

The Role of Technology in Primary Health Care Management Strategy : Literature Study

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ABSTRACT

Primary health care is a very important first-level service in the health system, especially in remote and low-income areas. The development of digital technology has great potential to improve the effectiveness and efficiency of primary health care through integration in management strategies. This article is a literature study that aims to explore the role of technology in primary health care management strategies based on the results of recent research. Data were obtained from various national and international scientific journals between 2021 and 2025 through searches on databases such as Google Scholar, PubMed, Scopus, and ScienceDirect. The results of the analysis show that the use of technology such as electronic medical records, telemedicine, and mobile health applications can improve access, service quality, and managerial efficiency. However, challenges such as limited infrastructure, digital literacy, and human resource readiness are still major obstacles. This study recommends the need for contextual adaptive strategies to optimize the use of technology in primary health care, especially in developing countries like Indonesia.

Keywords: Technology, Management Strategy, Primary Health Care

INTRODUCTION

Primary health care is a form of basic service in the health system provided by medical personnel such as doctors, nurses, and environmental health workers. This service is generally intended for people living in remote or rural areas, especially in areas that are still relatively underdeveloped and low-income. This service is also known as first-level health care, because it is intended for communities that do not yet have adequate access to health facilities or medical services in their surroundings (Anshari, 2023).

According to WHO 2024 that Primary health care enables the health system to support a person's health needs - from health promotion to disease prevention, treatment, rehabilitation, palliative care, and more. This strategy also ensures that health care is

delivered in a way that is centered on people's needs and respects their choices. The implementation of digitalization in the Primary Care program has the potential to improve the quality of health services in facilities such as Community Health Centers, Assistant Health Centers (Pustu), and Integrated Health Posts (Posyandu). The use of digital technology in this context helps create more accessible, efficient, and equitable health services for all levels of society (Ministry of Health, 2024).

Most research on technology in primary healthcare focuses more on technical and clinical aspects, such as application development and information systems. However, studies that explore how technology is integrated into service management strategies from the planning stage to evaluation are still rare. In addition, most of these studies focus on developed countries, so they do not fully describe the conditions and challenges in developing countries such as Indonesia. This condition indicates the need for a more comprehensive and relevant literature study related to the role of technology in primary healthcare management strategies according to the local context.

METHOD

This study uses a literature review approach to explore in depth the role of technology in primary health care management strategies. This approach was chosen because it allows researchers to develop theoretical and empirical understanding based on the results of previous published studies, and provides a comprehensive conceptual framework in viewing the relationship between technological developments and primary health care management. This literature review is narrative in nature and focuses on integrating information from various scientific sources to form a critical analysis of the use of technology in the context of primary health care. Data were collected from various national and international scientific journals obtained through access to several academic databases such as Google Scholar, PubMed, Scopus, and ScienceDirect. The literature search process was carried out using a combination of keywords such as "technology in primary health care", "healthcare management strategy", "digital health in primary care", and "telemedicine AND primary care". The articles reviewed were limited to publications between 2021 and 2025 to ensure the relevance and recency of the data.

The initial search yielded a large number of articles, but the screening process was carried out by reading the abstracts and main content to select literature relevant to the topic. Only articles that specifically discussed the application of technology in primary health care management were included in this review. In addition, articles that were opinion pieces, editorials, or did not contain strong empirical or theoretical studies were excluded from the review. The selected articles were then analyzed thematically to identify the main focus of previous research, trends in technology implementation, benefits generated, and challenges faced in implementing these technologies in primary health care. This analysis also examined the context of implementation, such as health systems in developing and developed countries, the types of technology used (e.g. Electronic Health Records, telemedicine, and mobile health applications), and their implications for management efficiency, access to services, and quality of care. Through this approach, it is hoped that the study can provide a rich synthesis of information and present conceptual recommendations for the development of technology-based health management strategies in the future.

