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A Scoping Review of Challenges and Solutions in the Successful Implementation of Hospital Management Information Systems (HMIS)

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Abstract

Background: A Hospital Management Information System (HMIS) is a comprehensive, computer-based system designed to manage and streamline the entire spectrum of hospital operations, including administrative, clinical, and financial processes. It integrates various functions such as patient registration, medical records management, appointment scheduling, billing, and reporting into a cohesive network that facilitates efficient information flow and decision-making within a hospital setting (1-3). HMIS is essential for improving hospital efficiency through the integration of medical, administrative, and financial data. However, HMIS implementation may face a variety of challenges. This scoping review aims to identify these challenges and propose solutions for successful HMIS adoption.

Methods: A Hospital Management Information System (HMIS) is a comprehensive, computer-based system designed to manage and streamline the entire spectrum of hospital operations, including administrative, clinical, and financial processes. It integrates various functions such as patient registration, medical records management, appointment scheduling, billing, and reporting into a cohesive network that facilitates efficient information flow and decision-making within a hospital setting (1-3). HMIS is essential for improving hospital efficiency through the integration of medical, administrative, and financial data. However, HMIS implementation may face a variety of challenges. This scoping review aims to identify these challenges and propose solutions for successful HMIS adoption.

Results: The initial search of the selected databases retrieved 2,419 records, of which 2,058 were duplicates. After duplicate removal, 361 titles and abstracts were screened according to the eligibility criteria. Following full-text assessment, 18 studies were relevant to the research objective. Four categories of key factors in successful HMIS implementation were identified, including technical, organizational, human, and environmental factors. The proposed solutions include advanced security measures, phased implementation, comprehensive user training, and strong leadership support.

Conclusion: The results showed that a multidimensional approach that can simultaneously address technical, organizational, human, and environmental factors is crucial for successful HMIS implementation. Employing targeted strategies to overcome these challenges and improve the efficiency of hospital information management is essential, as these strategies were identified. It should also focus on localizing strategies related to these factors in line with the country-specific challenges and solutions in different healthcare settings.

Keywords: Hospital Management Information Systems, HMIS, Implementation, Challenges

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Key Messages:

↑What is "already known" in this topic:

Information systems are recognized as one of the essential building blocks of health systems. Hospital Management Information Systems (HMIS) use information-system capabilities to support hospital managers' decision-making. Previous studies have identified multiple factors and strategies associated with successful HMIS implementation.

→What this article adds:

This scoping review synthesizes the challenges and proposed solutions for successful HMIS implementation across four interrelated dimensions: technological, organizational, human, and environmental. The findings provide a consolidated evidence base that may support hospital managers and policymakers in planning, implementing, and adapting HMIS to local healthcare contexts.

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Introduction

"A hospital management information system (HMIS) is a comprehensive system of software, processes, and tools that not only integrates disparate hospital data—including patient medical records, administrative information, and financial data—but also supports hospital management in resource allocation, performance evaluation, and strategic planning (1). It allows managers to improve interdepartmental communication and enhance clinical and managerial decision-making, ultimately contributing to operational efficiency, cost savings, and increased patient and staff satisfaction (2, 3).

These features reduce delays, prevent errors, and improve care coordination. This integration allows managers to enhance interdepartmental communication and improve the quality of clinical and managerial decision-making (2). Enhancing HMIS leads to significant improvements in operational efficiency, cost savings, and increased patient and staff satisfaction (2, 4).

Despite extensive research on the successful implementation and operation of hospital management information systems (HMIS), certain issues need to be addressed in this area (5-10). A major problem is that, in practice, information systems may not achieve their intended goals (11, 12).

The failure of hospital management information systems (HMIS) is attributed to a variety of issues, including inadequate success outcomes that do not accurately reflect the real needs and challenges of healthcare settings (5-10).

Several studies have identified and analyzed numerous challenges in the successful implementation of hospital management information systems (HMIS), including user resistance, inadequate training, inadequate management support, system complexity, and poor integration with existing hospital infrastructure (7, 9,13, 14). Previous studies highlight challenges such as user resistance, inadequate training, inadequate management support, and poor system integration in HMIS implementation (5, 9, 13, 14). The aforementioned problems often lead to failure in HMIS implementation, and research suggests that insufficient focus on these areas may compromise the effectiveness of the systems in increasing operational efficiency and patient care (9). Given the high cost of implementing and running these systems in a hospital, this represents a substantial risk, which highlights the necessity of carefully and comprehensively anticipating and designing the key success factors of the system before its deployment (5, 10).

