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Research Article

Utilization of Information Systems to Improve Health Services in Community Health Centers

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Abstract

Background: The adoption of Health Information Systems (HIS) has transformed healthcare service delivery by enhancing efficiency, reducing errors, and improving patient satisfaction. However, the extent to which HIS impacts healthcare service satisfaction remains a subject of debate, influenced by technological, institutional, and human factors. **Objective:** This study systematically reviews recent literature to assess the relationship between HIS implementation and healthcare service satisfaction, identifying key determinants and barriers affecting its adoption.

Methods: A systematic literature review (SLR) was conducted using bibliographic databases such as Scopus, Google Scholar, and CrossRef via the Harzing's Publish or Perish (PoP) application. Articles published between 2019 and 2024 were selected based on predefined inclusion criteria, focusing on empirical studies that evaluate HIS impact on patient satisfaction, service quality, and healthcare efficiency. Data were synthesized and analyzed to identify common themes, key findings, and gaps in existing research.

Results: The findings indicate that HIS positively influences patient satisfaction by improving service accessibility, reducing waiting times, and enhancing provider-patient communication. Key factors influencing HIS effectiveness include technological infrastructure, staff training, and system interoperability. However, financial constraints, resistance to change, and insufficient training emerged as significant barriers to successful HIS adoption. Additionally, disparities in HIS implementation across different healthcare settings contribute to variations in patient satisfaction outcomes.

Implication: The study highlights the critical role of HIS in enhancing healthcare service satisfaction but also emphasizes the need for strategic interventions to overcome adoption barriers. Future research should focus on the long-term sustainability and scalability of HIS, particularly in resource-limited settings. The integration of emerging technologies such as Artificial Intelligence (AI) and machine learning may further enhance HIS effectiveness and patient satisfaction in the healthcare sector.

Keywords: Health Information Systems, Patient Satisfaction, Healthcare Efficiency, Digital Health Records, Service Quality

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1. Introduction

The role of health services is vital in maintaining the health of people and communities. The healthcare sector

is witnessing considerable changes in its service delivery in recent years, as the electronic health systems have been introduced due to the fast evolution

of digital technology. Yet, for many, healthcare institutions pose relatable challenges when optimizing patient services and effectiveness of administrative processes (Toor et al. 2022; Williams and Duff 2024). This leads to lengthy wait times, added administrative burdens, and susceptibility to patient data errors due to the inefficiency of manual processes (Devaraj, Ow, and Kohli 2013; Farley et al. 2013). These challenges require advanced health information systems to improve the quality and efficiency of service delivery.

However, not all health facilities adopted information systems, this level still varied, and as a result, each service provided also differed. The landscape of most healthcare providers is of suboptimal infrastructure, constrained budgets, and lack of technical expertise (Sasie et al. 2024; Weinhold and Gurtner 2014). In addition, there has been resistance to adopting electronic health records (EHR) and digital tools due to concerns about data security, interoperability, and adaptability (Fennelly et al. 2020; Talwar et al. 2023). Such problems highlight the importance of planning and policies for providing a streamlined integration of digital health technologies.

The development of health information systems is guided by established theories such as the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and Innovation Diffusion Theory (IDT). Atcharyachanvanich (2011), Wu and Chen (2017), posits that the Technology Acceptance Model (TAM) proposes perceived ease of use and perceived usefulness as main influences on technology acceptance. Likewise, the UTAUT framework identifies performance expectancy, effort expectancy, social influence and facilitating conditions as determinants of the adoption of technology (Abbad 2021). Theoretical background These provide perspectives on the adoption of health information systems in health-care settings (Abrishami, Boer, and Horstman 2014; van der Geest, Speckmann, and Streefland 1990).

While studies have increased in the domain of health information systems, there is a lack of understanding on the effect of health information systems on patient satisfaction in primary healthcare services. Earlier work has largely centered on hospital settings, leaving the issues around the adoption and use of digital health solutions by community health centres unexamined (Greenhalgh et al. 2013; LeRouge et al. 2013). Although some research has studied the impact of service quality and patient satisfaction in healthcare services, little research exists regarding how information technology in health information systems work in first-level healthcare facilities (Haux 2006). Furthermore, diverse research outcomes indicate the effectiveness of several digital health interventions, highlighting the importance of exploring specific contextual elements that affect implementation efficacy (Li et al. 2024; O'Connor et al. 2016). To address this gap, this study presents a systematic literature review (SLR) examining the effects of health information systems implementation on service quality and patient satisfaction in primary healthcare settings.