RESULTS

Table 1. Literature Review Results

Name, Year, Title	Method	Research result
(2021). Preparation of strategic plans for information systems and information technology at the Grhasia Mental Hospital, Special Region of Yogyakarta.	This research uses qualitative methods	This article explains that IS/IT applications in Grhasia Mental Hospital are still suboptimal and characterized by undesirable information systems, manual reporting, limited human resources and IT infrastructure, and lack of IS/IT SOP. Based on the SWOT analysis, 2 strategic developments have been compiled into six SO strategies. In addition, 17 information system developments are categorized into four

		application portfolios (strategic, high potential, core companies, and support). The IS/IT development roadmap is divided into three phases, as well as identification and standardization, integration and infrastructure improvement, and use of information to support the decision-making process. This study emphasizes the importance of management involvement, planning strategies in accordance with the hospital's vision, and the inclusion of all stakeholders to implement information systems, and effective and efficient support for mental health services.
Aini et al. (2022). Development Strategy for Transformation of Hospital Management Information System (SIM-RS) at Dr. Iskak Tulungagung Regional Public Hospital	This research uses qualitative methods	The research in this journal indicates that the process of developing the Hospital Management Information System (SIM-RS) conversion at RSUD dr. Iskak Tulungagung has not been running optimally. Through fishbone analysis, a number of main causes were identified, such as the lack of IT experts, low programmer competency, the absence of supporting regulations, and the continued use of a paper-based manual medical record system that is not yet digitally connected. USG analysis identified two main problems that need to be addressed immediately, namely the

		digitization of medical records and data integration between service units. Meanwhile, the results of the SWOT analysis recommend an aggressive strategic approach, which emphasizes the utilization of internal strengths and opportunities from the external environment. The recommended strategic steps include the gradual digitization of medical records, expanding the use of the SIM-RS module to all units, and building an integration system for back office services. The implementation of this strategy is carried out through coordination between units and the preparation of a new software procurement framework, accompanied by routine evaluation to ensure the success of its implementation.
Lubis & Pratama. 2025). The Role of Information Technology in Improving the Quality of Health Services.	This research uses qualitative methods	This article shows that the use of technologies such as electronic health records (EHR), telemedicine services, artificial intelligence (AI), and hospital information systems can improve service effectiveness, minimize medical errors, and expand access to health services, especially in remote areas. Technology also plays a role in improving the efficiency of hospital

		management through data digitization, direct monitoring of patient conditions, and more organized resource management. However, the implementation process faces a number of obstacles such as high investment costs, resistance from some medical personnel to change, low digital skills, and concerns about patient data security. Therefore, synergy between the government, technology industry, and health service institutions is the key to success in optimally implementing information technology in the national health sector.
Eliza & Idayanti. (2020). Implementation of e-health services in improving the quality of health services at the Ketabang Community Health Center, Surabaya.	This study uses a descriptive qualitative method.	The results of the study showed that the implementation of the e-health system brought significant benefits, including accelerating the registration process, minimizing conventional queues, and facilitating access to services for patients. The level of satisfaction of the user community reached 96.34%, which is classified as "very satisfying". The majority of patients did not encounter significant obstacles when operating the system, although several challenges were still encountered such as limited mastery of technology in the senior age

		group and the possibility of technical problems in the system. Overall, e-health is considered to contribute greatly to the efficiency of health center officers' performance and improving the quality of health services. This study suggests intensifying education and socialization programs to the wider community and improving technical infrastructure to support the optimization of e-health services.
Nur et al. (2024). Technology and health innovation diffusion strategies in increasing public health awareness in Purbaratu.	This research uses qualitative methods	The study shows that the implementation of an integrated health application based on transfer learning at the Purbaratu Health Center is effective in increasing public awareness of Clean and Healthy Living Behavior (PHBS). This application is easy to operate by the majority of cadres and residents, especially the online registration feature, BMI/BMR calculation, and water consumption reminder. Health education content in the application has been proven to be useful in changing people's behavior towards a healthier direction, based on survey and interview results. Although a small number of users with low technological literacy still need assistance, overall this application makes a positive

		contribution to health promotion programs and has the potential to be implemented in other areas to support primary health services.
Amallia, A. (2024). Digitalization of Health in Improving the Quality of Health Services.	This research uses the literature review method.	The literature review findings demonstrate the critical role that health digitalization plays in improving the quality, effectiveness, and accessibility of health services. Technologies such as online registration tools and electronic medical records have simplified administrative procedures, accelerated treatment processes, and maintained the accuracy of patient data. The level of digital literacy of the community, the readiness of the technological infrastructure, and the expertise of health workers all have a significant impact on the effectiveness of digitalization. The study identified barriers to digitalization implementation, including user reluctance and the digital divide in rural areas, in addition to perceived benefits. Concerns about patient privacy and data security were also significant. According to the study, countries with strong infrastructure and high levels of digital literacy generally provide better healthcare services, while areas with less