However, there has yet to be a comprehensive study that accurately analyzes all the issues and solutions in the successful implementation of hospital management information systems (HMIS), synthesizes previous research, and provides a more comprehensive model than HOT-fit. Although models such as HOT-fit emphasize human, organizational, and technological elements (8), no study has systematically linked these to contemporary challenges such as improving cybersecurity, integrating artificial intelligence, and data interoperability in healthcare systems, thereby providing a next-generation framework for HMIS implementation. Research of this type is crucial for developing a unified framework to address the growing challenges in healthcare information technology (4, 6, 15, 16).

This work uses a scoping review methodology that is presented to systematically identify issues and propose practical solutions for effective implementation of hospital management information systems (HMIS) in the academic literature. The aim is to create a more complete and integrated model for HMIS implementation based on contemporary research.

Methods

The main research question of this study is: "What barriers, solutions, and effective strategies can improve HMIS implementation?" This scoping review seeks to identify the main factors and propose appropriate strategies for implementing each factor towards successful HMIS implementation. The review was reported in accordance with the PRISMA-ScR guidelines for scoping reviews (17). PubMed, Scopus, Web of Science, ProQuest, and Google Scholar databases were searched in August 2024 with a time limit of 2007 to 2024. The search period was limited to publications from 2007 to 2024, as 2007 marked the World Health Organization's identification of information systems as one of the six essential building blocks of health systems (18).

The main search concepts included management information systems, hospital management information systems, Implementation, successful Implementation, and related terms. Appropriate synonyms and Medical Subject Headings (MeSH), where applicable, were also used.

An example of the search strategy was:

("HMIS" OR "health information system*" OR "Hospital Management Information System*") AND ("successful implementation" OR Implementation OR architecture OR framework OR structure)

The search strategy was adapted according to the requirements of each database (Appendix 1). Reference lists of relevant studies were also reviewed to identify additional eligible publications.

Inclusion criteria

- Peer-reviewed articles and grey literature addressing HMIS-related challenges and solutions.
- Studies discussing human, technical, or organizational factors influencing HMIS implementation.
- Publications in English.
- Time limited to 2007-2024

Exclusion criteria

- Letters to the editor, editorials, comments, conference papers, protocols, and viewpoints.
- Studies that did not address HMIS implementation or factors related to its successful Implementation.
- Publications without sufficient information relevant to the objectives of the review.

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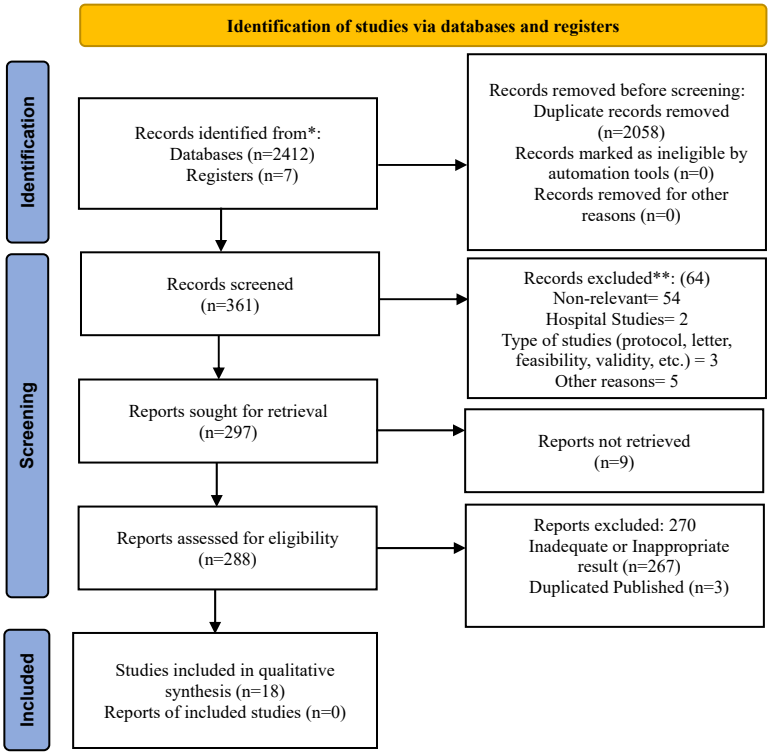

Figure 1. PRISMA flow diagram of included studies

Data extraction

The identified records were imported into EndNote X8, and duplicate records were removed. Titles and abstracts were initially screened according to the eligibility criteria. Two researchers then reviewed the full texts of potentially eligible studies. Disagreements regarding study eligibility were discussed and resolved through consultation with a third researcher when necessary.