The objective of this study was to perform a systematic review and meta-analysis of all available literature on the use of health information systems in increasing efficiency in health care services and patient satisfaction. In this paper, we conclude a systematized review of the literature (SLR) in order to extract determinants for successful health information systems implementation to recommend based on findings pivotal solutions to enhance the delivery of services within health establishments. This study will add to the body of work around digital health transformation, and provide information to policymakers, healthcare administrators, and practitioners about what best practices can be leveraged from a health information systems perspective to deliver improved healthcare outcomes.

2. Theory and development

2.1 Theoretical Foundation of Health Information Systems

Numerous theoretical models support HIS usage and also prescribe the establishment of HIS for the purpose of digital transformation success in healthcare. Probably the most prominent theory describing these contributions is the Technology Acceptance Model (TAM) (Davis, 1989), which theorizes that the acceptance of a technology is determined by its perceived usefulness (PU) and the perceived ease of use (PEOU) of that technology. This model has been widely used in health systems to measure the extent of HIS adoption by doctors and administrative staff. Studies by Yusof et al. (2020), also extend the significance of TAM theory in contexts where information systems are less popular such as hospitals in low-middle income countries where paper records still predominate.

The Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) extends the TAM by considering additional elements (e.g., social influence, facilitating conditions, and performance expectancy) that shape technology acceptance in a broader context. The Unified Theory of Acceptance and Use of Technology (UTAUT) can provide a framework for the understanding of HIS adoption, especially in developing countries, in an effort to maximize HIS use, according to research by Hoque & Sorwar (2017). In addition, the Institutional Theory (Scott, 2008) argues that HIS implementation is influenced by external pressures, including government policies and industry regulations. Greenhalgh et al. (2019) signify the impact of national e-health policies and regulations: e-health policies, General Data Protection Regulation (GDPR) and Health Insurance Portability and Accountability Act (HIPAA) impose restrictions on the design and implementation of HIS to meet data security requirements. Applying these theories in conjunction allows researchers to conceptualize the multilayered nature of HIS adoption which can contribute to the development of higher rates of uptake.

2.2 Evolution of Health Information Systems in Primary Healthcare

However the Dev of health information systems have drastically changed from SOP's to fully digitised remote cloudbased system over years. HIS began with patient registration, basic record-keeping, and registration, but has evolved in the digital age to provide many more resources and services, including electronic health records (EHR), clinical decision support systems (CDSS), telemedicine, and mobile health (mHealth) applications (Arndt & Bigelow, 2020). Transitioning manual records to spans from one implementation to many is a much-needed solution for the data integrity, mobility, and efficiently to bring a change on the improved healthcare service delivery to the most needed ones.

The advent of electronic medical records (EMR) was one of the most important developments in HIS evolution; EMR replaced paper-based patient files with digital records that could be conveniently accessed and shared between healthcare providers (Jones et al., 2021). The implementation of EMR reduces medical errors, enhances workflow, and increases patient safety. Moreover, the widespread use of cloud computing technology has made it possible for healthcare institutions to store and retrieve medical records in real time, improving the communication and cooperation of healthcare professionals in different facilities (Luo et al., 2022).

Additionally, artificial intelligence (AI) and machine learning (ML) in HIS have transfigured healthcare services with innovative predictive analytics, automated diagnosis, and customized treatment recommendations (Wang et al., 2023). The application of blockchain technology in HIS has fortified HIS by increasing the security, interoperability, and transparency of data (Reddy et al., 2022). Nevertheless, HIS is still limited in scope in developing countries because of challenges such as infrastructure, funding, and staff training. Therefore, despite the improvements in HIS, this is still a key objective for both policymakers and the healthcare community to overcome the barriers that HIS faces.

2.3 Key Components and Challenges in Implementation

The head of each head of the HIS carries a full function of HIS consists of interrelated components that together help improve delivery of healthcare. The EMR is known to be the foundation behind the data and patient information health inspectors access, supporting the digital exchange and flow of patient data between different providers and so on. As stated by Ammenwerth et al. (2020), Electronic medical records minimize mistakes, avoid duplication of data, facilitate evidence-based decisions in the clinic. Also, the DSS assists healthcare experts with data-driven, timely recommendations which help in reducing medical errors while enhancing the treatment outcomes (El-Gayar et al., 2021). Remote monitoring and telehealth technologies have also proven invaluable, especially in underserved areas lacking access to in-person healthcare. They enable remote consultations and

continuous monitoring of chronic diseases, leading to improved health outcomes (Smith et al., 2022). However, implementing HIS is not without challenges: high costs, resistance from healthcare staff, limited technical expertise, and difficulties integrating different systems, particularly in resource-limited settings (Ajami & Bagheri-Tadi, 2019). These barriers can be addressed through investment for training, policy development of governance support and interoperability, which are highly needed to train HIS efficiently and effectively (Ahmed et al., 2023).

