Institute of Social Studies Trust

DIGITALISATION AT THE FRONTLINES

ASHAs' Experiences across Haryana, Rajasthan, Kerala, and Meghalaya

Dr. Sreerupa, Sneha Makkad and Dr. Aishwarya Rajeev

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Program Lead
Sreerupa

Research Team
Sneha Makkad, Aishwarya Rajeev, Tanisha Dasgupta, Barathi Nakeeran

Reviewed by
Renu Khanna, Founder and Director, Sahaj
Dr Jahnvi Andharia, Director and Research Lead, ISST

Designed & Illustrated by
Mandar Mehta & Riddhi Joshi

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LIST OF ACRONYMS

ABDM	-	Ayushman Bharat Digital Mission
ABHA	-	Ayushman Bharat Health Account
ANC	-	Ante Natal Check-ups
ANM	-	Auxiliary Nurse Midwives
ASHA	-	Accredited Social Health Activists
AWW	-	Anganwadi Workers
BIMARU	-	Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh
CHC	-	Community health center
CHIS	-	Community-Based Health Incentive Scheme
DBT	-	Direct benefit transfer
FGD	-	Focus group discussions
FHW	-	Frontline health worker
HBNC	-	Home Based New Born Care
HBYC	-	Home-Based Care for Young Child
HFR	-	Health Facility Registry
HPR	-	Healthcare Professional Registry
HMIS	-	Health Management Information
ICDS	-	Integrated Child Development Services
ICT	-	Information and communication technologies
IMR	-	Infant mortality rate
IVR	-	Interactive voice response
JSY	-	Janani Suraksha Yojana
K-DISC	-	Kerala Development and Innovation Strategic Council
KSUM	-	Kerala Startup Mission
LHV	-	Lady Health Visitor
M-CAT	-	Maternal Clinical Assessment Tool
MHIS	-	Megha Health Insurance Scheme
MMR	-	Maternal Mortality Ratio
MoHFW	-	Ministry of Health and Family Welfare
NCD	-	Non-Communicable Diseases
NDHE	-	National Digital Health Ecosystem
NDHM	-	National Digital Health Mission
NEN	-	North East Network
NFHS	-	National Family Health Survey
NHM	-	National Health Mission
NRHM	-	National Rural Health Mission
PCTS	-	Pregnancy, Child Tracking & Health Services Management System
PHC	-	Primary health center
PMJAY	-	Pradhan Mantri Jan Arogya Yojana
PNC	-	Post-natal check-ups
PMU	-	Project Management Unit
POSHAN	-	Prime Minister's Overarching Scheme for Holistic Nourishment
PPP	-	Public-private partnerships
RI	-	Routine immunization
RSY	-	Rashtriya Sadbhavana Yojana,
SCEP	-	State Health Enhancement Project
SDHM	-	State Digital Health Mission
U5MR	-	Under-five mortality rate
UHC	-	Universal Health Coverage
UHID	-	Unique Health Identification Card
VHND	-	Village Health Nutrition Day

EXECUTIVE SUMMARY

Technology is often heralded as the solution to inefficiencies in healthcare delivery. The Ayushman Bharat Digital Mission, a state-led initiative in India, is a key example, aiming to optimise and streamline public healthcare systems through digital platforms. This push for digitalisation, further accelerated by the pandemic, has expanded the responsibilities of Accredited Social Health Activists (ASHAs), who now manage numerous digital tasks alongside their existing community health roles. This shift raises critical questions: How has digitalisation transformed the work and lives of these frontline healthcare workers? What opportunities and challenges does it present?

To address these questions, the Institute of Social Studies Trust (ISST) conducted a research study to examine whether digital tools have empowered ASHAs by improving work processes or introduced new challenges, such as additional burdens and exclusions. The report, Digitalisation at the Frontlines, presents the findings from this study conducted across four diverse states—Haryana, Kerala, Meghalaya, and Rajasthan. Using multi-method qualitative research, the study explores ASHAs' perspectives on the digitalisation of their work and its broader implications. The study employed in-depth interviews with ASHAs, union leaders, and key informants in the public health system, as well as focus group discussions, workshops, activity mapping exercises, and a desk review of relevant literature.

The ISST study highlights the transformative potential of digital skilling for community health workers, envisioning ASHAs as a digitally empowered workforce. Digitalisation has improved their access to technology, enhanced communication, and increased efficiency and transparency in various aspects of their work. For instance, transitioning to digital systems for incentive claims and payments has simplified verification processes, enabling quicker approvals and timely disbursements. Tools like WhatsApp have streamlined communication and coordination among ASHAs, health officials, and the community, facilitating faster report sharing, real-time consultations, and emergency responses. Additionally, apps designed to support ASHAs in their community work have the potential to build trust by improving the dissemination of information about entitlements, such as cash transfers.

However, the transition to digital systems has not been seamless. Persistent challenges include inadequate digital infrastructure, limited access to quality digital devices, low digital literacy, insufficient training, and a lack of trust in digital tools. These challenges are further exacerbated by intersectional factors, as many frontline workers—particularly older ASHAs, those with lower levels of education, and those from Dalit and tribal communities—face additional barriers in moving from traditional paper-based processes to digital tools. Digital workloads have increased, particularly unpaid digital labour, and working hours have extended, with a growing shift from community care work to digital data collection and reporting. The findings also highlight a complex relationship between technology and gender norms. While many ASHAs initially felt empowered by owning and using a smartphone, they simultaneously had to navigate restrictive gendered expectations around technology use, especially in rural and patriarchal settings.

Based on research conducted in four states—Haryana, Rajasthan, Kerala, and Meghalaya—the study reveals that the impact of digitalisation on ASHAs' work is highly uneven. It argues that digitalisation must be understood as a spectrum influenced by factors such as existing digital infrastructure, access to skilling opportunities, and changes in the nature of community care work. In states like Rajasthan and Kerala, which have adopted worker-friendly and participatory approaches, digital tools have enabled ASHAs to perform their community healthcare duties more effectively. In contrast, in states like Haryana, where a top-down approach was implemented,

digital tools have led to increased workloads and heightened surveillance—challenges that ASHAs have, at times, successfully resisted.

Drawing from ASHAs' everyday experiences with digital work, the study makes key recommendations for targeted interventions to fully realise the potential of digitalisation for community workers.

- **Investments in robust digital infrastructure, ensuring reliable connectivity and access to good quality devices.**
- **Comprehensive digital skill development programmes tailored to the diverse needs of ASHAs (regarding language, education and age), especially for older and marginalised workers.**
- **Develop participatory approaches to co-designing digital tools by involving frontline workers.**
- **Design an integrated worker-friendly digital tool to streamline data collection and provide ASHAs with easy access to data to support their community care work, similar to the PCTS app in Rajasthan.**
- **Gender-sensitive approaches that address social norms limiting women's use and access to technology.**
- **Recognition of digital work and ensuring adequate pay for digital tasks and equitable access to digital tools through systemic changes.**

INTRODUCTION

Digital technologies are increasingly transforming traditionally non-digital sectors, including public health. In India, public health has become a focal point of the government's push to leverage Digital Public Infrastructure (DPI)[1] to address developmental challenges. Initiatives such as the National Digital Health Mission (NDHM), now renamed the Ayushman Bharat Digital Mission (ABDM), aim to integrate technology and harness data in healthcare delivery to enhance public health strategies and decision-making. The ABDM envisions creating a national digital health ecosystem that ensures accessible, inclusive, affordable, and secure healthcare for all (Sharma et al., 2023; National Health Authority, 2020). While framed as a transformative approach to public health governance, this emphasis on digitalisation aligns with a global neoliberal agenda that prioritises technological innovation and data-driven policy, often overlooking the human labour sustaining these systems.

In India, the push for digitalisation in public healthcare is deeply entwined with the gendered and precarious labour conditions of frontline health workers. Globally, women dominate the healthcare workforce but are disproportionately confined to undervalued, low-paying roles—a reflection of entrenched gender norms and hierarchies. This dynamic is starkly evident in the case of Accredited Social Health Activists (ASHAs), women frontline workers who form the backbone of India's public health system. ASHAs serve as critical intermediaries, bridging the gap between marginalised communities and the formal public healthcare system, particularly in rural and remote areas. Despite their indispensable contributions, these community care workers' labour is systematically devalued (Palriwala & Neetha, 2010). Labelled as "voluntary" workers, they are classified as piece-rate or honorarium-based workers, a categorisation that denies them recognition as public sector employees and instead aligns their labour with notions of sewa (service) (Das & Das, 2021; Sreerekha, 2017; Wichterich, 2021). Women, particularly those from marginalised caste and class backgrounds, are overrepresented in such precarious frontline care work, reflecting the intersectional inequalities embedded in India's labour force.

From a feminist perspective, it is essential to interrogate who shoulders the burden of digitalisation efforts and how these shifts affect women workers, particularly ASHAs, who are already embedded in informal and precarious labour conditions. With the increasing push for digitalisation, ASHAs are being tasked with new digital responsibilities raising the need to assess whether digitalisation has been an enabler for ASHAs, enhancing their agency or perpetuating their marginalisation and reinforcing prevailing power imbalances. While digitalisation is often celebrated for its potential to improve efficiency and reduce workloads, it also raises significant concerns about exacerbating inequalities and infringing on privacy (Bisht et al., 2021; Krishna, S. 2021). However, most research predominantly focuses on the effects of digitalisation on healthcare systems and governance, leaving a significant gap in understanding its consequences for workers themselves. Against this backdrop, ISST undertook a research study to examine how the digitalisation of work has impacted the work and experiences of ASHAs. The study spans four states—Haryana, Kerala, Meghalaya, and Rajasthan—and seeks to highlight ASHAs' perspectives on the process of digitalisation. This research sits at the intersection of two key thematic areas at ISST: Informality, Precarious Work, and Care and Gender and Digitalisation of Work. By focusing on ASHAs, this research

[1] *During India's G20 presidency, India successfully advocated for the Digital Public Infrastructure (DPI) which has been a key area of digital thrust for the Indian government. DPI is a digital infrastructure to deliver public services and a building block to create jobs and enhance connectivity. In 2015, Indian government launched Digital India Campaign to digitise all government services and public-government interactions. The Indian government has achieved success with several Digital Public Infrastructure (DPI) initiatives, such as Aadhaar for identity systems, Unified Payment Interface (UPI), and CoWin, which effectively managed the world's largest vaccination program.*

seeks to deepen our understanding of how digitalisation is reshaping the future of work for women in community care work.

Some studies have attempted to address the gap in understanding the digitalisation of work for ASHAs and Anganwadi workers through a worker-first approach (Azhagu Meena et al., 2022; Ismail et al., 2022); however, these efforts have largely been limited to state-specific analyses. Our study builds on this body of work by centring the gendered experiences of women workers in broader debates on digitalisation. The strength of our research lies in its unique position as one of the first to examine the digitalisation of frontline workers' labour using a bottom-up approach across multiple states in India, offering a comparative perspective on its diverse impacts. Notably, we have adopted an innovative and intersectional methodological approach to capture these complexities. Furthermore, the study seeks to expand the discourse on digitalisation beyond the gig economy by highlighting the platformisation of traditional sectors, where women predominantly occupy lower hierarchical positions. While significant attention has been directed toward the platform economy and its effects on gig workers, comparatively little focus has been placed on how digital technologies are reshaping so-called "traditional sectors." These transformations are quietly redefining the lives and working conditions of ordinary workers, particularly women, underscoring the urgent need for deeper exploration and critical engagement.

Overview of the ASHA program

In 2005, the government launched the National Rural Health Mission to improve healthcare access in rural areas, deploying currently 1,000,000 ASHAs[2] (Accredited Social Health Activists), each responsible for providing essential healthcare services to approximately 1,000 people. The initiative involved selecting one woman per village, addressing the stark disparity between the density of doctors, nurses, and midwives in urban areas and rural areas (Yadav et al., 2021). ASHAs' key responsibilities include raising awareness about health determinants such as nutrition, sanitation, and the use of health services; counselling women on birth preparedness, prenatal/postnatal care, immunisation, contraception, and preventing infections; assisting communities in accessing health services; collaborating on community health planning; recording vital events like pregnancies, births, and deaths; and delivering primary healthcare, especially maternal and child health services, through home visits, immunisation, and first-aid (Sharma et al., 2014; Ismail et al., 2022). They serve as the primary liaison between pregnant women and the government healthcare system, reaching underserved groups (Scott et al., 2022a; Yadav et al., 2021).

Through their contributions, ASHAs enhance the public health infrastructure and help achieve national health and population policy goals (Garg et al., 2013). The ASHA programme has been universally lauded for its contribution towards grassroots community healthcare, with the World Health Organisation (WHO) awarding one million ASHAs the prestigious Global Health Leaders Award in 2022 for their work during COVID-19 (Tiwari, 2022). Despite the strengthening of the ASHA programme and its global recognition, ASHAs face a host of challenges. Historically, primarily a female task force belonging to low caste and low-class households, ASHAs, have been designated as "self-motivated volunteers" rather than

[2] *ASHAs are required to have 8 to 10 years of formal education and complete a 23-day training program, though many in certain regions have limited literacy. They are typically women aged 25 to 45 who are married, widowed, or divorced, and are recruited from their own communities, often from deprived households*

[3] *Density of doctors, nurses and midwives is three times higher in urban areas than in rural areas.*

government employees who enjoy the associated benefits (Joshi & George, 2012; Gopalan et al., 2012). ASHAs are constructed as voluntary piece-rate workers, performing honorary tasks as an extension of housework and female caregiving (Wichterich, 2021; Sreerekha, 2017).

After prolonged demands for regularised payments from one of the nation's largest unionised workforces, the ASHAs, the Prime Minister announced "a landmark increase" in ASHAs' honorarium in 2018, which would see their routine incentives doubled (Krishnaprasad, 2021; Kaul, 2022). Subsequently, ASHAs would be eligible for free insurance cover under the Pradhan Mantri Jeevan Jyoti Bima Yojana and the Prime Minister Suraksha Bima Yojana (Kaul, 2022). The small honorarium or incentives they earn, averaging 2,000–8000 per month, become a crucial income source for their families. Predominantly from marginalised backgrounds, ASHAs often accept these exploitative wages to provide their families with much-needed financial support, while the state relies on women to shoulder the burden of unpaid community care work (Kaul, 2022).

Government's Rationale for Digitalisation of ASHAs' Work

The government's digital integration initiatives reflect its intention to move towards "platformised governance" with technology support from corporate actors (Ismail et al., 2022). "Platformisation" refers to "the penetration of infrastructures, economic processes and governmental frameworks of digital platforms in different economic sectors and spheres of life, as well as the reorganisation of cultural practices and imaginations around these platforms" (Poell et al., 2019). Simply put, it refers to the proliferation of online platforms in different spheres of life, like governance and development. This rapid digitisation is often justified by the idea that technology is "above corruption" (Azhagu Meena et al., 2022).

However, Pal et al. (2018) argue that any digitisation effort should be inspired by the principles of technology-driven modernity rather than merely aiming for productivity gains (Ismail et al., 2022). They find technology-driven modernity to be rooted in postcolonial techno-rationality, which assumes that technological progress is synonymous with development.

The Indian government has committed itself to integrate healthcare infrastructure with digital technology; the NDHM/ABDM is one of the most notable examples of platformised governance that attempts to simplify the processes associated with ASHA work with the help of digital platforms. More recently, the government has expressed its intent to digitise healthcare practices and services in the Union Budget 2022-23 by creating the National Digital Health Ecosystem (NDHE). In her Budget speech, the finance minister outlined plans to build an open platform integrating health providers, facilities and individuals with unique health identities, supported by a consent framework (Kaul, 2022). The need to leverage growing digital technologies to make health facilities more accessible to people living in different parts of the country was felt more severely after the pandemic. The government emphasised tapping into the private sector's potential to enhance the existing NDHE through public-private partnerships (PPP) (Goel, 2022).

Opportunities for Digitalisation of community care work

Scott et al. (2022a) found that both ASHAs and ANMs viewed digitisation as a positive step towards the recognition of their work despite the challenges that they faced. Digital methods have helped eradicate many of the aggregation, storage, transmission and analysis errors associated with paper-based data collection (Medhi et al., 2012). The use of digital records also helped ASHAs access their performance-based incentives more easily. Joshi et al's

(2020) study of Asha Soft, an online payment and monitoring system for ASHAs in Rajasthan, revealed an increase in job satisfaction among its beneficiaries due to the error-free, unbiased system of payment and performance monitoring as opposed to traditional paper-based multi-level processes. According to their study, this new form of payment increased ASHAs' motivation levels and resulted in improved health indicators in the state. Further, it generated data on various parameters, which enabled policymakers to address the necessary concerns.

Building on these advancements, digital technologies are increasingly recognised for their transformative potential in addressing broader socio-economic challenges. Information and communication technologies (ICTs) can play a role in improving the health, education and economic status of the poorest sections of society (Yadav et al., 2019; Kumar et al., 2015). Ramachandran et al. (2010) explore the persuasive powers of ICTs in bringing about a positive change in maternal health in rural India by introducing short persuasive videos for pregnant women and testimonial videos for ASHAs. These videos proved to be more informative and motivating for ASHAs than monthly training updates, especially for ASHAs with limited literacy levels (Ramachandran et al., 2010; Yadav et al., 2019). Similarly, Bashingwa et al. (2021) highlight the role of mobile phones in providing in-service training to FHWs through apps like Mobile Academy that deliver quality, inexpensive and standardised instructions across the nation at any time and location of the user's choice. Mobile Academy is a type of mLearning programme for ASHAs that employ interactive voice response (IVR) to refresh their original in-person training (Yadav et al., 2019). It had a high completion rate of an estimated 81% of all ASHAs who initiated the programme.

Challenges in the Digitalisation of community care work

Efforts for digitisation have also been criticised for their excessive focus on the collection of data rather than its use. Much of the emphasis has been on streamlining information up the health system hierarchy, instead of improving health workers' working conditions (Scott et al., 2022a). Extensive data reporting also enabled increased worker surveillance. An app that faced significant resistance was MDM Shield 360 in Haryana which would allow supervisors to restrict their workers' access to any mobile app like YouTube or Facebook if they were found using it too much (Ismail et al., 2022). However, the ASHAs' Union of Haryana, through its efforts, was successful in having the app recalled owing to privacy concerns. Similarly, Scott et al's (2022a) study of the Kilkari programme in Madhya Pradesh saw FHWs express their concerns over the government using the tool to keep track of their activities through follow-up calls to beneficiaries. Azhagu Meena et al's (2022) study of AWWs highlighted how such unprecedented forms of surveillance led to an increase in their financial, cognitive, and emotional burdens, including worsening personal and professional relationships.

ASHAs' increased vulnerability during COVID-19 also points to the fact that technological investment has done nothing to counter the exploitation of women health workers (Ismail et al., 2022). ASHAs were overwhelmed with work as in-person meetings were replaced by WhatsApp and Zoom calls, while they were also expected to be digitally available to their beneficiaries throughout the day. Further, in the absence of adequate government training on using digital technologies and dealing with sensitive information, ASHAs relied on their children, ASHA facilitators or their peers to help them out with their online duties (Ismail et al., 2022). According to Ismail et al. (2022), the response to digitisation varied with levels of literacy, with those who did not have enough literacy to comprehend the instructions given to them in informal sessions reacting negatively.