We prepared a data extraction form in MS Word 2016. Information extracted from the included studies consisted of the first author, publication year, study location, study design or methodology, factors affecting HMIS implementation, reported implementation challenges, and proposed solutions. Figure 1 presents the study selection process.

Data analysis

The extracted data were analyzed using thematic analysis based on the approach described by Braun and Clarke (19). The analysis included familiarization with the data, generation of initial codes, identification of related concepts, review and organization of the identified themes, definition and naming of the themes, and reporting of the findings.

Successful HMIS implementation was considered the main area of analysis. Challenges reported across the included studies were grouped into broader categories, and the corresponding solutions and strategies were identified. Similar or overlapping concepts were merged during the analysis.

Results

Results were then thematically synthesized into groupings of studies that addressed the types of HMIS successful implementation challenges they aimed to resolve, the objectives, methodologies, settings, and challenges and solutions. This thematic synthesis narrated the literature on HMIS successful implementation challenges and proposed solutions. During the search, 2419 records were identified during the years 2007- 2024, while 2058 were duplicates.

361 titles and abstracts were screened according to the eligibility criteria. The main reasons for exclusion during title and abstract screening were lack of relevance to hospital management information systems and lack of focus on implementation-related issues.

Following full-text assessment, 18 studies met the eligibility criteria and were included in the review.

Of the 18 included studies, 12 (66.67%) were review or evidence-synthesis studies, 5 (27.78%) were empirical primary studies, and 1 (5.56%) focused on framework development and evaluation. Issues addressed by these studies included readiness for the implementation of HMIS, security and privacy concerns, user acceptance of HMIS, and how to enhance the influence of health information systems on hospital productivity (Table 1).

Among these 18 selected studies, the most significant proportion was conducted in resource-limited settings and, therefore, had a wide geographical distribution. The majority of the studies were performed in low- and middle-income nations. Hence, most concentrated on the challenges and solutions associated with implementing and accepting HMIS.

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Table 1. Characteristics of included studies in the scoping review

First Author/ Year	Publication Type	Study Objectives	Setting	Methodology/ Data Collection	Challenges ofc successful implementation	Solutions for successful implementation
Rahimi B, 2007	Literature Review	To review methods used to evaluate health information systems in healthcare settings	Healthcare settings	Literature review	Inadequate and fragmented approaches to HIS evaluation	Use of systematic and multidimensional approaches for evaluating HIS implementation
Yusof MM, 2008	Journal Article	To develop an evaluation framework for health information systems based on human, organizational, and technological factors	Health information systems	Critical appraisal and framework development	Lack of fit among human, organizational, and technological dimensions	Application of the HOT-fit framework to evaluate and improve alignment among human, organizational, and technological factors
Rahimi B, 2009	Journal Article	To synthesize evidence regarding health information system implementation	Healthcare organizations	Qualitative meta-analysis	Interrelated technical, organizational, and human implementation challenges	Consideration of organizational, human, and technological factors throughout implementation
Blaya JA, 2010	Review Article	To review evidence regarding the impact of e-health technologies in developing countries	Developing countries	Systematic review	Resource and infrastructure constraints and variable effectiveness of e-health implementations	Targeting investments toward effective technologies and conducting appropriate implementation evaluations
Vest JR, 2010	Review Article	To examine persistent challenges and strategies related to health information exchange	Healthcare organizations	Literature review	Interoperability, information exchange, and organizational barriers	Development of effective information-exchange strategies and improved interoperability
Millard PS, 2012	Review Article	To examine open-source point-of-care electronic medical records in resource-limited settings	Resource-limited settings	Systematic review and questionnaire surveys	Limited resources, infrastructure, technical capacity, and implementation support	Use of appropriate open-source systems and adaptation of implementation to local resources and needs
Cresswell KM, 2013	Review Article	To identify organizational issues influencing implementation and adoption of health information technology innovations	Healthcare organizations	Interpretative review	Organizational complexity, workflow changes, stakeholder resistance, and implementation difficulties	Attention to organizational context, stakeholder engagement, workflow, and implementation processes
Jahanbakhsh M, 2014	Journal Article	To assess the status, weaknesses, and opportunities of hospital information systems in Iranian hospitals	Iranian hospitals	Descriptive study	Lack of appropriate long-term strategic planning for HIS initiation, development, and improvement	Development of long-term strategic planning for initiation, development, and improvement of hospital information systems
Boonstra A, 2014	Systematic Review	To identify factors affecting implementation of electronic health records in hospitals	Hospitals	Systematic literature review	Financial, technical, organizational, psychological, social, legal, and change-related barriers	Comprehensive implementation strategies addressing organizational and user-related barriers
Tilahun B, 2015	Journal Article	To model factors associated with successful electronic medical record implementation in low-resource hospitals	Low-resource hospital settings	Empirical/modeling study	Organizational readiness, resource limitations, and factors affecting implementation success	Strengthening organizational readiness and addressing antecedents of implementation success
Farzandipur M, 2016	Journal Article	To identify factors affecting successful implementation of hospital information systems	Hospitals	Empirical study	Human, organizational, managerial, and technological barriers to successful HIS implementation	Attention to key organizational, human, and technological success factors during implementation
Kruse CS, 2016	Systematic Review	To identify barriers to electronic health record adoption	Healthcare settings	Systematic literature review	Cost, technical limitations, resistance to change, training, workflow disruption, and implementation barriers	Training, organizational support, appropriate infrastructure, and strategies addressing adoption barriers

