RESEARCH ARTICLE

Digital Health, Technology and Innovation in Nutrition Monitoring in Lunglei District, Mizoram

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Abstract

India's adoption of digital health technologies has progressed through several phases, beginning with early telemedicine initiatives and institution-specific administrative systems, and gradually evolving into a comprehensive national digital health ecosystem. In Mizoram, the use of digital health technology dates back to the mid-2000s, with early telemedicine initiatives and administrative tracking systems. By 2023, the state had emerged as a national leader in implementing integrated digital health ecosystems. More recently, in September 2024, the Civil Hospital in Lunglei began using a Health Management Information System (HMIS) to support hospital-level digital health operations. Alongside these developments in digital health, nutrition has become an increasingly important component of public health policy in India. Nutrition monitoring is now recognized as a critical mechanism for tracking health outcomes, particularly among women and children, with the broader aim of achieving a malnutrition-free nation. In Mizoram, digital nutrition monitoring has been implemented through the POSHAN Tracker App, which has been in use since March 2021.

The main objective of this study is to examine the impact of digital health technologies, specifically HMIS, and to assess innovation in nutrition monitoring through the POSHAN Tracker App. The study adopts a qualitative research methodology, using interviews as the primary method of data collection. A total of 20 participants (10 female and 10 male) were interviewed. The research was conducted in the southern region of Mizoram, with a focus on Lunglei district. The study aims to identify existing gaps in digital health and nutrition management systems and to highlight areas where improvements can strengthen the overall health system in Lunglei, Mizoram.

Keywords: Digital health, Technology, Nutrition, Impact, Gap.

Introduction

The term "digitalisation" describes the use of digital technologies in daily operations, such as e-banking and e-governance, to increase people's digital literacy. It is the steps the Indian government has taken to empower the nation digitally, enhance government accountability and transparency, and improve access to technology-based public service delivery. On July 1st, 2015, the Digital India program was introduced with the goal of implementing numerous projects across the nation, including internet connectivity, banking, health, and education *(Ministry of Electronics and Information Technology [MeitY], 2015)*

India's transition from paper-based to digital public services aims to close the gap between "digital haves" and "digital have nots" by utilising technology to integrate the people and the government (Chandola et al., 2025). Ayushman Bharat Digital Mission (ABDM) promotes a digital ecosystem for patients by offering unique health IDs and permitting data sharing between patients and health providers, while flagship initiatives like "e-Kranti" have transformed the country's healthcare system to be more client-centered and enable the electronic delivery of medical services (Mitchell & Kan, 2019).

With regard to nutritional monitoring, Poshan Tracker is a mobile application that has been developed to help Anganwadi Workers (AWWs) monitor pregnant women, nursing mothers, and children under the age of sex years in real time. In addition to digitising the Anganwadi Center's services and replacing the manual register, this application guarantees accountability and transparency in the distribution of health and supplemental nutrition services

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Table 1: Assessment of POSHAN tracker among the Anganwadi Workers (AW)

S. No.	Particulars		Percent (%)
1	Years of work	Less than 1 year	8.33%
		1–5 years	25.00%
		More than 10 years	66.67%
2	Poshan Tracker ease of use	Yes	62.5%
		No	37.5%
3	Poshan Tracker App use frequency	Daily	100%
		Weekly	0%
4	Helpfulness of the App	Yes	100%
		No	0%
5	Task performed using the App	Child registration	100%
		Growth monitoring	100%
		Nutrition tracking	100%
		Pregnant women data	100%
6	App save your time?	Yes	80%
		No	20%
7	Problem faced while using the App	Internet problem	58.33%
		App not working properly	16.67%
		No problem	16.67%
		Login issues	8.33%
8	Network availability at Anganwadi Centre	Yes	99%
		No	1%
9	Poshan tracker improved record keeping	Yes	100%
		No	0%
10	POSHAN Tracker as an innovative tool for monitoring nutrition	Yes	100%
		No	0%
11	App helps in improving accuracy of nutrition data	Yes	100%
		No	0%
12	App is better than maintaining register	Much better	75%
		Better	25%
13	Helps in identify malnourished children or mother	Yes	100%
		No	0%
14	Help in better monitoring of mother and child	Yes	100%
		No	0%
15	Help in better monitoring of child and lactating mother	Yes	100%
		No	0%
16	Work efficient after using the App	Yes	100%
		No	0%
17	Areas for improvement	Better internet support	83.33%
		Faster app	16.67%

Source: Computed

(MeitY, 2025). Poshan trackers determine the children's nutritional status and growth standard by using growth monitoring to calculate Z-scores for stunting, wasting, and underweight prevalence (Gouroumourty et al., 2025). Additionally, the system facilitates a continuum of care throughout the health ecosystem by integrating with the Ayushman Bharat Digital Mission (ABDM) to generate unique health IDs (ABHA) for recipients.

