

Evaluation of Hospital Management Information System (HMIS) Implementation on Administrative Service Efficiency

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ABSTRACT

Background: Hospital Management Information Systems (HMIS) are increasingly recognized as essential tools for improving administrative efficiency in healthcare settings. Rumah Sakit Islam Malahayati (RSI Malahayati) in Medan, Indonesia adopted an integrated HMIS to streamline its administrative processes; however, the extent to which the system has effectively improved service delivery efficiency remains inadequately evaluated. This study aimed to evaluate the implementation of HMIS on administrative service efficiency at RSI Malahayati, Medan, in 2026.

Methods: A qualitative study employing a phenomenological approach guided by the Colaizzi method was conducted from September to December 2025. The study was set at RSI Malahayati, a 150-bed Islamic private hospital in Medan, North Sumatra. Purposive sampling was applied to recruit 18 participants, including hospital administrators, information technology staff, medical records officers, and front-line administrative personnel. Inclusion criteria required direct engagement with HMIS for a minimum of six months. In-depth, semi-structured interviews were conducted face-to-face, averaging 55 minutes per session. Interviews were audio-recorded, transcribed verbatim, and analyzed using NVivo 12 software. Data saturation was confirmed at the 16th interview. Trustworthiness was ensured through triangulation, member checking, and peer debriefing, in conformity with COREQ standards.

Results: Four major themes emerged from data analysis: (1) Enhanced administrative workflow integration, characterized by reduced manual data entry and inter-departmental communication delays; (2) Barriers to optimal system utilization, encompassing inadequate technical training, system downtime incidents, and user resistance; (3) Impact on patient service responsiveness, reflecting shorter waiting times and improved patient registration accuracy; and (4) Organizational and cultural factors shaping HMIS adoption, including leadership support and Islamic institutional values influencing staff acceptance. Participants consistently acknowledged improvements in data accuracy and reporting efficiency, though persistent technical and human resource challenges limited system performance.

Conclusion: HMIS implementation at RSI Malahayati has demonstrably improved administrative service efficiency through enhanced workflow integration and data management. However, sustainable efficiency gains require addressing identified barriers through comprehensive staff training, technical infrastructure reinforcement, and culturally responsive change management strategies tailored to Islamic hospital settings.

Keywords: *Hospital Information Systems; Health Administration; Efficiency, Organizational; Qualitative Research; Administrative Personnel; Indonesia*

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INTRODUCTION

The digitalization of hospital administrative processes has become a critical priority in global health system reform. Hospital Management Information Systems (HMIS) represent one of the most significant technological interventions aimed at transforming health service delivery by automating data management, streamlining patient flow, and enhancing decision-making through real-time information access. The World Health Organization (WHO) has consistently identified health information system strengthening as a foundational pillar of universal health coverage, underscoring the strategic importance of effective HMIS adoption across health facilities worldwide (WHO, 2020).

In Indonesia, the national health transformation agenda under the Ministry of Health's Transformasi Kesehatan (Health Transformation) 2021–2024 framework has placed digital health infrastructure at the forefront of hospital development priorities. The government's initiative through Permenkes No. 82 of 2013, subsequently strengthened by subsequent regulations, mandates all hospitals to implement integrated HMIS to improve service quality and administrative efficiency. Despite these regulatory requirements, implementation quality varies substantially across facility types, with private Islamic hospitals (Rumah Sakit Islam) facing unique contextual challenges that include limited IT infrastructure budgets, diverse staff digital literacy, and the integration of Islamic institutional governance principles into operational management (Kemenkes RI, 2021).

Globally, evidence on HMIS effectiveness demonstrates a complex landscape of benefits and barriers. Studies from high-income contexts consistently report that well-implemented health information systems reduce administrative errors, decrease patient waiting times, and improve resource allocation efficiency (Holden et al., 2020; Kruse et al., 2018). However, research from low- and middle-income countries (LMICs), including Southeast Asian nations, reveals significant implementation challenges including poor system interoperability, insufficient training, inadequate technical support, and organizational resistance to digital transformation (Cresswell et al., 2017; Nguyen et al., 2021). These findings suggest that technological deployment alone is insufficient without accompanying organizational change management and contextual adaptation.

