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ORIGINAL ARTICLE

FORMATIVE EVALUATION OF HMIS 3.0 PILOT, POONAMALLEE HUD, TAMIL NADU, 2025

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ABSTRACT

INTRODUCTION : Health Management Information System (HMIS) facilitates systematic recording, storage, and analysis of health data to support decision-making and strengthen service delivery. Tamil Nadu, an early adopter of digital health, launched HMIS in 2007 and is transitioning to HMIS 3.0, integrating services across care levels with improved analytics and real-time reporting. This study evaluates HMIS 3.0 implementation in public health facilities under Poonamallee HUD.
METHODS : A cross-sectional formative evaluation was conducted in all 13 public health facilities from February 2024 to March 2025 using input, process, and output indicators. Data sources included system logs, module usage reports, digital registers, and stakeholder interviews. Data were collected via Epicollect and analyzed in Epi Info.
RESULTS: Facilities were equipped with 52 desktops, 13 tablets, printers, and broadband. Nine of 16 modules were activated, and all staff received training. Compliance exceeded 98% for outpatient registration, prescriptions, laboratory tests, and inpatient documentation, while ABHA-ID creation remained low (23%). Outpatient consultations totaled 472,520, with 77% digital prescriptions and 59% linked to dispensed drugs; 83% of 134,856 lab reports were digitized.
CONCLUSION: HMIS 3.0 demonstrated infrastructure readiness and high module uptake. Gaps in ABHA-ID adoption, prescription–dispensation linkage, and module rollout highlight areas for targeted improvement before state-wide scale-up.
KEYWORDS : HMIS 3.0, Digital Health, Public Health Facilities, Infrastructure Readiness, Health Service Delivery.

INTRODUCTION

Health Management Information System (HMIS) is a process through which health data (inputs) are systematically recorded, stored, retrieved, and processed to support decision-making (outputs). This decision-making encompasses key managerial functions such as planning, organizing, and controlling healthcare services at the national, state, and institutional levels.[1] In the context of public health programs, HMIS primarily addresses healthcare delivery components such as antenatal care, immunization, and disease control as well as administrative aspects like reporting, inventory and financial management, and oversight of vehicles and personnel. Hence, an effective HMIS is fundamental to the efficient functioning of a health system. While such systems are still largely managed manually in most parts of India, they can also be implemented through computerized platforms.[1]

Tamil Nadu stands as one of the leading states in India when it comes to the implementation of the Health Management Information System (HMIS). The state embarked on its digital healthcare journey in 2007, introducing HMIS as a tool to streamline healthcare management and improve service delivery. Over the years, HMIS has been rolled out across various levels of the healthcare system, ensuring comprehensive coverage.[2]

Tamil Nadu is now transitioning to the latest version of the Health Management Information System (HMIS) – HMIS 3.0 – as part of its ongoing commitment to improving healthcare services through technology. Building on the success of earlier versions, HMIS 3.0 brings enhanced features designed to further streamline healthcare processes, improve data accuracy, and ensure seamless integration across all healthcare facilities, from Primary Health Centres (PHCs) to Government Medical College Hospitals (MCHs).

The upgraded system offers improved user interfaces, advanced analytics, and enhanced reporting capabilities, allowing healthcare professionals to access real-time patient data more efficiently. This transition marks a significant step forward in the state's digital healthcare journey, enabling better decision-making, faster service delivery, and improved patient care outcomes.

With HMIS 3.0, Tamil Nadu continues as a leader in healthcare innovation, ensuring that its health infrastructure is future-ready and capable of meeting the growing demands of its population.

The enhanced version, HMIS 3.0, integrates services across primary, secondary, and tertiary care facilities

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within a unified digital platform, allowing for seamless tracking of patient care and facility performance. Tamil Nadu is implementing HMIS 3.0 in a phased manner, with Poonamallee Health Unit District (HUD) identified as the one of the pilot study sites along with Poonamallee Government Hospital, Avadi Government Hospital, Tirunelveli Maternal and Child Health Centre (MCH), Kovilpatti MCH. This study aims to document the implementation process and assess the functionality of HMIS 3.0 in Poonamallee HUD to evaluate its readiness for broader rollout and to inform strategies for strengthening digital health service delivery.

