Journal of Public Health for Tropical and Coastal Region (JPHTCR)
Journal homepage: https:/ejournal2.undip.ac.id/index.php/jphtr/index
ISSN: 2597- 4378

Obstacles and Challenges in Implementing Hospital Management Information System (A Study of Public and Private Hospitals in Padang City)

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Abstract
Introduction: Digital transformation in the health sector requires hospitals to implement the Hospital Management Information System (HMIS); however, problems remain in its implementation. This study aimed to analyze the obstacles and challenges in implementing an HMIS in Padang City.
Methods: This descriptive qualitative study was conducted between March and July, 2024. The study was conducted in two hospitals in Padang City: one public hospital and one private hospital. The research participants were 16 people who were identified through purposive sampling. Data were collected through in-depth interviews, observations, and review of documents. Data processing consisted of data collection, reduction, and presentation, with content analysis. Source and method triangulation were used to ensure data validity.
Results: Public hospitals have conducted internal training and have an adequate IT team, while private hospitals do not have formal training and lack IT personnel. From an organizational perspective, public hospitals show strong managerial support in the form of budget allocation and cross-unit coordination, whereas private hospitals face limitations in the integration of Electronic Medical Records (EMR) and SATUSEHAT. In terms of technology, both hospitals face obstacles due to slow Internet networks, but public hospitals are better prepared in terms of hardware infrastructure.
Conclusion: The success of an HMIS implementation depends heavily on the alignment of human, organizational, and technological aspects. Private hospitals require stronger support in terms of training, infrastructure, and policies to compete with public hospitals in the digital transformation of health care services.

Keywords: hospital management information system, electronic health records, private hospitals, public hospitals.

DOI: https://doi.org/10.14710/jphtcr.v8i2.28754

Article History: Received: 28th July 2025, revised: 14th August 2025 accepted: 19th August 2025

Introduction

Digital transformation in the healthcare system is one of the strategic focuses of Indonesian governments in realizing effective, efficient, and integrated healthcare services. One of the main pillars of this transformation is the implementation of the Hospital Management Information System (HMIS), a computer-based system designed to manage all aspects of hospital information, from patient data and medical services to administration and management. HMIS is expected to improve the quality of healthcare services,

accelerate decision-making, increase operational efficiency, and support transparency and accountability in hospital management.[1, 2]

The implementation of HMIS is also in line with national policies, such as the mandate of Minister of Health Regulation No. 24 of 2022 concerning Medical Records, and the data integration initiative through the SATUSEHAT platform, which requires healthcare facilities to adopt compatible and integrated information systems.[3] This presents both a challenge and a significant opportunity for hospitals throughout Indonesia. Although systematic regulatory support has been provided, the reality shows that HMIS implementation does not always run smoothly. Various studies and reports have identified obstacles to the implementation process. These obstacles stem not only from technical aspects such as inadequate infrastructure and software, but also from non-technical aspects, such as a lack of human resource competency, resistance from healthcare workers, budget constraints, and a lack of managerial support and weak institutional commitment.[4, 5, 6, 7]

The results of a systematic review of the implementation of the HMIS in Indonesia from 2009 to 2019 showed obstacles not only in terms of staff recruitment and technical errors, but also inadequate planning, monitoring, and evaluation. The results of the systematic review from 2019 to 2023 explained that these obstacles were not only the understanding and skills of human resources and systems and technology but also management integrity and standard operating procedures (SOPs). The implementation of HMIS at MHJS Hospital emphasized improving the quality of service. The implementation of SIMRS at RSU Mitra Paramedika Yogyakarta was hampered by a lack of human resources, budget for SIMRS development, SOPs not being available in all units, and a shortage of computers. The implementation of MHJS Hospital faced obstacles due to the lack of quality system services, absence of SOPs, and lack of evaluation.