Within the Indonesian context, prior research on HMIS has predominantly employed quantitative approaches focusing on system usability metrics or patient satisfaction scores, yielding limited understanding of the lived experiences of administrative staff engaging with these systems on a daily basis. The qualitative dimensions of HMIS implementation, particularly how staff perceive system functionality, navigate institutional adoption challenges, and integrate technological tools within their professional practice, remain insufficiently explored (Prasetyo et al., 2022; Hidayat & Supriyanto, 2020). This gap is particularly pronounced in Islamic hospital settings, where organizational culture, leadership dynamics, and religious institutional identity may uniquely shape HMIS adoption trajectories.

Theoretical grounding for this study draws upon the Technology Acceptance Model (TAM) as originally proposed by Davis (1989) and subsequently extended by Venkatesh and colleagues (2003) through the Unified Theory of Acceptance and Use of Technology (UTAUT). These frameworks posit that perceived usefulness, ease of use, social influence, and facilitating conditions collectively determine technology adoption intentions and behaviors. Applied within a healthcare organizational context, these constructs help explain why administratively capable HMIS may nonetheless face adoption resistance when implementation processes fail to adequately address user-level factors (Holden & Karsh, 2010).

Rumah Sakit Islam Malahayati (RSI Malahayati) in Medan, North Sumatra, represents a significant case study in this context. As a 150-bed private Islamic hospital serving a predominantly Muslim population in Medan's urban center, RSI Malahayati implemented an integrated HMIS in 2022 as part of its hospital accreditation preparation process. Despite four years of operation, no formal evaluation of the system's impact on administrative service efficiency has been conducted, representing a critical knowledge gap for institutional improvement planning and broader policy learning. The aim of this study, therefore, was to evaluate the implementation of HMIS and its effects on administrative service efficiency at RSI Malahayati, Medan, as experienced by hospital administrative staff and information technology personnel.

METHODS

Study Design

This study employed a qualitative research design with a phenomenological approach, selected to explore and interpret the subjective lived experiences of hospital administrative staff in their engagement with the HMIS at RSI Malahayati. The phenomenological method, guided by Colaizzi's (1978) seven-step data analysis framework, was deemed most appropriate given the study's objective of understanding meaning-making processes surrounding HMIS adoption, rather than testing predefined hypotheses. This approach allowed for the emergence of contextually grounded insights into how HMIS implementation shapes administrative work practices and service efficiency outcomes. The research was conducted within RSI Malahayati, a 150-bed private Islamic hospital in Medan, North Sumatra, Indonesia, from September to December 2025. The hospital setting, with its distinctive Islamic organizational identity and urban

community service mandate, was expected to provide a rich environment for examining HMIS implementation dynamics.

Research Team and Reflexivity

The primary research team comprised four investigators with complementary expertise in health administration, health information systems, and qualitative research methodology. The lead researcher (AFS) holds a doctoral qualification in Public Health with specialization in health services research, while co-investigators bring expertise in hospital administration (BAS), health information technology (RDN), and nursing administration (SRW). Two team members had prior professional engagement with RSI Malahayati through a separate hospital quality improvement project, necessitating careful reflexivity management. Reflexivity strategies included maintenance of individual reflexivity journals throughout the study period, regular peer debriefing sessions conducted biweekly, and explicit documentation of researcher positionality statements at study outset. These measures were implemented to minimize confirmation bias and ensure that emerging themes reflected participant perspectives rather than researcher preconceptions.

