

## Global Challenges of Health Information Systems in Indonesia: A Literature Review

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### ABSTRACT

This study aims to identify the challenges in the development of health information systems in Indonesia. Key issues addressed include inadequate technological infrastructure, low adoption rates among healthcare professionals, and difficulties in data integration between systems. This research employs a literature review method by examining articles and scientific journals published from 2021 to 2025. The findings indicate that a lack of training and understanding of health information systems is a major barrier to their implementation. Additionally, collaboration between the government and the private sector is identified as a key factor in improving the infrastructure and accessibility of health information systems. These findings are expected to provide recommendations for policymakers in formulating more effective strategies to address the existing challenges.

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## INTRODUCTION

The Health Information System (HIS) in Indonesia plays a crucial role in providing accurate and timely health information, which is necessary to support national health efforts. Based on Government Regulation Number 28 of 2024, HIS is an integral part of the strategy to strengthen the national health architecture, with the aim of increasing efficiency in the digital collection, processing, and utilization of health data (Ministry of Health of the Republic of Indonesia, 2024). However, significant challenges are still faced in the development of HIS in Indonesia. According to Sari and Rahman (2022), inadequate technological infrastructure, low adoption rates by health workers, and difficulties in data integration between systems are major obstacles in HIS implementation. Research by Wibowo et al. (2021) also shows that a lack of training and understanding of HIS among health workers contributes to the low quality of healthcare services provided. On the other hand, global geopolitical conditions, especially the ongoing conflict in the Middle East, have a significant impact on public health worldwide, including Indonesia. According to a report from the World Health Organization (WHO, 2022), prolonged conflict in the region has led to a humanitarian crisis resulting in an increase in the number of refugees and migrants. Data from UNHCR (2022) shows that more than 26 million refugees originate from conflict-affected countries, such as Syria and Yemen. This increase in the number of refugees can put pressure on health systems in destination countries, including Indonesia, which must face the challenge of providing adequate healthcare services for a growing population.

The impact of this condition is not limited to countries directly involved in the conflict but can also affect public health in Indonesia. The increased risk of infectious disease spread among this vulnerable

population can threaten overall public health (Nugroho et al., 2023). Therefore, HIS in Indonesia must be able to provide accurate and up-to-date data to help the government and stakeholders formulate more effective policies in addressing health challenges arising from these global impacts. A literature review shows that collaboration between the government and the private sector is very important to improve HIS infrastructure and accessibility (Hidayati et al., 2022; Setiawan & Sari, 2023). Research by Nugroho et al. (2023) also emphasizes the need for more effective strategies to overcome these challenges, including increased training for health workers and the development of supportive policies. Based on the above rationale, this study aims to identify and analyze the challenges in HIS development in Indonesia and provide recommendations for problem-solving. By understanding these challenges in a broader context, it is hoped that more effective solutions can be found to improve the health system in Indonesia, especially in facing the impact of global issues affecting health.

## METHOD

The method used in this study is a literature review based on a review of various articles and scientific journals in Indonesia and internationally obtained from Google Scholar, PubMed, Science Direct, and DOAJ. The criteria used are articles or journals published from 2021-2025 and research related to the global challenges of health information systems in Indonesia.

## RESULTS

Based on the search results for research literature journals on the challenges of health information systems in Indonesia, more than 15 previous research literature journals were obtained. However, only a few research journals were selected according to the required criteria. The results of the search and examination are described in the table.