Research conducted by Yusof et al. showed that the successful implementation of a health information system is greatly influenced by three main interacting components: human, organizational, and technological, known as the HOT-fit model. This model provides a comprehensive approach for analyzing the readiness and fit between system users, organizational environment, and technological devices used. This model also allows for the systematic identification of weaknesses in implementation, while also providing the basis for formulating relevant improvement strategies.[7, 8]

Various studies have described implementation using the HOT fit model. The evaluation of HMIS of Kediri Regional Hospital using the HOT-FIT Model stated that in the technological aspect, errors still often occur in the system's supporting devices, the Internet network in accessing HMIS is still quite slow, and security access for system users is still lacking; in the user aspect, input errors from users into the system often occur; in the organizational aspect, there is still a lack of management support for rejuvenation or purchasing hardware when HMIS is implemented in the hospital.[9] The implementation of HMIS at RSUD X is hampered by user satisfaction that is not yet optimal because the system is under development and the addition of features. In the organizational component, additional facilities are needed. In the technology component, in addition to periodic system development, users are always reminded to complete patient data that has been filled in, conduct network monitoring, and re-check patient data taken from the old HMIS.[10]

This study was conducted at two hospitals in Padang City, representing two different types of institutions: public hospitals (public and teaching hospitals) and private hospitals (private hospitals). Both have implemented HMIS, but with varying levels of readiness, support, and implementation outcomes. Public hospitals have developed an EMR and have begun connecting with SATUSEHAT, while private hospitals still face challenges in system development and integration. The differences in status and resources between public and private hospitals provide an interesting context for understanding how each institution

responds to the challenges of healthcare digitalization.

Using the HOT-fit model approach, this study aimed to identify barriers and challenges to HMIS implementation from the perspectives of users and system administrators at both hospitals. The results are expected to contribute to strategic recommendations for strengthening the effective, efficient, and sustainable implementation of SIMRS as well as supporting national efforts to realize an integrated digital health system through SATUSEHAT.

Methods

This study used a descriptive qualitative method to analyze the barriers and challenges in the implementation of the HMIS in Padang City, using the HOT-fit Model theoretical framework. The study was conducted between March and July 2024 at two hospitals in Padang City. These hospitals consisted of one government or public hospital, and one private hospital. The research informants were selected using purposive sampling, resulting in 17 participants. Data saturation was stated to have been achieved in in-depth interviews after no new themes emerged in the last three interviews at each hospital. Informants from the Public Hospital included the Director of General Affairs and Human Resources, Head of Finance, Head of the EMR Team, Head of the HMIS Installation, Head of the Medical Records Unit, Head of the Nursing Unit, Head of the Hospital Facilities Maintenance Installation, and a doctor. Informants from private hospitals included the Hospital Director, the Head of the Medical Records Unit, medical records staff, HMIS IT staff, HMIS outpatient registration staff, HMIS inpatient registration staff, HMIS emergency room staff, and a doctor.

The data collection methods were in-depth interviews, observations, and document reviews. The average interview duration was 60 min, with two observation sessions conducted at each hospital. The research instrument was the researcher herself, assisted by an in-depth interview guide and checklist. The main domains covered in the implementation of the Hospital Management Information System (HMIS) are categorized into human, organizational, and technological components. The Human component comprises system usage and user satisfaction. The Organizational component comprises the organizational structure and environment. The Technology component comprises system quality, information, and services.

Data processing was performed in the following stages: data reduction, presentation, and conclusion drawing. The coding process was based on the HOT fit theoretical framework, which consists of three main dimensions: Human, Organization, and Technology. However, an inductive approach was also used to capture new themes that emerged in the field. Contextual analysis with source and method triangulation was used to ensure data validity. This study was approved by the Faculty of Public Health, Andalas University.

Results

Informant Characteristics

The informants for this study were 17 people from public and private hospitals. Participants' characteristics are listed in Table 1. There were 9 informants from private hospitals and 8 informants from public hospitals. It is known that 76% of respondents are female, and 70% are aged 20 – 40 years.

