

ANALYSIS OF THE IMPLEMENTATION OF ELECTRONIC MEDICAL RECORDS (EMR): A CASE STUDY

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ABSTRACT

Implementing electronic medical records (EMR) is a form of effort to improve the efficiency of healthcare services. During the implementation process, it is common to encounter issues such as inadequate infrastructure availability, human resource readiness, funding, clarity of system usage, and monitoring and evaluation mechanisms, all of which affect the optimal implementation of electronic medical records. The purpose of this research is to identify management elements (man, material, method, machine, money), planning, implementation, monitoring and evaluation, and follow-up. This is a qualitative research with research informants consisting of key informants (Head of Administration, Head of Medical Records). Key informants include the Head of Information Technology (IT), staff, specialist doctors, nurses, pharmacists, laboratory analysts, and medical records staff. Supporting informants are non-medical hospital personnel. The research was conducted in May 2025 at the Regional Mental Hospital of Lampung Province. Data collection was done through in-depth interviews, observation, and supporting document studies. Validation of data collection results was carried out through source, technique, and time triangulation. In conclusion, the implementation of electronic medical records at the hospital is not yet available, nor are the standard operational procedures. The existing network infrastructure, computers, and servers are inadequate. The budget efficiency policy by the President of the Republic of Indonesia impacts efforts to meet the availability of supporting infrastructure. During the implementation phase, there are still obstacles such as inadequate user skills and internet network instability, which leads to system downtime; the evaluation stage has not yet been carried out. It's recommended to increase network bandwidth capacity through collaboration with an internet service provider. This is to support the development of an offline electronic medical record system with local hospital server storage, which would be done in partnership with a university specializing in information technology.

Keywords: electronic medical records; input; process; output

INTRODUCTION

The rapid development of globalization has imposed increasing demands on all sectors, including healthcare services. Healthcare providers are now expected to improve efficiency, maintain competitiveness, and deliver high-quality services. One key strategy for achieving these goals is the digital transformation of health systems, notably through the implementation of Electronic Medical Records (EMR). EMR systems are designed to digitally store patients' personal, demographic, social, and clinical information in an integrated and accessible format. They support clinical decision-making and enhance the continuity, accuracy, and safety of healthcare services.

In Indonesia, the implementation of EMR remains a challenge despite its recognized benefits. According to the Indonesia Health Profile (2023), only 24.47% of hospitals (768 out of 3,138) have fully implemented EMR, while 39.03% (1,225 hospitals) have partially adopted EMR, and 36.48% (1,145 hospitals) have yet to begin implementation. In Lampung Province, only 11.11% (9 hospitals) have fully adopted EMR, and more than 55% are in the partial implementation phase, with one-third still relying on conventional paper-based systems.

Various studies have highlighted persistent obstacles to EMR implementation, such as limited infrastructure, inadequate human resource capabilities, lack of funding, resistance from senior medical staff, and poor system integration. These challenges are often compounded in mental health hospitals, where digital adoption lags behind due to stigma, limited policy focus, and underfunding.

The Ministry of Health of the Republic of Indonesia has mandated the digitalization of medical records through Ministerial Regulation No. 24 of 2022 and No. 22 of 2024. These regulations aim to enhance healthcare quality, ensure data security and availability, and support integrated digital health services. However, implementation at the hospital level remains inconsistent and faces operational barriers, particularly in regional and mental health facilities.

The Regional Mental Hospital of Lampung Province began its EMR implementation in late 2023. Preliminary observations revealed partial use of the EMR system, which was still integrated with manual documentation due to the ongoing development of the hospital information system (SIMRS). This dual documentation increased the workload for medical staff and exposed the hospital to inefficiencies and data security risks. Additionally, network instability and insufficient server capacity hindered data access and slowed administrative processes. Training for health workers, especially senior staff, was also insufficient, resulting in inconsistent EMR usage and resistance to change. To address these issues systematically, this study adopts the Input-Process-Output (IPO) model combined with the 5M framework (Man, Money, Method, Material, Machine). The IPO model allows a structured assessment of the EMR implementation process, while the 5M approach provides a detailed analysis of resource readiness and operational dynamics.

METHOD

This research uses a qualitative case study design. Data were collected in May 2025 through interviews, observations, and document analysis. Informants were selected purposively, comprising hospital management, IT staff, healthcare professionals, and support staff. The data were analyzed using thematic analysis, and triangulation (source, method, and time) was applied to ensure data validity.