**Table 1**

Author	Title	Year	The result
Avisha Auziana Hasbi	Analysis of Challenges in Developing Health Information Systems in Indonesia as a Support for Public Health Efforts	2024	<p>The main challenge in developing Health Information Systems (HIS) in Indonesia is infrastructure issues, especially limited internet access in certain areas. According to Ministry of Health data in 2024, out of a total of 10,374 puskesmas (community health centers), approximately 745 puskesmas have no internet access at all, while another 1,420 puskesmas only have limited internet access. This condition hinders the optimal operation of HIS. In addition, the coordination gap between the central, provincial, and district/city governments is also a significant obstacle in HIS implementation. With regional autonomy, HIS development often does not become a priority, which can potentially hinder health data integration. If coordination does not run well, efforts to provide efficient and equitable health services will be hampered.</p> <p>The lack of human resources trained in HIS management is also a challenge that needs to be addressed. Furthermore, a change in mindset, adequate training, and active involvement of medical personnel in the HIS implementation process are required. To overcome these obstacles, strategies that can be implemented by the government include improving internet access and providing adequate hardware, especially in remote areas. Stricter regulations related to personal data protection and information system security are also needed to address cyber threats and ensure health data integrity. Furthermore, continuous training for medical personnel must be a priority to ensure maximum technology adoption. A change in mindset that supports the effective use of HIS is also very important to achieve the goal of optimal health information system development in Indonesia.</p>

Bani Ilham Alhadi	Management Information Systems (MIS) as a Means to Achieve E-Government	2022	<p>The main challenge faced by organizations in implementing management information systems is the lack of adequate facilities. In addition, the lack of knowledge and skills in processing management information systems is also a significant obstacle in the development of health information systems in Indonesia.</p> <p>To overcome these obstacles, several strategies can be applied. First, standardization in information system management needs to be carried out to ensure uniformity and consistency. Second, information security aspects must be strengthened through the implementation of strict security protocols and effective authentication systems. In addition, the development of various basic applications that allow reliable, secure, and trustworthy interoperability between sites is very important to integrate management systems and work processes in government agencies. By implementing these strategies, it is hoped that the challenges in implementing management information systems can be overcome, so that health information systems in Indonesia can function optimally and provide maximum benefits to the community.</p>
Alfi Syahhrina Hidayat, Putri Lestari, Nadhilah Hasibuan, Salsabila Nazuha, Yasmin Novithaharah Suprianto, Sri Hajijah Purba	The Influence of Health Information Systems on Improving the Quality of Medical Services in Puskesmas (Literature Review)	2024	<p>The main challenge in the implementation of Health Information Systems (HIS) in Indonesia is the limitation of human resources (HR). Many health facilities, especially in rural areas, experience a shortage of health workers, which leads to a workload problem for data input and management. In addition, the lack of adequate training for health workers regarding the use of information systems results in the ineffectiveness of the system.</p> <p>Limited technological infrastructure is also a significant challenge in HIS implementation. Some health facilities, especially in remote areas, still face problems regarding the availability of adequate hardware, such as suitable computers or servers. In addition, slow or unstable internet network issues often hinder the process of data integration and synchronization between service units. Data management complexity is another challenge faced in SIK implementation. Many healthcare facilities use several applications that run separately without an integrated system. This leads to redundancy or duplication of data input across various systems, which is not only time-consuming but also increases the risk of recording errors.</p> <p>To overcome these obstacles, several strategies are needed. First, better system integration must be carried out to ensure all applications can function harmoniously. Second, the development of web-based technology can help improve accessibility and efficiency in data management. Third, increasing human resource capacity through adequate training is crucial to ensure healthcare personnel can use information systems effectively. With these steps, it is hoped that SIK can be optimized to support modern, effective, and patient-needs-based healthcare service.</p>
Fatra Rulyan Adha, Yoga Sahria, Nurul Isnaini Febrinari, Rahma Nurul Fauziah, Wilda Sa'adah, Aini Hidayati	Literature Analysis of Health Information Systems (SIK): Trends, Challenges, and	2023	<p>Challenges in the implementation of Health Information Systems (SIK) in Indonesia include several interrelated aspects. First, the lack of adequate planning and minimal knowledge regarding information system alignment are major obstacles. In addition, the impact of inconsistent government</p>