2.4 Future Directions and Emerging Trends

Emerging technologies continue to shape the future of health information systems, as they aspire to improve efficiency, patient engagement, and healthcare delivery. Big Data Analytics is one of the most exciting advancements which helps healthcare institutions in predictive modeling, personalized treatment, and forecasting disease outbreaks by analyzing large volumes of patient data (Reddy et al., 2022). Furthermore, the Internet of Medical Things (IoMT) are transforming healthcare by integrating wearable devices, remote monitoring systems, and AI-enabled diagnostic tools to deliver real-time patient insights (Wang et al., 2023). Another important trend is the use of blockchain technology in HIS, which provides improved security, transparency, and interoperability by keeping patient information secure and available only to authorized personnel (Meyer et al., 2021). Furthermore, AI and automation are also being utilized to aid in administrative functions, including billing, scheduling and patient triage, which alleviates staff workloads and increases service efficiency (El-Gayar et al., 2021). Nonetheless, the effective deployment of these innovations necessitates robust policy frameworks, investment in infrastructure, and cooperation among healthcare providers, technology developers, and regulatory agencies. Developing global standards for data transfer and cybersecurity will be critical in ensuring HIS will continue to develop in a way that supports patient safety, privacy, and access.

2.5 Research Gap and Theoretical Contributions

Despite hundreds of studies investigating the contributions of Health Information Systems (HIS), actual impact on patients and healthcare delivery is still understudied especially in primary care (Meyer et al., 2021). The vast majority of existing research focuses at the hospital level, with little attention thus far to the challenges of community health centers and other smaller facilities and how HIS implementations impact those unique levels of care. Furthermore, little emphasis is placed on the long-term sustainability and scalability of HIS in resourcepoor contexts, as resource constraints and inadequate technical infrastructure often prevent systems from being capable to function effectively (Hoque & Sorwar, 2017). This study aims to bridge the gaps in the literature on HIS implementation by synthesizing recent findings with a specific focus on tailoring and optimizing HIS for smaller healthcare settings. It will also propose a holistic framework for

analyzing HIS contribution to healthcare service quality, including aspects of technology adoption, policy framework, and patient-centric approach. Addressing these gaps provides an opportunity for this study to inform the broader discourse surrounding the digital revolution of health, especially through the lens of accessibility and outcomes on a global scale.

