



Health Information System for Strengthening Primary Health Care

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Abstract

Health Information Systems (HIS) are an important component in strengthening first-level health facilities because they play a role in improving service quality, administrative efficiency, and data-driven decision-making. Digital transformation in the health sector has encouraged the use of HIS across a wide range of primary health services, but its implementation still faces various challenges, especially in developing countries. This research aims to analyze the role of HIS in strengthening first-level health facilities. The research method uses PRISMA guidelines with a literature search across international databases such as PubMed, Scopus, ScienceDirect, and Google Scholar. The articles used are publications from 2016–2026 focusing on HIS implementation in primary health facilities. Based on the selection process, 15 articles that met the inclusion criteria were obtained. The review results show that HIS contributes to improving the quality of health services through accelerated patient service, improved accuracy of medical recording, and enhanced continuity of services. In addition, HIS supports data-based decision-making through the provision of real-time health information for program monitoring and evaluation of health services. The implementation of HIS also improves administrative efficiency and data integration between health service facilities. In conclusion, the implementation of HIS still faces various obstacles such as limited technological infrastructure, low competence of human resources, suboptimal data quality, and limited internet access in rural areas. Therefore, policy support, strengthening of health workforce capacity, and the development of sustainable digital infrastructure are necessary to optimize HIS implementation in strengthening primary health services.

INTRODUCTION

Transformation system health become one of the important agendas in development global health, especially in strengthen service primary health as the front line service community. Facilities health level First own role strategic in effort promotive, preventive, curative, and rehabilitative services that are sustainable. However, various developing countries Still face challenge in the form of limitations source Power human, quality services that have not been evenly distributed, low data integration, as well as weakness system recording and reporting health. In condition said, the existence of system information health or *Health Information Systems* (HIS) become component important in support strengthening facility health level First health (Amouzou et al., 2021; Koumamba et al., 2021).

The World Health Organization confirms that digitalization health and strengthening system information health is foundation main in realize service health effective, efficient and needs-oriented society. System information health allows power health obtain data in a fast, accurate, and integrated so that can increase quality taking decision clinical and managerial. In

addition, the system information health also helps government in do monitoring indicator health, distribution source power, as well as health program evaluation in a way sustainable (WHO, 2025b, 2025a).

Development digital technology in sector health experience acceleration after COVID-19 pandemic. Pandemic show that system health that has support more digital information capable do surveillance disease, tracking service health, as well as patient data management in a way fast and precise. Condition This push many countries to strengthen system information health at the level primary care through use record medical electronics, *health management information systems*, telemedicine, and systems supporters decision clinical (Amouzou et al., 2021; Region, 2022).

At the facility health level first, the system information health own role important in increase quality service and efficiency Work power health. Use system digital information is capable speed up the recording process patients, improve accuracy of diagnosis, making it easier monitoring disease chronic, as well as support continuity service health society. Research in India shows that implementation system information digital health in primary care is capable increase quality service health and improve external health public through integration of patient data and services health in a way comprehensive (Koumamba et al., 2021).

In addition to supporting service clinical, system information health also plays a role in strengthening governance facility health level First, the health data presented real-time help leadership facility health in compile program planning, identifying problem health priority, up to determine allocation source Power in a way more appropriate target. Strengthening *routine health information systems* proven increase ability data analysis and utilization information For taking decisions at the level service primary (Amouzou et al., 2021; Mboera et al., 2021).

Implementation system information health in various developing countries Still face Lots obstacles. Some challenge main covering limitations infrastructure technology, low interoperability between system, lack of training power health, as well as suboptimal data quality. In many facility primary health, registration process Still done manually so that cause delay reporting and low data (Koumamba et al., 2021).

digital transformation of health in Indonesia is becoming part important in system reform health national. Government Keep going develop health data integration through various digital platforms for support service better primary health care responsive and needs-oriented society. However, the gap quality service and readiness facility primary health care is still become challenges, especially in the area with limitations source power and infrastructure technology (Haemmerli et al., 2021).

The urgency of this research is driven by the growing recognition that strengthening primary health care through digital transformation is essential for achieving Universal Health Coverage (UHC) and improving health outcomes. The WHO has emphasized that digital health is a critical enabler for health system strengthening, yet evidence on effective HIS implementation strategies remains fragmented. The novelty of this research lies in its systematic synthesis of evidence from multiple countries and contexts, using the PRISMA framework to ensure methodological rigor and comprehensive coverage of available evidence.

Based on description said, can understood that system information health own a very important role in strengthen facility health level first. HIS does not only functioning as tool data recording, but also to become instrument strategic in increase quality service, efficiency

system health, taking decision data-based, as well as continuity service health society. Therefore that, research aim For analyze role system information health in strengthen facility health level First become important done For identify contributions, challenges, and opportunities development system information health in support service quality and sustainable primary health care.