OBJECTIVES

1. To describe the functioning of HMIS 3.0 in public health facilities in Poonamallee HUD, 2025
2. To evaluate the functioning of HMIS 3.0 based on infrastructure, system usage, and service delivery indicators in Poonamallee HUD, 2025.

METHODS

STUDY SETTING: Poonamallee is Health Unit district located in Thiruvallur District which comprises of 13 PHCs (8 urban PHCs, 2 Upgraded PHC and 5 Additional PHCs). HMIS was implemented in Poonamallee in all the 13 PHCs and is functional since February 2024.

STUDY DESIGN: A cross-sectional evaluation was conducted and the activities carried out implementation of HMIS 3.0 in Poonamallee HUD is described by abstracting information through Government Orders, operational guidelines and strategy documents and also by interviewing the stakeholders at State, District and Block level.

A logical framework approach was employed using input, process, and output indicators. Data sources included facility-level system logs, module usage reports, and digital registers. Analysis focused on system uptake, infrastructure readiness, and inter-facility variation in adoption.

SAMPLING AND SAMPLE SIZE: No sampling methods were used as all the thirteen public health facilities, including Urban PHCs, Urban CHCs, and Additional PHCs under Poonamallee HUD were included in the assessment.

Evaluation Period: Since Initiation (16.02.2024 to 31.03.2025).

DATA COLLECTION METHODS AND TOOLS: A record review of the facility-level system logs, module usage reports, and digital registers. Data abstraction forms were used to collect information from records. Data was collected by Epicollect software and data was managed using excel. Data analyzed by Epi info to derive proportions of input, process and output indicators.

Description of HMIS-3.0:

Figure 1 illustrates the functioning of HMIS 3.0.[2] The primary objectives of HMIS 3.0 are to streamline data collection and management, reduce manual errors, and digitize patient records and clinical workflows. By providing real-time access to comprehensive health data, HMIS empowers healthcare personnel and government officials to make timely and informed decisions. The integration of patient histories, diagnostics, prescriptions, and treatment plans into a unified digital system enhances continuity of care, minimizes redundancy, and improves overall treatment quality. Furthermore, HMIS supports optimal allocation of resources—including human resources, medical supplies, and infrastructure by providing accurate, up-to-date information to facility managers and district health administrators.

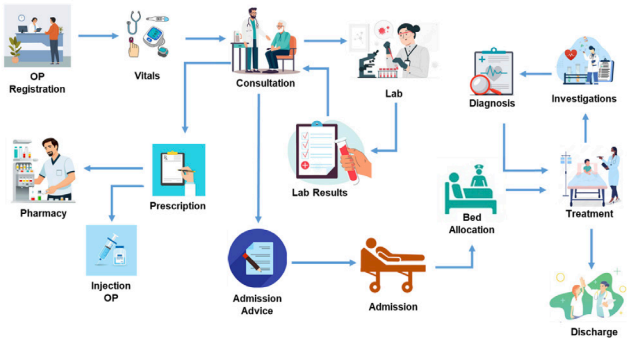

Figure:1 Structural frame work of HMIS-3.0 with key features

Key features of HMIS 3.0 include modules for patient registration, clinical information management, inventory tracking, human resource oversight, financial reporting, and advanced analytics. The platform's enhanced user interface is designed to simplify data entry and improve accessibility for frontline health workers. New functionalities such as mobile access and interoperability with national digital health systems (e.g., ABHA ID, electronic medical records) ensure wider usability and integration. Data security has also been significantly strengthened, with encrypted access and stricter user controls to protect patient privacy.

HMIS 3.0 introduces a range of advancements aimed at strengthening digital health delivery across all levels of care. The system features an improved, user-friendly interface that simplifies data entry and enhances user experience for healthcare workers. Enhanced security protocols, including stronger encryption and access controls, ensure the protection of sensitive patient data in line with privacy standards. HMIS 3.0 also offers seamless interoperability with other digital health platforms such as electronic medical records (EMRs) and national health databases, supporting comprehensive and integrated care. A key addition is mobile accessibility,

which allows healthcare providers to access the system remotely, facilitating improved service delivery in rural and underserved areas. Patients can also view their medical records through a dedicated mobile app, empowering them with access to their health information.