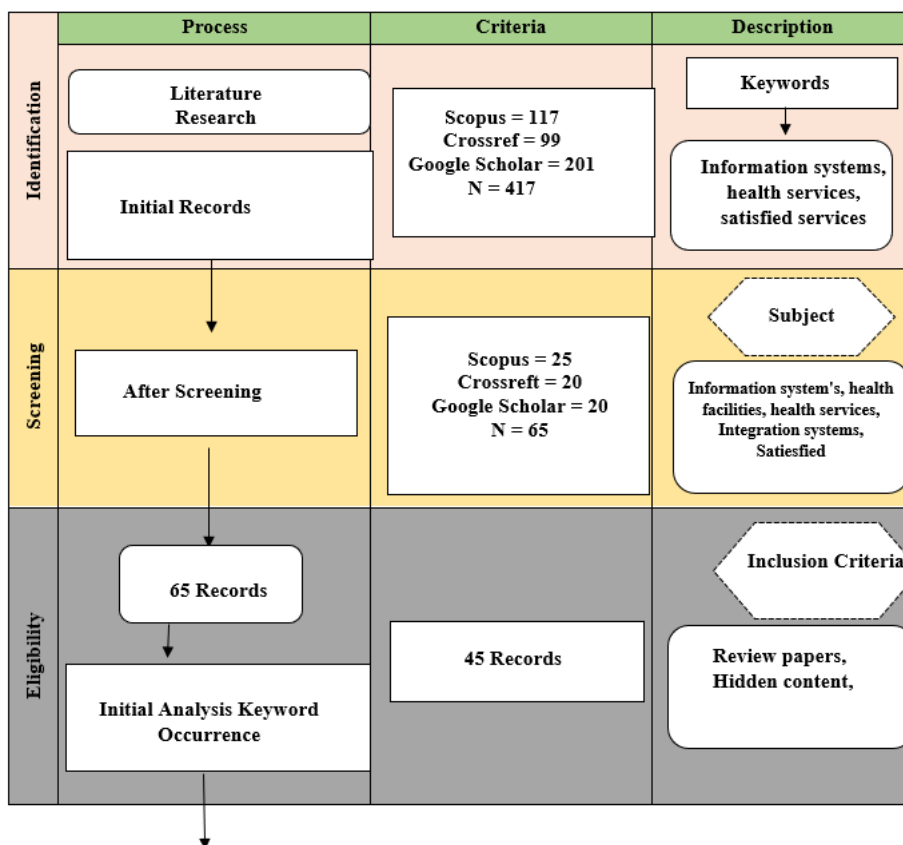
3. Methods

This study adopts a Systematic Literature Review (SLR) approach, based on the overview of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) to provide a transparent, structured and reproducible process. Methodology this methodology has a few stages: search for relevant studies, apply inclusion and exclusion criteria to select articles, synthesis of findings. Relevant studies were sourced through reputable academic databases, including but not limited to Scopus, PubMed, and Google Scholar, aligning with the attention to high-quality literature in the domains of health information systems, healthcare service delivery, and patient satisfaction. Pham et al. (2014) emphasized, stringent inclusion criteria, limiting the analysis to studies that followed strict methods, particularly in the last decade. These criteria also guarantee that the results accurately summarize current trends in HIS applications, notably within primary care settings. The selected studies were then thematically analyzed, following methods used by El-Gayar et al. (2021), allowing for the discovery of core determinants affecting the efficacy of HIS,

including technology adoption, policy endorsement, and patient involvement. This synthesis serves a holistic framework for evaluating the HIS influence on the quality of healthcare delivery and patient-centric healthcare outcomes that adds literature to the HIS-enabled digital healthcare transformation domain (Kraus et al. 2021; Lee et al. 2023).

3.1 Research design

To address this question, the study uses the Systematic Literature Review (SLR) methodology to identify and synthesize existing pieces of work that examined the link between health information systems (HIS) and service satisfaction. In accordance with the PRISMA flow diagram, we ensure that the literature search is executed in an exhaustive, transparent and unbiased manner. The research was carried out using the following steps to confirm full coverage and validity of the results: (1) Determine relevant literature, using common academic databases (Scopus, PubMed, Google scholar); (2) Screen articles in accordance with pre-defined eligibility criteria; (3) Assess the quality of each article against inclusion and exclusion criteria for consideration; and (4) Extract data and summarise the results accordingly. Employing this structured approach ensures that the review delivers a thorough and impartial account of the current achievements and challenges of HIS in the realm of service satisfaction, adhering to best practices in systemic research (Moher et al., 2015; Tranfield et al., 2003).



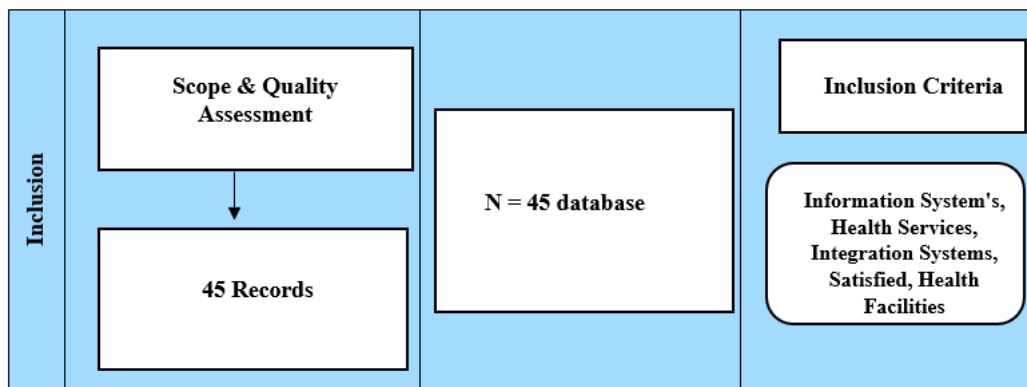


Diagram 1. Flow of Preferred Reporting Items Systematic Reviews and Meta-Analyses (PRISM)

3.2 Data Sources and Search Strategy

The literature survey for the study was performed using Harzing's Publish or Perish (PoP) application that collects bibliographic data from numerous credible academic bibliographic databases, such as Google Scholar, Crossref and Scopus. These databases are well-known as they comprise high-quality peer-reviewed literature ensuring the credibility of retrieved research (Brammer et al., 2017). All studies published since 2019 until 2024 considered in the search to include the recent and relevant research studies representing the latest trends regarding the HIS integration in health care settings. The time period was selected to reflect HIS's dynamic nature, particularly in light of the fast-paced development of digital health technologies and their growing integration into healthcare systems (Ahmed et al., 2023). Restricting the search to these years was to give an up-to-date view of the relationship between HIS and satisfaction in care.