RESEARCH METHODOLOGY

Purpose and scope of the Study

The purpose of this study is to examine the process of digitalisation in the public health sector through the narratives and lived experiences of ASHAs, as their roles and responsibilities continue to evolve. By centring the everyday experiences of frontline women workers, the study offers a unique, bottom-up perspective on the digitalisation debate in India.

Recognizing the disparities and varied structures of public health systems across India, the study focuses on four states—one from each broad region—to capture the diversity of ASHAs' experiences. This approach seeks to uncover whether the digitalisation strategies adopted by different states are responsive to the diverse needs of women community care workers, many of whom belong to marginalised communities. The study also aims to explore pathways for fostering more inclusive and gender-equitable outcomes in the digitalisation process.

Grounded in a feminist intersectional framework (Crenshaw, 1989), the study examines how intersecting factors such as gender, age, region, caste, and class shape ASHAs' experiences with digitalisation. Adopting a gender-transformative lens, it investigates whether digitalisation alleviates or exacerbates existing gendered and intersectional inequities within the workforce. Furthermore, the study critically explores whether digitalisation acts as an enabler for ASHAs, or if it reinforces their marginalisation.

Research Methodology

TThe research was designed as a scoping study to understand the impact of the digitalisation of work on ASHAs, focusing on their lived experiences as they navigate a changing world of work. The study aimed to explore the nature of digitalisation in ASHAs' workflows, assess its impact through a feminist intersectional lens, and analyse how ASHAs adapt to and collectively respond to these shifts. The fieldwork mapped the digitalisation of ASHAs' work and its influence in three key areas. First, it examined the extent and nature of digitalisation, including the apps used and available digital infrastructure. Second, it documented ASHAs' experiences with technology, focusing on opportunities, and challenges. Third, it captured ASHAs' responses to technological changes, including shifts in their work and their collective strategies for addressing these changes.
The first phase of the study was conducted in Sonipat district, Haryana, chosen due to its high level of digitalisation in ASHAs' workflows. The district has also witnessed powerful collective action from the ASHAs against the digitalisation of their work and its impact on their privacy. This phase involved 15 days of intensive fieldwork between December 2022 and January 2023.

Phase I: Scoping study in Haryana

This study took recourse to multi-method qualitative fieldwork (Creswell, 2015). Primary data was collected through in-depth interviews with ASHAs, interviews were also conducted with other stakeholders, like union leaders and key informants in the public healthcare system, to capture a broader perspective and highlight diverse insights. Focus group discussions (FGDs) with ASHAs were conducted, which also included activity mapping exercises to document their tasks and the frequency of digital tool usage. Desk analysis of relevant literature complemented the fieldwork. The fieldwork and analysis concluded with a dissemination workshop for ASHAs to share findings and deepen their collective understanding of the digitalisation of their work. The workshop explored how technology could better address workers' needs and make their tasks easier. To engage participants, it began with an art activity that encouraged them to reflect on their relationship with smartphones and the emotions tied to their use.

An analysis of the rich data collected from the

scoping study in Haryana revealed that there is such diversity in the lived realities of ASHAs and their experience of the processes of digitalisation of their work based on their social and economic location. Further, our in-depth interviews with key informants revealed that even within a small state of Haryana both the process of digitalisation and how it was experienced was highly uneven and was influenced by multiple social, economic and cultural factors. It was, therefore, imperative to underscore the diversity and specificities of these processes and experiences if we were to begin to make sense of the process of digitalisation of ASHAs' work in a country like India and explore possibilities of how technology can be introduced to make their work easier. This ethos drove the next phase of research, which expanded the research to cover three more states Kerala, Rajasthan, and Meghalaya to represent the south, west and eastern regions of India.

Phase 2: Expanding the Study

Based on the insights from Haryana, the second phase expanded to include three additional states—Kerala (Pathanamthitta district), Rajasthan (Jodhpur district), and Meghalaya (Shillong and Khasi Hills districts) — representing southern, western, and northeastern regions, respectively. These states were selected through a literature review and mapping exercise to ensure regional diversity, capture differences in public health systems and unionisation levels, and document varying stages of digitalisation. For instance, Rajasthan is a leader in digital integration, while Meghalaya represents an early-stage adopter.

Given resource constraints, expanding the study necessitated the adoption of an innovative 'dipstick' research methodology. Instead of replicating the comprehensive fieldwork plan across all three states, which would have been both time- and resource-intensive, the fieldwork was condensed into focused, intensive periods of 6 to 7 days in each of the selected districts (between January 2024 and March 2024). Workshops with ASHAs in each state were a central component of this phase, designed to serve two key purposes. First, they fostered open, free-flowing discussions about ASHAs' experiences with digital tools such as smartphones and apps, as well as the opportunities and challenges these tools present, initiated through an art activity. Second, they shared insights from the scoping study on the digitalisation of ASHAs' work in Haryana, enabling participants to compare experiences across different contexts. This dual approach was instrumental in identifying patterns, continuities, and contradictions while deepening engagement with ASHAs' lived realities and their understanding of the digitalisation process in diverse settings. Originally conceived as dissemination workshops, these sessions were integrated into the fieldwork in other states to both generate and validate data. By cross-referencing findings from smaller fieldwork samples with responses from larger groups of 15 to 20 workers, the workshops provided a broader and more nuanced perspective.

This study demonstrates that an agile and intensive 'dipstick' research methodology, grounded in a rigorous scoping study, can serve as an effective and innovative approach for conducting broader research in resource-constrained settings. It allowed the study to surface focus areas for deeper exploration and more rigorous analysis while highlighting the diverse contexts in which digitalisation occurs. Through this agile approach, we aim to spotlight the diverse contexts within which the digitalisation of work is unfolding and highlight the pressing need to support frontline healthcare workers throughout this transition.

Data collection and analysis were conducted with a commitment to being both useful and accountable to workers and their collectives. A feminist intersectional lens informed all phases of the research, as it not only unveils overlapping and compounding deprivations (Crenshaw, 1989) but also helps to understand how crises distinctly and disproportionately impact intersecting identities (UN Women, 2020). ASHAs were selected using an intersectional approach, taking into account

multiple factors such as caste representation, urban and rural locations, varying levels of network connectivity, and differences in ease or difficulty with performing digital tasks.

Identifying ASHAs for the study posed significant challenges due to their unique position within the public healthcare system. Although classified as volunteers, ASHAs are held accountable to government officials, placing them in a liminal space between formal and informal employment. To navigate these challenges, we employed a combination of strategies to identify ASHAs for the study across the four states. These strategies included:

- ***Assistance from senior leaders in the ASHA workers' union***
- ***Engagement with senior and mid-level health officials***
- ***Collabouration with local community-based organisations, such as GRAVIS in Jodhpur and***

Table 1: Summary of Research Activities Conducted Across Four States

	Haryana	Kerala	Rajasthan	Meghalaya
In-depth interview with workers	15	5	5	5
Union leader	1	1	1	1
Government official	5	2	2	2
FGDs with 7 to 10 ASHAs at least one in rural and urban area with activity mapping exercises	3	2	2	2
Workshop with 15 to 20 ASHAs	1	1	1	1

Table 2: Sample Distribution Across Caste, Region, and Educational and Digital Competencies

State	Total Number of ASHAs interviewed	Caste		Region		Educational and digital competencies	
		Upper caste	OBC/ lower caste/ tribal	Urban	Rural	Ease in Digital Work	Difficulty in Digital Work
Haryana	15	6	9	4	11	7	8
Rajasthan, Kerala and Meghalaya	5	1	4	1	4	2	3

The interviews, focus group discussions (FGDs), and workshops were conducted in multiple languages, including Hindi, Malayalam, and English, with translations in Rajasthani and Khasi provided where necessary. All research ethics were followed throughout data collection; respondents were informed about the goal of the study and the researchers. Before recording the interviews and for the respondent's involvement in the study, verbal consent was obtained. The names of all ASHAs and respondents have been anonymised to protect their identity. The principles of reflexive research were followed throughout the research, recognising the social locations and positionality of the researchers, and being cognisant of the power relations that operate within the process of research.

Background and Overview of the States

To set the context for digitalisation and community care work, we discuss the nature of healthcare and digitalisation in each of the four states. We also examine select indicators related to maternal and child health using NFHS data (Round 3: 2005-06, Round 4: 2015-16, Round 5: 2019-21), since these are key focus areas for ASHAs. While data for maternal mortality is not collected under NFHS, we have included some indicators like access to institutional delivery, postnatal visits, births assisted by health personnel, along with total fertility rates, infant and under-five mortality rates as well as immunisations. While NFHS-3 coincides with the introduction of the ASHA program in the National Rural Health Mission (NRHM) in 2005, subsequently digitalisation as well as the expansion of the network of ASHAs has taken place in different phases and at a different pace across the states.

Haryana

Despite being one of the richer states in the country, Haryana has yet to achieve commensurate success in healthcare outcomes. The state's performance in the NITI Aayog Health Index demonstrates moderate progress, albeit with substantial room for improvement. In the 2019-2020 reference year, the state ranked 12th among larger states, showing no improvement or decline from the previous round (NITI Aayog, n.d.). However, its mid-tier ranking among larger states underscores the necessity for continued, comprehensive efforts to elevate its healthcare system. Literature has shown that there is high out-of-pocket expenditure on health in the state, inequalities in resource distribution and gaps in the provision of infrastructure, leading to health inequities (Sharma et al., 2017; Gupta et al., 2016). However, the state government's initiatives to bolster health infrastructure, including the establishment of medical colleges and expansion of medical education capacity are steps in the right direction.

The introduction of the ASHA program under the National Rural Health Mission (NRHM) in 2005 has been associated with a reduction in both Maternal Mortality Ratio (MMR) and Infant Mortality Rate (IMR) in the state (Gupta et al., 2016). The state has shown improvement across indicators, with a significant rise from NFHS-3 (2005-06) to NFHS-4 (2015-16) in institutional births (35.7 % to 80.4%), births assisted by medical personnel 48.9% to 84.6%) and access to postnatal care (39.3% to 67.3%). Subsequently, Haryana has made significant strides in digitalizing healthcare services across the state. Studies have shown how apps like Kilkari (the largest maternal mobile messaging initiative) and Mobile Academy (which is a phone-based refresher course for frontline health workers) have improved access to information for both beneficiaries and ASHAs, even though there may be limitations in their functioning (Scott et al., 2022 (a); Bashingwa, 2021). Krishnan et al. (2010) also found that digitalisation through computerised Health Management Information (HMIS) saved time for ASHAs and improved service delivery, monitoring and implementation.

Concomitantly, Haryana has made significant strides in digitalizing healthcare services across the state. The state introduced the e-Upchar app for digital appointment booking at hospitals, helping to reduce waiting times and

Table 3: Key Maternal and Child Health Indicators in Haryana: NFHS-3 to NFHS-5

S.No.	Indicator	NFHS -3 (2005-06)	NFHS -4 (2015-16)	NFHS- 5 (2019-21)
1.	Total fertility rate (children per woman)	2.7	2.1	1.9
2.	Births assisted by a doctor/nurse/LHV/ ANM/other health personnel (%)	48.9	84.6	94.4
3.	Institutional births (%)	35.7	80.4	94.9
4.	Mothers who received postnatal care from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of delivery (%)	39.3	67.3	91.3
5.	Children 12-23 months fully immunised (BCG, measles, and 3 doses each of polio/DPT) (%)	65.3	66.2	76.9
6.	Infant Mortality Rate (IMR)	42	32.8	33.3
7.	Under-five mortality rate (U5MR)	52	41.1	38.7

Source: NFHS reports- rounds 3, 4 and 5

overcrowding (NHSRC, n,d,). The state had also established a telemedicine network connecting PHCs in remote rural areas to district hospitals and tertiary care centres even before the pandemic. Furthermore, Haryana implemented an SMS-based IT-enabled Integrated Disease Surveillance System (IDSP) for rapid reporting of disease occurrences (Health Department, Haryana, 2023).

Rajasthan

Often categorised as one of the 'BIMARU' states, Rajasthan has historically lagged in health outcomes and processes, showing limited improvement on the health index over the years (NITI Aayog, n.d.). The state trails both comparable states and the national average in key health indicators. Research highlights significant gaps in Rajasthan's healthcare sector, particularly in accessibility and quality of health services (Prasad et al., 2022). Banerjee, Deaton, and Duflo (2004), in their study of rural Rajasthan, noted poor quality public services alongside the proliferation of unqualified private practitioners who provide the bulk of healthcare. Contributing factors include a shortage of specialist doctors, pharmacists, trained technical personnel, and a well-developed digital infrastructure (Sakthivel et al., 2014; Joshi et al., 2021). Alarmingly, a significant portion of the population forgoes treatment due to a lack of accessible and affordable healthcare options (Srivastava et al., 2023).

In recent years, Rajasthan has taken steps to address these challenges. It became the first state in India to enact the Right to Health Act, ensuring mandatory, free-of-cost emergency treatment for all residents (The Hindu Bureau, 2023). Since 2014, the state has made notable strides in digitalizing its public health infrastructure. For instance, Rajasthan was the first state to introduce ASHA Soft, an online payment and monitoring system for ASHAs. Additionally, numerous e-health initiatives have been implemented under the National Health Mission (NHM), including OJAS Online JSY and Shubhlaxmi payment system, E-Sushrut (HMIS) Arogya Online health management and information system, PCTS (HMIS) pregnancy, child tracking and health

services management system software, telemedicine service project, Mukhymantri Nishulk Jaanch Yojana, computerised human resources information system, eligible couple tracking system, integrated ambulance service payment monitoring system, Bhamashah Swasth Yojana (Joshi et al., 2021).). Studies have shown that the state's e-health initiatives are being recognised as effective and ASHA Soft is even being adapted in other states (Joshi et. al., 2020).

steadily through NFHS-5 (2019–21). Although causality cannot be definitively established, the dramatic improvement from NFHS-3 to NFHS-4 coincides with the implementation of the ASHA program in the state. Furthermore, the steady progress across indicators leading up to NFHS-5 aligns with intensified digitalisation efforts, particularly the introduction of the Pregnancy, Child Tracking & Health Services Management System (PCTS) portal. Studies have documented the PCTS portal's significant

Table 4: Key Maternal and Child Health Indicators in Rajasthan: NFHS-3 to NFHS-5

S.No.	Indicator	NFHS -3 (2005-06)	NFHS -4 (2015-16)	NFHS- 5 (2019-21)
1.	Total fertility rate (children per woman)	3.2	2.4	2.0
2.	Births assisted by a doctor/nurse/LHV/ ANM/other health personnel (%)	41.0	86.6	95.6
3.	Institutional births (%)	29.6	84.0	94.9
4.	Mothers who received postnatal care from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of delivery (%)	26.9	63.7	85.3
5.	Children 12-23 months fully immunised (BCG, measles, and 3 doses each of polio/DPT) (%)	26.5	54.8	80.4
6.	Infant Mortality Rate (IMR)	65	41.3	30.3
7.	Under-five mortality rate (U5MR)	85	50.7	37.6

Source: NFHS reports- rounds 3, 4 and 5

A review of health indicators reveals a correlation between the introduction of the ASHA program under the National Rural Health Mission (NRHM) in 2005 and notable improvements in Rajasthan's health outcomes. Institutional births assisted by health personnel increased significantly from 29.6% in NFHS-3 (2005–06) to 84.0% in NFHS-4 (2015–16). During the same period, immunisation rates also improved, while key indicators such as the Infant Mortality Rate (IMR) dropped from 65 to 41.3, and the Under-Five Mortality Rate (U5MR) decreased from 85 to 50.7. These improvements continued

contribution to enhancing ASHAs' community care work and outreach (Scott et al., 2022a; Khandelwal, 2019). Additionally, programs like Mobile Academy, an audio-based training initiative for ASHAs, have been well-received, further strengthening their digital skills and capacity (Scott et al., 2022b).

Kerala

The Kerala model of health has been long a subject of academic and policy interest. One of the key features of Kerala's approach to health is its accessibility, bolstered by outreach and increased participation of local-level

governments indicating a decentralised mode of functioning (Krishnan et al. 2023). The state has been leading in healthcare indicators at the national level consistently (Paliwal, 2019). A high level of education and training, especially for women, has led to a highly skilled medical workforce and increased awareness of the latest and advanced healthcare practices and treatments (Choolayil and Puthran, 2020). This success has in part been attributed to the robust decentralisation that the state has undergone over the years and the Kerala People's Campaign for Decentralised Planning (Elamon, Franke and Ekbal, 2004). Now there is a push to enhance service quality by harnessing modern technology and focusing on developing technology-driven healthcare solutions, which also include the use of AI, machine learning (ML) and blockchain (Ramachandran, 2022).

Overall, in response to the increasing demand for IT initiatives within the healthcare sector, the eHealth Kerala Project Management Unit (PMU) transformed in 2021, evolving into the State Digital Health Mission (SDHM), which now assumes a broader role in driving digital advancements in healthcare. Drawing from the concept of 'One citizen, one Electronic Health Record' the e-Health Kerala project aims to support nearly 50,000 healthcare service personnel, by creating a centralised, state-owned Integrated Healthcare Cloud which holds complete healthcare data of all the citizens in the state (Kerala State Planning Board, 2022). E-health is now being integrated into the Ayushman Bharat Digital Mission (ABDM).

As India's first digital state, it is found that as compared to other states, Kerala has the highest percentage of households with access to computers (24%) and internet (51%), 95% mobile phone penetration, 62% smartphone penetration and 75% digital literacy, along with one of the lowest gender-based and rural-urban digital divide in the country. In terms of mobile phone ownership, access, usage, and perception in Kerala, perceptions of technology, usage of digital resources and social media use are not significantly gendered (Thakkar et al, 2023). Kerala is also uniquely placed to leverage such forms of technology for healthcare since it is also implementing digital skilling programmes and initiatives, coupled

Table 5: Key Maternal and Child Health Indicators in Kerala: NFHS-3 to NFHS-5

S.No.	Indicator	NFHS -3 (2005-06)	NFHS -4 (2015-16)	NFHS- 5 (2019-21)
1.	Total fertility rate (children per woman)	1.9	1.6	1.8
2.	Births assisted by a doctor/nurse/LHV/ ANM/other health personnel (%)	99.4	99.9	100.0
3.	Institutional births (%)	99.3	99.8	99.8
4.	Mothers who received postnatal care from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of delivery (%)	84.6	88.7	93.3
5.	Children 12-23 months fully immunised (BCG, measles, and 3 doses each of polio/DPT) (%)	75.3	82.1	77.8
6.	Infant Mortality Rate (IMR)	15	5.6	4.4
7.	Under-five mortality rate (U5MR)	16	7.1	5.2

Source: NFHS reports- rounds 3, 4 and 5

with its experience of relying on digital technologies for emergency preparedness during several crises like Covid-19, Nipah outbreak, and the floods, among others (Ummer, 2021). Training and services imparted by the District Institutes of Education and Training, the Digital University of Kerala, and Akshaya project[4] and many other initiatives including the Kerala Development and Innovation Strategic Council (K-DISC) and Kerala Startup Mission (KSUM) are being undertaken to strengthen the digital network and help citizens gain digital skills.