The implementation of HMIS 3.0 is aimed for benefits across the health system. Real-time access to patient data enables more accurate diagnoses and treatment decisions, leading to improved patient care and safety. By automating key administrative processes, HMIS 3.0 enhances operational efficiency, freeing up healthcare workers to focus more on clinical duties. The system also strengthens public health surveillance by offering insights into disease patterns and health trends, allowing for faster, data-driven responses to emerging health issues. Additionally, the digitization of records and automation of workflows contribute to cost-effectiveness by reducing the need for paper-based documentation, minimizing manual errors, and improving overall resource utilization.

Evaluation of HMIS 3.0 in Poonamallee HUD:

Inputs:

All 13 facilities were equipped with essential hardwares including 52 desktop computers, UPS units, 13 tablets, printers, and 11 biometric devices—all functional at the time of review. High-speed BSNL broadband connectivity was available at all facilities, with reported 100% uptime. Nine out of sixteen software modules were activated during the pilot, including patient registration, outpatient consultations, pharmacy (OP), laboratory (OP), admission-discharge-transfer (ADT), and dashboard modules. Seven modules—such as inpatient services, biomedical waste, and patient enquiry—were yet to be operational. All staff involved in data entry, clinical service, and pharmacy management were trained before rollout, ensuring foundational readiness for digital adoption. The pilot had been operational since February 2024.

Process:

All 13 facilities (100%) reported complete compliance in OP registration in HMIS, prescription generation, lab investigations, drug dispension, IPD admission entry, and IPD discharge entry. However, ABHA-ID generation was completed in only 3 out of 13 facilities (23%). Under maintenance and support, 100% of reported software issues (54 out of 56) and all hardware issues (2 out of 2) were resolved.

Input indicators	N	n	%
Infrastructure			
Desktops	52	52	100
UPS	52	52	100
Tablets	13	13	100
Printers	13	13	100
Internet	13	13	100
Connectivity			
BSNL 30,40&50 mbps	13	13	100
Modules			
Patient Registration module	13	13	100
Emergency Registration	13	13	100
Out Patient Department Management	13	13	100
Injection OP	13	13	100
Investigation for Lab (for OP)	13	13	100
Pharmacy Management (for OP)	13	13	100
Dash Board (OPD)	13	13	100
ADT (Admission Discharge Transfer)	13	13	100
Inventory- store Management	13	13	100
Mobile app for doctors	13	13	100
Mobile app for Citizens	13	13	100
Patient Enquiry	0	13	0
In Patient Department (IPD)	0	13	0
Investigation for Lab (for IP)	0	13	0
Pharmacy Management (for IP)	0	13	0
Bio Medical waste management	0	13	0
Trained Human resources			
Medical officers	13	13	100
Staff Nurses	13	13	100
DEOs	13	13	100
Pharmacists	13	13	100
Lab Assistants	13	13	100
HMIS Technical support	2	2	100

Outputs

A total of 4,72,520 outpatient consultations were recorded during the evaluation period, of which 3,63,026 prescriptions (Rx) were generated digitally through the HMIS platform, reflecting a 77% uptake of the prescription module. Of the 3,63,026 prescriptions (Rx) generated, 3,16,782 prescriptions were with drug advise entry. However, only 59% of the prescriptions (1,88,485 out of 3,16,782) had associated drug dispensation entries. Out of 1,34,856 investigations, 1,13,247 reports were digitally generated and recorded, resulting in 83% compliance. In terms of inpatient care, the number of inpatient admissions recorded (981) was slightly more than the number of discharges (963).