Table 1 presents the characteristics of the included studies and the main factors affecting successful HMIS implementation.

The main factors that affect successful implementation of HMIS are Human, technical, organizational, and environmental. Strategies for dealing with each factor have been mentioned in Table 2.

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Table 1. Cont

First Author/ Year	Publication Type	Study Objectives	Setting	Methodology/ Data Collection	Challenges ofc successful implementation	Solutions for successful implementation
Sligo J, 2017	Literature Review	To examine planning, implementation, and evaluation of large-scale health information system projects	Healthcare systems	Literature review	Complexity of large-scale implementation, organizational change, stakeholder coordination, and project-management difficulties	Comprehensive planning, stakeholder involvement, implementation management, and continuous evaluation
Alipour J, 2017	Journal Article	To evaluate success or failure of hospital information systems in public hospitals	Iranian public hospitals	Cross-sectional study	Factors affecting HIS success, system use, user satisfaction, and implementation outcomes	Improving system quality, organizational support, and factors associated with successful HIS use
Handayani PW, 2018	Systematic Review	To identify factors influencing user acceptance of hospital information systems and related technologies	Hospital/healthcare settings	Systematic review	User resistance and factors affecting perceived usefulness, ease of use, and acceptance	User-centered implementation, attention to acceptance determinants, and adequate organizational and technical support
Higman S, 2019	Literature Review	To examine the design of interoperable health information systems using an Enterprise Architecture approach	Low- and middle-income/resource-limited countries	Literature review	Multiple data sources, heterogeneous systems, inadequate interoperability, and context-specific implementation requirements	Enterprise Architecture, data standards, flexible systems, open models, and context-sensitive implementation approaches
Shiferaw KB, 2019	Journal Article	To model predictors of acceptance and use of an electronic medical record system in a resource-limited setting	Resource-limited healthcare setting	Quantitative study using a modified UTAUT model	Factors affecting users' acceptance and use of electronic medical record systems	Strengthening facilitating conditions and addressing determinants of users' acceptance and system use
Tummers J, 2021	Systematic Review	To identify obstacles and important features of health information systems	Healthcare settings	Systematic literature review	Technical, organizational, usability, interoperability, and implementation obstacles	Designing and implementing HIS with attention to usability, interoperability, organizational requirements, and user needs

Table 2. Challenges and Solutions in Successful Implementation of HMIS

Category	Description	Challenges	Solutions
Human Factors	User acceptance, attitudes, skills, and behavior in relation to the system.	Resistance to adoption and factors affecting user acceptance (5, 20); need for adequate and continuous training (21).	Training programs (21); user engagement and involvement in the implementation process (5, 22, 23).
Organizational Factors	Influence of organizational structure, culture, and resources on system implementation and success.	Lack of organizational readiness (8, 17, 23); high implementation costs and resource constraints (10, 56, 69); absence of adequate leadership and management support (22 , 23, 24).	Readiness assessment (8,17,69); strategic implementation planning and leadership involvement (10, 22, 23, 24).
Technological Factors	Technical aspects including system implementation, functionality, security, and integration capabilities.	Data security and privacy concerns (4, 25, 26); complexity of system integration and interoperability (3,15,27); technical and infrastructure limitations (56, 61, 69).	Enhanced security and privacy measures (4, 25, 26); appropriate interoperability standards and system architectures (3, 23, 27); phased and context-sensitive implementation (22, 23).
Environmental Factors	External influences such as governmental policies, legal and regulatory requirements, economic conditions, and cultural and social factors.	Inadequate or unstable policies and legal/regulatory requirements (19, 27); economic and resource constraints (28, 29, 30); political and social instability (31, 32).	Development of supportive policies and regulatory frameworks (19, 27); strengthening infrastructure and sustainable resource allocation (28, 29, 30); adapting implementation strategies to local environmental and socioeconomic conditions (19, 27, 30).