Human Component

Based on in-depth interviews, it was discovered that the HMIS system at private hospitals is not yet optimal owing to network constraints and the lack of bridging with EMR and SATUSEHAT. This contrasts with the HMIS implementation at the Public Hospital, which is already optimal and is developing an Electronic Medical Record (EMR) for bridging with SATUSEHAT. This is consistent with the following statement from the informant:

> *"Although the HMIS has been implemented, it's important to acknowledge that there may be a performance decline. This is a normal occurrence in health information technology. This is due to various*

factors, such as system adjustments, more complex data processing, and the need to readjust the use and processing of bridging to SATUSEHAT and EMR. This will be updated and refined later." (Inf-1)

"The HMIS at our hospital is good, but not yet our EMR and SATUSEHAT, right? So... it's still in the process of getting there." (Inf-2)

"...because the HMIS network is sometimes slow, which can hinder work." (Inf-5)

"Currently, public hospitals are integrated with the Ministry of Health's SATU SEHAT system. Because the Ministry of Health requires a gradual transition to an electronic medical record system, the initial requirement is for ICD-10 and visit data." (Inf-13)

To support the successful implementation of HMIS, training is needed to enhance the knowledge and skills of HMIS users. At a Private Hospital, there is no specific training for HMIS, and learning is primarily self-taught or guided by seniors. Meanwhile, at the Public Hospital, training has been conducted, supported by a review of socialization and training documents, as quoted from the following information:

"...Since the beginning, there hasn't been any training related to HMIS here, so we've been learning on our own..." (Inf-3)

"...I don't think there's any specific training, sis, just through personal training, I think..." (Inf-4)

"Usually, during orientation, you learn from your seniors. There's nothing formal or anything like that." (Inf-5)

"...actually, with the socialization, we've already received training directly, so it's not really training, but in-house training..." (Inf-10)

"...previously, the IT team participated in training..." (Inf-14)

"...I think the training was only for the head of the room, something like that, and not for everyone. Therefore, the head of the room would teach relevant users one-on-one. So, at that time, there were some users who didn't understand how to use it, so we used Zoom..." (Inf-15)

"...we didn't have any training, but during the socialization, we tried it out, we each brought our own laptops..." (Inf-16)

Officers already understand how the HMIS application works, and most officers are satisfied with its use. However, a small number of officers are still dissatisfied with their use owing to network constraints and missing patient ID numbers. There are differences in human resource conditions between the two hospitals. Public hospitals already have sufficient IT staff to develop an integrated HMIS EMR for SATU SEHAT, while private hospitals are considered to lack sufficient IT staff.

Organization Components

Based on the results of in-depth interviews related to the planning of HMIS implementation, both hospitals have involved parties related to the use of HMIS, and public hospitals have even begun developing electronic medical records. Coordination between units in the hospital has been running quite well, and efforts have been made by the leadership to encourage staff to use HMIS, such as holding meetings with the heads of installations in each unit, providing guidance to staff, contacting IT if there are problems with HMIS, and providing facility support. This is reinforced by the results of a review of the hospital's financial planning documents related to HMIS development costs. The excerpt from the informant's statement is as follows:

HMIS would not be possible without the support of the leaders. For example, if there's a problem, like a patient not being able to be entered by a doctor, it will be communicated in the group and a solution will be sought." (Inf-2)

"...The most common support is providing facilities..." (Inf-9)

"There is, sir, for the procurement of HMIS materials, usually from the finance department." (Inf-4)

"...because it's mandatory and we have to allocate a budget (for HMIS

development), and we buy it directly, so there is no limit. If it's needed, we've entrusted it to a pre-selected team..." (Inf-10)

In practice, the HMIS at both hospitals has bridged the JKN-BPJS Kesehatan (national health insurance) system, but private hospitals have not yet bridged with SATU SEHAT due to the lack of electronic medical records. This differs from public hospitals, which have developed EMR and are bridged by SATU SEHAT.