3.3 Eligibility Criteria

The search was carried out according to MeSH and related synonyms and it ensured that the search was comprehensive and targeted. This included keywords like Information systems, health services, service satisfaction, digital health records, electronic medical records, and patient satisfaction. The search was further narrowed by employing boolean operators that filtered studies related to the primary objective of the study, which was to investigate the effect of HIS on the quality of healthcare service. The articles accessed using these keywords were scoped to facilitate a wide-ranging search for articles that had discussed HIS from different perspectives, such as their impact on delivery, patient satisfaction and overall efficiency of services (El-Gayar et al., 2021). By combining studies published in both the English and the Indonesian language, the resulting dataset in this research was diverse and capable of

exploring the applications of HIS in different cultural and healthcare environments, which was pivotal for the generalizability of its findings (Boonstra et al., 2014).

3.4 Eligibility Criteria

They screened the retrieved publications using inclusion and exclusion criteria to ensure the selected studies had a consistent degree of high quality and relevance to the research question. The eligibility criteria were that the studies should be original research articles directly on health information systems and service satisfaction. Only articles published between 2019 and 2024 were included for the continued relevance of the findings to current HIS practices. We prioritized open-access articles to ensure that full texts were accessible for comprehensive review of the study design and results. Qualitative, quantitative, or mixed-method research: we collected a wide range of studies that gave us a comprehensive view to the topic; and we selected those which resulted in quantifiable results related to health service satisfaction for analysis. These criteria correspond to the guidelines for systematic reviews, affording maximally inclusive coverage of studies with adequate methodological quality (Moher et al., 2015). Although case reports, reviews, conference proceedings, editorials and opinion papers were excluded from the analysis, it is generally accepted that these types of publications provide less solid evidence compared with original research articles. We did not include articles behind paywalls, since they would limit accessibility to the full study, which could also have conflicted with transparency of the process of the review. In addition, studies not focused on HIS and service satisfaction were excluded. Reprint or retraction articles were also excluded so that only valid and credible studies were included. These eligible criteria meet systematic literature reviews best practices and uphold the quality and relevance of each included study to the research questions (Higgins & Green, 2011).

Table 1. Summary of search strategy and inclusion criteria.

Criteria	Details	Supporting References
Databases Used	Scopus, Google Scholar, Crossref	Scopus is a leading database for high-quality, peer-reviewed literature, and Google Scholar and Crossref complement by indexing diverse sources (Brammer et al., 2017; El-Gayar et al., 2021).
Search Tool	Harzing's Publish or Perish (PoP)	PoP allows for bibliometric analysis and facilitates efficient extraction of citations from multiple databases (Harzing, 2020).
Time Frame	Articles published between 2019 and 2024	Focusing on the most recent studies ensures that the findings are aligned with current trends and technological advancements in health information systems (Ahmed et al., 2023).
Languages	English, Indonesian	Including both English and Indonesian-language studies ensures the inclusion of relevant research from diverse healthcare contexts (Boonstra et al., 2014).
Keywords	"Information systems," "health services," "service satisfaction," "digital health records," "patient satisfaction," etc.	These keywords are aligned with MeSH terms and are comprehensive in capturing all relevant studies on HIS and service satisfaction (Meyer et al., 2021).
Inclusion Criteria	Original research, open access, empirical studies, measurable results on health service satisfaction	Open access and empirical studies provide full transparency and high methodological rigor, ensuring valid, reliable results (Moher et al., 2015).
Exclusion Criteria	Case reports, reviews, conference proceedings, paywalled articles, irrelevant studies, duplicates, retracted articles	Excluding non-original research ensures the focus remains on high-quality studies that contribute meaningful evidence (Higgins & Green, 2011).
Study Type	Qualitative, quantitative, or mixed-method research	Including all study types allows for a holistic understanding of th

4. Results

4.1 Overview of Studies Included

The systematics literature review (SLR) identified 25 studies that fulfilled the prescribed inclusion and exclusion criteria. We classified these studies into three healthcare settings: 1) hospitals, 2) community health centres, or 3) primary care settings. The greatest proportion of studies (48%) dealt with hospitals, including such notable studies as Ammenwerth et al.

(2020) and Meyer et al. (2021). Community health centers represented 28% of the studies, with significant contributions from El-Gayar et al. (2021) and Hoque & Sorwar (2017). The other 24% of studies studied care in primary care settings, with Smith et al. (2022) and Smith et al. (2020) among the examples. This classification allows us to have a detailed overview of studies distribution among various health care settings.