RESULT

Tabel 1.
Characteristics of Research Informants

Inisial	Usia	JK	Pendidikan	Jabatan	Kode
Informan Utama					
DWT	55 Tahun	Perempuan	S2 Kesmas	Kepala Bagian Tata Usaha	IU1
MDK	31 Tahun	Laki-laki	D4 Rekam Medis	Kepala Rekam Medik	IU2
Informan Kunci					
LUS	39 Tahun	Perempuan	D3 Komputer	Kepala IT	IK3
CHY	49 Tahun	Perempuan	Dokter spesialis jiwa	Dokter spesialis jiwa	IK4
FSK	40 Tahun	Perempuan	S1 Keperawatan	Perawat	IK5
OKT	42 Tahun	Perempuan	S1 Keperawatan	Perawat	IK6
TRI	55 Tahun	Perempuan	S1 Keperawatan	Perawat	IK7
AHF	36 Tahun	Laki-laki	Apoteker	Tenaga kesehatan (apoteker/analisis ab)	IK8
AMB	31 Tahun	Perempuan	D3 Rekam Medis	Staf rekam medis	IK9
GNT	39 Tahun	Laki-laki	D3 Teknik Informatika	Tim IT	IK10
Informan pendukung (pengguna poli dan unit rekam medis)					
KHA	42 Tahun	Laki-laki	D4 Sarjana Terapan Kesehatan	Kepala Laboratorium	IP11

This study employed a qualitative descriptive design with a case study approach, focusing on the implementation of Electronic Medical Records (EMR) at the Regional Mental Hospital of Lampung Province. Data were obtained through in-depth interviews, observations, and document analysis conducted in May 2025. Informants included administrative officers, IT staff, medical record officers, doctors, nurses, pharmacists, laboratory personnel, and non-medical support staff. The findings were categorized based on the Input-Process-Output (IPO) framework and 5M approach (Man, Money, Method, Material, Machine). The following is a statement from the Head of the Administration Department regarding infrastructure conditions:

"The hospital has begun developing the EMR system. However, we still lack sufficient computers and servers. Some service units still rely on manual documentation due to limited access to SIMRS."

Input Analysis

Man: Human resources have not received adequate and routine EMR training. Some staff, particularly senior medical professionals, still experience difficulties operating digital systems. Training is needed for all employees, both medical and non-medical.

Money: Budget allocation for EMR development remains limited. National budget efficiency policies hinder the fulfillment of infrastructure and system improvement needs. The hospital has not yet included EMR-specific funding in its strategic plan.

Method: No standard operating procedures (SOPs) were available for EMR usage. Each unit runs its own workflow without standardization, which impacts data integration and patient service flow.

Material: Computers, scanners, and printers were not evenly distributed. Some units lacked the tools required to input or retrieve EMR data effectively. There were no special devices allocated to support EMR access in the field.

Machine: Internet connectivity was unstable. The current network system frequently experiences downtime. The internal server has limited capacity, which affects simultaneous multi-user access.

The following is a quote from an IT officer regarding technical constraints:

"Our current system can't handle too many users at once. When more than five users log in at the same time, the system slows down or crashes. We really need to upgrade the server and bandwidth."

Process Analysis

Planning and Implementation: EMR implementation is still partial. Health workers use both manual and digital records, leading to duplicated efforts and inefficiencies. Workflow integration with SIMRS is still ongoing.

Training and Support: Not all staff have received EMR training. Health workers express concerns about limited support when facing technical problems.

Monitoring and Evaluation: No formal evaluation process has been implemented. There are no performance indicators or audit routines to measure system effectiveness or user compliance.

The following is a nurse's quote regarding usage challenges:

"We're still using paper records, especially when the system is down. Sometimes, I don't know if the EMR saved my input or not. It's confusing, and we waste time double-checking everything."

Output Analysis

Efficiency: In departments where EMR is used consistently, access to patient data is faster, and documentation errors are reduced. However, these improvements are undermined by inconsistent implementation and system reliability issues.

Data Access: Patient data is more accessible digitally, but incomplete system integration limits cross-departmental information sharing.

Service Quality: There has been a slight improvement in service quality and patient data management. However, slow systems and lack of full adoption prevent maximum benefits.

Data Security: Data security protocols such as password authentication are in place, but encryption and

access tracking have not been fully developed.

The following is a quote from a medical records officer regarding system benefits:

"Having the EMR makes our work easier when it works. But we need a consistent system and clear rules. We're still figuring things out as we go."

DISCUSSION

This study explored the implementation of Electronic Medical Records (EMR) in a mental health facility, focusing on the Regional Mental Hospital of Lampung Province. Using the Input-Process-Output (IPO) framework and the 5M (Man, Money, Method, Material, Machine) approach, several challenges and enabling factors were identified. This section discusses the results in relation to existing literature, regulatory frameworks, and the specific context of mental health services in Indonesia.

Human Resources (Man)

Human resource readiness emerged as a major barrier to EMR adoption. The study found that health workers, especially senior staff, often lack the digital literacy and confidence required to operate EMR systems effectively. Training opportunities are limited, inconsistent, and sometimes not inclusive of all departments. This aligns with Risnawati et al. (2024), who found that digital transformation in Indonesian health systems is often hindered by the absence of structured and ongoing capacity-building programs. Furthermore, task overload due to dual documentation (manual and digital) creates additional stress and resistance among staff. This highlights the importance of aligning digital transformation efforts with change management strategies that promote ownership, adaptation, and peer-to-peer learning.