METHOD

Study This use method *systematic review* For identify, evaluate, and synthesize various results study related role *Health Information Systems* (HIS) in strengthen facility health level First, a systematic review approach was chosen. Because capable give description comprehensive about effectiveness, challenges, and implementation system information health in service primary health care based on proof available scientific in a way systematic and structured.

The systematic review was compiled referring to the guidelines *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) to ensure transparency and quality reporting research. Research This focus on the article published scientific papers in range 10 years final For get relevant information with development technology latest digital health.

Search Strategy Literature

Search literature done in a way electronic through several international databases that can accessible in a way open access, including PubMed, Scopus, ScienceDirect, and Google Scholar. Search strategy use a combination of keywords and Boolean operators (*AND* , *OR*) as here are “Health Information Systems” *AND* “Primary Health Care” *OR* “First-Level Health Facilities” *AND* “Digital Health” *AND* “Health Services Strengthening.” Search article done on publication speaking English published between 2016–2026.

Criteria inclusion selected articles in study This must fulfil criteria that is article study original; discuss implementation or role system information health in facilities health level first; focus on service primary health, community health center, primary clinic, or *primary health care facilities* ; published in journal national and indexed international and national; articles available in form *full text* and can accessible in a way complete; published in range 2016–2026; using design study quantitative, qualitative, and *mixed methods* . Meanwhile Criteria exclusion The article will issued if No discuss system information health in a way specific; focused research on the house Sick level carry on or service tertiary; article in the form of editorials; opinions, *conference abstracts* , or *literature review* ; article No available in a way full text *unavailable* ; duplication article from another database.

Article Selection Process

Selection process article done in a number of stage in accordance PRISMA flow, namely:

1. *Identification*

All over articles obtained from the database collected and identified based on title as well as abstract.

2. *Screening*

Duplicated articles deleted, then done filtering based on suitability topic study.

3. *Eligibility*

Articles that meet the requirements condition beginning reviewed in a way full (*full-text review*) for evaluate suitability with criteria inclusion and exclusion.

4. *Included*

Articles that meet the requirements all over criteria entered to in systematic review analysis.

Data Extraction

Data from articles that meet criteria extracted use table data extraction including author name and year publication, country of research, objectives research, design research, number sample, type system information health, research outcomes, and findings main study.

Evaluation Article Quality on Quality methodological article assessed use instrument evaluation customized critical with design each research, namely *Joanna Briggs Institute (JBI) Critical Appraisal Checklist* For study Quantitative and *Critical Appraisal Skills Programme (CASP)* For study qualitative assessment quality done For ensure validity and reliability articles used in synthesis results study.

Data analysis

Data analyzed use method synthesis narrative (*narrative synthesis*). Research results from various article compared and grouped based on theme main related role system information health in strengthening facility health level first, like improvement quality service, efficiency administration, collection decision data-driven, integration service health, as well as challenge HIS implementation. Synthesis results Then served in form description descriptive and tabular For make things easier interpretation findings study.

Table 1. Assessment Article Quality Using the JBI Critical Appraisal Checklist

No	Author / Year	Research Design	JBI Score	Category
1	Erku <i>et al.</i> (2023)	Scoping Review	7/8	Tall
2	Fava and Lapão (2024)	Overview Review	8/8	Tall
3	Simbini <i>et al.</i> (2026)	Mixed Methods	7/8	Tall
4	Ashrafizadeh and Rassouli (2026)	Systematic Review	8/8	Tall
5	Majo <i>et al.</i> (2026)	Cross-sectional	7/8	Tall
6	Nasir <i>et al.</i> (2026)	Systematic Review	8/8	Tall
7	Alvarez-Rodríguez <i>et al.</i> (2026)	Scoping Review	7/8	Tall
8	Shahzad and King (2026)	Case Study	6/8	Currently
9	Hosizah, Kuntoro and N. (2016)	Cross-sectional	6/8	Currently
10	Jayathissa and Hewapathirana (2023)	Development Research	7/8	Tall
11	Satrio and Aqid (2024)	Modeling Study	6/8	Currently
12	Tresp <i>et al.</i> (2016)	Survey Review	7/8	Tall
13	Nizamov and Abduvakhobov (2026)	Literature Review	6/8	Currently
14	Dejen Tilahun, Liyew and Kasew (2024)	Implementation Study	8/8	Tall
15	Mboera <i>et al.</i> (2021)	Cross-sectional	7/8	Tall