Discussion

This review comprehensively investigates the fundamental challenges and successful implementation solutions of Hospital Management Information Systems (HMIS) in the three dimensions of technology, organization, and human factors. This study identifies a new dimension—environmental factors—in addition to the three dimensions in the HOT-fit model, which contributes to the effective implementation of HMIS, particularly in resource-limited settings. It also addresses the aforementioned aspects. The subsequent sections will investigate these dimensions from a variety of angles.

From a technological standpoint, data security has become a critical factor (4, 25, 28). In light of the growing number of cyberattacks on health systems that target sensitive patient data, many studies have emphasized the imperative need for enhanced security protocols, such as the implementation of advanced data encryption and multi-factor authentication techniques (4, 25, 26, 33). This is consistent with prior research on the increasing threats to health

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information systems and the necessity of robust protective mechanisms (4, 25). Despite the high costs and intricacy of system integration, phased implementation strategies are still considered essential (13, 23). Cloud-based solutions have recently become increasingly significant as low-cost alternatives for HMIS, a role that was not previously emphasized in previous evaluations (33, 34). These solutions may offer scalable environments at lower initial costs, although security and privacy considerations remain important (33, 34).

In low- and middle-income countries, the preparedness to implement HMIS is significantly inhibited by financial and infrastructural barriers (19, 28, 29, 30). These challenges also extend to organizational issues. Readiness assessment programs are indispensable, particularly in regions of this nature, as they facilitate the seamless adoption of electronic health records by assessing the organizational readiness for HMIS (8, 17, 30). Recent research has highlighted the importance of leadership engagement as one of the most critical organizational factors for successful implementation (24). This is due to the fact that effective planning for system adoption and its long-term sustainability is required (10,13). Phased implementation and leadership support are critical factors in improving the successful implementation of health information technologies (13, 23, 24).

User resistance and other human-related challenges are not restricted to particular regions; rather, they are more prevalent in resource-constrained environments (17, 30, 35). Unfamiliarity with new systems and varying levels of IT literacy among healthcare personnel are important sources of resistance (7, 20). Shiferaw and Mehari (20) confirmed that users become more receptive to new systems through appropriate facilitating conditions and support. Extensive training programs and capacity-building efforts can also facilitate effective implementation (21). This promotes user confidence in the use of HMIS (7, 20, 21) and allows them to adjust to the culture of continuous change. Through early user involvement, ongoing support, and the cultivation of an organizational learning culture, cultural resistance necessitates the implementation of change management strategies (20, 41, 23). User-centered methodologies and attention to usability may also mitigate resistance to novel technologies in hospital environments (5, 22).

Issues associated with the external environment

In this investigation, it was determined that the external environment of the organization is closely associated with the successful implementation challenges of Hospital Management Information Systems (HMIS). In countries that are experiencing resource constraints, this is particularly important (19, 28, 29, 30). An example of these challenges is the inconsistency, instability, and lack of focus in the successful implementation of HMIS programs that result from shifts in healthcare priorities and government policies (19, 27). Studies indicate that the successful implementation and adoption of hospital management information systems are substantially impeded in numerous countries, particularly in low- and middle-income nations, by the absence of stable policies and insufficient legal support in the field of e-health (19, 27). Previous studies have also indicated that policy and governance challenges can impede digital health implementation, particularly in resource-limited settings (19, 27). The results of these studies suggest that the efficacy and effectiveness of successful HMIS implementation can be diminished by changes in government and healthcare policies. These findings indicate that the advancement of e-health programs may be impeded by inadequate or unstable healthcare policies (19, 27). The success of HMIS implementation and deployment can therefore be directly influenced by the transparency of government priorities and the implementation of stable policies (19, 27).