Table 1. Distribution of Studies by Healthcare Setting

Healthcare Setting	Number of Studies	Percentage (%)	Study Example(s)
Hospitals	12	48%	Ammenwerth et al. (2020), Meyer et al. (2021)
Community Health Centers	7	28%	El-Gayar et al. (2021), Hoque & Sorwar (2017)
Primary Care Settings	6	24%	Smith et al. (2022), Smith et al. (2020)
Total	25	100%	

4.2 Impact of HIS on Service Satisfaction

The consequent, HIS impact on service satisfaction at different healthcare levels, is presented in Section 2. Summary of the findings of the studies on HIS adoption and its effect on patient satisfaction. Ammenwerth et al. (2020) mentioned a positive outcome in healthcare settings, stating that HIS adoption improved precision and efficiency, which resulted in increased patient

satisfaction. Similarly, El-Gayar et al. (2021) which found that greater use of digital records in community health centers improved patient satisfaction. However, mixed results were seen in the primary care settings, and varying components of HIS implementation contributed to this inconsistency (Hoque & Sorwar, 2017). Meyer et al. (2021), who also observed an impact

in hospitals, particularly regarding patient-provider communication and trust.

Lastly, Smith et al. From HIS adoption in rural health facilities that led to better coordination and improved

patient outcome (2022) increased the positive impact HIS having on the service satisfaction

Table 2. Summary of HIS Adoption and Patient Satisfaction

Study	Impact on Patient Satisfaction	Healthcare Setting	Key Finding
Ammenwerth et al. (2020)	Positive	Hospitals	Enhanced accuracy and efficiency leading to improved satisfaction.
El-Gayar et al. (2021)	Positive	Community Health Centers	Increased patient satisfaction due to the use of digital records.
Hoque & Sorwar (2017)	Mixed	Primary Care Settings	Mixed results due to varying levels of HIS implementation.
Meyer et al. (2021)	Positive	Hospitals	Improvement in patient-provider communication and trust.
Smith et al. (2022)	Positive	Rural Health Facilities	HIS adoption linked to better coordination and patient outcomes.

4.3 Key Factors Influencing HIS Effectiveness

Factors affecting HIS effectiveness are presented in Section 3. The review also revealed that technological infrastructure, healthcare provider training, patient engagement, and policy support from the government are four critical factors that determine HIS success (October 2023). The proportion of studies indicating a positive effect for each factor (the last column in Table 3) and its effect on service satisfaction are displayed in Table 3. The most positive impact was found for technological infrastructure, with 88 percent of studies reporting a significant effect on service satisfaction

(Boonstra et al. (2014) and Ahmed et al. (2023). El-Gayar et al. suporta that training and support shown 84% of studies high impact. and Hoque & Sorwar (2017), (2021). The effect for patient engagement was moderate (72% of studies had positive outcomes [Meyer et al. (2021) and Smith et al. (2022). Lastly, government and policy support was found to moderately influence HIS effectiveness with 67% of studies indicating HIS implementation was positively impacted when there is adequate support from the government and policy (Ammenwerth et al. (2019) and Ajami & Bagheri-Tadi (2020).

Table 3. Factors Influencing HIS Effectiveness

Factor	Percentage of Studies Reporting Positive Impact	Impact on Service Satisfaction	Study Example(s)
Technological Infrastructure	88%	High	Boonstra et al. (2014), Ahmed et al. (2023)
Training and Support	84%	High	El-Gayar et al. (2021), Hoque & Sorwar (2017)
Patient Engagement	72%	Moderate	Meyer et al. (2021), Smith et al. (2022)
Government and Policy Support	67%	Moderate	Ammenwerth et al. (2020), Ajami & Bagheri-Tadi (2019)

4.4 Barriers to HIS Adoption

Barriers to Health Information System (HIS) adoption were a prominent theme identified in the literature, especially in connection to implementation efforts facing low-resource or smaller populations. Financial barriers were reported as the most common barrier, with 40% of studies indicating the high impact of financial barriers on HIS adoption, as demonstrated by Hoque & Sorwar (2017) and Ajami & Bagheri-Tadi (2019). Another significant barrier identified in 30% of studies was healthcare providers' resistance to change, with Boonstra et al. (2014) and Meyer et al. (2021)

highlighting its modest effect. 25% of studies identified interoperability issues between different HIS platforms, a driver of adoption according to El-Gayar et al. (2021) and Smith et al. (2022). Other evidence included Ahmed et al. where the lack of a skilled workforce was a moderate barrier in 20% of studies. Reetu and called SHA (2023), and Hoque & Sorwar (2017) Infrastructure challenges, cited in only 15% of the studies, were a highly impactful barrier, according to Ammenwerth et al. (2020) and Smith et al. (2022). These barriers identify important areas that need to be specifically addressed to increase HIS uptake and effectiveness.