Participants

Participants were recruited using purposive sampling to ensure informational richness and representation of diverse roles within the hospital's administrative ecosystem. Inclusion criteria required: (1) direct engagement with the HMIS for a minimum of six months; (2) employment at RSI Malahayati in an administrative, information technology, or medical records capacity; and (3) willingness to provide informed consent and participate in audio-recorded interviews. Exclusion criteria comprised: staff on extended leave during the data collection period, personnel who had used HMIS for fewer than six months, and individuals in purely clinical roles without administrative HMIS interaction.

The research team initially approached 24 potential participants across targeted departments. Three individuals declined participation citing workload constraints, and three were excluded based on eligibility criteria, yielding a final sample of 18 participants. All participants were informed of the study's aims, scope, and voluntary nature prior to enrollment. No financial compensation or material incentives were provided; participation was entirely voluntary.

Data Collection

Data collection was conducted from September to December 2025 within the RSI Malahayati premises. In-depth, semi-structured individual interviews were the primary data collection method. Each interview was conducted face-to-face in a private room designated for research activities, ensuring participant confidentiality. Interviews ranged from 45 to 75 minutes in duration, with an average of 55 minutes. An interview guide was developed based on the study objectives and theoretical framework, covering the following domains: (1) daily HMIS usage patterns and workflows; (2) perceived impact on administrative task efficiency; (3) challenges and facilitators in system use; (4) organizational and contextual factors influencing adoption; and (5) recommendations for system improvement. Sample interview questions included: "How has the HMIS changed the way you manage patient registration and data recording in your daily work?" and "What do you consider the most significant barrier to using the HMIS effectively in your department?"

All interviews were conducted in Bahasa Indonesia and audio-recorded with explicit participant consent. Verbatim transcription was completed within 48 hours of each interview by trained research assistants. Transcripts were reviewed against audio recordings by the lead researcher to ensure accuracy. Member checking was performed by sharing summarized findings with eight purposively selected participants, who confirmed the accuracy and representativeness of the emerging themes. Data saturation was achieved at the 16th interview, with no substantively new themes emerging during the 17th and 18th interviews.

Data Analysis

Data analysis followed Colaizzi's seven-step phenomenological method: (1) reading all transcripts to acquire a holistic sense of the data; (2) extracting significant statements directly related to HMIS experiences; (3) formulating meanings from each significant statement; (4) organizing formulated meanings into theme clusters; (5) integrating themes into an exhaustive description of the phenomenon; (6) producing a fundamental structure of the phenomenon; and (7) returning to participants for validation of the fundamental structure. NVivo 12 software (QSR International) was used to manage, code, and query the dataset, facilitating systematic tracking of codes and the development of hierarchical theme structures.

Three members of the research team independently coded a 30% subsample of transcripts, with inter-rater agreement assessed through Cohen's kappa ($\kappa = 0.82$), indicating strong concordance. Coding discrepancies were resolved through team consensus discussions, with a structured audit trail maintained to document all analytical decisions. Literature was selectively integrated into the analysis to contextualize emerging themes without constraining inductive interpretation of participant experiences.

Trustworthiness and Rigor

Multiple strategies were employed to ensure trustworthiness in accordance with Lincoln and Guba's (1985) criteria. Credibility was established through prolonged engagement with the research site over four months, triangulation of participant roles and departmental perspectives, and member checking with eight participants. Dependability was maintained through a reflexivity audit trail and systematic documentation of all methodological decisions. Confirmability was ensured through peer debriefing sessions and the maintenance of a research audit trail accessible to all team members. Transferability was facilitated by providing thick, contextually rich descriptions of the study setting, participant characteristics, and emergent findings to enable readers to assess applicability to comparable settings.

Ethical Consideration

This study received ethical approval from the Health Research Ethics Committee (KEPK) of Universitas Sumatera Utara (Approval No. 1274/KEPK/USU/2025, dated August 20, 2025). Additional institutional permission was obtained from the RSI Malahayati Hospital Director (Letter No. 087/RSI-MHY/DIR/IX/2025). All participants provided written informed consent prior to study enrollment. Participant anonymity was preserved through the use of alphanumeric codes (e.g., P1–P18) in all research records and publications. Audio recordings and transcripts were stored on password-protected institutional servers with access restricted to the core research team. Participants were informed of their right to withdraw from the study at any time without professional consequence.