The results of this study also indicated that economic constraints are another substantial factor in the external environment (28, 39, 30, 35). Prior research has demonstrated that numerous developing nations are confronted with severe economic and resource challenges (28, 29, 30, 35). Consequently, there may be insufficient allocation of financial resources to e-health systems, which include hospital management information systems (29, 30, 35). In addition, studies have shown that the absence of adequate resources for the maintenance and upgrade of HMIS can result in system degradation, poor system implementation, and reduced long-term efficiency (29, 30, 35).

As external factors that influenced the successful implementation of HMIS, challenges associated with laws and regulations were also identified in this study. The results of previous research are consistent with these findings, underscoring the fact that legal and regulatory differences can pose substantial obstacles to health information exchange (23, 28, 27). In developing countries, regional or global collaborations in healthcare may also be important (23, 27). According to research, differences in privacy and data security requirements may create challenges for health information exchange and interoperability (23, 25, 27, 28).

In conclusion, this investigation found that the successful implementation of HMIS is also influenced by political and social challenges (31, 32). The proper implementation of HMIS is of the utmost importance during political crises, as the destruction of health and information technology infrastructure can result from political crises such as wars, social unrest, and internal or external political conflicts (31,32). Additionally, when nations are confronted with political and social instability, the availability of stable human capital and resources for the implementation, development, and maintenance of information systems may be substantially diminished (32).

Therefore, the successful implementation of HMIS necessitates continued and thorough consideration of external environmental challenges in order to achieve success. Developing countries that are confronted with resource constraints must implement strategies to enhance the efficacy of HMIS implementation by reinforcing infrastructure, establishing sustainable policies, and aligning domestic requirements with appropriate standards and regulations (19, 27, 29, 30).

As a result, this discourse underscores the necessity of a multidimensional and contextual approach to HMIS successful implementation, in which the technological, organizational, human, and environmental dimensions are interconnected and must be balanced (8, 20, 23, 36). In addition,

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previous research has also verified the importance of these challenges and has suggested adaptive solutions that can support the efficacy of HMIS implementation in a variety of healthcare environments (13, 23, 36).

Conclusion

The findings of this study indicate that addressing all these factors is necessary for the successful implementation of HMIS. Technical, organizational, human, and environmental factors are interconnected and should be considered simultaneously in the implementation process (8, 23, 36, 37). Key constraints include data security and privacy, system integration, organizational readiness, user resistance, inadequate training, financial limitations, and external environmental challenges (4, 24, 56, 28).

Yusof et al. (8) emphasize the importance of fit among human, organizational, and technological factors in the successful implementation and evaluation of health information systems. The findings of the present study further indicate the importance of considering environmental factors in addition to these dimensions.

Active and supportive leadership is also important for successful implementation (24). Continuous training for staff should be considered to improve users' knowledge and skills and facilitate effective use of the system (21). Furthermore, advanced security measures can be used to address security and privacy challenges (24, 26, 33). Cloud-based systems may also provide scalable technological solutions, although their security and privacy implications should be carefully considered (33, 34).

Future studies should investigate HMIS implementation challenges and solutions in countries with different cultural, economic, regulatory, and healthcare-system contexts. Such studies may contribute to the development of strategies that are better adapted to local conditions and implementation requirements.

Overall, the use of adaptive and context-sensitive strategies to address technological, organizational, human, and environmental challenges may enhance the efficacy of HMIS implementation in different healthcare settings (13, 23, 30, 36, 37, 38).

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Conflict of Interests

The authors declare that they have no competing interests.

Authors' Contributions

M.Z. contributed to formal analysis, data curation, methodology, resources, synthesis of findings, writing the original draft, and reviewing and editing the manuscript. H.P. contributed to conceptualization, methodology, investigation, supervision, validation, writing the original draft, and reviewing and editing the manuscript. E.H. contributed to formal analysis, data curation, methodology, resources, synthesis of findings, writing the original draft, and reviewing and editing the manuscript. A.S.T. contributed to formal analysis, data curation, methodology, resources, synthesis of findings, writing the original draft, and reviewing and editing the manuscript. A.A.H. contributed to the conception of the study. All authors read and approved the manuscript.

Ethical Considerations

This study was approved by the Research Ethics Committee of Iran University of Medical Sciences (IR.IUMS.REC.1403.054). As this study was a scoping review based exclusively on previously published literature and did not involve human participants, informed consent was not applicable.

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Data Availability

The data analyzed in this study are available from the corresponding author upon reasonable request.