In contrast to the other states, Kerala's indicators were already at high levels and rising since NFHS 3 (2005-06), with lower fertility rates and very high levels of access to institutional and assisted births (99.3% and 99.4% respectively). The sharp decline in IMR (15 to 5.6) and U5MR (16 to 7.1) is observed from NFHS-3 (2005-06) to NFHS-4 (2015-16).

Meghalaya

As a mountainous state with the largest number of remote inhabitants in the country, Meghalaya faces significant geographical challenges in delivering healthcare to its citizens. Factors such as difficult terrain, lack of connectivity, and underlying structural issues in the health system contribute to the state's low vaccination coverage, poor nutritional status, underperformance in key healthcare indicators, and limitations in maternal and child healthcare (Momin and Datta, 2021). Despite these challenges, Meghalaya has made significant progress in improving health outcomes. According to NITI Aayog's Health Index, the state ranks second among the eight smaller states in terms of incremental progress, placing it in the "most improved" category (NITI Aayog, n.d.). This improvement is supported by data from the National Family Health Surveys (NFHS), which highlight considerable progress between NFHS-3 (2005-06) and NFHS-4 (2015-16). Institutional births increased from

Table 6: Key Maternal and Child Health Indicators in Meghalaya: NFHS-3 to NFHS-5

S.No.	Indicator	NFHS -3 (2005-06)	NFHS -4 (2015-16)	NFHS- 5 (2019-21)
1.	Total fertility rate (children per woman)	3.8	3.0	2.9
2.	Births assisted by a doctor/nurse/LHV/ ANM/other health personnel (%)	31.1	53.8	64.0
3.	Institutional births (%)	29.0	51.4	58.1
4.	Mothers who received postnatal care from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of delivery (%)	27.3	47.5	43.9
5.	Children 12-23 months fully immunised (BCG, measles, and 3 doses each of polio/DPT) (%)	32.9	61.4	63.8
6.	Infant Mortality Rate (IMR)	45	29.9	32.3
7.	Under-five mortality rate (U5MR)	70	39.6	40.0

Source: NFHS reports- rounds 3, 4 and 5

[4] *Akshaya, the telecentre-based e-Governance project in Kerala, renowned for its ICTD efforts aimed at narrowing the digital gap by tackling access, skills, and content issues simultaneously. Initiated in November 2002, Akshaya was started as a trial project comprising 630 kiosks situated in the Malappuram district of Kerala (Mukerji, 2013).*

29% to 51.4%, while infant mortality rate (IMR) and under-five mortality rate (U5MR) declined from 45% to 39.9% and 70% to 39.6%, respectively. However, NFHS-5 (2019-21) revealed some reversals in these trends, particularly in IMR, U5MR, and the proportion of mothers receiving postnatal care from health personnel which needs further investigation. These setbacks underline the need for sustained efforts to address both structural and geographical barriers to healthcare in the state.

The Government of Meghalaya was the first state in India to commit to Universal Health Coverage (UHC) through the expansion of the Megha Health Insurance Scheme (MHIS), its local health insurance initiative (Dutta et al., 2022). Building on this foundation, the state emphasised its commitment to UHC in its State Health Policy 2021, introducing the State Health Enhancement Project (SCEP). This project represents a robust model of comprehensive healthcare and well-being, focusing on the preventive, curative, and enabling aspects of treatment (Kumar and Bhargava, 2023). Meghalaya also became the first state to provide Outpatient Department (OPD) coverage of 30,000, in addition to the coverage provided under Pradhan Mantri Jan Arogya Yojana (PMJAY) (Kumar and Bhargava, 2023). However, despite these advancements, Meghalaya's healthcare system faces significant challenges due to its geographical location, rugged terrain, and specific infrastructure limitations. Issues such as poor connectivity (transport and communication), unreliable water supply, and inconsistent electricity provision particularly affect remote and isolated villages, further complicating healthcare access and delivery (World Bank, 2021).

In recent years, the state has been undergoing a digital transformation in its healthcare system. One notable initiative is the Smart Village Movement Project, launched in collaboration with the University of California, Berkeley. This project leverages digital technology and artificial intelligence (AI) to revolutionise public health service delivery by analysing trends and designing data-driven interventions (Smart Village Movement, n.d.). Additionally, Meghalaya introduced the MOTHER App, which streamlines data collection for pregnant women. Auxiliary Nurse Midwives (ANMs) input real-time data from the field, enabling doctors and health officials at district and state levels to monitor the progress of expectant mothers through a centralised dashboard. The app facilitates timely emergency interventions when needed, ensuring more effective maternal healthcare delivery. The state is also rolling out the Ayushman Bharat Digital Mission (ABDM) under its local implementation framework. Training programs have been conducted to familiarise healthcare workers with digital health concepts and to enable the creation of Digital Health IDs (ABHA) for citizens, establish a Health Facility Registry (HFR), and update the Healthcare Professional Registry (HPR) (GOI - Meghalaya, 2022).

Despite the state's efforts to promote digital health initiatives, the success of these measures is shaped by the broader landscape of digital access and usage. In Meghalaya, access to technology is marked by overall low usage, with only 34.7% of women and 41.2% of men having ever used the internet (Garg, 2021; Bhuyan, 2020). While gender disparities are not pronounced, these figures reflect the limited digital penetration and inadequate supporting infrastructure in the state. It is also important to note that these statistics represent basic awareness of the internet rather than consistent or effective usage (Garg, 2021). The gendered norms surrounding technology use in Meghalaya do not appear as rigid as in other states. For example, when ASHAs in Meghalaya heard about the mobility restrictions and strict gendered rules that ASHAs in Haryana faced regarding the use of technology, they expressed empathy, stating, *"We feel bad, you know? It affects us as women."* This contrast underscores how the primary barriers for women in Meghalaya arise more from limited overall connectivity than from familial or societal restrictions. That said, while ASHAs in Meghalaya reported not facing overt policing or restrictions on technology use from their families, they did experience subtle and less explicit gendered differences in usage patterns.

HARYANA

A Top-Down Approach to Digital Transformation

Extensive Digitalisation of ASHAs' work

The digitalisation of ASHAs' work in Haryana began well before the government distributed smartphones and the onset of the COVID-19 pandemic. Since 2014, ASHAs have been increasingly required to document their work through digital data collection and images. This gradual shift brought mounting challenges for ASHAs, leading to strikes from 2019 to 2020. During these strikes, ASHAs demanded smartphones with SIM cards and internet connectivity from the state government to effectively carry out their digital responsibilities. The integration of digital technology in Haryana accelerated significantly in 2020, with the availability of smartphones becoming a pivotal factor by 2021. This marked a transformative moment for ASHAs, particularly for those from Dalit and OBC communities, many of whom became first-time smartphone users.

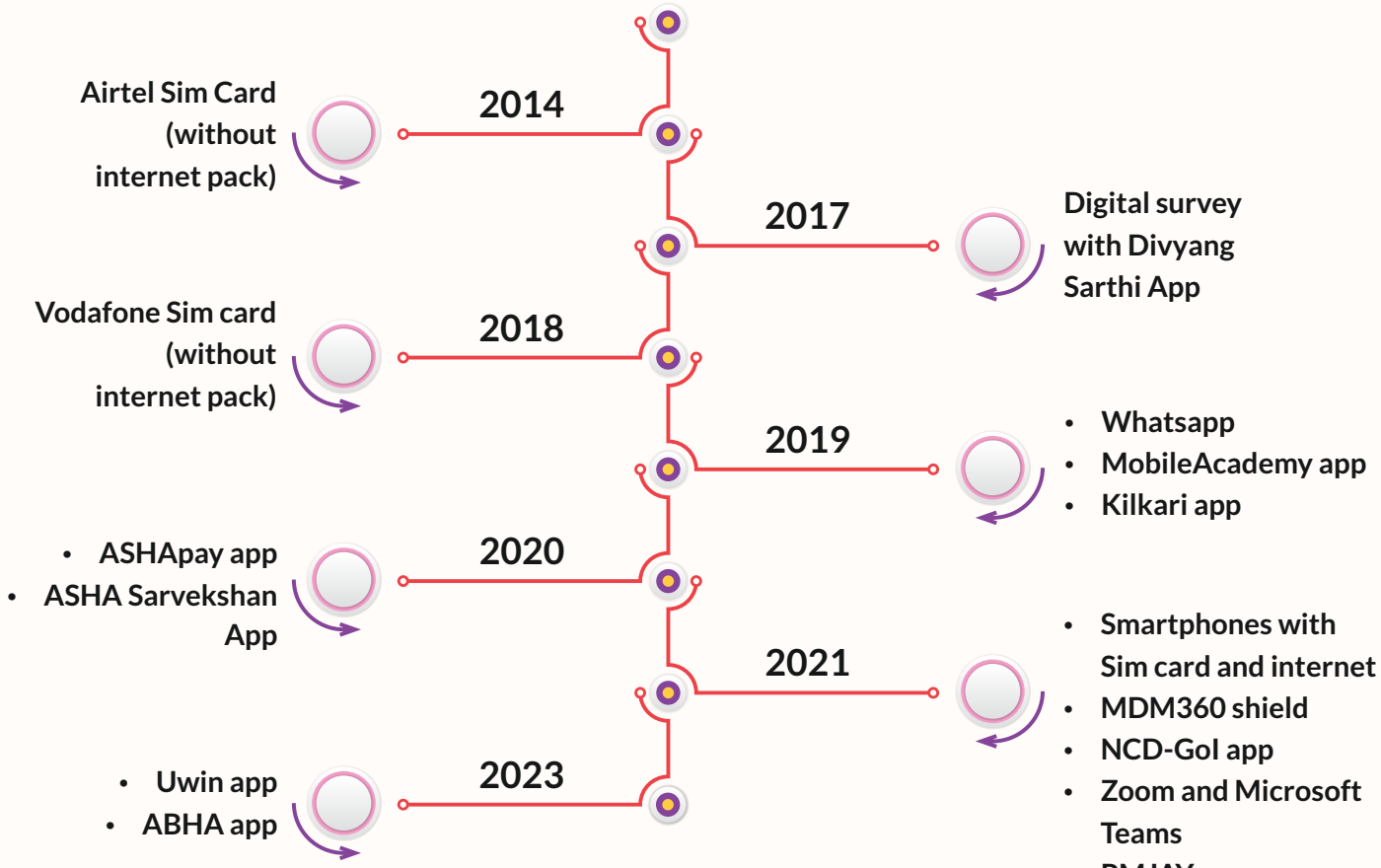
In 2020, the National Health Mission (NHM), in partnership with the state government, introduced an Android application and web portal called ASHApay for digital payment and monitoring of ASHAs (ANI, 2020). The ASHApay app is designed to streamline and digitise paper-based payment processes, reduce payment processing times, monitor the status of incentive claims, and enhance payment transparency. It is primarily used to record completed work, enabling ASHAs to claim their monthly incentives. Our research found that this app has been extensively integrated into ASHAs' workflows, with every ASHA we interviewed using the app to claim their monthly incentives.

Additionally, our research reveals that WhatsApp is widely used for communication and coordination among ASHAs and senior health professionals, including Medical Officers, ANMs, Block and District ASHA Coordinators, and even Union leaders. Since 2019, ASHAs have increasingly relied on WhatsApp, often referring to it simply as

"group." ASHAs are typically members of multiple WhatsApp groups, which function as key communication channels within the health system. These groups are primarily used for reporting ASHAs' work, sharing information about duties, and coordinating upcoming meetings. WhatsApp groups can exist at various levels—sub-centre, PHC, block, district, and state—though not all ASHAs are included in every group. During the COVID-19 pandemic, ASHAs relied heavily on WhatsApp for their daily tasks, and its usage has continued to grow since then (Ismail et al., 2022). WhatsApp has now become an indispensable tool for communication and coordination within the ASHA's workflow.

ASHAs have also been using various digital survey tools as part of their work, including but not limited to the NCD-GOI ANM app, ASHA Sarvekshan app, and Divyang Sarthi app. The NCD-GOI ANM app, launched in 2021, is designed to help health workers conduct community-level population enumeration, assess risk factors, and screen individuals for

Figure 1: Timeline of digital interventions in Haryana



five Non-Communicable Diseases (NCDs): Hypertension, Diabetes, Oral Cancer, Breast Cancer, and Cervical Cancer. Based on the screening results, individuals are referred for further treatment and disease management. The app also enables health workers to follow up with individuals to ensure treatment adherence and to review their performance and their sub-centres against specific targets. However, during our research, we observed that a significant number of ASHAs had not downloaded the app. Many cited increased workload and inadequate training as primary barriers to its use.

Similarly, the Divyang Sarthi App, introduced in 2017 by the Ministry of Social Justice and Empowerment, was designed to collect comprehensive information related to Persons with Disabilities (Divyangjan). However, our study found that only a small number of ASHAs had experience using the app to conduct

disability surveys. ASHAs reported having limited knowledge of the app's features and did not consider it a core part of their responsibilities. Another app, the ASHA Sarvekshan App, was developed in-house by NHM Haryana and launched in 2020. Initially introduced for the Door-to-Door COVID-19 Survey, the app was later expanded to support other routine data collection activities conducted by ASHAs as part of community healthcare services.

Another digital tool utilised by ASHAs is Kilkari, an automated audio call service designed for pregnant women. Kilkari is the world's largest maternal mobile messaging initiative, delivering up to 72 weekly pre-recorded calls to mobile numbers registered in government Health Information Systems (HIS) registries. These calls provide critical information on maternal, child, and reproductive health (Scott et al., 2022a). Introduced by the Ministry of Health and Family Welfare (MoHFW), ASHAs play a pivotal role in this program by registering mothers' phone numbers in the system and informing them about the service.

Similarly, Mobile Academy is a course designed for ASHAs to enhance their knowledge of maternal and child healthcare. This audio-based application, introduced in 2016, can be accessed through a simple toll-free phone call. It provides comprehensive content covering the period from pregnancy to when the child reaches two years of age, spanning approximately 33 months. ASHAs can call in and hang up at their convenience, with their progress tracked using bookmarking technology, allowing them to revisit the course as often as needed (Bashingwa et al., 2021). Although ASHAs often found it challenging to complete an entire session in one call due to time constraints, other studies suggest that ASHAs with access to a functioning mobile phone, reliable network connectivity, digital literacy, motivation for self-learning, a supportive home environment, and awareness of the Mobile Academy application were able to complete the course. It appears that urban ASHAs are generally more familiar with Mobile Academy, making it an important source of digital training for maternity and child health. Another dimension of digitalisation is the growing trend of conducting meetings and training sessions for ASHAs online, using platforms like Zoom and Microsoft Teams. While this practice began gaining traction between 2018 and 2023, it was more widely adopted by health officials in 2023, especially during and after the pandemic. However, only a very small number of ASHAs used these platforms for virtual meetings. Many ASHAs expressed dissatisfaction with online training provided by health officials, citing issues such as poor network connectivity and the training format. Several ASHAs reported being unable to participate due to unfamiliarity with the applications and unreliable network connectivity in their areas. Some also mentioned using social media platforms like YouTube to access information on maternal healthcare.

Finally, ASHAs also interact with the Ayushman Bharat - Pradhan Mantri Jan Arogya Yojana (PM-JAY) app, a flagship initiative by the Government of India aimed at providing cashless secondary and tertiary healthcare services through registered public and private hospitals. ASHAs are tasked with mobilizing the community for this initiative. However, our research revealed that many ASHAs faced significant challenges when asked to contact individuals from lists provided by senior health officials and encourage them to create Ayushman Bharat Cards[5]. One field observation highlighted the complexity of the numerous steps and responsibilities involved in the card creation process. ASHAs are expected to manage these additional duties alongside their regular workload. Currently, they are responsible for compiling lists of individuals, contacting them, and organizing camps to facilitate card creation. ASHAs were instructed to prioritise this task over their usual duties, yet none of the ASHAs we interviewed had received any payment for this additional work, despite having started it in 2018. Furthermore, ASHAs reported feeling pressured to independently navigate and use mobile applications to support the card generation process.

Gendered and Intersectional Access to Technology

Our study revealed that until 2020-2021, not all ASHAs had access to smartphones. Before the government provided them with smartphones, younger ASHAs from middle-class and upper-caste Jat families often already owned personal devices. In contrast, many ASHAs relied on phones shared with family members or borrowed from their husbands for both personal and professional use. By 2021, however, several Dalit and OBC ASHAs became the first women in their families to own smartphones, marking a significant milestone in their digital access and autonomy.

> *"When we got these phones from the government that was my first time using a smartphone. Before that, I had not used a smartphone in my life" (Jaibala, 58 years old, OBC).*
>
> *"I got this phone in November 2021. Before that we had a small phone at our home. Even that was not mine" (Seema, 29 years old, Muslim).*
>
> *"I bought this phone for myself in 2020. Women in my relatives' circle did not even have small phones. Most of them are not allowed to use smartphones or any phones" (Neena, 33 years old, OBC).*

While our study found that all ASHAs now have "access" to smartphones, their usage is still constrained by gender norms in both public and private spaces. These norms dictate how, when, and where ASHAs can use their phones, often influenced by factors such as age, community, family traditions, and village customs. For instance, in many villages, daughters-in-law are required to cover their faces and wear veils in the presence of elderly men and male relatives and frequently face taunts or critical remarks from villagers when seen using their phones in public even for work-related purposes.

> *"Suppose, we must catch an auto, and we are walking, and someone calls. The villagers will say, 'Look how she's walking with a phone in her ear.' I don't answer the call because I know they will talk like this about me, but sometimes it's urgent!" (Seema, 36 years old, OBC).*

[5] *The Ayushman Bharat card is a health insurance card that provides financial protection for eligible individuals and families. The card is issued by the Government of India and is part of the Ayushman Bharat Yojana, which is the world's largest health assurance scheme.*

> *Calls come in frequently, and sometimes I'm on the phone while cooking or doing chores. This can upset my husband and in-laws…my in-laws sometimes say things like, 'Daughter, make the food, you can talk later.' Occasionally, my husband also says, 'You can talk later; there's no need for such long conversations" (Preeti, 35 years, SC)*

ASHAs have reported that societal attitudes often stigmatise women's use of smartphones, with assumptions that phones might distract them or lead to undesirable changes. For example, in Haryana, Khap Panchayats have banned girls and women from using smartphones, asserting that such restrictions reduce the likelihood of elopement. They claim that smartphones can "corrupt" young women by fostering independence, which is perceived as a threat to family honour (Kovacs, 2017). Radhakrishnan et al. (2023) argue that the term "access" is inadequate when examining women's use of digital technologies, as it fails to capture the influence of social and cultural factors. Instead, they propose the concept of "meaningful connectivity," which goes beyond mere availability or use of technology to encompass the broader sociocultural context shaping digital engagement. Thus, it is vital not only to provide access to digital technologies but also to address the underlying social and cultural barriers preventing women and other marginalised communities from fully benefiting from them. This requires a comprehensive approach that considers the broader context in which women's access to digital technologies is situated. Digital inclusion alone will not lead to gender empowerment and equality (Rani et al, 2022).

The promise of digital empowerment

In Haryana, the state government is actively digitizing ASHA skill-building processes, aiming to transform them into "SMART ASHAs". During the field visits, the research team observed a review meeting at the NHM office in Sonipat, involving ASHAs and nodal officers from Kilkari and Mobile Academy, along with senior monitoring officers from the Ministry of Family Health and Welfare's RCH Department. The meeting focused on improving the quality of Ante-Natal Care (ANC) data through the use of Kilkari and increasing awareness among mothers. Emphasis was placed on motivating ASHAs to become more technologically adept in their roles and to become SMART ASHAs.