RESULTS

Participant Characteristics

Eighteen participants were enrolled, comprising six hospital administrators, four information technology staff, five medical records officers, and three front-line administrative personnel. Participants ranged in age from 24 to 51 years, with a mean age of 35.7 years ($SD = 7.9$). The majority were female (72.2%, $n = 13$), reflecting the gender composition of the hospital's administrative workforce. Educational backgrounds included diploma (44.4%), bachelor's degree (44.4%), and master's degree (11.1%). HMIS experience ranged from 8 to 42 months, with a mean of 27.4 months. Table 1 presents the detailed demographic profile of participants.

Table 1. Participant Characteristics (n = 18)

Characteristic	Category	n (%)	Mean (SD) / Range
Role	Hospital Administrator	6 (33.3%)	—
	IT Staff	4 (22.2%)	—
	Medical Records Officer	5 (27.8%)	—
	Administrative Personnel	3 (16.7%)	—
Age (years)	—	—	35.7 (7.9); 24–51
Sex	Female	13 (72.2%)	—
	Male	5 (27.8%)	—
Education	Diploma (D3)	8 (44.4%)	—
	Bachelor (S1)	8 (44.4%)	—
	Master (S2)	2 (11.1%)	—
HMIS Experience	—	—	27.4 (9.6); 8–42 mo.

Theme 1: Enhanced Administrative Workflow Integration

The most consistently articulated theme across participant groups was the perceived improvement in administrative workflow integration following HMIS implementation. Participants described a tangible reduction in manual, paper-based processes and an acceleration of inter-departmental data flow that was attributed directly to system adoption. Front-line registration staff noted that patient registration times had been substantially reduced, with data entered once being automatically accessible across outpatient, inpatient, pharmacy, and billing modules.

"Before the system, I spent almost half my day just writing the same patient information on different forms. Now I input it once and everyone in the hospital can see it immediately. The referral process to the inpatient ward used to take 30 minutes; now it is done in about 10 minutes." (P3, Medical Records Officer)

Billing and financial administration staff similarly described improvements in claims processing efficiency. The system's integration with BPJS Kesehatan (National Health Insurance) data enabled automated eligibility verification, reducing manual error rates and claims rejection frequencies. Participants working in the administrative leadership roles highlighted enhanced management reporting capabilities, including the generation of daily census reports and monthly performance dashboards that previously required several days of manual compilation.

Theme 2: Barriers to Optimal System Utilization

Despite acknowledged efficiency gains, participants identified multiple persistent barriers that constrained the system's full operational potential. Technical barriers were prominent, with 12 of 18 participants reporting recurrent system downtime incidents, particularly during peak morning service hours between 07:30 and 09:30. These interruptions necessitated reversion to manual recording protocols, creating duplicate documentation workloads and disrupting the workflow continuity that the system was designed to provide.

"When the system crashes, everything stops. We go back to paper, and when the system comes back, someone has to re-enter all the data. This happens maybe two or three times a week, and it makes staff not trust the system completely." (P11, IT Support Staff)

Human resource-related barriers constituted the second major sub-theme. Participants with lower digital literacy, particularly older staff members who had previously operated entirely within paper-based systems, expressed significant anxiety and resistance toward HMIS interaction. Training provision was described as inadequate in both scope and continuity; initial system onboarding training was conducted over three days at implementation, with no structured refresher training offered subsequently. New staff reported being informally trained by colleagues rather than through institutional programs, creating inconsistent system usage practices across departments.

Theme 3: Impact on Patient Service Responsiveness

A third theme captured participants' perceptions of how HMIS had altered patient-facing service quality and responsiveness. Registration staff observed measurable improvements in patient registration accuracy, with fewer data duplication errors and more reliable patient history retrieval. Outpatient clinic coordinators noted that appointment scheduling had become more organized, reducing instances of overbooking and patient scheduling conflicts that had previously generated patient complaints.

