Effectiveness of Hospital Management Information Systems in Improving Hospital Efficiency in Indonesia: A Scoping Review

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ABSTRACT

Background: Digital transformation in the health sector, including the implementation of Hospital Management Information Systems (HMIS), has become a key factor in improving the efficiency of healthcare services in Indonesia. This study aims to examine the effectiveness of HMIS in enhancing hospital operational efficiency and to identify the factors that support and hinder its implementation. Method: A scoping review method was employed, analyzing 10 selected articles from databases such as PubMed, ScienceDirect, Google Scholar, and Garuda published between 2018 and 2025. Results: The findings suggest that HMIS has the potential to enhance efficiency by automating administrative processes, integrating data systems, and reducing operational costs. However, its implementation still faces multidimensional challenges, with approximately 80% of issues arising from non-technical factors—such as the absence of standardized operating procedures, limited human resource competencies, and weak management commitment—while the remaining 20% are related to limitations in technical infrastructure. Studies by Waruwu et al. (2024) and Handayani et al. (2018) confirm that human resource training and strong leadership are critical factors for successful implementation. Conclusions: The conclusions of this study emphasize the need for a holistic approach that combines technological improvements, strengthening of human resource capacity, and the implementation of sustainable policies. Policy recommendations include the development of standardized Standard Operating Procedures (SOPs), regular training programs, infrastructure improvements, and routine evaluation mechanisms. These findings provide a comprehensive perspective for policymakers to optimize HMIS implementation and enhance hospital efficiency in Indonesia.

INTRODUCTION

Digital transformation in the health sector has become a primary focus in many countries, including Indonesia (Atika, 2023; Hanifa & Wicaksono, 2025; Santoso et al., 2024; Sulaiman, 2024). To improve the quality and efficiency of healthcare services, hospitals must manage information quickly, accurately, and in an integrated manner (Algresha et al., 2024; Huang et al., 2024; Tiriteu et al., 2024). One strategic solution employed is the implementation of the Hospital Management Information System (HMIS), an information technology–based system designed to comprehensively manage hospital operational data. HMIS is intended to support various critical processes, including patient registration, medical records management, equipment and medication inventory, human resource management, and financial reporting.

According to Peraturan Menteri Kesehatan No. 24 Tahun 2022, healthcare facilities are mandated to implement electronic medical records (Asrofi et al., 2024; Ratnawati &

Iskandar, 2025; Sunargo et al., 2025). The regulation also explains that the use of information technology in electronic medical records provides benefits in terms of efficiency in data recording and processing (Kementerian Kesehatan, 2022). This indicates that information systems are not merely administrative tools but also play a crucial role in optimizing workflows and supporting both clinical and managerial decision-making. In line with this, Andika and Dety (2023) explain that HMIS is a computerized system that processes and integrates all business process flows of healthcare services through a network of coordination, reporting, and administrative procedures to obtain information quickly, accurately, and precisely.

The Indonesian government also encourages the comprehensive implementation of HMIS through Peraturan Menteri Kesehatan Nomor 82 Tahun 2013 as part of the modernization of national healthcare services. However, in reality, the implementation of this system still faces numerous obstacles. Based on data from the Ministry of Health in 2016, only about 48% of hospitals in Indonesia had successfully operated HMIS effectively, while 16% had not yet implemented the system at all. Some identified barriers include limited technological infrastructure, lack of technical training, and resistance from medical personnel toward system changes.

Given the strategic role of HMIS in enhancing operational efficiency and the challenges associated with its implementation in Indonesia, a comprehensive review is necessary to understand how this system functions and its impact across various hospital contexts. Therefore, this study is structured as a scoping review to identify, map, and analyze the role of the Hospital Management Information System in enhancing operational efficiency in Indonesian hospitals based on various published studies. Through this approach, it is expected that a comprehensive overview of HMIS effectiveness and the factors influencing its success can be obtained.