> *"It is now the era of technology. The more knowledge you gain from this mobile academy, you will have better hold on your field performance. A person willing to learn will become a SMART ASHA. This is happening to build good strong ANC data. We do not have good ANC data now. Digital ways of working will improve the quality of data. Even the health department will create small training videos for your training and send them to your WhatsApp. ASHA will become a coordinator and management professional with technical expertise. You will become a SMART ASHA!! The government has provided you with a personal assistant (smartphone) so make use of it and we are doing it to increase the quality of data. This will reduce your workload. Look at the ASHAs of Ambala—they are learning everything through WhatsApp. Sonipat must also raise its standard." (Observation from Training Review Process for Urban ASHAs in NHM, Sonipat)*

The introduction of digital tools, such as the ASHApay App, was designed to improve efficiency and transparency within the system. By digitizing paper-based forms, the app aimed to reduce payment delays and provide ASHAs with a sense of autonomy and ownership over their work (Singh et al., 2015). The ASHApay App offers ASHAs greater transparency, enabling them to track their payment status and coordinate with senior health officials when needed.

> *"Yes, at least we get to know about the status of the money in the ASHApay app. It is beneficial." (ASHA FGD)*

Similarly, we found that the use of applications like WhatsApp allows ASHAs to share data with health officials more efficiently, significantly reducing the need for multiple visits to various locations, including health centres. WhatsApp has also simplified work-related communication and streamlined certain processes for ASHAs.

Additionally, some ASHAs shared that engaging with these digital tools has boosted their confidence and provided a sense of personal growth. One ASHA from an urban area, eager to learn new skills, reflected on how digitalisation has positively impacted her self-esteem:

> *"We have gained a lot of experience and knowledge; we are learning something even if we don't get any monetary benefit out of it. When we learn something new, it boosts our self-esteem and confidence. We can help someone else; we are...*

> *...learning so much on the internet. When we get a hold of something, then it feels good that I can do something like this. Like when I learned about the Ayushman Card when I made my first card, it was a great feeling." (Preeti, 35 years old, SC, Urban)*

Gaps in digital skills and exclusions

Most ASHAs have completed studies only up to the 10th grade and lack prior exposure to digital tools. We found that low levels of digital literacy and lack of English language proficiency among ASHAs remain significant barriers to the adoption of digitalised workflows. Individual experiences with and responses to evolving technology vary; however, older ASHAs often maintain a distant relationship with smartphones, struggling to fully embrace the digital revolution.

> *"I started using WhatsApp when I got this phone. I can't send messages, but I can listen to voice messages. If the message is typed in Hindi, then I can read it but not in English. I have even forgotten how to send "okay". But what can I do? My mind is not active because of my age. I learn and then I forget." (Jaibala, 58 Years old, OBC)*

Older ASHAs, in particular, are at a higher risk of digital exclusion and dependency. Their limited confidence in operating digital devices, compounded by the health system's inadequate support, often excludes them from

opportunities to develop digital skills. Despite the emphasis on digitizing workflows, the government has not paid adequate attention to providing high-quality training or skill-building opportunities for the digital tools that have become central to ASHAs' daily tasks. Many participants expressed concerns about the poor quality of training sessions. These trainings are often short, conducted for large groups, or only offered to a select few ASHAs with prior digital skills.

> *There were too many people that day—28 to 29 ASHAs—and only one coordinator, who arrived in the afternoon. How much can we possibly learn in just 2–3 hours? First, they asked us to open certain things on our phones, but when we couldn't understand, she didn't provide individual help. The younger ones were able to do it and even asked questions, but women like us can't learn everything in just one day. I get confused and can't find anything on the phone. (Rajwanti, 54 years old, Jat)*

The focus is typically limited to digital training for flagship initiatives like Ayushman Bharat Card and ASHApay, with little to no guidance on using other applications. This lack of comprehensive training and support reduces many ASHAs' motivation to fully engage in the learning process.

> *"The training from the health department only involved information about how to use and work on the ASHApay app and other things we have learned on our own" (Disha, 29 Years Old, Jat community)*

To navigate these gaps, ASHAs often seek assistance from family members, neighbours, or fellow workers. Family members—especially children and husbands—play a significant role in helping ASHAs learn to use smartphones and manage digital workflows, such as using WhatsApp, entering data into the ASHApay app, or navigating other applications. However, the ability to bridge these digital skill gaps depends on various factors, including access to family resources, caste, class, literacy, and relationships within the health system. For instance, an upper-caste ASHA from the Jat community, despite lacking digital skills, English literacy, and having a hearing disability, was able to pay a digitally skilled ASHA to handle her digital work due to her access to financial resources. In contrast, marginalised ASHAs from poor and Dalit backgrounds often lack similar resources and face greater challenges. These women are more likely to be excluded from learning opportunities and experience job insecurity, highlighting the intersectional barriers that shape digital exclusion within the ASHA workforce.

Shift from Community Care to Unpaid Digital Labour

Our research highlights a significant transformation in the nature of ASHAs' work, with an increasing shift from community-based care to data-driven, digitalised tasks. ASHAs are now under considerable pressure, or dabav, to engage with digital tools for data collection, coordination, and reporting. These digital demands often divert attention from their primary responsibilities of maternal and child healthcare and community engagement.

ASHAs feel their roles are increasingly focused on documentation rather than care provision. One striking example is the task of creating Ayushman Bharat Cards, which senior health officials now prioritise. Originally unrelated to ASHA work, this additional responsibility shifts their role from that of a community health worker to a "digital agent." ASHAs report that this transformation not only distances them from their community and primary healthcare

Overview of ASHAs' Work Responsibilities, Including Digital Tasks, in Haryana

Responsibilities

- Immunisation, ANC Registrations
- Home visits to pregnant women and lactating mothers
- Home visits for home-based care of young child] of children
- Promoting and accompanying pregnant women for institutional deliveries in health services
- Counselling pregnant women on ANC, PNC, vaccination, and child care
- Screening malnourished children
- Screening and DOTS treatment for TB patients
- Providing information about family planning programs and contraceptives to couples (mainly women)
- Maintaining registers and monthly list of : Immunisation, married couples, ANC, PNC, birth and deaths in the community
- Organizing and conducting meetings of VHNC
- Participation in monthly meeting at PHC and CHC
- Spreading health awareness in the community

Digital Tasks

- ASHApay app
- Divyang Sarthi App
- WhatsApp for sending information to health officials, ANM, ASHAs
- NCD-GOI app
- TB Survey
- Ayushman Bharat PM-JAY App
- Mobile Academy
- Zoom and Microsoft Teams

Source: Interviews and FGDs with ASHAs

roles but also diminishes the trust placed in them by beneficiaries.

> *"The government has provided us cell phones with internet connection for work purposes but the work we do with children and pregnant women is now facing issues. The workload has increased drastically. We work online but our focus on these community areas is decreasing, whereas this used to be our main work earlier. Now we are given extra work, like this online work is additional. A senior health official told me "You leave all ASHA work behind and work on Ayushman cards as a priority" how can we leave our ASHA work?" (Bharti, 40, widow, SC)*

This shift has created tension between ASHAs and the communities they serve. Beneficiaries, who once relied on face-to-face interactions, now express dissatisfaction with the diminished personal contact.

> *"They say 'Earlier you used to visit us, now you have stopped coming completely. What has happened?' ...We are unable to meet them every time. We are working online, so we are unable to meet them. Some conversations are understood better while talking face to face. So when we ask on the phone they tell us that you have stopped coming, you should come and visit us and ask about our well-being." (Dolly, 33 years old, OBC)*

While the digital transformation in healthcare has introduced new responsibilities for ASHAs, these additional duties are often undertaken without corresponding compensation. Currently, there is no mechanism to account for "digital tasks" in their reporting or to include them in their incentives. As a result, this digital labour remains largely invisible, unacknowledged, unaccounted for, and unpaid. Feminist scholarship on labour has long emphasised how women's work is frequently unpaid, undervalued and dismissed as unproductive (Pateman, 1988). The unpaid digital tasks assigned to ASHAs further reinforce the entrenched gendered division of labour. Since ASHAs are predominantly women, they disproportionately bear the burden of these additional responsibilities without adequate recognition or compensation. Many ASHAs view this as an exploitation of their unpaid labour by the state.

> *"These women are working for free. These women are stuck in this for free - get as much work done from them as you want. There is no value to our work whether it is field work or online work." (Rural FGD)*

Increased digital availability and stress

Digital tools have undoubtedly improved the efficiency and convenience of communication and coordination among ASHAs, their supervisors, and the community. WhatsApp-based communication and group chats, for instance, have significantly streamlined everyday interactions, enabling faster sharing of reports and updates. Real-time communication through instant messaging and video calls has facilitated prompt connections with healthcare professionals, supervisors, and community members, proving especially beneficial in emergencies or for quick consultations.

> *"Earlier, we had to meet our ANM (Auxiliary Nurse Midwife) face-to-face. There was no other choice. But now we have the option of talking and getting things done over a phone call, so it has benefited both of us. It reduces actual visits to many places and saves time. Likewise, for the village residents – if a woman is pregnant, we don't always have to go and meet her; similarly, she can also call us, and we can consult the doctor on the phone. The phone has these advantages, by the time we reach the spot to solve an issue, it can get solved over the call within minutes." (Meera devi, 48 years old, Jat).*

However, the widespread use of smartphones and platforms like WhatsApp has also led to an expectation of "24/7 digital availability" for ASHAs. They are constantly required to monitor messages and calls from senior health officials and relay information promptly to their colleagues. Reporting and data submission have become around-the-clock tasks, significantly increasing their workload. ASHAs report feeling overwhelmed as they struggle to balance these new digital responsibilities with their household caregiving duties, leading to heightened frustration and stress.

> *"We have to constantly check the messages; if we don't see them, our seniors say we don't check their messages. Some tasks are very urgent and require answers within 10 minutes. Since we carry our phones with us, we quickly create the report and send it to them. Sometimes they inform us on very short notice that we have to be...*

> *...there by 10 for a vaccination drive, or they ask for a report in the late evening or night". (Sunita, 47 years old, SC)*

Many ASHAs reported experiencing significant mental stress due to the increased workload from online tasks and the expectation to be available 24/7 via phone and WhatsApp, providing "data on demand" to health officials. This added digital burden intensifies the strain on ASHAs, who are already overworked. One young ASHA expressed feeling so overwhelmed by these tasks that she considered quitting her job. The constant digital availability not only impacts their emotional well-being but also strains their relationships with spouses, children, and other family members.

Another often overlooked consequence of digitalisation is the risk of online violence faced by ASHAs. Similar studies have highlighted how female health workers using social media for public health advocacy are vulnerable to online harassment and sexual violence (Jain, 2021). ASHAs reported receiving "inappropriate and provocative messages" on WhatsApp from unknown numbers. They also experienced sexually explicit phone calls, often late at night, from intoxicated men insisting on speaking with them. In some cases, the husbands of female beneficiaries harassed ASHAs with vulgar language and inappropriate conversations.

> *"I just didn't use this number for some time. Once, I got a call from a boy named Ranbir and he said he wanted to be friends with me. He was talking nonsense" (Rural FGD)*

> *"Sometimes the woman's husband has our number, so they trouble us and swear at us. Once what happened a person called me and was swearing, speaking in a vulgar language (Jaibala, 58 years old, OBC)*

Powerful Collective asserting ASHAs' digital rights

Our study revealed a strong sense of collectivisation and solidarity among ASHAs in the state, with their union playing a critical role in addressing concerns related to their working conditions and the increasing digitalisation of their work. The union's advocacy on digital issues began as early as 2014 when ASHAs were first mandated to use smartphones for reporting. At the time, a significant number of ASHAs did not own smartphones, leading to protests demanding that the government provide smartphones along with SIM cards and internet data packages.

> *"It started after 2014, the online work. Then they started asking for reports of the work. ..()... The government suddenly needed such reports. The digital era has come – 'Now, you send us photos. You make a report and send us photos.' Since then, this digital started and the system of taking reports has started. Since then, this pressure has been put on us. But not all ASHAs had smart phones. ASHAs who didn't have smartphones struggled and their work was affected. Yes, it was pressure, not a request. When they started pressuring us, then we - all...*

> *workers and the union - said that 'we don't have such data' and 'we are not able to buy a phone costing Rs 10 to 15 thousand'. Then we raised our demand, if the government wants such data from us, they should provide the phones and data." (Union leader)*

A significant turning point in the union's struggles came in 2021 when ASHAs were mandated to download the MDM360 Shield app, which was designed to monitor their work and daily activities. With its live location-tracking capabilities, the app was widely perceived as a surveillance tool, sparking widespread resistance. In response, ASHAs collectively refused to use the app, asserting their right to privacy and voicing concerns about the app's potential misuse of their personal data.

> *"The government gave phones in 2021 and later they said, 'Download the MDM360 App'. It tracks location. Say if I am here right now then it would show my live location. We opposed that. We asked them to take the phones back and said, 'We oppose such tracking, and will not accept it'. It is a threat to our privacy." (Union leader)*

The ASHAs' success in resisting the surveillance app and securing one of the highest honorariums in the country highlights the power of collective action in addressing critical challenges. This achievement reflects the union's ability to effectively advocate for its members while fostering a strong sense of community and solidarity among ASHAs.

> *"A union should be there because they are the ones who can raise and solve our issues. We cannot individually fight the system, but together with them, we can bring a change". (Kiran Devi, 48 years old, Jat)*

Key insights

- Haryana initiated a rapid, top-down process of digitalizing ASHA work in 2014, introducing various apps that overwhelmed ASHAs, many of whom lacked the necessary skills or training to manage the increased workload effectively.
- By 2021, the state government had provided smartphones with internet access to all ASHAs, enabling the majority to become smartphone owners and integrate digital tools into their work.
- Enhanced transparency in payments through the ASHApay app and streamlined communication and coordination via WhatsApp.
- The focus on digital data collection and reporting overshadowed the core objective of delivering quality community healthcare services.
- Gaps in digital skilling, increased workload and reporting, along with issues of exclusion, unpaid labour and privacy concerns, have left many ASHAs feeling alienated and disconnected from the digitalisation process.
- Haryana's strong ASHA union played a pivotal role in advocating for better digital tools, successfully demanding government-provided smartphones with internet access and resisting the introduction of surveillance apps like MDM360 Shield.

RAJASTHAN

Embracing Worker-Centric Digitalisation

Pioneer of Digitalisation of ASHAs' Work

Rajasthan has been a frontrunner in digitalisation efforts among Indian states, having implemented the Pregnancy, Child Tracking and Health Service Management System (PCTS) in 2008, well before its nationwide rollout. It was also the first state in India to digitise health records (Scott et al., 2022b) and to introduce ASHA Soft, a platform for digitizing incentive payments for ASHAs. Additionally, by 2021, the Rajasthan government launched India's first PCTS mobile app for over 53,000 ASHAs to track daily healthcare services provided to pregnant women and children (Sharma, 2023). Over the years, the state has made significant strides in incorporating digital technology into healthcare. Therefore, it is crucial to examine how ASHAs (or ASHA Sahayoginis[6], as they are called in Rajasthan) have been integrated into these digital initiatives and how this has transformed their work.

The Pregnancy, Child Tracking and Health Services (PCTS) app serves as a distinctive platform, acting as an effective planning and management tool for the Health and Family Welfare Department of the Government of Rajasthan. The PCTS system primarily focuses on collecting and storing data related to reproductive health programs, including maternal and child health services, immunisation, family planning, and abortion cases. Other key features of PCTS include indicator-wise health institution lists, periodic work plans for ANMs, monitoring of institutional deliveries and high-risk pregnancies, sterilisation case tracking, an online directory of health institutions and workers, evaluation report cards for health institutions, infrastructure and human resource assessments, vaccine demand forecasting, and online DBT for JSY and RSY beneficiaries[7].

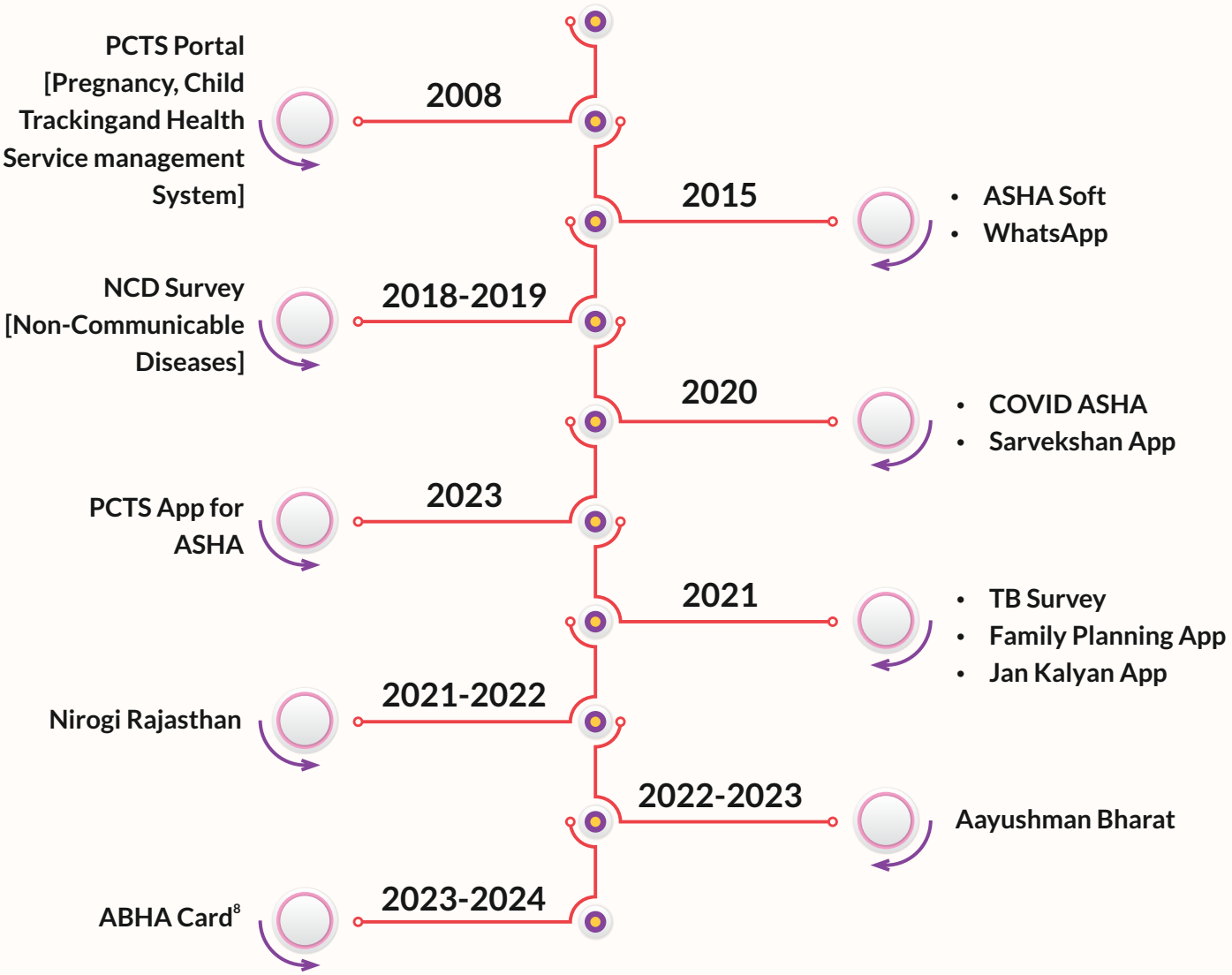
Originally, Auxiliary Nurse Midwives (ANMs) and data operators were tasked with entering details into the system at the primary health centre (PHC) and community health centre (CHC) levels. However, over the past two years, ASHAs have been instructed to input data directly into the PCTS via an app installed on their smartphones. ASHAs are required to log daily data on antenatal care (ANC), postnatal care (PNC), immunisation, and all six indicators related to reproductive health services. Despite this shift, not all ASHAs have the app on their phones and they rely on ANMs to enter the data on their behalf. A unique feature of the PCTS platform is that it provides access to ASHAs, ANMs, medical officers, and district ASHA coordinators, enabling real-time data monitoring and enhancing the efficiency of service delivery.