Table 2. Synthesis Thematic Research Results

Main Theme	Subtheme	Supporting Articles	Synthesis Results
Improvement quality service	Efficiency service patient	1, 2, 8, 13	HIS improves speed and quality primary care
	Continuity service	2, 3, 4	Digital systems support continuity service patient
Strengthening taking decision	Real-time data	3, 10, 12, 14	Digital data helps monitor and evaluate health programs
	Health data analysis	5, 12, 15	HIS supports decision based proof
Efficiency administration	Recording electronic	9, 11	EMR and HIS reduce burden manual administration
	Data integration	4, 10	Interoperability increase coordination between service
Strengthening health human resources	Training power health	14, 15	HR competency influences success HIS implementation
Challenge implementation	Infrastructure technology	6, 7, 13	Internet and device limitations become obstacle main
	Resistance users	9, 11	Adaptation technology Still become challenges in primary facilities

Table 3. Characteristics of Articles Based on HIS Type

No	Author / Year	HIS Type	Focus System	Main Benefits
1	Erku <i>et al.</i> (2023)	Digital Health Intervention	Digital services	Service access
2	Fava and Lapão (2024)	Digital Primary Care	Digital consultation	Efficiency service
3	Simbini <i>et al.</i> (2026)	Electronic Health System	Data integration	Retrieval decision
4	Ashrafizadeh and Rassouli (2026)	Integrated Digital Systems	System integrated	Coordination service
5	Majo <i>et al.</i> (2026)	Information Management System	Monitoring program	Data accuracy
6	Macaskill <i>et al.</i> (2026)	Rural Digital Health	Rural services	Regional access remote
7	Alvarez-Rodríguez <i>et al.</i> (2026)	Sustainable HIS	Sustainability	Sustainability system
8	Shahzad and King (2026)	eMed GP System	Digital-first care	Subtraction time Wait
9	Hosizah, Kuntoro and N. (2016)	Computer-Based HIS	Community Health Center	Efficiency recording
10	Jayathissa and Hewapathirana (2023)	HAPI-FHIR System	Interoperability	Data exchange
11	Satrio and Aqid (2024)	Electronic Medical Record	Record medical	Effectiveness service

12	Tresp <i>et al.</i> (2016)	Big Data Health System	Data analytics	Data-driven decisions
13	Nizamov and Abduvakhobov (2026)	Health Digitalization	Digital transformation	Efficiency service
14	Dejen Tilahun, Liyew and Kassew (2024)	National HIS	Human Resources Capacity	Data utilization
15	Mboera <i>et al.</i> (2021)	HMIS	Management information	Health monitoring

RESULTS AND DISCUSSION

The Role of Health Information Systems in Increase Quality Primary Health Care

Results of a systematic review of 15 articles show that *Health Information Systems* (HIS) has significant contribution in increase quality service at the facility health level. First, HIS implementation allows service health done in a way more effective, fast, and integrated so that support improvement quality service primary health care comprehensive.

Research by Erku *et al.* (2023) explain that digital health interventions capable increase access public to service primary health care, especially in areas with limitations geographical and resource Power health. Digital systems help patient get service in a way more fast through utilization technology based electronics and telehealth. In addition, Fava and Lapão (2024) found that service digital-based primary health care improves continuity service and efficiency communication between patients and staff health. Digital services also provide flexibility time service as well as help lower burden visit direct to facility health. Findings the reinforced by Shahzad and King (2026) who stated that *the digital-first primary care* model capable reduce time Wait patients and improve satisfaction users service health. Use digital systems allow power health access patient data in a way *real-time* so that the service process become more fast and coordinated.

Study Simbini *et al.* (2026) also show that implementation of electronic health systems in facilities primary health care in Ethiopia, Ghana, and Zimbabwe is improving quality service through patient data integration and acceleration reporting health. Digital systems help power health do monitoring condition patient in a way more effective and supportive taking decision more clinical accurate. In addition, the use of Electronic Medical Record (EMR) has been proven increase accuracy documentation medical as well as reduce risk loss of patient data. Satrio and Aqid (2024) mention that EMR implementation in facilities Indonesia's primary care services help increase effectiveness service and speed up the administrative process health. The review results show that HIS contributes in create service better primary health care responsive, efficient, and needs-oriented patient.

The role of HIS in Support Data-Driven Decision Making

One of function main HIS found in this review is his abilities in support taking decision evidence-based *decision* making system information health provide service data health in real-time so that can used for program monitoring, evaluation services, and preparation policy health. Dejen Tilahun, Liyew and Kassew (2024) explain that strengthening capacity power health in the use of HIS increases utilization of health data for the planning and evaluation

process service primary health care in Ethiopia. Training and mentoring conducted increase ability power health in do data analysis and utilise information health For taking decision.