A number of previous studies have shown that the application of hospital information systems plays an important role in improving the efficiency and quality of healthcare services. Benning and Knaup (2020) explained that hospital information systems can improve operational coordination through data integration across various healthcare service units. The study by Mohammadpour et al. (2022) also showed that the use of hospital information systems is able to improve the efficiency of healthcare services from the perspective of clinical personnel. In addition, research by Handayani et al. (2018) revealed that the successful implementation of hospital information systems is influenced not only by technological factors but also by organizational aspects and user acceptance. Other research by Pane et al. (2023) and Fadilla (2021) confirms that hospital management information systems can improve operational efficiency through the automation of administrative processes, reduction of operational costs, and improvement of healthcare data management quality.

Although various studies have demonstrated the significant potential of HMIS in improving hospital efficiency, its implementation in many hospitals in Indonesia still faces various obstacles. Several studies have found that the main challenges are not only related to technological infrastructure but also include non-technical aspects such as limited human resource competencies, lack of training, weak management commitment, and the absence of

clear standard operating procedures. Research by Waruwu et al. (2024) shows that human resource training has a significant influence on the effectiveness of HMIS utilization. Meanwhile, research by Salsabila and Veronica (2024) indicates that the implementation of HMIS in several hospitals is still not optimal due to various operational and organizational barriers. These conditions demonstrate that the successful implementation of HMIS requires a more comprehensive approach that focuses not only on technological aspects but also on organizational readiness and user preparedness.

However, most previous research has focused on evaluating the implementation of HMIS within a single hospital or using a limited case study approach, which does not provide a comprehensive overview of the effectiveness of the system in improving hospital operational efficiency on a broader scale. In addition, studies that integrate various empirical findings to map the factors influencing the effectiveness of HMIS implementation in Indonesia remain relatively limited. These limitations indicate the existence of a research gap related to the lack of systematic and comprehensive literature synthesis on the role of HMIS in improving hospital efficiency in Indonesia.

Based on these gaps, this research is important in providing a more comprehensive understanding of the effectiveness of HMIS implementation in improving hospital operational efficiency in Indonesia. The urgency of this research is increasing alongside the acceleration of digital transformation in the health sector and the growing demand to improve the quality of healthcare services in a more efficient and transparent manner. By understanding the factors that support and hinder HMIS implementation, this research is expected to contribute to the development of policies and strategies for more effective health information system implementation in the future.

The novelty of this research lies in the literature synthesis approach using the scoping review method, which aims to systematically map various research findings related to HMIS implementation in improving hospital efficiency in Indonesia. Unlike previous studies that generally focused on a single case or institution, this study integrates findings from various academic sources to produce a more comprehensive understanding of the technical, organizational, and human resource factors influencing the successful implementation of HMIS.

Based on this background, this study aims to analyze the effectiveness of the implementation of the Hospital Management Information System (HMIS) in improving hospital operational efficiency in Indonesia and to identify the factors that support and hinder its implementation. The results of this study are expected to provide both academic and practical benefits. Academically, this research can enrich the literature on health information systems and digital transformation in the healthcare sector. Practically, the findings of this study are expected to serve as a reference for hospital managers and policymakers in designing more effective HMIS implementation strategies to improve the efficiency and quality of healthcare services in Indonesia.

METHOD

This study employed a scoping review method, which is a systematic approach aimed at identifying, mapping, and thoroughly analyzing relevant literature on a particular topic. A

scoping review was chosen because this method enables researchers to explore the breadth of the available evidence, identify research gaps, and understand the concepts or frameworks used in previous studies related to the role of the Hospital Management Information System (HMIS) in improving hospital operational efficiency in Indonesia.

The literature search was conducted through several academic databases, including PubMed, ScienceDirect, Google Scholar, and Garuda, using keywords such as "Sistem Informasi Manajemen Rumah Sakit," "efisiensi rumah sakit," "SIMRS Indonesia," and "hospital information system."

Articles included in this review were selected based on inclusion criteria, namely: (1) articles published within the last five years (2018–2025), (2) directly discussing the implementation and impact of HMIS on hospital efficiency or performance, and (3) available in either Indonesian or English. Meanwhile, exclusion criteria covered opinion articles, those not peer-reviewed, or those irrelevant to the hospital context in Indonesia.