Output indicators	N	n	%
Rx Generated in HMIS	4,72,520	3,63,026	77%
Drug Dispensed in HMIS	3,16,782	1,88,485	59%
Lab report generated in HMIS	1,34,856	1,13,247	83%
Inpatient Admission in HMIS	981	981	100%
Inpatient discharge in HMIS	963	981	98%

DISCUSSION

This formative evaluation of the HMIS 3.0 pilot in Poonamallee HUD highlights both the opportunities and challenges of transitioning to a digital health management platform in Tamil Nadu. The pilot demonstrated strong infrastructural readiness, with universal availability of hardware, reliable internet connectivity, and complete training coverage across all facilities. These inputs ensured a favorable environment for digital adoption, in contrast to earlier experiences of fragmented or delayed rollouts of health information systems in other parts of India.

Process indicators suggest that outpatient workflows including registration, prescription generation, laboratory services, and pharmacy modules were successfully digitized across facilities, indicating rapid uptake of digital systems by healthcare staff. This aligns with international evidence that strong frontline engagement and adequate technical support are critical determinants of early success in health information system implementation. However, certain critical gaps persisted. For example, despite 77% digital prescription generation, only 59% had corresponding drug dispensation records, pointing to workflow discontinuities and possible duplication of manual processes. Similarly, although inpatient admissions and discharges were captured digitally, the full inpatient service modules were yet to be activated, limiting the scope of comprehensive patient tracking.

The relatively low coverage of ABHA-ID generation (23%) underscores the challenges of integrating HMIS 3.0 with national digital health initiatives. Ensuring interoperability with ABHA and other national platforms is essential for building a unified health record system. Addressing these integration challenges will be crucial before statewide expansion.

Outputs from the evaluation also emphasize that while digital recording has improved data completeness and accessibility, there is still a need to bridge the gap between recorded prescriptions, dispensed drugs, and laboratory services to ensure continuity and accuracy of digital records. These findings are consistent with lessons from digital health transitions in other states, where partial module usage and incomplete workflows reduced the effectiveness of new platforms.

An important advancement with HMIS 3.0 is the shift from paper-based records to a fully digital platform, enabling real-time monitoring of health services and patient care. Previously, data entry, reporting, and supervision relied on manual registers, leading to delays, errors, and increased administrative workload. With HMIS 3.0, facility and district managers can access up-to-date information on service delivery, resource utilization, and patient outcomes, which facilitates timely decision-making. This real-time monitoring also has financial implications, as improved efficiency and reduced duplication of manual processes can potentially lower operational costs and optimize budget allocation for the government. The system thus not only strengthens service delivery but may also contribute to cost savings in public health administration.

LIMITATIONS

This evaluation primarily focused on the Input–Process–Output (IPO) model of HMIS 3.0 implementation. Portal-based evaluations using frameworks such as the CDC Surveillance System Evaluation Framework or the PRISM Framework which assess technical, organizational, and behavioral determinants affecting data quality and use, including real-time monitoring of service delivery and public health indicators were not included in this study. Future evaluations should incorporate these dimensions to provide a more comprehensive understanding of system performance.

CONCLUSION

The evaluation of HMIS 3.0 in Poonamallee HUD demonstrates that while the digital infrastructure and

foundational systems are in place, consistent and holistic adoption of modules across facilities remains a challenge. Outpatient and laboratory modules demonstrated consistent usage and formed the core of digital data entry. However, gaps existed between prescriptions and drug dispensation, limited inpatient module activation. The current phase represents a critical opportunity to strengthen system usability, reinforce training, and improve module integration before state-wide scale-up.

To address existing gaps and support the effective scaling of HMIS 3.0, several areas merit qualitative investigation. These include assessing user experience and system usability through in-depth interviews with healthcare providers and data entry staff to identify practical challenges and workflow inefficiencies. Future evaluations should incorporate portal-based assessments using the CDC Surveillance System Evaluation Framework or the PRISM Framework to examine technical, organizational, and behavioural determinants. Integrating real-time monitoring will allow assessment of the system's impact on service delivery and public health indicators. Evaluating the effectiveness of training, particularly in low-performing facilities, can guide targeted capacity-building strategies. Finally, capturing patient experiences with digital registration and access to care will help align the HMIS platform more closely with service delivery needs.

CONFLICT OF INTEREST

None

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