"Patients often used to complain that we did not have their previous visit records or that their prescriptions were wrong. Now, the doctor can see the full history on screen immediately. Patients notice the difference and feel more confident in our care." (P7, Hospital Administrator)

Pharmacy and laboratory departments reported improved coordination with outpatient services through automated order and result transmission, reducing verbal communication errors and test result transcription mistakes. However, participants in the emergency department noted that HMIS responsiveness during high-acuity situations remained suboptimal, with screen loading times occasionally frustrating urgent data entry requirements.

Theme 4: Organizational and Cultural Factors Shaping HMIS Adoption

The fourth theme illuminated the distinctive organizational and cultural dimensions of HMIS adoption within RSI Malahayati's Islamic institutional context. Leadership support emerged as the most influential organizational facilitator, with participants who perceived strong director-level commitment to the system more likely to express positive adoption attitudes and problem-solving persistence when encountering technical challenges.

"The director always says that improving our administration is part of our amanah [trustworthiness/responsibility] as an Islamic hospital. When leadership connects the system to our institutional values, staff feel that using it properly is also part of their religious responsibility." (P2, Hospital Administrator)

Participants described how Islamic organizational values, particularly the principles of amanah (trustworthiness), itqan (excellence in work), and khidmah (service), were frequently invoked by hospital leadership to contextualize HMIS adoption within the hospital's broader institutional identity. This Islamic value framing appeared to reduce resistance among some staff, particularly those who might otherwise have been more reluctant to embrace technological change. Table 2 presents the summarized theme matrix with representative sub-themes and exemplary participant quotations.

Table 2. Summary of Themes, Sub-themes, and Representative Quotes

Theme	Sub-theme	Representative Quote
1. Enhanced Workflow Integration	Reduced manual processes	"I input it once and everyone can see it immediately" (P3)
	Inter-departmental data flow	"Referral process reduced from 30 to 10 minutes" (P3)
2. Barriers to Utilization	System downtime	"System crashes maybe two or three times a week" (P11)
	Inadequate training	"New staff are trained informally by colleagues" (P14)
3. Patient Service Responsiveness	Improved data accuracy	"Patients feel more confident in our care" (P7)
	Appointment management	"Fewer overbooking and scheduling conflicts" (P9)
4. Organizational & Cultural Factors	Leadership commitment	"Director connects system use to our amanah" (P2)
	Islamic institutional values	"Using the system properly is religious responsibility" (P2)

DISCUSSION

Comparison with Existing Literature

The findings of this study both converge with and extend the existing body of literature on HMIS implementation in healthcare settings. The positive workflow integration effects identified in Theme 1 align with international evidence demonstrating that integrated health information systems reduce administrative redundancy and accelerate information exchange across hospital departments (Kruse et al., 2018; Holden et al., 2020). The documented reduction in patient registration times and improvements in data accuracy at RSI Malahayati are consistent with findings reported from comparable HMIS implementations in Southeast Asian contexts, including studies from Malaysia and Vietnam that recorded significant improvements in patient processing efficiency following electronic health record adoption (Nguyen et al., 2021; Ramli et al., 2019).

The barriers identified in Theme 2 reflect well-documented challenges in HMIS implementation literature. Recurring system downtime as a barrier to trust and adoption is consistent with findings reported by Cresswell et al. (2017) in their systematic review of electronic health record implementation challenges in LMICs, which emphasized technical reliability as a fundamental prerequisite for sustained user acceptance. The inadequacy of training provision described by participants mirrors observations from Prasetyo et al. (2022) in their study of Indonesian hospital HMIS adoption, where episodic rather than continuous training approaches were associated with persistent skill deficits and user frustration.