In 2014, a web-based software called ASHA Soft was introduced to streamline payments for ASHAs. This online system records the services provided by ASHAs in the community, facilitates direct payments to their bank accounts, and generates reports to monitor program progress (Jain et al., 2016). Another significant development in the digitalisation of ASHAs' work has been the use of WhatsApp for communication and coordination, which has improved information sharing and awareness. For instance, ASHAs in Rajasthan utilised WhatsApp to support COVID-19 vaccination campaigns (Mukherjee, 2021). The extent of digitalisation expanded significantly between 2018 and 2023, with digital surveys becoming an integral part of ASHAs' responsibilities. Today, ASHAs handle various digital tasks, including conducting surveys, facilitating communication, and entering data related to maternal and child health programs, reproductive health, and family planning through the PCTS app.

[6] *Until 2022, ASHAs in Rajasthan were accountable to both the Women and Child Department and the Health Department. While their payment and recruitment were managed by the Women and Child Department, their training and work primarily aligned with the Health Department. This dual accountability created significant challenges, as ASHAs were required to attend meetings and fulfil expectations for both departments.*

[7] *https://pctsrajmedical.rajasthan.gov.in/private/login.aspx*

Figure 2: Timeline of digital interventions in Rajasthan



Note: ASHA Soft is integrated with the PCTS portal and both are managed by data operators and ANMs, meaning ASHAs themselves are not required to perform any digital tasks on this portal. The system records person-specific details of the services provided by ASHAs.

[8] *An ABHA card, or Ayushman Bharat Health Account, is a health ID card that contains a 14-digit identification number and a person's medical history.*

Gender Norms and Access to Technology

Rajasthan continues to grapple with low literacy levels and inadequate, gendered access to technology and digital skills. The gender digital divide, shaped by both unequal access to technology and entrenched patriarchal norms, is stark in the state. While 70–80% of men own a mobile phone, only 10–20% of women have access to one (Dahiya, 2023). An earlier ISST study on rural Punjab and Rajasthan similarly found that mobile phone usage was significantly lower among women compared to men (Chakraborty, 2020). To address this gap, in 2023, the state launched the Indira Gandhi Free Smartphone Yojana, distributing 40 lakh smartphones and mobile data free of cost to girl students and women from low-income households. This scheme provided women with smartphones worth approximately INR 9,500, including unlimited local and STD calling and 5 GB of data per month for three years (Dahiya, 2023; Asnani, 2022). This initiative represents Rajasthan's commitment to promoting digital literacy and ensuring women's equitable access to opportunities in the digital age.

However, access to opportunities and capabilities is deeply intertwined with gender norms and social rules. Patriarchal attitudes often limit women's access to technology, as many believe that giving girls smartphones could corrupt them. Concerns such as "the internet and YouTube will spoil them" remain prevalent (Dahiya, 2023). Some ASHAs echoed similar beliefs, reinforcing these norms by confiscating smartphones from young girls.

While these norms are slowly evolving, meaningful progress requires more than just access to technology. It demands equal access to education and a focus on improving digital literacy. Training programs for ASHAs must also account for these gendered realities.

During a field visit, we observed a residential training session for rural ASHAs focused on Home-Based Neonatal Care (HBYC) and mental health. The training, conducted at a centre affiliated with a Community Health Centre, required ASHAs to stay for approximately 5–6 days. However, many ASHAs chose to commute daily due to domestic responsibilities, such as overseeing their children's education during exam time, and resistance from family members about overnight stays. The oversight in scheduling the training during the children's exam period reflects a lack of gender-sensitive planning, further exacerbating the challenges these women face in balancing paid work with

> *"What use is a phone? It would have been better if she had a sewing machine, she could have learnt sewing. Giving phones to girls is wrong… anyone can lure her. She is not an adult… Even if I stand on my own feet, I am still scared about tainting our social image. We are afraid about our 'Izzat' (honour). If our child is fine, our 'Izzat' will be fine. Otherwise, our social image will be spoiled. (Gita,40 years old, SC)*

domestic care responsibilities. This scenario underscores the ongoing influence of gender norms and the gendered division of labour, which continue to shape women's work in both explicit and subtle ways.

Digital Skilling and Intersectional Realities

From our field observations, it became evident that the state places significant emphasis on training ASHAs for the Pregnancy, Child Tracking and Health Services (PCTS) app, a flagship initiative. Rural ASHAs reported receiving two days of training (four hours per day) at the Primary Health Center (PHC). From the FGDs, it was found that trainings are typically conducted in large groups and usually ranges from one to five days. Interestingly, our fieldwork revealed that rural ASHAs seem to benefit more from focused training, possibly reflecting awareness of the digital divide between urban and rural areas. However, urban ASHAs reported receiving only about 30 minutes of discussion on the PCTS app during their training, which was combined with content on health programs. While our observations indicate a greater emphasis on digital skilling for rural ASHAs, we were unable to meet ASHAs from very remote rural locations, where low digital literacy and poor connectivity may further hinder digital adoption. This underscores the need for further investigation into the digital skilling needs of ASHAs, especially in remote areas.

In addition to the PCTS app, both rural and urban ASHAs expressed frustration with limited or inadequate training for other apps and digital surveys. Many ASHAs reported that they often receive only basic instructions and a link to download the app via WhatsApp, leaving them to learn through peer support, family assistance, or self-practice. For example, ASHAs in both urban and rural areas mentioned insufficient training for the ABHA Card and other digital tools. This highlights the gaps in coverage when it comes to digital skilling.

ASHAs have also expressed concerns for their peers who face greater challenges in handling online tasks using apps. They highlighted that older ASHAs, especially those with lower levels of education or limited prior exposure to digital technology like smartphones, often struggle and are supported by other ASHAs.

> *"We are also afraid that if we don't work and complete our task we'll be scolded or there might be some sort of notice issued against us. So, personally due to fear I downloaded the app, and then we were instructed to start working accordingly.* ***Because I am educated, I could figure out how to work with it, but if someone is not educated it is very difficult for her to work with it. So, there should have been training for the app". (Rajani, 34 years old, SC, Urban)***
>
> *"Actually, the older ladies were not familiar. They are not as educated and they do not know how to use phones. They face a lot of problems…. they do come for the training and try their best to understand. If she still does not understand then we help her understand. They know how to read and write, but they just do not know how to use the phone. They always complete their written work and then we help them in their online work" (Rural FGDs)*

While the state's efforts to provide training on the PCTS app are commendable, gaps in coverage and accessibility remain. Addressing these challenges requires tailored and inclusive digital skilling programs that account for intersectional realities such as age, education levels, and access to technology.

Supporting Community Care Work Through Digital Tools

A groundbreaking feature of the PCTS app is its integration of ASHAs by granting them access

to the platform and its collected data. This has digitally enabled and empowered frontline workers in their community care roles. The app supports ASHAs in multiple ways: it helps them maintain records of women and children accessing services, ensures seamless reporting, generates monthly action plans, provides task-specific "due lists," and tracks their incentives. Additionally, it includes short informational videos that ASHAs can use to educate pregnant and lactating women about infant and child care, enhancing their ability to disseminate information through digital means (Sharma, 2023). Many find the app valuable because it provides information about upcoming tasks related to ANC, PNC, and immunisation by aiding in systematic planning and tracking incentives. While not all ASHAs currently use the PCTS app, a significant number have adopted it and highlighted its role in streamlining their work and improving efficiency.

> ***"We want work which we can do like there is this PCTS app which includes our work also and has our data also so now it is easy for us. We can see what work we need to do. So, we would like to work on that app". (Rural FGD)***
>
> *"Before PCTS, we were not able to see our work. Now we can track and see our work which helps us to understand how much work we did" (Vimala Devi, SC)*
>
> ***"PCTS app gives the work plan itself. It shows missing deliveries, and which immunisation is due. So she gets the work plan easily.*** *Earlier ASHAs had to write the same names 70 -80 times for offline work. If there is a pregnant woman, her name will be written with her child also. Now we have digitalised that and you can get all the details in one click." (District-level health official)*

Over the past couple of years, the introduction of the PCTS app has significantly increased the use of mobile applications among ASHAs. ASHAs also report that the app has improved transparency, particularly in tracking their payments. Previously, the process was opaque and required considerable effort to obtain information about pending claims. With the app, ASHAs can follow up on claims and check the status of their payments online, saving time and reducing stress. This transparency and efficiency likely explain the state's enthusiasm for digitalisation, even amidst challenges like low digital literacy.

> ***"Through the PCTS app, we have started working online and started earning more money. We can track the work online as well. There should be more apps like this (Vimala Devi, middle-aged, Rural ASHA, SC)***
>
> *"The new version of the PCTS app shows the due list, the work, and the payment. She (ASHA) does not have to go anywhere. She can see it on her phone from her home, what payments have been made to her, and for which activities." (District-level health official)*
>
> *"We can also see the amount we have received, how much it is, and for what task. For example, I received this amount for maternal services and this amount for child health services. We can also see which payments are still pending. For example, we can see that we have not received 600 rupees this month for using the PCTS mobile app" (Chandni, 28 years old, Urban)*

Finally, although PCTS and ASHA Soft have revolutionised payment processes for ASHAs, issues persist. ANMs have the authority to modify and verify data after ASHAs upload it to

the portal. Many ASHAs have expressed concerns that ANMs do not approve the data on time, which affects and delays their receipt of remuneration. Once the due date has passed, ASHAs sometimes cannot claim payment for tasks they have already completed. Further, this progress is accompanied by concerns, such as those raised in Haryana, about increased workloads due to duplicated efforts, a persistent gendered digital divide, and insufficient digital training despite rapid digitalisation.

Our fieldwork in Rajasthan revealed that digitalisation through the PCTS app is not shifting the focus away from community care work but rather complementing it. The app supports ASHAs by providing data on their tasks, work plans, and due dates, thereby enhancing their efficiency and saving time and effort.

> *"Through the apps, we get to know about the due date of the vaccination of people and then we call them to get their vaccination done. This has made our work so easy; this is the benefit of the existence of an online app." (Vimala Devi, SC)*

Another way digitalisation is enhancing community work is by increasing transparency regarding the benefits available to community members under various schemes. This knowledge empowers ASHAs to facilitate access to these benefits. Moreover, as ASHAs become proficient in using digital tools, they build trust within the community by improving information dissemination and raising awareness. For instance, the following example illustrates how ASHAs leverage information from the PCTS to help individuals claim payments owed to them, thereby fostering and strengthening trust in their work within the community.

> ***"In Rajshree Yojana, if the child is 12 months old, and we immunised the child on time, it would show on the app and ask to get the second instalment paid to her (the mother). So we will inform her about it. She will have trust in us that we are doing things on time and she is getting paid.*** *When things were offline, we knew if the child had turned 12 months old, but we did not know when the money would be transferred. Now we know that after we submit the document, the second instalment comes timely. So women feel we are doing their work." (Rural FGD)*

Digitalisation is also enhancing ASHAs' community work through their use of WhatsApp, which has proven to be a valuable tool for supporting their health outreach efforts. ASHAs reported that they can perform tasks more efficiently by using WhatsApp statuses to raise awareness and by creating groups of women, especially new mothers, to share information about maternal health programs and family planning initiatives.

> ***"Four years ago, I used to go door to door. Now I put information about immunisation on my WhatsApp status. Every Thursday, 20-25 people come for sure for immunisation. No Thursday goes by when I do not have people." (Urban ASHA workshop)***

Overview of ASHAs' Work Responsibilities, Including Digital Tasks, in Haryana

Responsibilities

- Immunisation, ANC Registrations
- Home visits to pregnant women and lactating mothers
- Home visits for Polio drops
- Providing iron folic acid tablets to children
- Iron tablets for young girls
- Screening and DOTS treatment for TB patients
- Going with pregnant women in health services for childbirth
- Counselling of women facing violence
- Maintaining registers: Immunisation, families, ANC, PNC
- In Dengue Season: Home visit to check conditions at home
- Keep track of malnutrition among children, infant
- 10 home visits in a day: checking vitals of children
- Giving health-related information to poor families
- Providing information to adolescent girls about pads and menstruation
- Prevention of child marriages in the community
- Providing information about family planning programs and contraceptives to couples (mainly women)

Digital Tasks

- PCTS app
- Ayushman Bharat Card
- ABHA Card
- WhatsApp for sending information to health officials, ANM, ASHAs
- NCD Survey
- TB Survey
- Family planning app
- Nirogi Rajasthan

Source: Interviews and FGDs with ASHAs

This digital transformation in community care work has led to greater efficiency and transparency in many aspects of ASHAs' responsibilities. They can now monitor their remuneration and complete tasks online that previously required physical interactions with community members, saving time and effort. This shift has made their primary task of improving maternal and child health outcomes more streamlined and effective. However, challenges remain. Poor network connectivity, limited access to quality digital resources, gaps in digital education and skills, and deeply entrenched gender norms continue to impact ASHAs' mobility and overall effectiveness. These barriers hinder the full potential of ASHAs in leveraging digital tools to support their work.

Fragmented Union and Limited Gains

The presence of ASHA unions in Rajasthan is highly fragmented, with multiple unions operating based on caste, differing strategies, and approaches to engagement with the system. According to an ASHA union member, at least three main unions—ASHA Shakti, Chittor ASHA Group, and Meri Ashayein—operate in the state. However, these groups often fail to unify and work together due to disagreements, mutual suspicion over personal agendas, and internal conflicts. Despite this fragmentation, there have been instances where ASHA unions have collaborated on protests and achieved notable results.

One of the key challenges faced by ASHAs in Rajasthan was their dual accountability to two departments. Until 2022, ASHAs were answerable to both the Integrated Child Development Services (ICDS) under the state Women and Child Department and the National Health Mission (NHM) under the Health Department. This dual reporting structure created significant crises for ASHAs, who found it difficult to manage the expectations of both departments simultaneously. As ASHAs were receiving half of their honorarium from ICDS, ASHAs were required to report to the Anganwadi Sewika at the ICDS centre for tasks such as weighing children, distributing nutritious food, and monitoring growth charts. Many described this reporting relationship as distressing, with Anganwadi workers often exerting authority over them, sometimes engaging in surveillance by requiring photos and attendance reports.

> ***"We protested to keep us in one department only. It's a lot of pressure to work under two departments. It's more like being controlled by a mother-in-law at a house." (Aanchal, 28 years old, Prajapat, Urban)***

In 2022, following unified strikes and persistent advocacy by some ASHA unions, the state government decided to consolidate their roles under a single department, the Health Department. This change addressed many of the challenges ASHAs faced under the dual accountability system.

> *"So many issues have been resolved after coming under one department, our everyday struggle has gone away. We had to send the photo right after reaching, we had to sign. If we were late, the worker would hide the register and not let us sign. The worker used to think of ASHA as her servant that they have been provided as a helper. They used to ask us to go to the field and take measurements of children, weight etc. Immunisation is our work. There used to be quarrels, and ASHAs were exploited a lot." (Union Leader)*

Although this change has been formally implemented, ASHAs believe it will take time to fully integrate at the grassroots level. Currently, ASHAs' recruitment, training, honorarium, and incentives are administered solely by the Health Department. However, their demands remain unfulfilled, including permanent employment, monthly remuneration of INR 20,000–30,000, promotions to supervisory and managerial roles, and better working conditions.

ASHAs in several districts have also raised demands for smartphones to facilitate their increasing digital tasks. However, there has not been a unified state-level effort to advocate for this. Many ASHAs report that their workload has increased due to digitalisation, as online tasks often require more time and effort, including working late into the night.

> *"The tasks we were able to do in 4 hours, now take 8 hours. It takes double the time. We have to do online work at night also. Earlier, we used to work till noon, now we work till 4 p.m. Our time has increased, but work is the same... Our payment is not in tandem with the time that it takes us".*
> *(Rural FGD).*

This disparity between increasing workloads and the lack of commensurate remuneration for digital work has heightened frustrations among ASHAs, highlighting the urgent need for fair compensation.

Despite these challenges, the fragmented nature of ASHA unions in Rajasthan continues to hinder collective efforts to improve pay and working conditions. Limited collectivism, internal social divisions, and entrenched gender norms have further weakened union unification and women's participation in these movements. Moreover, ideological differences among unions contribute to their inability to raise a unified voice, particularly regarding the increased demands and pressures arising from digitalisation. This lack of cohesion has diminished the unions' potential to advocate effectively for the rights, recognition, and welfare of ASHAs, leaving many of their concerns unaddressed amidst an evolving work landscape.

Key insights

- Rajasthan was a pioneer in digitalisation, introducing the ASHA Soft app in 2014 and the PCTS app in 2023.
- Data entered into the PCTS app is accessible to ASHAs, enabling them to track their work outcomes. This transforms ASHAs from mere data collectors into active participants in the system, helping them feel supported and enhancing their ability to perform community healthcare duties effectively.
- ASHAs reported increased efficiency and a sense of empowerment due to real-time access to data, which has strengthened trust in their work within the community.
- A rapid yet worker-friendly and participatory approach to digitalisation has allowed ASHAs to realise the potential benefits of these tools and view themselves as active stakeholders in the digitisation process.
- Despite these advances, challenges persist, including inadequate training (beyond the PCTS app), reliance on peers or self-learning, increased workloads without additional pay, delayed payments due to dependency on supervisors, and restrictive gender norms around technology use.
- Fragmented unions in the state further hinder unified advocacy for better pay and improved working conditions.