However, despite the technological capabilities, digitalisation has presented several challenges for both the operators and the beneficiaries. It has been argued that it increases workload without corresponding compensation and functions as a surveillance tool that prioritises data over actual care work.

Overview of Literature

Copious of literature had highlighted the innovative and the transformative nature of Digital India initiative. The digital India with more than one project are underway, yet it required more time and developmental process to fully achieved its objectives (Jani and Tere, 2015). Sharma et al. (2015) emphasize that the digital initiative have the capacity and the ability to boost national economy by creation of more employment among the youths as well as transforming the lives of the people in the country.

Bogale (2021) assessed the implementation of Health Management Information Systems (HMIS) in central Euthopia and it was found that there was poor implementation with zero funds allocated despite the staff were being trained on how to operate the system. Similarly, Dehury and Chatterjee (2018) examined the HMIS implementation in the rural district of Odisha revealed several obstacles, including low-quality data, technical issues like power outages that made it difficult to enter data on time, and a lack of worker feedback. Additionally, it was stated that inadequate facilities and a lack of staff training contributed to the system's unreliability in rural areas. In contrast to the pervious findings, Meghani et al. (2022) study found that implementing and upgrading the health system with HMIS improved health management, better decision-making, and effective information use, resulting in increased trust and accountability among hospital staff and officials.

Jaacks et al. (2024) analyse how "Poshan Tracker" greatly improved India's nutritional surveillance system, increased accountability in service delivery, and improved nutritional supply transparency. However, there are still difficulties because it has placed a great deal of strain on the employee. In their evaluation of the effects of digitally enabling Anganwadi workers in India's Integrated Child Development Services, Patil et al. (2022) discovered that the digital intervention greatly enhanced the adequacy of home visits and counselling recall among mothers and pregnant women. Although digital technology helps employees in many service areas by eliminating the need for paper-based

records, there is no other way to address more extensive systemic structural barriers.

The digital India initiative had made significant progress in making the health sector more digitally accessible to citizens. The Ayushman Bharat Digital Mission (ABDM), Health Facility Registry, and Unified Health Interface (UHI), as well as the Aarogya Setu app and eSanjeevani, have all had a significant impact on disease surveillance, data exchange, and operational efficiency. However, there are still challenges that everyone cannot access because there is a huge gap in infrastructure and divides the citizens who have and have not (Rana et al., 2024).

Methods

The data was gathered using purposive sampling, and the sample was taken in Lunglei district. Structured interviews scheduled were used to collect primary data. There were 20 participants for this study: 10 male and 10 female respondents. Interviews were conducted with Anganwadi workers who used Poshan tracker. To determine the impact of HMIS interview scheduled was adopted and interviewed patients from IPD and OPD.

Results and Interpretation

The findings indicated that maximum number of the respondents are having more than 10 years of working experience (66.7%) which is followed by 1-5 years of work experience (8.33%) while a minimum of respondents have working experience of less than a year (8.33%). The majority of the respondents (62.5%) have reported that the application is easy to operate, and while 37.5% face challenges in operating the application. The maximum number of the respondents (100%) use it daily and reported that the application is very helpful (100%) for the smooth operation of their work and services. The respondents reported that the application is used for child registration, growth monitoring, nutritional tracking and management of pregnant women data with 100% implementation and indicated that it is very crucial for delivering the services for Anganwadi centre.

The maximum number of the respondents 80% have reported that the application save time and while 20% reported that due to technical illiteracy they found it challenging and inconvenient to use the application but still managed to use it. The respondents also reported that they also faced challenges while using the application such as internet problem (58.33%), application not working properly (16.67%) while the same proportion of the respondents also reported they did not face any problem (16.67%) and the remaining of the respondents have faced login issues (8.33%). Majority of the respondents reported that they can access to internet connectivity for operating their application while 1% of the respondents reported that they did not avail stable internet connectivity at the centre. Regarding record keeping, monitoring nutritional status of the children and lactating mother, identifying the malnourished children, efficiency in work the respondents had perceived that the application is crucial for them. The respondents reported a positive preference more on digital rather than maintaining a register.