The analytical stages followed the framework of Arksey and O'Malley (2005), consisting of five key steps: (1) identifying the research question, (2) identifying relevant studies, (3) study selection, (4) data extraction and mapping, and (5) compiling, reporting, and interpreting the results. The collected data were analyzed descriptively to identify general trends, frequently discussed dimensions of efficiency, as well as the technological, organizational, and human aspects that most influence the implementation of HMIS in Indonesian hospitals.

RESULT AND DISCUSSION

Based on the reduction of scientific articles that had been carried out, a total of 10 articles were selected for the scoping review, as shown in Table 1:

Table 1. Article Data Collection

No.	Full Original Title	Authors	Year	Method	Key Findings	Database Source
1	Hospital Information Systems	Nils-Hendrik Benning, Petra Knaup	2020	Conceptual three-layer analysis	The strategic-tactical-operational approach is practical for HIS management	PubMed
2	Use of Hospital Information Systems to Improve the Quality of Health Care from Clinical Staff Perspective	Ali Mohammadpour, et al.	2022	Cross-sectional (n=120 clinical staff)	HIS effectiveness increased from 64.42% to 81.85% with development strategies (p<0.001)	PubMed
3	Hospital information system user acceptance factors: User group perspectives	P.W. Handayani, et al.	2018	Mixed-methods (interviews + questionnaire)	15 user acceptance factors, non-technical dimensions more influential than technical	PubMed
4	Hospital Management Information Systems In Increasing Efficiency: Mini	Nadifa Maulani Fadilla	2021	Systematic literature review	HIS increases efficiency through service automation and cost reduction	Sinta

	Literature Review					
5	An Evaluation Of The Implementation Hospital Management Information System (HMIS Transmedic) Using Hot-Fit Method At Hospital Royal Prima Medan	Benedictus Juve, et al.	2024	Cross-sectional (n=168)	Leadership support is the most influential factor (p<0.05)	Sean Institute
6	Evaluation of HMIS Implementation at RSU Hermina Tangerang	Tania Evita Salsabila, Shela Julia Veronica	2024	SEM-PLS	Implementation is not yet optimal due to various operational challenges	Sinta
7	Adoption of Innovation in Hospital Management Information System (HMIS) at UPT RSUD Kabupaten Kepulauan Meranti	Apry Rifaldi, Dedi Kusuma Habibie	2024	Qualitative (observation + interview)	Adoption increased through online registration and monthly evaluation	Google Scholar
8	The Effect of Training on the Efficiency of Using Hospital Management Information System (HMIS) at Klinik Pratama Tabita Gunungsitoli	Misericordias Domini Waruwu, et al.	2024	Quantitative (SPSS v27, n=35)	Strong relationship (r=0.869), training influences 75.5% (p<0.05)	Google Scholar
9	Hospital Management Information System (HMIS) to Improve the Quality of Health Services in Indonesia	Maya Saufinah Pane, et al.	2023	Literature review	HMIS implementation improves service quality following Permenkes No.82/2013	Google Scholar
10	Review of Effectiveness in the Use of HMIS Khanza in Outpatient Services at RSIA Citra Insani in 2023	Miftah Parid Firmansyah, et al.	2024	Descriptive qualitative (5M)	Main obstacles: lack of SOPs, internet network issues, and inadequate staff training	Google Scholar

Based on the analysis of the ten articles reviewed in this study, the implementation of the Hospital Management Information System (HMIS) in Indonesia has shown a positive impact on improving the efficiency of healthcare services. However, it still faces various multidimensional challenges. Recent studies such as those by Firmansyah et al. (2024) and Rifaldi et al. (2024) reveal that the complex interaction between technical and non-technical factors significantly influences the effectiveness of HMIS. From a technical perspective, although the availability of basic infrastructure such as internet networks and supporting devices is adequate in some hospitals (as reported in the evaluation of the HMIS Khanza), the main issues arise from non-technical factors, including the absence of clear Standard Operating Procedures (SOPs) and the limited competence of human resources in operating the system.