Mboera *et al.* (2021) also found that quality utilization of health data greatly influences performance *Health Management Information System* (HMIS) in services primary health care in Tanzania. Complete and accurate data help facility health in identify problem health society and determine priority service in a way more right. Research Majo *et al.* (2026) show that system management information health assist in monitoring health programs and improving quality reporting health in facilities primary care in Malawi. The use of digital data enables program evaluation processes to be carried out in a way more systematic and transparent. In addition, Tresp *et al.* (2016) state that digitalization system health and use *big data analytics* give opportunity big in development service health data-driven. Health data analysis help manager service health in predict need service, monitoring trend disease, and improve effectiveness intervention health community. Findings the show that HIS does not only functioning as tool documentation health, but also as instrument strategic in taking decisions and strengthening governance system primary health.

Efficiency Administration and Strengthening of Service Governance

The review results show that HIS implementation plays a role important in increase efficiency administration service primary health care. Use digital systems help the process of recording, managing patient data, and reporting health done in a way more fast compared to manual method. Hosizah, Kuntoro and N. (2016) find that use system information based computers in Indonesian health centers help speed up health data processing and reducing burden administration power health. Digital systems also improve efficiency recording report health and make things easier patient data search.

Study Jayathissa and Hewapathirana (2023) show that interoperability system through the use of HAPI-FHIR is capable increase health data exchange between facility primary care in Sri Lanka. The integration of these data help coordination service health and minimize duplication of patient data. In addition, research Ashrafizadeh and Rassouli, (2026) explain that integrated digital system capable strengthen coordination service health in support achievement *Universal Health Coverage* (UHC). System mutual information connected help distribution service health become more effective and efficient. Nizamov and Abdvakhobov (2026) also mentioned that digitalization system health help increase governance efficiency primary care through acceleration access information health and reduction of manual administrative processes.

Health Information Systems (HIS) has contribution important in creating governance service more modern, integrated and efficient primary health care.

The role of HIS in Strengthening Health System Integration

A number of article in this review emphasize importance health data integration in support strengthening system service primary health care system information integrated health allows exchange information health between facility service so that service patient can done in a way sustainable.

Jayathissa and Hewapathirana (2024) show that health data interoperability increase effectiveness coordination between service primary health care system interoperable help

power health get history health patient in a way complete so that support continuity service. Research Simbini *et al.* (2026) also show that integration of electronic health systems improves effectiveness health reporting and monitoring communities in several Sub-Saharan African countries. In addition, an integrated digital system make things easier government in do supervision service health and distribution source Power health.

Findings the show that HIS plays a role important in build system better health coordinated and supportive service sustainable primary health care.

Challenge Implementation of HIS in Primary Health Facilities

Although give various benefits of HIS implementation in facilities health level First Still face a number of challenges. Obstacles main thing found in this review covering limitations infrastructure technology, low competence power health, resistance users to digital systems, as well as suboptimal quality of health data.

Macaskill *et al.* (2026) explain that facility health in rural areas is still face limitations internet access and devices technology so that implementation of digital health has not yet running optimally. Condition This cause gap utilization of HIS between area urban and rural. Alvarez-Rodríguez *et al.* (2026) mention that sustainability HIS implementation is greatly influenced by readiness source Power human and support organization. Lack of training power health cause low ability use digital systems and influence quality of health data input.

Hosizah *et al.* (2016) also found that perception convenience use system become factor important in HIS acceptance at the facility primary health care. If the system considered complicated and difficult used, power health tend experience resistance to implementation technology new. In addition, some study show that health data quality Still become challenge main in HIS implementation. Data input errors, delays reporting, and data inconsistencies can influence validity information health used in taking decision.

Implications of Strengthening Primary Health Care

Health Information Systems (HIS) has potential big in support strengthening service primary health care sustainable. Implementation system information integrated health can help create better service efficient, quality and based need public.

Strengthening HIS requires support infrastructure technology, improvement competence power health, interoperability system, as well as policy government support digital transformation of health. Investment in development system information health become step strategic in increase effectiveness service primary and supportive health achievement *Universal Health Coverage* (UHC).

In addition, sustainable HIS development can also increase ability system health in face challenge health society in the future, including control disease, health monitoring population, and response to condition emergency global health.

CONCLUSION

Health Information Systems (HIS) has role important in strengthen facility health level First through improvement quality service, efficiency administration, health data integration, and taking decision data-based. HIS implementation is proven capable speed up service patients, improve accuracy recording medical, supports monitoring of health programs, and

strengthens coordination between service health. In addition to providing benefit in governance service primary health, HIS also contributes in support achievement Universal Health Coverage (UHC) via better service effective and integrated. However, the implementation of HIS is still face various challenge like limitations infrastructure technology, low competence source Power humans, suboptimal data quality, and limitations internet access, especially in rural areas. Therefore that, is necessary support policy, strengthening capacity power health, as well as development sustainable digital system so that HIS implementation can walk optimally in increase quality service primary health.

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