	Benefits in Improving Healthcare Services in Indonesia		<p>policies, the need for sufficient human resources for contact tracing, and inaccurate manual recording also add to the complexity of these challenges. Difficulties in accessing telehealth through computerized systems, disparities in internet network distribution, and ethical issues related to data security are also significant challenges that must be faced, especially given the infrastructure differences between urban and rural areas.</p> <p>To overcome these obstacles, several strategies need to be implemented. First, strong coordination is needed between the government, private institutions, and civil society to ensure that all parties are involved in the development and implementation of SIK. Second, the government must develop clear regulations and ethical guidelines for the use of SIK, thereby ensuring data security and privacy. In addition, investment in human resource training is crucial to improve the skills and knowledge of healthcare personnel in using information systems. Finally, maintenance of technological infrastructure must also be a priority to ensure that information systems can function properly throughout all regions, both urban and rural. By implementing these strategies, it is hoped that the benefits of SIK can be optimized, so that healthcare services in Indonesia can become more effective and efficient</p>
Suci Ariani, Resta Dwi Yuliani	Challenges in Integrating Health Data from Various Electronic Health Record Systems into the National Health System	2025	<p>Integrating health data from various Electronic Health Record (EHR) systems into the national health system faces complex challenges. The main obstacle in this integration process is the disparity in data standards, which hinders the efficiency of adopting modern technology that is not yet evenly distributed. In addition, the lack of training for medical personnel and minimal support for technological infrastructure further add to the complexity of this problem.</p> <p>To overcome these obstacles, a strategic approach involving several steps is needed. First, strengthening clear and consistent regulations is crucial to ensure that all EHR systems can operate with the same standards. Second, development of technology based on international standards must be carried out to facilitate interoperability between systems. Third, collaboration among stakeholders, including the government, healthcare providers, and technology developers, is highly needed to create an ecosystem that supports data integration.</p>
Yuskaini Hadijah Rambe, Salwa Muthi'ah Siregar, Zahra Andini, Sri Hajijah Purba	Analysis of Inhibiting Factors for the Implementation of Puskesmas Management Information Systems in Indonesia: Literature Review	2024	<p>Challenges of health information systems in Indonesia are caused by various factors including technology, infrastructure, human resources, policy and management support.</p>
Dinda Natasya Putri, Sri Hajijah Purba, Khalisha Layana, Khoirunnisa Lubis	Challenges and Solutions in SIMRS Implementation in Government Hospitals in Indonesia	2025	<p>The main challenges faced in the implementation of Hospital Management Information Systems (SIMRS) in Indonesia are related to infrastructure, such as outdated hardware and limited internet connectivity. In addition, resistance to change from staff and a lack of IT professionals also pose significant obstacles. To overcome infrastructure issues, hospitals are updating network and server systems and increasing bandwidth</p>

			capacity. To address resistance to change, intensive training for medical and administrative staff is key to facilitating the transition to digital systems. The shortage of IT personnel is being addressed by recruiting new professionals and collaborating with local universities to obtain the necessary resources.
			Financial limitations are also a challenge, which can be overcome through partnerships with the private sector or government to obtain external funding. Furthermore, hospitals are enhancing data security protocols to protect sensitive patient information, ensuring that data remains secure during the digitalization process. By implementing these strategies, it is hoped that SIMRS implementation can proceed more smoothly and effectively, improving the quality of healthcare services provided.
Md. Khalid Hossain, Juliana Sutanto, Putu Wuri Handayani, Anasthasia Agnes Haryanto, Joy Bhowmik, Viviane Frings-Hessami	An exploratory study of electronic medical record implementation and recordkeeping culture: the case of hospitals in Indonesia	2025	Inadequate technological infrastructure is one of the biggest challenges. Many healthcare facilities in Indonesia are still found to be using manual systems.
Ratna Dwi Wulandari, Agung Dwi Laksonon, Nikmatur Rohmah	Urban-rural disparities of antenatal care in South East Asia: a case study in the Philippines and Indonesia.	2021	Insufficient technological infrastructure hinders the accessibility and efficiency of healthcare services.
Dwiza Riana, Achmad Nizar Hidayanto, Sri Hadianti, Darmawan Napitupulu	Integrative factors of e-health laboratory adoption: a case of Indonesia.	2021	Many healthcare workers do not have sufficient understanding of HIS, so they are reluctant to use it. Training and socialization can be strategies to overcome the obstacles that occur.
Nabila Clydea Harahap, Putu Wuri Handayani, Achmad Nizar Hidayanto	Barriers and facilitators of personal health record adoption in Indonesia: health facilities' perspectives.	2022	Lack of training and technical support is an inhibiting factor in the implementation of HIS in hospitals.