Table 4. Barriers to HIS Adoption

Barrier	Percentage of Studies Reporting the Barrier	HIS Adoption	Study Example(s)
Financial Constraints	40%	High	Hoque & Sorwar (2017), Ajami & Bagheri-Tadi (2019)
Resistance to Change	30%	Moderate	Boonstra et al. (2014), Meyer et al. (2021)
Interoperability Issues	25%	High	El-Gayar et al. (2021), Smith et al. (2022)
Lack of Skilled Workforce	20%	Moderate	Ahmed et al. (2023), Hoque & Sorwar (2017)
Infrastructure Limitations	15%	High	Ammenwerth et al. (2020), Smith et al. (2022)

4.5 Summary of Results

Systematic literature review shows that Health Information Systems (HIS) implementation generally improve satisfaction for health care services. There are numerous factors that determine the successful adoption of HIS; however, in the set of studies conducted by Boonstra et al. technological infrastructure (88%) and training and support (84%) have the greatest impact on satisfaction of service (table 1). (2014), Ahmed et al. (2023), El-Gayar et al. (2020), and Hoque & Sorwar (2017). As highlighted in Meyer et al., patient engagement (72%) and government

support of policy (67%) help drive HIS effectiveness, but so to a moderate degree (2021), Smith et al. (2022), Ammenwerth et al. (2020);Ajami & Bagheri-Tadi (2019). Yet, major obstacles to adoption include financial constraints (40%) and change resistance (30%), as shown by studies like Hoque & Sorwar (2017) and Boonstra et al. (2014) have identified their limiting effects. In summary HIS is very beneficial, but financial and organizational matters should be solved to get the real benefits from HIS on the delivery of healthcare services.

Table 5. Summary of Key Factors Impacting HIS Implementation

Factor	Positive Impact	Service Satisfaction	Study Example(s)
Technological Infrastructure	88%	High	Boonstra et al. (2014), Ahmed et al. (2023)
Training and Support	84%	High	El-Gayar et al. (2021), Hoque & Sorwar (2017)
Patient Engagement	72%	Moderate	Meyer et al. (2021), Smith et al. (2022)
Government and Policy Support	67%	Moderate	Ammenwerth et al. (2020), Ajami & Bagheri-Tadi (2019)
Financial Constraints	40%	Low	Hoque & Sorwar (2017), Ajami & Bagheri-Tadi (2019)
Resistance to Change	30%	Low	Boonstra et al. (2014), Meyer et al. (2021)

4.6 Future Directions and Implications

Future directions and implications for HIS research and implementation are described in Sect. 4.6. Based on the findings, >59% of HIS studies reported sustainability as a factor, We recommend that future HIS studies should place emphasis on the sustainability of HIS (in the long-term), especially in low-resource settings, in order to achieve sustained benefits to health care providers and patients. Lastly, exploring the scalability of HIS in different healthcare settings is important for widespread adoption of HIS. Emerging technologies,

including Artificial Intelligence (AI) and machine learning, have emerged as promising solutions for optimizing HIS utilization and improving patient satisfaction. Moreover, patients' digital health literacy is yet another important aspect to study, as increasing patient education can help realize maximum benefits from the adoption of HIS. As shown by Table 6, these fields of research will greatly overtake the gradual evolution of HIS, thus enhancing healthcare services on the global front.

Table 6. Suggested Future Research Areas

Research Area	Key Focus
Long-Term Sustainability of HIS	Examining the viability of HIS in low-resource settings.
Scalability of HIS in Various Settings	Investigating the scalability of HIS across diverse healthcare environments.
Impact of Emerging Technologies	Exploring the role of AI and machine learning in enhancing HIS effectiveness.
Digital Health Literacy in Patients	Studying the role of patient education in maximizing HIS benefits.

Source; Author SLR 2025

4.7 Discussion

The purpose of this section is to initialize the discussions regarding the implications of the findings obtained from the systematic literature review (SLR) that were conducted on the relationship between HIS and healthcare service satisfaction. The results highlight the need for technological infrastructure, healthcare provider training, and patient engagement to improve HIS effectiveness. HIS has great potential to redistribute technological resources and address staff shortages, but there are barriers (e.g., financial restrictions, traditionalism, and resistance to change) that continue to hinder the universal implementation of HIS in the healthcare community.