The areas for improvement suggest that respondents suggest improving on better internet support (83.33%) and faster application (16.67%) experiences for the users for smooth operation. These findings suggest that enhancing connectivity and app performance could enhance user experience and optimize time-saving advantages.

Table 2: Impact of digital health technologies among the patients

Questions	Result
Smartphone ownership	100% own a smartphone
Comfortable with apps/internet	100%
Aware of online OPD/IPD registration	100%
Registered with help vs by self	55.6% with help. 44.4% by self
Found online registration easy	55.6%
Saved time	55.6%
Reduced waiting time	77.8%
Staff help with registration	77.8% "Always", 22.2% "Sometimes"
Believe HMIS improved services	55.6% "Yes"
Think HMIS is good for everyone	33.3% "Yes"; 66.7% "Only for educated/digital users"
Difficulty due to tech	55.6%
Accessibility impact	44.4% More accessible · 44.4% Less accessible · 11.1% No change
Problems faced	Depend on others for registration 66.7%; Long waiting time 44.4%; Confusion about the process 33.3%
Overall satisfaction	33.3% Very satisfied · 33.3% Satisfied · 33.3% Not satisfied

Source: Computed

The impact of HMIS on the IPD and OPD is shown in the above table. The majority of respondents (100%) had smartphones, were at ease using the internet and HMIS application, and knew how to register online for a health checkup. For online registration, over half (55.6%) of the respondents needed help. Similarly, 77.8% of respondents stated that online registration shortened waiting time compared to offline registration, while more than half (55.6%) of respondents indicated that online registration is simple and saves time. According to 77.8% of respondents, hospital staff assist patients with online registration. The majority of respondents (55.6%) believe that HMIS has enhanced hospital registration services. There is also a divide among users, as evidenced by the fact that 55.6% of respondents said they had trouble using the online registration because they lacked the necessary technological skills, and 66.7% of respondents said HMIS is only useful for users who are well-educated. There are conflicting opinions regarding its impact on accessibility; equal percentages of respondents (44.4%) thought it was more or less accessible. 66.7% of respondents said they had to rely on others to register, and 44.4% said they had to wait a long time. These were the respondents' challenges with HMIS. Despite the fact that most respondents reported shorter wait times, respondents' overall satisfaction with HMIS was evenly distributed (33.3%).

Discussion

The literature review portrayed India as a digitally innovative and transform the healthcare system with a potential for strengthening service delivery and foster economic gains (Jani & Tere, 2015; Sharma et al., 2015). While the study found that there is a transformative and potential for an increase in better service delivery, but the progress made is not uniformly experienced across users. Digital innovation takes time to adapt and required time for fully aware operate the system the study found that there is presence of mixed satisfaction of 33.3% each on satisfied, very satisfied and not satisfied. This result shows that innovation does not automatically positive uniformity among the users. Rana et al. (2024) mentioned that barrier exist where infrastructure and capacity are unequal and there is a gap in the initiative as the study found that 55.6% of the respondents are facing difficulty in registration process and 66.7% reported that HMIS are only beneficial for educated digital users. Despite the fact that the respondents have possessed smartphone and accessed internet connectivity there is a need for sensitization in this area. According to Patil et al. (2022), digital tools can improve service delivery, but there are still structural barriers, such as the fact that hospital staff primarily assist patients with online registration for the IPD and OPD (77.8% of respondents said they receive assistance from hospital staff). Although the purpose of digital tools is to reduce staff workload, human assistance is typically required in this situation. Dehury & Chatterjee

(2018) highlight the training gaps in HMIS which is also aligned with the present study. According to Meghani et al. (2022), HMIS's upgrade increased accountability. The study also supported earlier findings that showed 55.6% of respondents thought HMIS had improved the registration process. Jaacks et al. (2024) found that while POSHAN Tracker improved transparency and accountability, it also put a strain on employees. The study found that technical issues with AWW, such as internet connectivity and application performance, are likely to increase workload because data has to be entered repeatedly.

Overall, from the literature and the study findings it is evident that digital innovation has a potential for improving the efficiency and accountability while their impact is not uniformly experienced by the users because of low digital proficiency and infrastructure. There is a significant digital divide among users as a result of their limited proficiency with the English-language application, which makes it more difficult for them to use and forces them to look for assistance. Similar to the AWW, there is a language barrier when using the application, as well as connectivity issues in the institution. It would be advantageous if the application language could be translated into the local language for better user adaptability and a smoother application experience.

Acknowledgement

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