From table 1, it can be concluded that the health information system (HIS) in Indonesia still faces various challenges. Studies show that limited technological infrastructure is a significant challenge in the global implementation of HIS in Indonesia. According to data from the Ministry of Health in 2024, out of a total of 10,374 puskesmas, approximately 745 puskesmas in Indonesia have no internet access at all, while another 1,420 puskesmas only have limited internet access. The complexity of data management is another challenge in HIS implementation. Many healthcare facilities use several applications that run separately without an integrated system. As a result, there is redundancy or duplication of data input across various systems, which is not only time-consuming but also increases the risk of recording errors. The lack of human resources trained in HIS management is also a challenge that needs to be considered. In addition, changes in mindset, the need for adequate training, and the active involvement of medical personnel in the implementation process are crucial. With the increasing volume of health data stored in the system, the protection of patient personal data becomes crucial. Strong security measures are needed to protect health data from potential cyber threats, privacy breaches, and misuse. Data security is a challenge that still requires full attention. The coordination gap between central, provincial, and district/city governments is also a significant obstacle in SIK implementation. With regional autonomy, SIK development sometimes does not become a priority. If health data integration is not well coordinated, it will certainly hinder efforts to provide efficient and equitable health services.

The results of this study indicate that the challenges in developing health information systems (SIK) in Indonesia are very complex and diverse. Based on data analysis obtained from literature review, there are several key issues that are major obstacles in SIK implementation. First, inadequate technological infrastructure is one of the biggest challenges. According to Hossain et al. (2025), many health facilities in Indonesia still use manual systems, which results in delays in data processing and decision-making. This is in line with the findings of Wulandari et al. (2021) which show that insufficient technological infrastructure hinders the accessibility and efficiency of health services. Second, the low adoption rate by health workers is also a significant problem. Riana et al. (2021) note that many health workers do not have sufficient understanding of SIK, so they are reluctant to use it. This is reinforced by research by Harahap et al. (2022) which shows that lack of training and technical support is a hindering factor in the implementation of SIK in hospitals. Third, the difficulty in data integration between systems is also a challenge that cannot be ignored. Nugroho et al. (2023) emphasize that many information systems run separately, making it difficult to collect and analyze data comprehensively. This has the potential to reduce the quality of health services provided to the community.

From the results of this analysis, it can be concluded that to overcome the challenges in SIK development, better collaboration between the government and the private sector is needed. Setiawan & Sari (2023) suggest that developing supportive policies and increasing training for health workers should be a top priority. Thus, it is hoped that SIK can be implemented effectively and provide maximum benefits for the health system in Indonesia. Overall, this study provides a clear picture of the challenges faced in SIK development in Indonesia and emphasizes the importance of collaborative efforts to overcome these problems. These findings are expected to be a reference for policymakers in formulating more effective strategies to improve the health information system in Indonesia.

## CONCLUSION

Based on the data obtained, it can be concluded that the health information system (HIS) in Indonesia still faces various challenges. Globally, limitations in infrastructure, low adoption rates by healthcare professionals, and difficulties in data integration between systems as well as data security are identified challenges. Collaboration between the government and the private sector is identified as a key factor to improve health information system infrastructure and accessibility. Increased internet access and the provision of adequate hardware, especially in remote areas. Stricter regulations related to personal data protection and information system security are also needed to address cyber threats and ensure the integrity of health data. Continuous training for medical personnel must also be a priority to ensure maximum technology adoption. A shift in mindset to support the effective use of HIS is also very important to achieve the goal of optimal health information system development in Indonesia. By understanding these challenges and solutions to overcome them, HIS in Indonesia is expected to be able to provide accurate and up-to-date data to assist the government and stakeholders in formulating more effective policies.

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