Technology Components

In practice, the HMIS at both hospitals is integrated across all existing units, and the software meets the standards. However, the network latency issues persist. Meanwhile, hardware and computer availability across all units is sufficient, with the exception of the polyclinic, nurses' counter, and operating rooms, where computers are missing, as quoted by the following informant:

"That's enough for patient registration. The network is sometimes a bit slow, which slightly disrupts service." (Inf-5)

"Hmm, there are enough computers. The network often has problems, which hinders patient data input." (Inf-6)

"We already have enough computers here, but the network takes a long time to load, making prescription input slow." (Inf-8)

"... we have provided the necessary facilities, we have budgeted for them, and we have entrusted them to the team. If the EMR team requests it, we'll provide it." (Inf-10)

"Perhaps we still feel we don't have enough computers, and we plan to add more this year." (Inf-13)

"...for hardware like computers, at the end of last year we bought 17 new computers, then we bought 16 tablets, and for electronic signatures, those are supporting tools. So, we have three computers for each unit..." (Inf-14)

The network issues encountered resulted in staff having to manually record data and re-enter it when the network was stable. As seen in the following quote,

“If the network is slow, patient data entry can be delayed by 10–15 minutes. Patients wait a long time, and we also get stressed because of the long queues.” (Inf-6)

“The network often has problems, so sometimes we have to manually record data first and then input it into the SIMRS. It's tiring because we have to do double the work.” (Inf-7)

“…if there's a network problem… they'll do it manually later…” (Inf-13)

Table 1. Characteristics of Research Informants

No.	Informant Code	Sex	Age (y.o)	Last Education	Position
Private Hospital					
1.	Inf-1	Female	36	S2 Public Health	Hospital Director
2.	Inf-2	Female	47	DIII Medical Records	Head of Medical Records Installation
3.	Inf-3	Female	26	S1 Public of Administration	Medical Records Staff
4.	Inf-4	Male	23	Vocational School	IT and HMIS Staff
5.	Inf-5	Female	24	DIII Medical Records	Medical Records Staff
6.	Inf-6	Female	24	DIII Medical Records	Inpatient Admission
7.	Inf-7	Female	45	DIII Nursing	Emergency Room Nurse

No.	Informant Code	Sex	Age (y.o)	Last Education	Position
Private Hospital					
8.	Inf-8	Female	30	DIII Pharmacy	Pharmaceutical Technical Personnel
9.	Inf-9	Female	28	S1 Medical Profession	Head of Emergency Room Installation
Public Hospital					
10.	Inf-10	Female	51	S3 Medical Profession	Director General and Human Resources of the Hospital
11.	Inf-11	Female	50	S1 Economics	Head of Finance
12.	Inf-12	Male	38	S3 Medical Profession	Head of EMR
13.	Inf-13	Male	38	S1 Agricultural Technology	Head of HMIS Unit
14.	Inf-14	Female	26	D3 Medical Records	Head of the medical records installation
15.	Inf-15	Female	32	S1 Nursing Profession	Head of the outpatient installation
16.	Inf-16	Male	33	S1 Engineering	Head of the Hospital Facilities Management Installation
17.	Inf-17	Female	32	S2 Medical Profession	Oral Surgeon

Discussion

This study aims to identify barriers and challenges in implementing a Hospital Management Information System (HMIS) using the HOT-fit model approach, which encompasses human, organizational, and technological dimensions. The findings are based on the experiences of two hospitals in Padang City: Public Hospital (public-owned) and Private Hospital (private), to identify gaps and best practices in implementing HMIS for SATUSEHAT integration.

Human Component

From a user perspective, differences in the level of human resource readiness and training were found between the two hospitals. Private hospitals face challenges in terms of the competency and training of HMIS users. Most staff members are self-taught or guided by seniors, without structured formal training. This risks input errors, system resistance, and slow technology adoption.[11,12,4] By contrast, public hospitals demonstrate better practices. Although the training is not comprehensive, it is available in the form of in-house training, outreach, and gradual training for ward heads. The Public Hospital IT team also actively participated in training, ensuring smooth system update and integration with the SATUSEHAT platform.