KERALA

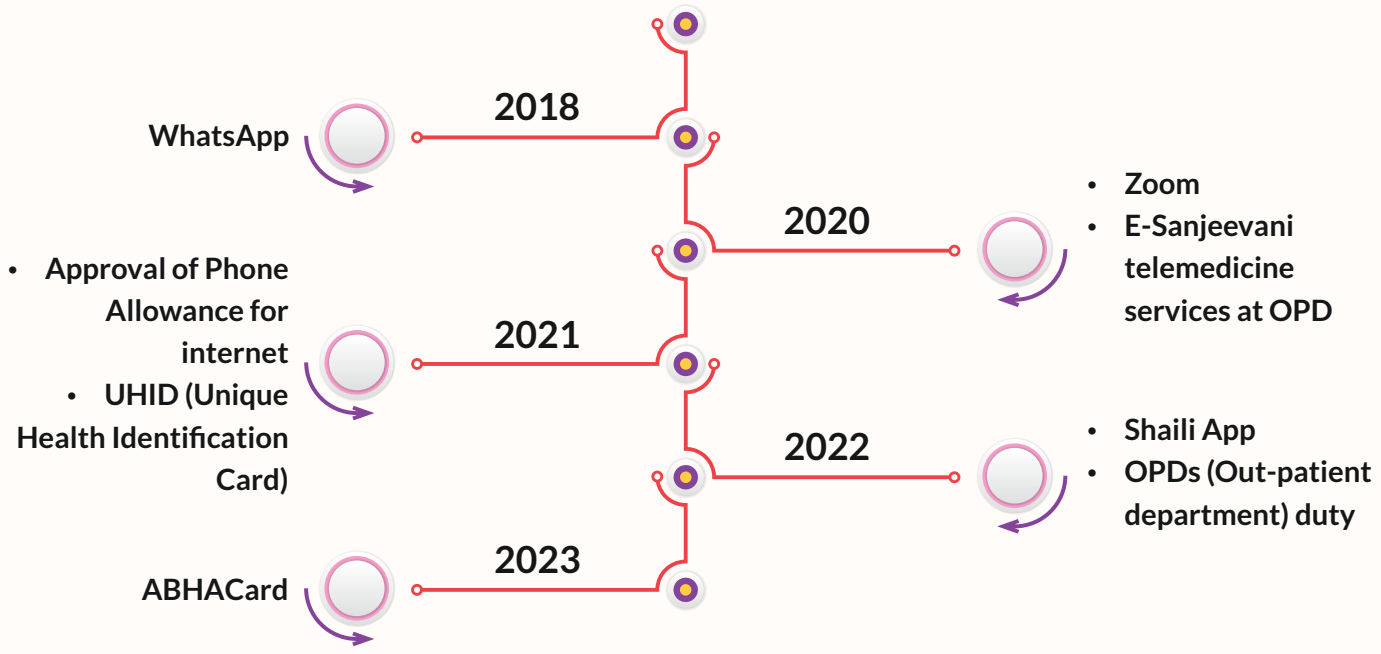
Fostering an inclusive approach to digitalisation

Slow and Intentional Digitalisation of Asha's Work

Kerala's response to crises over the years has demonstrated the multifaceted capabilities of digital technology, emphasizing the significance of leveraging a robust health system infrastructure and fostering collaborative efforts. It has been argued that Kerala is a good example of how technology can use the foundation of a well-entrenched healthcare system to meet the needs of the citizens, particularly in times of crisis (Ummer et al. 2021). In line with this trend, digitalisation is becoming increasingly integrated into the work profile of ASHAs in the state. Over the last three years, ASHAs have actively engaged in a wide range of digital responsibilities across various platforms and online avenues. These tasks primarily include conducting digital surveys, facilitating online communication and coordination, and overseeing the digital management of outpatient departments (OPDs) within healthcare services. Additionally, they operate digital platforms for issuing community cards and manage applications to coordinate family planning resources.

One of the prominent apps launched by the government of Kerala is an Android app called 'Shaili', introduced in 2022, which aims to diagnose and control lifestyle diseases among the people of Kerala. The app collects information about diseases such as diabetes, high blood pressure, heart disease, lung diseases, and other lifestyle-related ailments, including cancers. ASHAs were tasked with collecting information from individuals over the age of 30 in their respective areas about any lifestyle diseases or risk factors. By 2023, ASHAs had reportedly completed one crore NCD (Non-Communicable Diseases) surveys using the Shaili app, developed by eHealth Kerala (Express News Service, 2024).

Figure 3: Timeline of digital interventions in Kerala



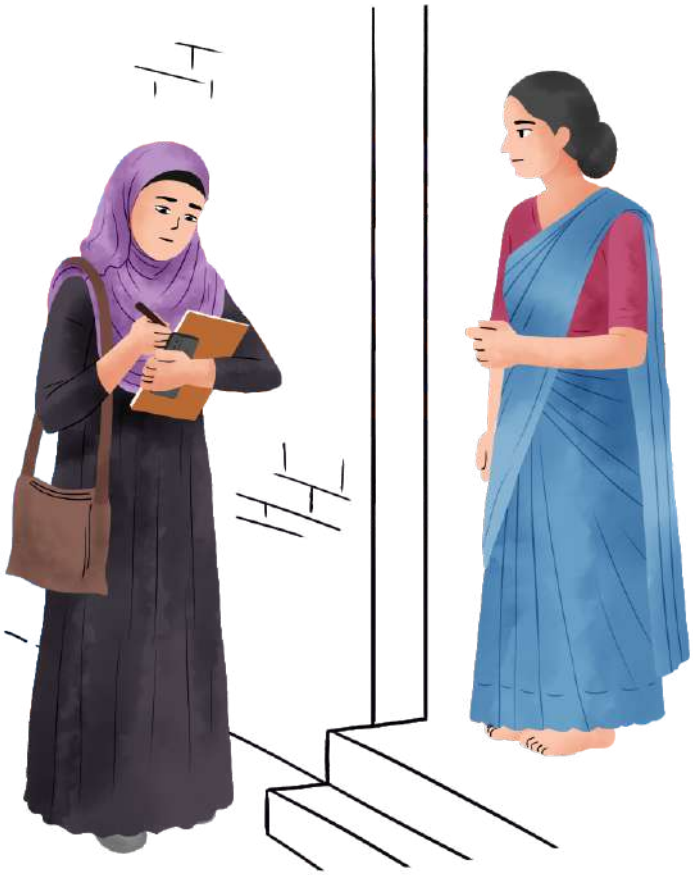
WhatsApp is now widely used for communication among ASHAs, enabling them to monitor important messages from senior health officials and share information with mothers regarding infant care, antenatal care (ANC), postnatal care (PNC), childbirth, and breastfeeding. Additionally, ASHAs are responsible for attending and actively participating in meetings and training sessions conducted on Zoom. These virtual meetings, which began during the COVID-19 pandemic, are used to disseminate information about COVID-19 screening and preventive measures. Zoom is also utilised for digital refresher training on the Shaili app.

Launched during the pandemic, the e-Sanjeevani telemedicine service facilitates teleconsultations between patients and doctors, eliminating the need for physical hospital visits. When doctors and nurses are unavailable, ASHAs take on the responsibility of engaging in initial patient conversations during telemedicine calls at health facilities. Over the past two years, ASHAs have also assisted individuals in obtaining their UHID (Unique Health Identification Number) cards through a portal on computers at OPDs in health centres. They are also tasked with spreading awareness about ABHA. Moreover, to assist with their digital tasks, ASHAs have been eligible for an internet usage allowance of Rs. 200 per phone since 2021. Before this allowance, ASHAs had to cover these costs themselves. However, the implementation of this allowance has not been consistent across all regions. As a result, many ASHAs continue to cover their internet costs out of pocket, which typically range from Rs. 300 to 400 per month.

In terms of digitizing the payment process for their remuneration, the EasyMan software is used. However, ASHAs are not responsible for data entry, as this task is handled by the JPHN (Junior Public Health Nurse). ASHAs are required to record the details of their work in their diaries and submit claim forms at the end of each month to ASHA coordinators and ANMs for approval. This process involves multiple stages of paper-based and digital approvals. Due to limitations in the EasyMan software, particularly in accessing entered data for future use, there are ongoing plans to develop and upgrade to a more user-friendly platform.

A Robust Digital Skilling Ecosystem and Enhanced Competencies

The digitalisation of ASHAs' work in Kerala occurred within the broader context of widespread digital skilling initiatives aimed at the general population. A significant contributor to this process was Akshaya, a telecentre-based e-governance project in Kerala, known for its efforts in Information and Communication Technology for Development (ICTD) to bridge the digital divide by addressing issues of access, skills, and content simultaneously. According to ASHAs, their digital competencies, including computer literacy, have significantly improved due to training conducted in collaboration with Akshaya centres. Through these centres,



ASHAs received training in MS Word, and Excel, digital OPD receipt data entry, using WhatsApp, and participating in Zoom and Google Meet meetings. This training, combined with the relatively high levels of digital literacy among women in Kerala, provided a strong foundation for the digitalisation of ASHAs' work.

Furthermore, between 2020 and 2023, ASHAs in Kerala underwent various training formats to enhance their digital skills and knowledge related to health initiatives. During the pandemic (2020-2021), Zoom meetings served as a key medium of training, focusing on COVID-19-related apps, screenings, non-communicable diseases, and maternal and child health. These sessions occasionally included the Shaili app. Each Zoom meeting lasted two to three hours, conducted in batches with a maximum of 100 ASHAs, and was held at the district level on the second or third Thursday of each month. From 2022 to 2023, one-time offline training sessions on digital apps were started at the Community Health Centres (CHCs) and Primary Health Centres (PHCs). These sessions emphasised the use of specific digital tools such as the Shaili app and UHID (Unique Health Identification Number) systems. Each session lasted about 30 minutes and included groups of 15-20 ASHAs per batch, further reinforcing their ability to integrate digital tools into their daily work routines.

The comprehensive digital training initiatives in Kerala have not only enhanced ASHAs' technical skills but also boosted their confidence in navigating digital tools. Many ASHAs have become more confident in handling smartphones and working on computers as a result of the various skill-building efforts. Remarkably, the grassroots ecosystem of digital skilling, fostered by projects such as Akshaya, has equipped many ASHAs—including older workers—with foundational skills that proved invaluable during their transition to digitalised work. The prior experiences enabled them to have a smoother integration of digital tools into their roles, such as managing OPD duties.

> *"I have studied computers. I learned it while I was part of Kudumbasree through Akshaya Centre... I didn't have difficulty when e-health came. I am comfortable with using the keyboard quickly. As I have learned typewriting, I can type using my two hands. So, I didn't have difficulty with e-health. I could do that after getting a basic understanding." (Pramila, 54 years old, SC)*

These reflections emphasise the role of foundational digital literacy in empowering workers to adapt to evolving demands. Initiatives like Akshaya not only helped ASHAs navigate their day-to-day digital work but also ensured that older workers did not feel excluded or alienated during the transition, despite the challenges they faced in adapting to digital workflows. This underscores the need to strengthen community-based digital skilling programs to enhance workers' adaptability and confidence in a rapidly digitalizing healthcare system.

Building on their foundational digital literacy, the use of smartphones has further elevated ASHAs' status as community health workers. Many take great pride in having access to smartphones, seeing them not only as tools for expanding their learning opportunities but also as symbols of increased respect and recognition within their families and

> *"I use this phone because I am an ASHA. If I was sitting at home, I would not have used the phone. I am proud of that. After starting work as an ASHA, I began learning many new things and meeting new people." (Rimy, 48 years, OBC, Urban)*

> *"Earlier, we were not using a computer at all, but we are now. I feel proud about this. Although it was difficult in the beginning, I am proud of what I am doing now." (Ashwini, 45 years, SC)*

communities.

This newfound access has not only boosted their confidence but also allowed them to engage with a wider range of individuals, solidifying their role as key health facilitators in their communities. By leveraging their digital skills and tools, ASHAs are streamlining communication within their communities, swiftly accessing critical health information, and improving their ability to offer focused assistance. The increased ease of communication with patients and colleagues has also facilitated better planning and execution of home visits. ASHAs recognise the potential of smartphones to enhance work efficiency, save time, reduce costs, and minimise travel.

Digital Infrastructure and Intersectional Realities

Despite significant progress in advancing digital technology in Kerala, exclusions persist, particularly among the most marginalised groups and those in remote areas. For example, inconsistent network connectivity in many villages continues to hinder access to online resources, limiting the effectiveness of digital initiatives. Additionally, access to quality smartphones is essential for performing digital tasks. As the reliance on digital work increases and the need to install multiple apps grows, ASHAs have highlighted the necessity for devices with larger storage capacities. However, not all ASHAs can afford high-quality, expensive smartphones, and many are forced to rely on outdated and unsupported devices, highlighting the digital divide faced by those

> *"When all these different apps are installed, there isn't enough space on our phones. That's when we need to replace them. Most people use phones that cost around 10-12k at maximum, and some even have ones that are around 5-6k only, which limits the number of apps we can install. We need phones in the 15-20k range." (Union leader).*

from poorer backgrounds.

Another intersectional reality is that access to digital skilling is often gendered. For example, online training through Zoom may not be equally accessible or beneficial for women workers. ASHAs feel that Zoom trainings create barriers to learning, primarily due to the time pressures from their paid work and domestic responsibilities. While these online sessions provide regular knowledge updates, ASHAs find them less engaging as they struggle

> *"I think Zoom meetings are not benefitting everyone. If it were offline training, we would go there and attend in person. We could listen directly, take notes, and understand better. But in a Zoom meeting, how much can we really pay attention? Sometimes, we're also doing household chores. So, I don't think it's as beneficial." (Rimy, 48 years old, OBC, Urban)*

to balance training with their household duties. The digitalisation of work has fundamentally altered ASHAs' daily routines, intensifying their already heavy workloads. As women community health workers, ASHAs bear the

"triple burden" of paid, underpaid, and unpaid labour (Moser, 1993). Their social location, marked by intersections of gender, class, and caste, plays a critical role in shaping their experiences. The addition of frequent digital reporting—often via phones or WhatsApp—has led to increased demands on their time, creating tension in their personal lives and disrupting work-life balance.

> *"I have been using my phone all the time during Covid. My husband scolded me for using my phone while I was making food for everyone." (Rimy, 48 years old, OBC)*
>
> *"It happens sometimes we have to submit reports quickly.... If they don't get us on call, they will leave a WhatsApp message. We might be travelling or somewhere else with family too. But we will have to respond!" (Pramila, 54 years old, SC)*

Gender norms also shape how ASHAs interact with technology. Access to technology and societal perceptions of women's smartphone usage are often gendered. Narratives reveal that smartphone use is frequently categorised as either "good" or "bad," with women facing disproportionate judgment for their habits. For example, family and society may criticise women perceived as being "constantly on their phone" or "misusing" it, even when their usage is work-related. This reflects a deeper moral pressure on ASHAs to conform to the idealised image of a "good woman," one who uses technology in ways deemed socially acceptable.

> *"When we use something for a purpose, we don't face negative comments. But when we misuse it, we face issues. If someone is always on the phone or making calls while walking on the road, she will receive criticism. Many women have faced this. People will say that she is always on the phone. We've heard similar things when we go for fieldwork." (Ashwini, 45 years, SC)*

Transforming Community Care Work through Digital Tools

Given the unique health challenges in Kerala, ASHAs' responsibilities have expanded to include additional areas such as the prevention and control of communicable diseases, management of non-communicable diseases (NCDs), palliative care, especially for the elderly, and community-based mental health programs. The integration of digital tasks has been gradual and supportive, enhancing the community healthcare work of ASHAs without overwhelming them.

Overview of ASHAs' Work Responsibilities, Including Digital Tasks, in Kerala

Primary Tasks

- Conducting home visits for pregnant women and newborns.
- Counselling and building awareness on antenatal care (ANC), postnatal care (PNC), breastfeeding, and vaccination.
- Accompanying women during childbirth.
- Organizing and mobilizing for Village Health and Nutrition Days (VHNDs).
- Coordinating vaccination camps.
- Raising awareness and conducting home visits under Home-Based Newborn Care (HBNC) and Home-Based Young Child Care (HBYC) programs.
- Identifying abortion cases and referring them to the Junior Public Health Nurse (JPHN).
- Organizing medical camps.
- Creating awareness about leprosy, conducting screenings, and accompanying patients to health services.
- Reporting to the JPHN for approval of incentives.
- Counselling and raising awareness about family planning methods.
- Registering ANC, PNC, births, and new couples.
- Keeping detailed health records in registers.

Additional Tasks

- Preventing communicable and non-communicable diseases.
- Prevention, screening, referrals, registration, and follow-up for non-communicable diseases (NCDs).
- Raising awareness about mental health.
- Providing palliative care, including identification and need assessment, referrals and supply of medical resources, distribution of medicines and follow-ups, and accompanying patients for treatment.

Digital Tasks

- Managing digital OPDs.
- Using WhatsApp and WhatsApp Groups
- Using the Shaili app
- Assisting with the issuance of UHID cards and ABHA cards

Source: FGD with urban and rural ASHAs and interviews with ASHAs.

For instance, digital tools like the Shaili app have been instrumental in supporting ASHAs' work, particularly in the management of NCDs. The Shaili app has streamlined the data collection process for NCD surveys, enabling ASHAs to efficiently gather, process, and refer cases. The app's design generates patient risk scores on a scale from 1 to 10 based on collected data, flagging individuals with scores above 4 for medical consultations. ASHAs have reported that the Shaili app has played a crucial role in the early detection of NCDs, allowing for timely interventions. Additionally, they acknowledged its contribution to providing easily accessible and verifiable data, which can improve the quality and efficiency of healthcare delivery at the community level.

> *"We have written down everything we entered on Shaili. The government received the details about many people quickly because of the Shaili app. We got to collect the data and that is a good thing. We can't lie as they can see exactly what we have entered. They can understand how many people have diabetes, and we can't tell otherwise. This ensures accurate data, which is really beneficial. It allows many people to identify health issues early. If someone's condition is borderline during screening, we advise them to consult a doctor, helping them avoid bigger problems later." (Pramila, 54 years old, SC)*

Another positive is that the ASHAs in Kerala are compensated for their digital work with the Shaili app, earning Rs. 5 for each data entry. This stands in stark contrast to other states, where digital work often goes unpaid.

On the other hand, ASHAs working in urban settings have observed a paradoxical shift in community responses, particularly regarding how people, especially women, access health information. Increasingly, community members are turning to the internet for information on health topics such as maternal and child health and overall well-being. As a result, there is a reduced expectation for ASHAs to raise awareness on issues like breastfeeding, childcare, and pregnancy-related care, which were once central to their role. High levels of digital literacy among urban populations have significantly contributed to this trend. As more individuals become proficient in using digital platforms and accessing online resources, they increasingly seek information independently, rather than relying solely on ASHAs for guidance and support. However, this shift appears to be more prevalent in urban areas, warranting closer investigation to understand its broader implications.

Moreover, there has been a shift in how awareness-building activities are conducted. Previously, ASHAs had to make multiple in-person visits to mobilise the community, but now they are using platforms like WhatsApp to disseminate information, much like in Rajasthan. The adoption of smartphones and WhatsApp has significantly improved communication and coordination with community members, including older adults and women. This technology facilitates the quick exchange of messages, enhances service delivery, raises awareness about specific health issues, and enables the prompt implementation of preventive measures. For instance, one ASHA described how creating WhatsApp groups for medical camps and coordination saves time compared to making physical visits:

> *"I have saved all the mobile numbers of residents in my ward and created a WhatsApp group. We just need one person from each house to form the group. The group is called 'Ward Health.' If there are any updates, like the immunisation schedule every month, we inform the group about the....*

...date and time. Similarly, when clinics and camps are conducted, we inform them through the group. This allows us to get messages across quickly. For an eye camp, we sent messages in the group, and there was a huge turnout, beyond our expectations." (Ashwini, 45 years old, SC)

These examples demonstrate how ASHAs are utilizing technology to innovate in their community care work, particularly in raising awareness and mobilizing efforts. While this shift improves efficiency and convenience, it also decreases the need for in-person interactions, which were once central to these activities. As technology becomes more integrated into their work, these activities are evolving in ways that reshape the traditional dynamics of community interaction.