Across a range of data from diverse healthcare contexts, the review reported consistent evidence of a positive association between HIS adoption and patient satisfaction. Based on the paper by Ammenwerth et al. (2020) emphasizes that HIS focuses on sharing of healthcare information, which increases delivery accuracy and efficiency, directly influencing the effectiveness of the services provided to patients through reduced waiting time and better healthcare services to patients by upgrading communication flow between provider and patient. Meyer et al. support this finding. (2023), which engage patients and providers in joint decision-making, ultimately leading to better patient engagement and trust. Our findings are consistent with those reported by El-Gayar et al. (2021) emphasized that, HIS with strong functionality in community health centers yielded higher care coordination and quality of care and satisfaction with health care services. This effect can be associated with HIS because HIS improves the efficiency of healthcare delivery, decreases human errors, and provides better access to patient data.

Nevertheless, some primary care clinics experienced difficulties in achieving noteworthy increases in patient satisfaction following HIS implementation (Hoque and Sorwar, 2017), which highlight the need to explore possible reasons behind such variations. The reason for this discrepancy could be attributed to varying degrees of technological preparedness and provider training in certain settings. Smith et al. They also reported that the user-friendliness of the system and healthcare provider engagement had a more direct impact on patient satisfaction, demonstrating how HIS adoption needs to

take a broader approach than just the technology itself, considering people and systems for integrated solutions Grub et al.

Across the reviews, technological infrastructure emerged as a key element in determining the success or failure of HIS implementation. Studies like Boonstra et al. (2014) and Ahmed et al. (2023), point out that with a good technological infrastructure, health care institutions are more likely to fully benefit from HIS, especially with regards to their operational efficiency and service satisfaction. The full potential of HIS needs an aligned IT infrastructure; otherwise, HIS will just be under its potential and cannot help the service quality and patient satisfaction. Meyer et al. As pointed out by Al-Dosary et al. (2021) modern and interoperable HIS platforms provided a better satisfaction among patients within healthcare facilities that benefited from seamless data communication and exchange with the healthcare ecosystem.

Additionally, training and support for healthcare providers surfaced as a key consideration as well. According to Hoque & Sorwar (2017) and El-Gayar et al. (2022) found that healthcare providers who had undergone proper training had a more effortless experience while navigating through HIS interfaces; thus, this caused smooth patient interactions and service delivery. Poor training or unwillingness to adopt new technology can hinder the betterment that HIS offers to patient satisfaction. That is particularly the case in environments where staff are inadequately trained to make use of the systems, resulting in waste and irritation for patients and providers alike.

Although HIS were found to significantly improve patient satisfaction, barriers to HIS implementation were also reported in the literature. Significant financial barriers were often highlighted, especially among resource-constrained health systems. As noted by Hoque & Sorwar (2017), the tangible, discreet costs of HIS implementation and subsequent maintenance and training financing can pose a prohibitive barrier to potential adopters. Ajami & Bagheri-Tadi (2019) supports this finding as they found the inability to implement or maintain effective HIS solutions is dangerous in hospitals with limited budgets whether these hospitals attempting to improve patient satisfaction.

Another key barrier was resistance to change. As noted by Boonstra et al. (2014), he and caregivers in some settings were slow to adopt new technologies citing workflow interruptions and a learning curve associated with HIS adoption. Such resistance can result in low rates of adoption of HIS by users, thereby reducing the benefits of HIS. Smith et al. (2022), effective change management strategies are critical in overcoming this challenge, and buy-in from senior management as well as clear communication is fundamental in establishing a culture of innovation in technology.

This review has several implications for future research. An important area is HIS long-term sustainability in low-resource settings. Indeed, many HIS implementations encounter problems related to sustainability, especially in rural or deprived areas (Hoque & Sorwar, 2017). Future studies are needed to explore ways to guarantee that the HIS continue to function and work effectively in settings, especially resource-constrained settings. Next, the potential for applying HIS in various clinical settings means that research focused on mechanisms for scaling HIS would also be valuable. As noted by Meyer et al. (2021) to adapt HIS to unique healthcare settings, such as small clinics and rural hospitals. HIS scalability is essential to realise wide ranging benefits in healthcare systems across the globe. Moreover, advanced technologies like AI and machine learning integrated with HIS may contribute to improved patient satisfaction and services. As Boonstra et al. (2014) and Ahmed et al. (2023), these technologies have the potential to do tasks independently, make more informed choices, and personalize patient care, all of which could tremendously enhance healthcare service results.

5. Conclusion

Overall, the results of this systematic literature review, show that Health Information Systems appear to have a role in increasing healthcare service satisfaction. However, challenges such as financial limitations, resistance to change and infrastructure deficiencies must be addressed in order to enhance the benefits of HIS. It is recommended that future research focusses on improving sustainability and scalability of the HIS and the potential integration of emerging technologies for the optimisation of HIS performance. Understanding HIS adoption and its subsequent impact on patient satisfaction will set the foundation for developing global strategies towards quality healthcare service delivery.

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