AI Use Statement

The manuscript was written by the authors. AI tools were used to assist with grammar, language editing, and improving readability. All content, interpretation, and conclusions were developed, reviewed, and approved by the authors.

References

1. Abouelmehdi K, Beni-Hessane A, Khaloufi H. Big healthcare data: preserving security and privacy. J Big Data. 2018;5(1):1.
2. Chaudhry B, Wang J, Wu S, Maglione M, Mojica W, Roth E, et al. Systematic review: impact of health information technology on quality, efficiency, and costs of medical care. Ann Intern Med. 2006;144(10):742-52.
3. Kruse CS, Frederick B, Jacobson T, Monticone DK. Cybersecurity in healthcare: a systematic review of modern threats and trends. Technol Health Care. 2017;25(1):1-10.
4. Higman S, Dwivedi V, Nsaghurwe A, Busiga M, Rulagirwa HS, Smith D, et al. Designing interoperable health information systems using Enterprise Architecture approach in resource-limited countries: a literature review. Int J Health Plann Manage. 2019;34(1):e85-e99.
5. Handayani PW, Hidayanto AN, Budi I. User acceptance factors of hospital information systems and related technologies: systematic review. Inform Health Soc Care. 2018;43(4):401-26.
6. Mehta N, Pandit A. Concurrence of big data analytics and healthcare: a systematic review. Int J Med Inform. 2018;114:57-65.
7. Farzandipur M, Rangraz Jeddi F, Azimi E. Factors affecting successful implementation of hospital information systems. Acta Inform Med. 2016;24(1):51-5.
8. Yusof MM, Kuljis J, Papazafeiropoulou A, Stergioulas LK. An evaluation framework for health information systems: human, organization and technology-fit factors (HOT-fit). Int J Med Inform. 2008;77(6):386-98.
9. Tummers J, Tekinerdogan B, Tobi H, Catal C, Schalk B. Obstacles and features of health information systems: a systematic literature review. Comput Biol Med. 2021;137:104785.
10. Sligo J, Gauld R, Roberts V, Villa L. A literature review for large-scale health information system project planning, implementation and evaluation. Int J Med Inform. 2017;97:86-97.
11. Alipour J, Karimi A, Ebrahimi S, Ansari F, Mehdipour Y. Success or failure of hospital information systems of public hospitals affiliated with Zahedan University of Medical Sciences: a cross sectional study in the Southeast of Iran. Int J Med Inform. 2017;108:49-54.
12. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res

[Downloaded from mjiri.iums.ac.ir on 2026-11-17]

[DOI: 10.47176/mjiri.40.90]