Negotiation through Collective Action and Solidarity

The ASHAs' union in Kerala, was established in 2009, and quickly grew from state to district levels, fostering political awareness through community mobilisation. Within six months, the union organised strikes advocating for better allowances, demonstrating strong solidarity among ASHAs. Another key concern for ASHAs is the timely payment of their incentives and honorariums. In January 2024, ASHAs protested against significant delays in receiving their payments (The Hindu Bureau, 2024), and workers across the state also demonstrated against delays in fund transfers to the scheme. ASHAs recognise the crucial role of their union in advocating for their rights, as changes in honoraria were achieved through collective action. As one ASHA explained

"Yes. We can survive only if we have a strong voice. There is a difference between me saying alone and saying as a group. So, the union is important. We do take part in the strikes actively."

Regarding digitalisation, the ASHA union has advocated for compensation to cover phone data costs, leading to the provision of a phone allowance. Additionally, ASHAs have raised concerns about the expectation for round-the-clock digital availability (Prasad and P.M., 2020). While they acknowledge the expanding use of digital apps as a valuable tool for improving information dissemination and implementing preventive health measures, their feedback highlights specific demands and challenges related to integrating digitalisation into their work.

"We have a positive opinion of this. We can complete our work more quickly, although the workload has increased. It has made the job easier as well, though it is hard to say which aspect is more beneficial. But overall, it's good work. Earlier, we used to write in a book and provide an OP ticket manually. But now, with the computer, we just click, and the OP ticket is generated automatically. Both are jobs, but we find the computer work easier. The writing part has been reduced, but the time taken for both tasks is almost the same. Now, when we go to the field and face an emergency, like dengue fever or chikungunya, we might learn about it when we get there, or sometimes, we might not fully understand it just by looking at the chart. In such cases, we call the respective officials and inform them about the situation. They'll ask us to send the discharge sheet, and we immediately send it over WhatsApp." (Union leader)

The union leader shared a generally positive but mixed perspective among ASHAs regarding the digitalisation of their work. While the increased workload is acknowledged, the use of digital tools, such as computers for generating OP tickets, is seen as making tasks faster and more efficient. Digital platforms, especially WhatsApp, have also enhanced their ability to respond to emergencies by enabling instant communication and the quick transfer of data, such as sharing discharge sheets with officials.

While this shift is regarded as beneficial, particularly in terms of speed and data accessibility, the concern about the growing workload persists. In Kerala, as previously discussed, the high levels of digital literacy, robust skilling ecosystem and gradual digitalisation have resulted in less resistance to this shift. Overall, the ASHA union has a favourable outlook on the digital transition, recognizing that their work will increasingly rely on digital platforms in the coming years.

Key insights

- The process of digitalisation in the state has been slower, intentional, and participatory, with adequate support to ASHAs in terms of digital skilling programmes.
- Kerala has a robust digital skilling ecosystem, with a crucial role played by Akshaya. Even the older ASHAs were able to adapt to the digital transformation of their work.
- Kerala's decentralised public health system emphasises participatory digitalisation through regular review meetings for ASHA coordinators in developing apps.
- The state focused only on one primary app, “Shaili”, which collected data on NCDs and supports in the screening and health services delivery.
- Innovate in their community care work, particularly in creating awareness and mobilizing efforts.

MEGHALAYA

Fragmented Pathways in Digitalisation

Nascent and Fragmented Digitalisation

In Meghalaya, digital interventions in the healthcare system have been limited, with the ASHA Payment App, introduced in March 2022, standing out as a notable innovation (Imphal Free Press, 2022). Known as ASHA First, this mobile application was developed to streamline the compensation process for ASHAs by enabling timely and transparent payments through an end-to-end digital approval workflow. Before its launch, the payment process was cumbersome, often taking over four months and requiring extensive physical documentation and verification. Since its implementation, the app has facilitated the timely processing of over 50,000 claims, amounting to Rs. 15.88 crore, for ASHAs across the state (Centre for Digital Financial Inclusion, n.d.). Despite this progress, many ASHAs still rely on paper-based claim forms due to challenges such as poor internet connectivity, limited access to quality smartphones, varying levels of digital literacy, and inadequate training provided by Primary Health Centers (PHCs). On the other hand, WhatsApp has become a widely adopted tool among both urban and rural ASHAs for work-related tasks. It is frequently used to report activities through images sent to health officials, communicate with community members, and disseminate health-related information.

In Meghalaya, the digitalisation of ASHA work, which began in 2019, is still in its early stages, characterised by fragmented adoption due to geographical and infrastructural challenges and varying levels of access to technology among workers. Remarkably, in 2023, ASHAs were provided with smartphones; however, the poor quality and performance of these devices made them nearly unusable for their digital tasks. The phones could not support even two applications and frequently froze or crashed, significantly hindering their functionality. As one ASHA succinctly put it,

> *"For 'smart' work, they are not providing us with 'smart' phones."*

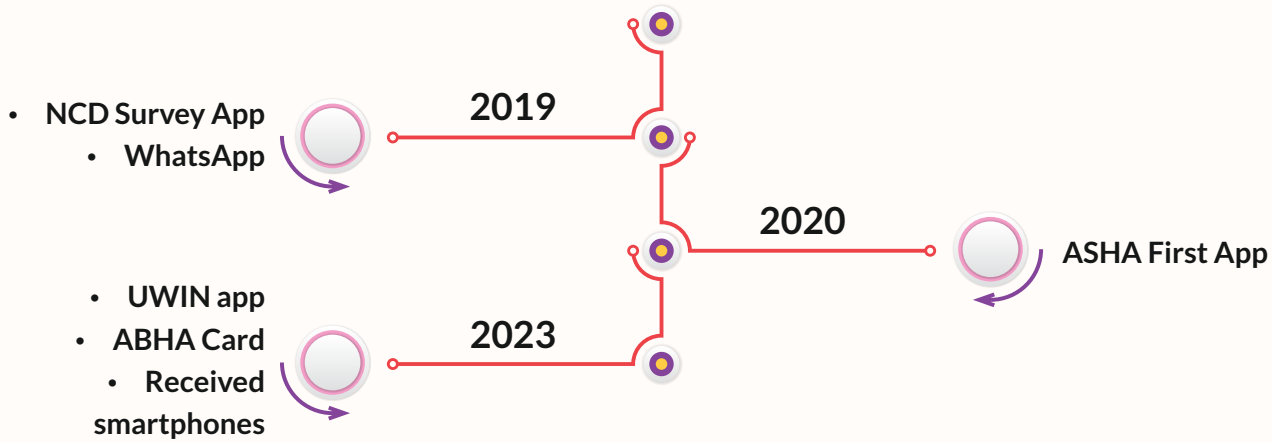
The rural ASHAs reported that health officials instructed them to use their smartphones for digital work. The following quotes illustrate the stark contrast in access to technology between rural and urban ASHAs. The rural ASHAs, who neither owned smartphones nor could afford to purchase them, struggled to keep up with their digital work, while urban ASHAs were able to continue their work using their personal smartphones.

> *"They've given us these cheap phones. When we tried using the app, it wouldn't support it. So, they said, 'You have to use it on your own phones.' But most of us don't have personal phones, and if we had to buy one, it would cost around 20,000 or more. And we get very little pay. If we bought that, for 2-3 years we wouldn't be able to feed ourselves." (Rural FGD)*
>
> *"They said, 'Other ASHAs from different PHCs are working using their own phones'. We, being from a rural area, cannot afford to buy an expensive phone." (Rural FGD)*

Unequal Access to Technology and Digital Skilling

ASHAs in Meghalaya, particularly those from rural areas, encounter challenges not only with basic digital literacy and skills but also with low

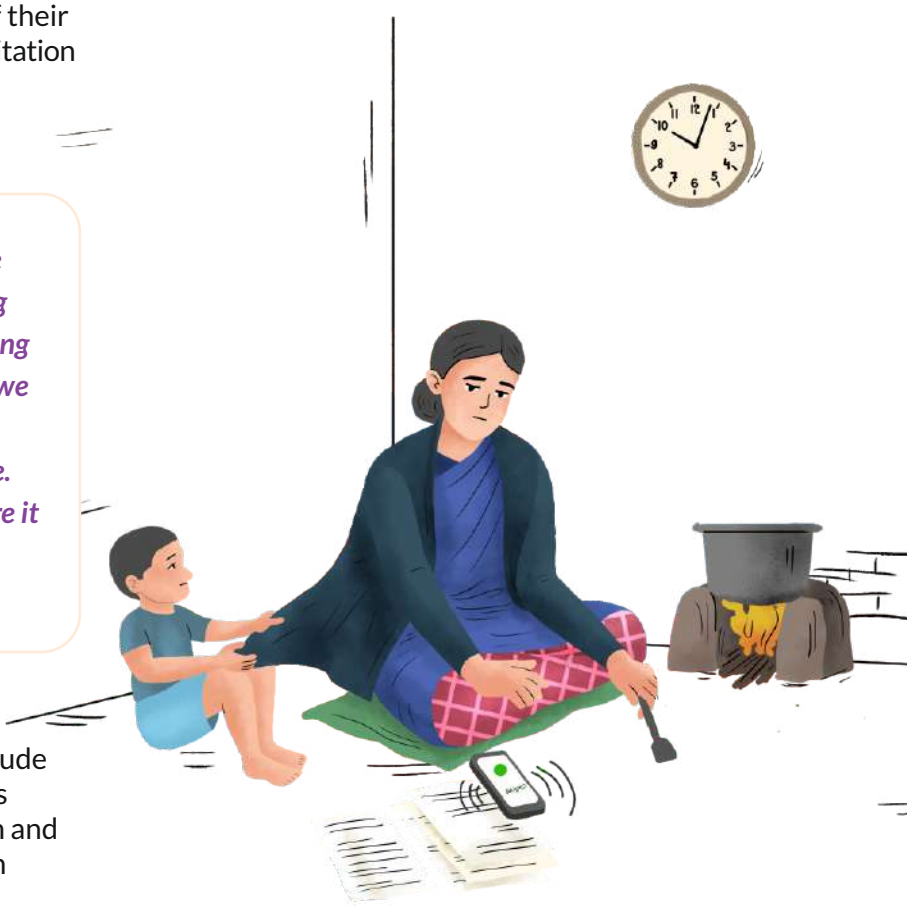
Figure 4: Timeline of digital interventions in Meghalaya



levels of general literacy and education. This dual disadvantage creates significant barriers to adopting digital skills, making it difficult for them to adapt to the evolving demands of their work. As a result, many ASHAs express hesitation and discomfort when using digital tools.

> *"NCD is a little complicated. With the total of families and all … it's just trouble working with the phone. We have been accustomed to using the form on the sheet of paper but now they say we don't need the forms anymore because all information will be stored on an app in the phone. That's where my problem lies. But I guess I'll figure it out one day. It may take some time." (Shimti, 50 years, Khasi)*

The rural ASHAs pointed to a shift in attitude from the earlier expectation of working as volunteers to an environment of rejection and disrespect, particularly toward those with limited education. Despite their years of service and extensive experience, they received minimal support from health officials and encountered a dismissive attitude toward their struggles in adapting to digital work.



"Before, they used to say, 'Work as volunteers, work with goodwill,' without ever mentioning the need for education, right? But now, there are times when they speak harshly, saying things like, 'Quit if you can't work with it.' Of course, hearing such things is hurtful. In terms of years, some of us have been working for 17 years or more, but when it comes to education, we've never received any." (Rural FGD)

However, senior health officials appear to acknowledge the distinct challenges faced by ASHAs in the state, particularly their limited education and lack of prior experience with smartphones, which makes digital training especially daunting. The officials we spoke with recognised the need for foundational training to address these skill gaps and emphasised the importance of providing regular refresher courses to support ASHAs in adapting to digital tools.

"Because, some of them are quite older, so it's kind of a very hand-holding support we have to give them. Even now also there are still some ASHAs that we have to capacitate time and again. So that also has been done during monthly meetings - we have to teach them again and again. Some ASHAs have not even passed class 8 or class 9. Some are quite mature, old ASHAs. So, to be technical, it's very difficult for them to operate things like smartphones." (District-level health official)

Despite acknowledging the challenges faced by ASHAs, the digital skilling process remains constrained. The state's nascent level of digitalisation possibly contributes to a fragmented approach to digital skills training. While some PHCs offer training on the NCD survey app and the ASHA First app, others do not. The absence of training at the PHC / block level, especially for the ASHA First app, is a significant concern.

ASHAs have expressed dissatisfaction with the training sessions, citing that they are neither comprehensive nor detailed enough to facilitate a thorough understanding of the applications. While some ASHAs may grasp basic smartphone usage for work due to prior experience with mobile phones, they find the NCD survey app complex and difficult to navigate. This highlights the pressing need for more specialised, focused, and iterative training to effectively address their challenges.

"I could not understand anything during the training. So, I got stuck when I reached home. After doing one (step), I don't know what the next step was." (Larishisha, 38 years old, Khasi)

"It (the training) was not conducted properly. They just kept the mobile (phone), and she was saying "You have to click here, you have to click here, you do like this, like this, finish". Not too much time also." (Poonan, 35 years old, Urban)

As in other states, age significantly influences how well ASHAs adapt to digital changes in their work. Older ASHAs often struggle with the technical complexities of digital tools, while younger, more tech-savvy ASHAs adapt more quickly. Although officials are somewhat aware of these challenges, the measures to address them are limited. Consequently, older ASHAs frequently depend on younger family members to help them navigate these issues, especially in the absence of targeted training.

> *"It's mostly the elders that don't have it (smartphones). The young ones were quick to adapt and learnt how to use it." (Rural FGD)*

> *"When we go for home visits we have to weigh the baby, so we have to take pictures. When we go to discuss or give information to pregnant women, we also have to take pictures. For that reason, it was challenging for me. I did not know how to use the phone - I only knew how to take pictures. I did not know how to write on my phone, so I always use the paper like this. I write everything on the paper and then take a picture, and when I meet my friends, children, or anyone who knows how to do it, I say "Please help me in sending these". So, I worked like that. I still do not know how to send it properly." (Daphi, 40 years old, Khasi)*

> *"There are these youngsters who have already passed the training. Mostly young people get through the training easily, while the old people like me who are 50 years plus, are the ones that are slow to adapt." (Shimti, 50 years old, Khasi)*

Another significant challenge faced by ASHAs in Meghalaya is the language barrier. In urban areas, where ASHAs speak both Khasi and non-Khasi languages, training sessions are primarily conducted in Khasi. Non-Khasi ASHAs struggle to understand the content, and when training is conducted in English, ASHAs who only speak Hindi are excluded. This adds another layer of complexity to an already challenging digital skilling process.

> *"They should separate, no? Like for those who understand Khasi they should keep one training for them, and the next day, for those who understand English, they can have a separate session. Some ASHAs from other areas like Bishnupur don't know English and Khasi; they only know Hindi. So, for them, training should be conducted separately in Hindi. The most difficult thing in our training is the language." (Urban FGD)*

The disconnect between the training provided and the existing skill levels of ASHAs is glaring. Many ASHAs feel disengaged during training sessions due to the lack of tailored, hands-on support. Some resort to completing other tasks, such as surveys or even playing games on their phones, as they struggle to follow along. This misalignment creates a frustrating and disorienting experience, leaving ASHAs feeling demotivated and reluctant to use the new applications.

> *"On screen, they are showing one thing but they are talking about another thing. Some ASHAs used to bring their survey register and start doing their survey (bursting into laughter) sitting in the backside. One ASHA said "I don't know what they are saying, so why should I watch? I will do my work" (Urban FGD)*

> *"When I use this smartphone for work, it affects me a lot. When I was working only on paper, it was very easy. But with the smartphone, we suffer and experience hardship. Plus, who informed us? And who will teach us again? When we use smartphones for work, it is hard but what can we do when we already took the job? (Suklin, 34 years old, Khasi)*

A significant issue identified in the digital training process is the apparent conflict of interest surrounding the implementation of the ASHA First app. Many ASHAs reported that they do not use the app to track or manage their payments. Instead, they rely on intermediaries, such as the ASHA facilitator, Auxiliary Nurse Midwife (ANM), and most notably, the accountant, who is responsible for disbursing their payments. However, the accountant also plays a central role in training ASHAs to use the app, creating a dual responsibility that has led to confusion and dissatisfaction among ASHAs. This dual role creates complex power relations, as the accountant controls both their payments and digital training. ASHAs shared that the accountant often discourages them from using the app, claiming that it is too complicated or time-consuming. Consequently, ASHAs remain dependent on the accountant, which limits the app's potential to enhance their autonomy and self-sufficiency. In addition, some ASHAs reported unexplained deductions from their payments, further undermining trust and creating frustration. This conflict of interest—where the accountant is responsible for both overseeing payments and training ASHAs on how to use the app to track their payments—raises concerns. It highlights the need for further investigation to address potential gaps in ASHA training and explore the reasons behind the low adoption rate of the ASHA First app.

> *"…because of the accountant only. He doesn't want to introduce us (to the app), he doesn't want to teach us. Then how will we know? how will we do?" (Poonam, 35 years old, Urban)*

> *"I told our accountant, 'You should allow us to do this (use the app). He said "It's very tiring work, you can't do it, it's very hard". I said, "You can explain to us? Nowadays everyone knows how to use Android phones, even if they don't know, they can learn from Google or YouTube no?" But still, he never said "you do". He used to do it by himself" (Urban FGD)*

Interplay between Community Care Work and Digitalisation

Given that the digitalisation of ASHAs' work is still in its nascent stages in the state, health officials tend to prioritise community health tasks over digital ones. Currently, ASHAs are primarily focused on immunisation-related work, indicating that they are not under pressure to prioritise digital tasks as they might be in other states. Nevertheless, both urban and rural ASHAs encounter challenges due to the need for dual documentation—both hard copies and digital formats—along with submitting proof and photos of their work.

The evidence indicates that there has not been a complete shift from community care work to digital tasks, primarily due to several obstacles ASHAs face in using digital tools. These barriers include gaps in digital skills, insufficient training, network issues, challenges at the block level, and poor-quality smartphones. Despite these challenges, ASHAs have observed that health officials emphasise the need to send pictures of their work via WhatsApp. This requirement creates a compulsory condition: if an ASHA fails to send a picture, health officials may assume that the work has not been completed.