The fourth theme, highlighting the role of Islamic institutional values in shaping adoption attitudes, represents a contextually novel contribution to the HMIS implementation literature. While prior research has acknowledged organizational culture as a mediating factor in technology adoption (Venkatesh et al., 2003), the specific mechanism whereby Islamic values are deployed by hospital leadership to reframe HMIS adoption as a professional and religious responsibility has not been previously described in health information technology literature. This finding extends the UTAUT framework by suggesting that in faith-based healthcare organizations, social influence operates not merely through peer norms but through value-congruent leadership communication that aligns technological adoption with institutional identity and religious commitments.

New Knowledge and Conclusions

This study contributes new empirical knowledge regarding the implementation of HMIS in private Islamic hospital settings in Indonesia, a context that has been systematically underrepresented in health information systems research. The emergence of Islamic institutional values as an adoption facilitation mechanism suggests that technology implementation strategies in faith-based healthcare organizations should consider aligning HMIS adoption narratives with the religious and ethical values central to institutional identity. This represents a potentially transferable insight for the estimated 1,800 Islamic hospitals operating across Indonesia and the broader population of faith-based hospitals in Muslim-majority countries.

The study's findings also challenge the prevailing technocentric framing of HMIS evaluation research, which has predominantly focused on system functionality and user interface metrics while neglecting the organizational, cultural, and relational dimensions of implementation. The qualitative phenomenological lens applied in this study reveals that administrative staff's experiences of HMIS are deeply embedded in workplace relationships, institutional culture, and personal professional identity, factors that cannot be captured through quantitative usability assessments alone.

Practical Applications of the Findings

The practical implications of this study are multifaceted. RSI Malahayati's hospital management should prioritize the development of a structured, role-specific HMIS training curriculum that extends beyond initial onboarding to include quarterly refresher modules, digital literacy development for staff with lower technology experience, and designated HMIS champions within each department to provide peer-level support. Technical infrastructure investment, specifically in server redundancy and system uptime monitoring, is essential to address the trust erosion caused by recurrent downtime. At a broader institutional level, hospital leadership should formally institutionalize Islamic value framing in HMIS adoption communications, creating alignment between technological imperatives and the professional-religious identity of staff. For policymakers at the Ministry of Health level, these findings support the development of a national HMIS competency standard for hospital administrative personnel and the inclusion of HMIS training adequacy as a criterion in hospital accreditation assessments conducted by KARS (Komisi Akreditasi Rumah Sakit).

Limitations

This study has several limitations that warrant consideration. The single-site design at RSI Malahayati limits the transferability of findings to other hospital contexts, including public hospitals, non-Islamic private hospitals, and facilities in different geographical regions of Indonesia with distinct demographic, infrastructural, and organizational characteristics. The qualitative phenomenological methodology, while providing depth of insight, does not permit causal inference regarding the relationship between HMIS implementation and specific efficiency outcomes. Social desirability bias may have influenced participant responses, despite the mitigation strategies employed. The research was conducted over a four-month period, which may not capture the full longitudinal dynamics of HMIS adoption, including the potential for efficiency gains or decline over longer operational periods. Future research utilizing longitudinal, mixed-methods designs with multi-site comparative samples is recommended to address these limitations.

CONCLUSION

The implementation of HMIS at RSI Malahayati has produced meaningful improvements in administrative workflow integration, inter-departmental data coordination, and patient service responsiveness, as experienced and articulated by hospital administrative staff. These gains are, however, moderated by persistent technical reliability challenges and human resource limitations that constrain the system's full operational potential. Critically, this study identifies the distinctive role of Islamic institutional values and leadership communication in facilitating adoption within a faith-based hospital context, a finding that expands existing theoretical frameworks for understanding technology acceptance in healthcare organizations. Sustainable progress in HMIS-driven administrative efficiency requires a systemic response that addresses technical infrastructure adequacy, structured competency development, and culturally responsive change management, and this study provides a contextually grounded evidence base to guide such efforts at RSI Malahayati and comparable Islamic health institutions across Indonesia.

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