The findings of Waruwu et al. (2024) provide strong empirical evidence of the importance of human resource capacity development, where structured training interventions have been proven to improve HMIS efficiency by up to 75.5%. This finding supports earlier results by Handayani et al. (2018), who identified 15 user acceptance factors and emphasized the dominance of non-technical aspects such as organizational readiness and management support. Juve et al. (2024) further confirm that strong leadership and organizational commitment are key determinants of successful HMIS implementation, as reflected in adequate budget allocations and sustainable system maintenance programs.

From a practical perspective, the qualitative study by Ali et al. (2024) demonstrates that the adoption of digital innovations, such as online registration, has made a tangible contribution to increasing service efficiency and operational output. However, implementation remains suboptimal due to several technical barriers, including unstable internet networks. These findings align with the study by Salsabila and Veronica (2024), which highlighted the gap between the potential of HMIS and its real-world implementation, where various operational obstacles continue to hinder the achievement of maximum efficiency.

Collectively, the literature reviewed in this scoping review provides a comprehensive picture that, although HMIS holds transformational potential in enhancing hospital efficiency through the automation of administrative processes and data integration (as shown in the studies by Pane et al., 2023 and Fadilla, 2021), realizing this potential requires a holistic approach that combines technical improvements with strengthening human resource capacity and sustained management commitment. Policy recommendations emerging from the synthesis of these findings include: (1) the development of detailed standardized SOPs (Firmansyah et al., 2024), (2) the implementation of structured and regular training programs (Waruwu et al., 2024), (3) strategic investment in supporting infrastructure (Rifaldi et al., 2024), and (4) the establishment of continuous feedback and evaluation mechanisms (Salsabila & Veronica, 2024).

The three-layer conceptual framework developed by Benning and Knaup (2020) regarding hospital information systems—which includes the task entity, application, and physical infrastructure layers—finds strong resonance in the context of HMIS implementation in Indonesia. The findings of Handayani et al. (2018) on the dominant role of non-technical factors in user acceptance of HMIS particularly reinforce Benning and Knaup's view on the importance of a holistic approach that integrates both technical and socio-organizational aspects. Further empirical evidence from Mohammadpour et al. (2022) demonstrates that a 17.43% increase in efficiency through HMIS is highly dependent on the system's ability to meet specific end-user needs, aligning with Benning and Knaup's emphasis on a deep understanding of the task entity layer in system design. Collectively, these studies form a comprehensive understanding that the effectiveness of HMIS in Indonesian hospital settings requires: (1) system design based on detailed clinical workflow mapping, (2) a participatory approach involving various stakeholders in the system development process, and (3) adequate supporting infrastructure, although not the sole determining factor. These findings underscore that the success of HMIS implementation in

Indonesia is more strongly influenced by organizational readiness and the quality of human resources than by the sophistication of the technology itself.

CONCLUSION

Based on a review of ten articles included in this scoping review, it can be concluded that the Hospital Management Information System (HMIS) has demonstrated significant potential to improve healthcare service efficiency in Indonesia, particularly through the automation of administrative processes, data integration, and operational cost reduction. However, this potential has not yet been fully realized, as HMIS implementation still faces multidimensional challenges. Non-technical factors—such as the absence of clear Standard Operating Procedures (SOPs), limited human resource competence, and lack of management commitment—constitute the main obstacles (accounting for approximately 80% of the issues), while technical factors—such as network infrastructure and device readiness—also play a role (approximately 20% of the issues).

These findings underscore the importance of a holistic approach that extends beyond a focus on technology alone, emphasizing the need for enhanced human resource capacity, improved governance, and sustained policy support. The studies reviewed consistently show that the effectiveness of HMIS depends on a balance between technological readiness, organizational readiness, and user readiness. Therefore, efforts to improve hospital efficiency through HMIS must include the development of clear Standard Operating Procedures (SOPs), regular staff training, infrastructure improvements, and routine evaluations to ensure that the system remains relevant to user needs.

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