Overview of ASHAs' Work Responsibilities, including Digital Tasks, in Meghalaya

List of Tasks: Community care work

- Home visits for various surveys
- Home visits for vaccination, ANC, and PNC
- Accompanying women to health services for childbirth
- Coordination for VHND and mobilisation of community members
- Survey, screening, and treatment coordination for TB
- NCD survey (paper-based)
- Malaria screening
- Maintaining registers and ASHA diary
- Guidance on the diet of mothers and children
- Screening high-risk mothers
- Attending meetings
- Reporting to ASHA supervisors/facilitators
- Counselling families on contraceptive use
- Counselling young girls on menstruation
- Distribution of condoms and medicines
- RI duties for ASHAs in urban health centres: assisting ANM with primary bodily check-ups of patients
- HBNC and HBYC
- Conducting yoga sessions in the community
- Providing iron tablets to women and children in the community

Digital Tasks

- Sharing pictures with health officials from each home visit, VHND, and yoga session
- Entering details in the ASHA First app (Only for ASHAs whose training is complete at the PHC and the app is functional on their phone)
- NCD survey through the app (Only for ASHAs whose training is complete at the PHC and the app is functional on their phone)
- Phone calls and messages on WhatsApp

Source: Interviews and FGDs with ASHAs

> *"Before we start a VHC meeting, we have to send pictures. Without the pictures, they won't trust you. They say they won't accept without it. Let's say a baby is born, within 42 days, we have to send pictures. If you don't send the pictures they would say we never did it" (Rural FGD)*

It was clear that using smartphones for calls and WhatsApp has significantly streamlined community care tasks for ASHAs, reducing the need for physical travel and enabling faster and more efficient communication. Both urban and rural ASHAs rely on WhatsApp for work-related activities, including reporting their activities with images, disseminating information, and connecting with community members.

> *"Instantly, we can connect with the person we need to contact urgently. So basically, if we have to share information - while going for the survey, we take the phone numbers as well, so they are in our contact list. For those who have WhatsApp, they can just see our status, if anything important is there, so they can make out. Otherwise, without any WhatsApp group or phone calls, it would be very difficult for us to go house to house to share information. So, in this way, it's helpful, I feel." (Urban FGD)*

Despite these benefits, some rural ASHAs face difficulties with WhatsApp due to limited familiarity and inadequate training, often relying on family members, including children, for assistance.

> *"...it affects (my work) because sometimes I tend to forget, sometimes I do not know how to use it so it affects. To be honest, for ASHAs like us who started working a long time ago without much education, we have to do whatever we can, we have to wriggle to fit in and do whatever we can. But these days I just feel like I cannot do it, I cannot keep up." (Daphi, 40 years old, Khasi)*

Like other states, in Meghalaya as well, ASHAs described how the increased amount of time spent on digital tools impacts the time they are left to complete their other paid work, as well as their unpaid domestic and caregiving responsibilities. These narratives reveal how digitalisation adds to their mental exhaustion, compounding the physical fatigue caused by juggling multiple forms of paid, underpaid, and unpaid work. This double or triple burden of work significantly affects their well-being.

> *"Half of the time, we went for survey. After coming home, we don't get time to spend with our family or our children. Because the whole day we are out for work, and even after coming back from work again we have to sit and complete our work. So, we miss those moments with our children. For me, I have my daughter, and she waits the whole day 'my mom will come and we'll spend time together'. But, because of this double work, I cannot give her that time. So, for me emotionally, mentally and physically, it's kind of torturing." (Urban FGD)*

Some ASHAs also highlighted how digitalisation has transformed their work processes, adding a layer of complexity and demanding more of their time.

> *"In the past, if we went to submit the report and come back home, there was no extra work. However, now, if we go there, it takes so much of our time - we have to take pictures, then we have to do this and that. For me, since I don't know what to do, I often have to ask for help, meeting some people here and there, so it affects me. Take for instance, since morning, we went for home visits and after coming back home, we have to use (phone). If we were using just the hard copy, we would finish the work and just keep it. But now, using the smartphone we also have to send the soft copies..." (Daphi, 40 years old, Khasi)*

> *"The majority of the members of the ASHA Union are from rural areas. The leaders of the union are from rural areas not from urban areas. So, we in the urban areas still lack power. It's like we are the branches and they are the tree. The union ASHA members are trying to get associated with different political parties and some ASHAs did not like the idea of being associated with politics. So, there are ASHAs who strike and also those who do not strike, because in the union there is no unity now. Most of the ASHAs from the West Khasi hills didn't participate in the strikes. From east Khasi hills also, they didn't go on strike." (Union leader)*

Struggles in Building Solidarity and Advocacy

In Meghalaya, ASHAs are organised under the Meghalaya ASHAs Union, which includes both urban and rural branches. Established between 2010 and 2012, the union has struggled with limited outreach and support, particularly among rural members, despite their significant representation.

A lack of unity within the union is a recurring challenge, as ASHAs from the West Khasi Hills and East Khasi Hills regions have repeatedly refrained from participating in strikes. This fragmentation is further compounded by suspicions of political motivations among union leaders, which has caused divisions and concerns over political affiliations. These social and cultural factors have weakened the sense of collective solidarity among ASHAs across the state, despite the union achieving some successes through its advocacy efforts.

Despite the lack of unity, the union has consistently worked to address critical issues facing ASHAs. Over the years, the union has advocated for increased incentives, timely release of honorariums, health insurance, and overall improvements in compensation. Currently, ASHAs in Meghalaya receive incentives mainly from the central government, amounting to Rs 2000 per month. However, due to issues with the state government's matching contribution of an additional Rs 2000 per month, ASHAs face severe underpayment and exploitation (Pyrtuh, 2022). Many ASHAs report significant delays in receiving honorariums, with some waiting months, creating confusion and difficulty in tracking the amounts owed to them.

Among the four states studied, Meghalaya offers one of the lowest honorarium ranges for ASHAs. To address this issue, ASHAs have employed various strategies, including indefinite strikes, hunger strikes, work stoppages, and discussions with authorities through formal letters. Notably, the union organised major protests in 2018 and 2021 to highlight delays in receiving incentives and

other grievances. Most recently, on November 27, 2023, the union cancelled a planned indefinite strike and sit-in protest outside the main Secretariat following negotiations with the state government. While the government proposed increasing their fixed incentive to Rs 3,000 under the new Community-Based Health Incentive Scheme (CHIS) (Hub Network, 2023), the union had not decided whether to accept or reject the proposal.

While the union has primarily focused on improving work conditions and remuneration, digitalisation has not been a major area of concern. However, union members acknowledge the significant challenges rural ASHAs face with digital tasks and smartphone integration.

> *"For us (Urban ASHA) we don't have a problem using smartphones. However, the rural ASHAs find it difficult. So, whenever there is an issue, many of them don't know how to use it. Plus, the network also is not good or not working." (Union leader)*

Rural ASHAs, who tend to have lower levels of education and digital skills, struggle to adapt to the increasing digital demands. Many union members have emphasised the need for tablets to improve the quality of digital work. As digitalisation progresses, this issue is likely to become a key area for the union's intervention.

Key insights

- Meghalaya has experienced fragmented and limited digitalisation due to geographic and infrastructural challenges such as poor connectivity, low literacy levels, and gaps in state-led digital skilling interventions, especially in rural areas.
- A lot of linguistic diversity in Meghalaya making training in only one language not accessible for many.
- Power dynamics between ASHAs and officials reinforce barriers in the digitalization process.

CONCLUSION

Decoding the Spectrum of Digitalisation and Its Implications for Workers

Our research revealed that the digitalisation of ASHAs' work has been neither uniform across states nor consistent in its impact on their experiences. We argue that digitalization must be understood as a spectrum—a continuum rather than a binary process—shaped by multiple contextual factors such as infrastructure availability, ASHAs' training and skills, state-level policies, and broader socioeconomic conditions like gender norms and rural-urban divides. In Haryana, the rapid rollout of digital tools and a flurry of apps have marked an extensive push toward digitalisation. However, gaps in digital skilling, issues of exclusion, unpaid digital labour, privacy concerns, and marginalisation have left ASHAs feeling alienated from the process, particularly the less educated and older ASHAs. This reflects a top-down approach to digital integration, where workers are expected to adapt to new technological demands without adequate inclusion, training, or support. Conversely, in Rajasthan, digitalisation has progressed swiftly too but with comparatively greater involvement from ASHAs. Here, the process is more worker-centric, as it supports and enables both rural and urban ASHAs to perform their community care work more effectively. ASHAs also recognise its potential benefits and view themselves as active participants in the process.

Kerala offers a markedly different model, where the digitalisation of ASHAs' work has been slower but more intentional and participatory, reflecting the state's decentralised and inclusive approach to public service delivery. This model is supported by a robust digital skilling ecosystem which benefited even older ASHAs and adopts a moderate pace of technological transition, acknowledging ASHAs' multifaceted responsibilities. The Kerala experience highlights that a slower, more careful approach can foster greater worker engagement and capacity-building, in contrast to rapid, externally driven processes.

Meghalaya, however, presents a distinct scenario where the digitalisation of ASHAs' work has been limited, primarily due to geographic and infrastructural challenges such as poor connectivity, low literacy levels, and gaps in state-led digital skilling interventions. Structural barriers—including the intersecting dynamics of age, language, and community distinctions—further compound the difficulties of integrating digital tools into ASHAs' work and designing training programs that align with their existing skill levels and diverse needs. The slow pace of digitalisation in Meghalaya reflects both the region's practical limitations and the state's constrained ability to address these complexities, underscoring the need for a more tailored and inclusive approach to digital skill development.

In many ways, Rajasthan has been at the forefront of digitalisation efforts for ASHAs, from being the first state to implement online claims for ASHAs, to ensuring smartphones for women and pioneering the digitisation of health records. The Pregnancy, Child Tracking & Health Services Management System (PCTS) portal and app have been central to this transition. What distinguishes digitalization in Rajasthan is that ASHAs have access to all the data they enter into the PCTS app, a feature rarely available in other states. This access empowers them to review the data they collect, monitor their work schedules, and plan their tasks more efficiently, enabling them to better manage their responsibilities and recognize opportunities for higher earnings. This stands in contrast to the more extractive forms of digitalisation seen elsewhere, where ASHAs are often treated merely as conduits for data. Instead, Rajasthan's model fosters a sense of ownership, enabling a more worker-centric approach to digitalisation. ASHAs are not just data collectors; they become active participants in the system, tracking the outcomes of their efforts and feeling more valued in the process.

Hence, ASHAs have emphasized that

digitalisation efforts that enhance their ability to perform their duties—such as those that strengthen their relationship with the community through better dissemination of information on healthcare delivery as well as related cash transfers—are more beneficial than those aimed solely at data collection or surveys. For instance, in Rajasthan, we found that the PCTS app, designed to support ASHAs in their community work, has the potential to build trust with the community by improving the dissemination of information about entitlements, such as cash transfers. Similarly, in Kerala, we found that ASHAs have reported that the Shaili app has played a crucial role in the early detection of NCDs, enabling timely interventions and efficient healthcare delivery at the community level. Likewise, a study by Srinidhi et al. (2021) on ASHA Kirana, a digital Maternal Clinical Assessment Tool (M-CAT) in Karnataka, revealed that such tools empower ASHAs by enabling them to apply their expertise more effectively. When supported through digital tools, ASHAs reported feeling a greater sense of agency and were viewed with increased respect within their communities due to their familiarity with risk symptoms and improved capacity to address maternal health concerns. This reinforces the argument that digital interventions should be designed not merely to collect data but to meaningfully enhance community care work, foster trust with the community, and strengthen the roles of frontline health workers, ensuring they are integral to community health processes.

Similarly, despite some limitations, there is emerging evidence of a more inclusive and participatory approach in the designing of digital health technologies. Kerala offers a notable example of fostering collaboration between developers and frontline workers to ensure that digital tools are tailored to the specific contexts of community healthcare workers and their communities. A key aspect of this approach is the regular review meetings held for ASHA coordinators, providing a formal platform to address concerns related to the implementation and functionality of digital platforms. Although these meetings currently involve only coordinators, they reflect an important recognition that diverse stakeholders including workers must be part of the digitalisation process for it to be truly inclusive and transformative. This participatory approach is possible in Kerala due to the decentralised nature of its public health system, which prioritises engagement and feedback.

Summary of the Intersectional Analysis of Digitalization of ASHA's work

Access and the Digital Divide

- When quality smartphones are provided by the state, ASHAs, particularly those from lower caste and class backgrounds, feel empowered by owning and using a smartphone for the first time in their lives.
- ASHAs from lower caste and class backgrounds often cannot afford high-quality, expensive smartphones and are forced to rely on outdated or unsupported devices.
- The disparity in smartphone quality sharpens inequalities between ASHAs with access to good-quality smartphones and those without.
- The expectation of digital and language skills exacerbates the challenges faced by ASHAs, particularly older ones with limited education, from rural areas, and lower caste backgrounds. Low digital and language skills result in inadequate inclusion during training, digital work and communication, further deepening inequalities within the workforce.

Sociocultural Barriers to Digital Inclusion

- Digital technologies often interact with gender norms, especially in rural and patriarchal settings, where women's use of smartphones is scrutinized and stigmatized.
- Societal perceptions that women's use of smartphones threatens traditional gender roles create barriers that go beyond physical access to technology.
- Gender-sensitive planning for training, such as avoiding inconvenient schedules, is often neglected, making it harder for ASHAs to balance caregiving roles. Online training formats fail to engage or align with ASHAs' dual responsibilities of paid and unpaid domestic labour, making participation in digital training difficult.

Power Asymmetries and Digital Inequities

- Power dynamics between ASHAs, ANMs, and accountants (in Meghalaya) reinforce inequalities in the digitalization process.
- Delays in data submission and approval by ANMs impact ASHAs' payment cycles, creating frustration and financial insecurity.
- The conflict of interest surrounding the ASHA First app (controlled by the accountant, who also trains ASHAs) complicates adoption and diminishes autonomy.

Intersectional Inequities in Digital Exclusion

- The ability to overcome digital skill gaps is influenced by caste, class, literacy, and family resources.
- Upper-caste ASHAs can afford to delegate digital tasks, while marginalized ASHAs (e.g., Dalits, and those from lower socioeconomic backgrounds) lack such resources, increasing their vulnerability and exclusion.
- Caste and class structures within the workforce perpetuate digital exclusion, further exacerbating job insecurity for marginalized ASHAs.

To conclude, digitalisation must be considered in relation to the existing responsibilities that ASHAs manage, particularly their community care roles. This research has highlighted how digitalisation intersects with community care work in different ways across states. In Haryana, there was a shift of focus from community care to digital and data-driven tasks while Rajasthan and Kerala, in their own ways, have developed systems where digital technology supports and enhances community care work. In contrast, the interplay of community care and digital work has been limited in Meghalaya, due to the slow pace of digitalisation in the state. Ideally, digital tools should alleviate the burdens ASHAs face and improve the delivery of community care services. However, ASHAs still often encounter additional challenges, such as duplicating tasks and managing both paper and digital documentation, which detracts from their core community care responsibilities. Furthermore, the increasing number of digital surveys has led to growing trust issues among ASHAs and their communities.

In response the unions have addressed the challenges of digitalisation, employing strategies to overcome obstacles and achieve notable successes. This research highlights the resilience and resourcefulness of the ASHA collective in resisting harmful digital practices and critiques the shortcomings of the top-down approach to digitalisation in healthcare. For example, the ASHA workers' trade union successfully resisted a state-imposed invasive surveillance app, demonstrating the collective strength and ingenuity of the ASHA workforce in challenging harmful digital data practices. Their efforts have laid the foundation for reimagining digital public infrastructures that do not disproportionately burden those most precariously positioned within the system. By championing an inclusive and participatory approach, they envision data futures that truly recognize and value the voices of frontline public healthcare workers.

To truly harness the transformative potential of digitalisation, a bottom-up approach must be adopted to support ASHAs not only in providing efficient healthcare but also in achieving dignity and satisfaction in their work. Moreover, the state can fully harness the benefits of digitalisation only if digital skilling and resource constraints (including and especially human resources) are addressed with a focus on intersectional marginalities. Gender norms and social relations and the power imbalances stemming from these are key factors in determining how effective and inclusive the digital transformation of Ashas' work can be. New approaches to digitalisation must prioritise the intersectional, which prioritise the needs and experiences of women workers fostering equity and inclusivity in delivering health services. Such efforts can pave the way for a more just and sustainable future for both workers and communities in this digital age.

RECOMMENDATIONS AND WAY FORWARD

In the ethos of building a bottoms-up approach to digitalisation, we foreground the voices of ASHAs, and in doing so develop policy recommendations drawing from their suggestions and narratives. Broadly, across states, ASHAs' have indicated, in many ways, issues of digital skilling, training and support, remuneration, dignity of work, and social security. The study highlights that while it is imperative to address concerns around the process of digitalisation and avert top-down implementation of digital technologies, it is also important to alleviate long-standing issues like conditions of work, as both digital work and community care work are interlinked and not exclusive of each other. The study makes the following key recommendations:

- **Build adequate digital infrastructure**
  ASHAs require access to good-quality smartphones and tablets, as well as better apps. A dedicated helpline could be created for ASHAs to seek guidance on technical questions about apps. ASHAs also indicated the need to strengthen digital infrastructure by improving network and internet connectivity in all areas, particularly rural, remote and tribal areas.

- **Comprehensive digital skill development and training program**
  A robust digital skilling ecosystem must be developed. Timely, frequent, and extensive training on apps and digital work should be provided. These training sessions must be held in locations that are convenient for ASHAs to access. The sessions should be inclusive and sensitive to the intersectional needs and requirements of ASHAs, particularly in terms of gender, age, education, network availability, and language. ASHAs suggested holding more offline training on digital work, as well as training in smaller groups with visual aids like images on projectors and pamphlets.

- **Develop participatory approaches to co-design digital tools by actively involving frontline workers**
  ASHAs should be included as key stakeholders in discussions and decision-making related to digitalisation. It is particularly important to involve those from marginalised backgrounds in the design and testing of tools. The consultation sessions for digital tools held with ASHA coordinators in Kerala are a first step and demonstrate how implementation can be made more consultative and participatory.

- **Design integrated, worker-friendly apps**
  This app should streamline data collection and provide ASHAs with easy access to data, supporting and enhancing their community care work. For instance, the Pregnancy, Child Tracking & Health Services Management System (PCTS) in Rajasthan found favour with ASHAs, as it fostered a sense of ownership among them as workers and stakeholders. This serves as a good example of an inclusive approach to digitalisation. Additionally, ASHAs often use poor-quality phones with limited storage; hence, lite apps should be developed for wider adoption. To further support ASHAs with limited literacy, apps could be developed with voice command features.

- **Recognition of digital work**
  ASHAs have demanded an honorarium for the numerous digital tasks they carry out, as these tasks currently lack recognition and remuneration. Workloads should be reduced, duplication of paper-based and digital tasks eliminated, and excessive reporting addressed. Creating work schedules and task lists could significantly streamline ASHAs' workflow.

- **Ensure dignity of labour for ASHAs**

  ASHA unions and collectives have long demanded regular employment with leave and social security, as they are an undeniably vital part of our public health system. ASHAs also stated that they should be provided with at least a fixed and adequate honorarium, proper ID cards, uniforms, dedicated spaces and seating and free healthcare services for ASHAs. These provisions not only signify respect for ASHAs and the work they tirelessly perform but should also be treated as their entitlements.

In sum, a worker-centric, intersectional and bottoms-up approach to digitalisation, grounded in the lived realities and diverse needs of marginalised ASHA workers, can ensure that the crucial work of community care is carried out in a manner which is empowering for both the workers and the communities that they work for. For this approach, while short-term solutions must address immediate concerns about digital skilling and infrastructure, the long-term, sustainable approach must view digital work and community care work in tandem with each other, being carried out by workers who are invaluable to the public health care system in this digital era.

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Institute of Social Studies Trust

U.G. Floor, Core 6A, India Habitat Centre,

Lodhi Road, New Delhi-110003

Tel : +91-11-4768 2222 | Email : isstdel@isstindia.org

Website : www.isstindia.org