This situation can be seen from the fewer cases of double entry and errors in patient data entry at public hospitals compared to private hospitals, where double entry still occurs due to varying understandings among staff. Furthermore, data entry at public hospitals is more consistently filled out according to the system format compared with private hospitals, where forms are often missed or

incomplete. This condition was predominantly related to female research informants, particularly at private hospitals. Theoretically, men tend to be willing to spend more time and effort to overcome existing obstacles and strive to pursue their goals, while women tend to consider the magnitude of the effort and the process to achieve their goals.[13] Good training can improve user skills, enabling them to utilize the system optimally.[14]

This demonstrates that the success of HMIS implementation is heavily influenced by the quality of human resources, including the availability of training, user understanding of the system, and technical support. The lack of private training and guidance was a major obstacle, aligning with a study by Yusof et al. that identified the human factor as a key determinant of the success of a health information system. Other research also concluded that many staff still lacked understanding of how to use or operate the HMIS application properly due to a lack of training from management or the hospital, as well as a lack of human resources with appropriate education and expertise, resulting in incomplete or incomplete patient data entry into HMIS.[11]

Organizational Component

Regarding the organizational aspect, both hospitals involved relevant parties in HMIS planning and demonstrated good coordination between the units. Public hospitals, in particular, demonstrated stronger support from their leadership, not only through directives and regular meetings, but also through budget allocation for system development and infrastructure procurement. Private hospitals also demonstrated support, but were more limited and reactive. One organizational challenge at private was the lack of Electronic Medical Records (EMRs), making bridging with SATUSEHAT impossible. This contrasts with Public Hospital, which already has an EMR and has completed its initial integration with SATUSEHAT (ICD-10 and visit data). The existence of an HMIS improves the quality of medical services at hospitals. Improving the quality of medical services is inseparable from the willingness of healthcare facilities to implement a health information system.[15]

Organizational cultural resistance and costs are the main obstacles to HMIS implementation.[16] Cultural resistance isn't just a direct rejection of technology, but also a preference for maintaining old practices even when technology is available.[17] This tendency was evident in both hospitals. At the Private Hospital, resistance was stronger due to minimal training and a lack of integration support. This was evident in the fact that several processes were still performed manually, despite the existence of SIMRS. Meanwhile, at public hospitals, resistance is more selective, limited to certain areas, and usually from senior staff.

Different leadership styles can influence program implementation.[18] This can be explained in the context of the SIMRS. The budget approval process for SIMRS infrastructure improvements in private hospitals was slow and relied solely on internal resources. The lack of dedicated training allocation led to new users learning on their own from the seniors. In contrast, public hospitals received financial support from internal and university sources with a relatively quick approval process. Stable financial support can strengthen the acceptance of a digital work culture.[19]

Furthermore, private hospitals tend to hold SIMRS meetings when major issues arise. This pattern was reactive, and did not encourage continuous improvement. Meanwhile, coordination meetings are held regularly at the Public Hospital, involving all relevant units. These meetings serve as a means to monitor the system performance, identify early problems, and formulate joint solutions. Regular monitoring and evaluation are essential to maintain SIMRS quality and improve the system to meet user needs.[20]

Organizational support, particularly from leadership and financial management, has proven to be crucial for the success of digital transformation.[10] Hospitals can prioritize budgetary funding for HMIS development from local funds and partnership programs.[21] The lack of active management involvement in the HMIS development process can hinder the

system's sustainability and integration. An organizational culture that supports innovation and change will facilitate the adoption of new systems and increase staff involvement in the implementation process.[14]

Technology Component

Technologically, the HMIS in both hospitals were integrated into most units. However, the main obstacle encountered is the frequently slow Internet connection quality, especially at private hospitals, which hampers data entry, pharmacy services, and patient registration. If there is a problem with the network, the officer inputs the data manually and then reinputs it into the system if the network returns to normal. This 'double entry' directly impacts healthcare worker satisfaction and productivity.[22]