Psychol. 2006;3(2):77-101.
13. Frimpong JA, Jackson BE, Stewart LM, Singh KP, Rivers PA, Bae S. Health information technology capacity at federally qualified health centers: a mechanism for improving quality of care. BMC Health Serv Res. 2013;13:35.
14. Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): checklist and explanation. Ann Intern Med. 2018;169(7):467-73.
15. Vest JR, Gamm LD. Health information exchange: persistent challenges and new strategies. J Am Med Inform Assoc. 2010;17(3):288-94.
16. Secinaro S, Calandra D, Secinaro A, Muthurangu V, Biancone P. The role of artificial intelligence in healthcare: a structured literature review. BMC Med Inform Decis Mak. 2021;21:125.
17. Boonstra A, Versluis A, Vos JFJ. Implementing electronic health records in hospitals: a systematic literature review. BMC Health Serv Res. 2014;14:370.
18. World Health Organization. Monitoring the building blocks of health systems: a handbook of indicators and their measurement strategies. Geneva: World Health Organization; 2010.
19. . Heeks R. Health information systems: failure, success and improvisation. Int J Med Inform. 2006;75(2):125-37.
20. . Shiferaw KB, Mehari EA. Modeling predictors of acceptance and use of electronic medical record system in a resource limited setting: using modified UTAUT model. Inform Med Unlocked. 2019;17:100182.
21. . Jeyakumar T, McClure S, Lowe M, Hodges B, Fur K, Javier-Brozo M, et al. An education framework for effective implementation of a health information system: scoping review. J Med Internet Res. 2021;23(2):e24691.
22. Blaya JA, Fraser HSF, Holt B. E-health technologies show promise in developing countries. Health Aff (Millwood). 2010;29(2):244-51.
23. Rahimi B, Vimarlund V, Timpka T. Health information system implementation: a qualitative meta-analysis. J Med Syst. 2009;33(5):359-68.
24. Laukka E, Pölkki T, Kanste O. Leadership in the context of digital health services: a concept analysis. J Nurs Manag. 2022;30(7):2763-80.
25. Fernández-Alemán JL, Señor IC, Lozoya PÁO, Toval A. Security and privacy in electronic health records: a systematic literature review. J Biomed Inform. 2013;46(3):541-62.
26. Keshta I, Odeh A. Security and privacy of electronic health records: concerns and challenges. Egypt Inform J. 2021;22(2):177-83.
27. Mamuye AL, Yilma TM, Abdulwahab A, Broomhead S, Zondo P, Kyeng M, et al. Health information exchange policy and standards for digital health systems in Africa: a systematic review. PLOS Digit Health. 2022;1(10):e0000118.
28. Cresswell KM, Bates DW, Sheikh A. Ten key considerations for the successful implementation and adoption of large-scale health information technology. J Am Med Inform Assoc. 2013;20(e1):e9-e13.
29. Millard PS, Bru J, Berger CA. Open-source point-of-care electronic medical records for use in resource-limited settings: systematic review and questionnaire surveys. BMJ Open. 2012;2(4):e000690.
30. Fritz F, Tilahun B, Dugas M. Success criteria for electronic medical record implementations in low-resource settings: a systematic review. J Am Med Inform Assoc. 2015;22(2):479-88.
31. Iman AT, Josef HK, Pertiwi AAP, Lazuardi L, Nurcahyani L, Hasan F. Design and framework for developing disaster health information system (DHIS): a systematic review. Iran J Public Health. 2024;53(4):747-59.
32. Truppa C, Yaacoub S, Valente M, Celentano G, Ragazzoni L, Saulnier D. Health systems resilience in fragile and conflict-affected settings: a systematic scoping review. Confl Health. 2024;18(1):2.
33. Mehraeen E, Ghazisaeedi M, Farzi J, Mirshekari S. Security challenges in healthcare cloud computing: a systematic review. Glob J Health Sci. 2017;9(3):157-68.
34. Ali O, Shrestha A, Soar J, Wamba SF. Cloud computing-enabled healthcare opportunities, issues, and applications: a systematic review. Int J Inf Manage. 2018;43:146-58.
35. Kruse CS, Kristof C, Jones B, Mitchell E, Martinez A. Barriers to electronic health record adoption: a systematic literature review. J Med Syst. 2016;40(12):252.
36. Ross J, Stevenson F, Lau R, Murray E. Factors that influence the implementation of e-health: a systematic review of systematic reviews (an update). Implement Sci. 2016;11:146.
37. Jahanbakhsh M, Sharifi M, Ayat M. The status of hospital information systems in Iranian hospitals. Acta Inform Med. 2014;22(4):268-75.
38. Rahimi B, Vimarlund V. Methods to evaluate health information systems in healthcare settings: a literature review. J Med Syst. 2007;31(5):397-432.

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Appendix 1. Summary of search strategy for scoping review

	Search strategy	Results	Date
Web of Science	((TI=(Hospital* OR "Medical center" OR "Healthcare facility") OR AB=(Hospital* OR "Medical center" OR "Healthcare facility")) AND (TI=("Management Information System*" OR HMIS) OR AB=("Management Information System*" OR HMIS)) AND (TI=(Successful implementation* OR Architecture* OR Framework* OR Structure*) OR AB=(Successful implementation* OR Architecture* OR Framework* OR Structure*))) AND PY=(2007-2024))	561	Searched in 29th July 2024
PubMed	((Hospital*[tiab] OR "Medical center"[tiab] OR "Healthcare facility"[tiab]) AND ("Management Information System*"[tiab] OR MIS[tiab] OR "Hospital management information system"[tiab] OR HMIS[tiab]) AND (Successful implementation*[tiab] OR Architecture*[tiab] OR Framework*[tiab] OR Structure*[tiab]))	301	
Scopus	TITLE-ABS(hospital* OR "medical center" OR "healthcare facility") AND TITLE-ABS("management information system*" OR MIS) AND TITLE-ABS(successful implementation* OR architecture* OR framework* OR structure*))	862	
ProQuest	(TI,AB(Hospital*) AND TI,AB("Management Information System*" OR MIS) AND TI,AB(Successful implementation* OR Architecture* OR Framework* OR Structure*))	20	
Google scholar	all in title: Hospital ,Medical center, Healthcare facility, ,Health Management Information System, HMIS , Successful implementation, Architecture ,Framework, Structure	668	

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