Budget Constraints (Money)

Financial limitations were repeatedly cited as a key challenge. The hospital's budgeting process has yet to accommodate specific allocations for EMR development, maintenance, or training. The reliance on general operational budgets, which are subject to efficiency policies, hinders the ability to invest in necessary IT infrastructure or to procure new equipment. This condition supports the findings of Kapitan et al. (2023), who noted that public hospitals in Indonesia often struggle to finance health information system upgrades due to fragmented planning and lack of earmarked digital transformation funds. Without clear budget lines for EMR-related activities, sustainability is difficult to achieve.

Standard Operating Procedures and Regulations (Method)

The study revealed that the absence of SOPs for EMR usage at the unit level results in inconsistent implementation, procedural confusion, and errors in patient documentation. As each unit improvises workflows, interoperability and data accuracy become problematic. This mirrors Alfiansyah (2021), who emphasized that SOPs are essential for guiding health personnel in using digital systems consistently and in compliance with existing regulations, such as the Ministry of Health Regulation No. 24 of 2022 and No. 22 of 2024, which mandate EMR standardization. SOPs are not only technical documents but also a tool to reinforce accountability and system integrity.

Infrastructure and Equipment (Material)

Hardware and supporting infrastructure are foundational to EMR implementation. The study identified an unequal distribution of devices such as computers, printers, and scanners, which limits access to the EMR system across units. In some areas, staff must queue to input or retrieve data, causing service delays. According to Aditama (2023), infrastructure gaps are a primary reason why EMR adoption fails in rural and specialized hospitals. In the context of mental health services, adequate infrastructure is also necessary for confidentiality, patient flow, and continuity of care. The lack of backup equipment or offline-capable devices increases vulnerability to system downtime.

Technology and Systems (Machine)

Network instability and limited server capacity present persistent problems. The hospital relies on a single internal server that cannot support multiple concurrent users, especially during peak hours. This leads to slow system performance and user frustration. Hammam et al. (2024) argue that EMR success depends not only on software usability but also on robust backend infrastructure, including servers, storage, cybersecurity, and broadband. Without system upgrades, hospitals risk poor data retention, security breaches, and interrupted services.

Partial Implementation and Dual Documentation

One of the most striking findings is the hospital's reliance on dual documentation systems: both manual and digital. This approach increases the workload for staff and reduces data consistency. Health workers are often unsure whether digital entries are successfully saved, resulting in double-checking or reverting to paper records. Saputra et al. (2025) note that partial EMR implementation often results in fragmented workflows and defeats the purpose of digitization. To overcome this, a clear transition plan with deadlines, pilot testing, and change support mechanisms is necessary.

User Perceptions and Motivation

Despite these barriers, departments that consistently use EMR reported time savings and improved data access. Staff members appreciated the potential for efficiency, although motivation remained low due to system unreliability and lack of institutional support. This confirms Wijayanti (2021), who found that motivation to use EMR increases when users perceive direct benefits, are involved in system design, and receive consistent support from management.

Lack of Monitoring and Evaluation

Another notable gap is the absence of routine monitoring and evaluation (M&E) related to EMR performance. No indicators, audit trails, or user feedback mechanisms were in place. This makes it difficult to identify system bottlenecks, noncompliance, or potential improvements. Rusdiana (2024) emphasizes the importance of M&E in digital health initiatives. M&E activities such as usage tracking, user satisfaction surveys, and technical audits provide critical feedback loops for continuous system development.

Special Considerations for Mental Health Services

Mental health facilities face unique challenges. Patient data is more sensitive, and the stigma associated with mental illness requires that digital systems ensure confidentiality, trust, and ease of use. While the hospital had basic password protections in place, features such as data encryption, access control, and audit logs were lacking. Friedman et al. (2023) argue that digital systems in mental health should be user-friendly and privacy-centric. Ensuring that EMR systems respect ethical standards for data protection is crucial for promoting patient trust and reducing stigma.

Institutional Collaboration and Opportunities

The study recommends collaboration between hospitals, universities, and the Ministry of Health to enhance technical capacity, conduct training, and support infrastructure development. Academic partnerships can help localize EMR features, ensure sustainability, and create a knowledge-sharing ecosystem. This echoes the findings of Alkaf et al. (2024), who advocated for a multisectoral approach to EMR sustainability through government, academia, and private sector collaboration.

CONCLUSION

The study concludes that EMR implementation at the Regional Mental Hospital of Lampung is still in a transitional phase, constrained by technical, financial, and human factors. For sustainable implementation, policy support, infrastructure investment, and staff capacity building are critical.

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