In terms of hardware, public hospitals are relatively better prepared and have procured new computers and tablets for digital signatures, including plans to strengthen the hardware system in inpatient and operating rooms. Meanwhile, Private companies have limited computer equipment in several units, such as polyclinics and operating rooms, which results in suboptimal real-time data input. Research at other hospitals has also concluded that inadequate hardware and unstable internet connectivity can hinder the optimal operation of HMIS.[23]

Network issues and hardware limitations are common challenges in the implementation of IS in Indonesian hospitals. The absence of supporting devices can hamper workflow, slow down administrative processes, and ultimately impact patient services.[24] Improving the quality of hardware and software will ensure the success of system implementation.[15]. The solutions offered in this context are routine budget allocations for infrastructure and system development as well as periodic technical evaluations of system performance.

Challenges and obstacles

The findings revealed significant differences between public and private hospitals in the readiness and success of HMIS implementation. Public hospitals have advantages in terms of internal training, IT staff support, leadership commitment to system development, and budget and infrastructure availability. Public hospitals have also been integrated with the national platform (SATUSEHAT).

Meanwhile, private hospitals face challenges such as a lack of training and technical guidance, limited IT infrastructure and staff, and a lack of an Educational Mechanism (EMR) and bridging to SATUSEHAT. Private hospitals rely heavily on short-term solutions and informal learning.

These differences indicate that private hospitals, despite having management flexibility, still require policy support and investment to successfully digitize services. Public hospitals are supported more by regulations and systemic government support. This support is evident in government universities' (public) Internet network-strengthening assistance, funded in part by government funds, including increased bandwidth capacity to support Electronic Medical Records. Furthermore, hardware procurement partly funded by public allocation is also available. This aligns with the results of a literature review that found that HMIS in general hospitals is more advanced than in private hospitals. Government Regulation Accelerates HMIS Implementation in Public Hospitals[16]

Both hospitals face common challenges in terms of digital work culture and ensuring full integration with national systems. According to regulations from the Minister of Health, hospitals are not only required to implement a Hospital Management Information System (HMIS), but also to implement integrated electronic medical records.

This study was conducted at two hospitals in Padang City: Government University Hospital and Private Regional General Hospital. Therefore, it cannot yet reflect the conditions of all the hospitals in Padang City. However, the findings of this study align with those of other hospitals in Indonesia.[12,23,25] Furthermore, the method used was qualitative with a limited number of informants. This approach provides in-depth information but does not allow for quantitative measurements of HMIS

effectiveness or user satisfaction statistically.

Conclusion

The implementation of the HMIS at public and private hospitals still faces various obstacles and challenges in human, organizational, and technological aspects. The main human barriers are the lack of formal training and poor understanding among some users, especially in private hospitals, which has led to delays in system adaptation. Organizational barriers include uneven management support, minimal budget allocation specifically for HMIS development, and coordination between units that still need to be strengthened, which is a major organizational obstacle. Technological barriers include Internet network disruptions, limited hardware (computers and tablets), suboptimal system integration with SATUSEHAT, and electronic medical records (EMR), especially in private hospitals, which pose significant technical challenges. Hospitals need to strengthen their training, managerial support, and technological infrastructure so that HMIS implementation can run optimally and be integrated with national systems such as SATUSEHAT.

Ethics approval

This research has passed ethical clearance from the Public Health Faculty, Andalas University Ethics Commission

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available because of informant requests but are available from the corresponding author upon reasonable request.

Acknowledgement

We thank the Public Health Faculty of Andalas University for supporting this study.

Funding

No institution funded this research

Author Contribution

AFS: Manuscript writing and final data analysis, SOP: Data collection and processing at Private Hospital, JNA: Data collection and processing at Public Hospital, SS: Preparation of interview guidelines. All authors have read and approved the final manuscript.

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