		exposure to technology struggle to integrate digital systems.
Lelyana, N. (2024). Analysis of the Impact of Technological Innovation on Hospital Management Strategy.	This research uses a qualitative method with a secondary data analysis approach.	Three key aspects of hospital strategic management are heavily influenced by technological innovation, the study found: operational efficiency, quality of patient care, and strategic implications for governance and leadership. The use of hospital information systems (HIS) can reduce administrative time by up to 50%, freeing up staff to focus more on patient care. Telemedicine technology improves access to healthcare, especially in rural areas, by reducing emergency room visits and increasing patient satisfaction by up to 30%. Hospital administration becomes more efficient with the use of data analytics and artificial intelligence; predictive algorithms can reduce drug inventory waste by up to 20%. The use of Electronic Health Records (EHRs) facilitates communication between healthcare providers, improves clinical decision-making, and makes it easier to manage information. Telemedicine and remote monitoring are two examples of innovations that improve patient satisfaction and resource efficiency. Artificial intelligence helps in adjusting

		resource allocation and predicting patient outcomes. Technology improves care coordination and diagnostic accuracy, which benefits quality, safety, and patient satisfaction. Medication errors are reduced thanks to EHR systems and clinical decision support tools, while telemedicine allows for proactive monitoring of patients with chronic diseases.
Aziz, M. A & Alfian, A. (2024). Socialization of the use of the One Health Data Application (ASDK) for the Implementation of the Primary Health Service Integration Recording System (ILP) in Tulungagung Regency.	This research uses qualitative methods	The results of the study showed that the integration of primary health services has been significantly impacted by the implementation of the Single Health Data Application (ASDK) by Tulungagung Regency. On May 15, 2024, fifty health workers from various health centers attended a socialization event. Participants' understanding increased significantly thanks to intensive training, data recording simulations, and pre- and post-test assessments; 85% of them reported that they were better able to utilize ASDK to record and integrate health data. The importance of data integration was successfully communicated to health workers through this outreach initiative. The enthusiasm of the training participants demonstrated how effective

		the interactive teaching strategy and visual aids were. Based on the evaluation results, participants identified the benefits of integrated data recording, which can improve the effectiveness and accuracy of health services, in addition to learning how to use ASDK. However, the study also noted difficulties in implementing ASDK, including inconsistent technology infrastructure and a lack of ready human resources. The creation of more user-friendly features and the need for ongoing training were among the recommendations. By developing a more effective and responsive data collection system that is in line with community needs, ASDK socialization has the potential to improve the standard of basic health services in Tulungagung Regency.
Rambe et al. (2025). SIMRS Technology Solutions in Improving the Quality of Public Health Services in Indonesia.	This research uses a literature study method.	The findings of this study show how the implementation of the Hospital Management Information System (SIMRS) in Indonesia has significantly improved operational efficiency and standards of medical care. Healthcare workers can now spend more time on patient care and improve patient satisfaction thanks to a 50% reduction in

		administrative processing time for tasks such as patient registration and maintaining medical records. Healthcare workers have benefited from the training; according to 85% of participants, their ability to use SIMRS to record and integrate health data has improved. Participants' understanding has improved thanks to interactive teaching strategies and the use of visual aids during the training. However, challenges in implementing SIMRS remain, such as limited technological infrastructure in remote areas and a lack of trained healthcare workers. While SIMRS offers many benefits, its success depends on continued support from the government and healthcare institutions in terms of training and infrastructure development.
Hanafi et al. (2025). Literature Review: Implementation of Health Information Systems in Community Health Centers in Indonesia.	This research uses a literature review method.	The findings of this study indicate that the quality of health services and the effectiveness of data management significantly improved when Health Information Systems (HIS) were implemented in health centers in Indonesia. Based on an assessment of research conducted between 2018 and 2024, HIS improved the accuracy of health data and accelerated

	administrative procedures, allowing health workers to focus more on patient care. Positive results were also obtained from the training provided to health workers; several participants reported that they were better able to record and integrate data using HIS. During the training, participants' understanding improved thanks to interactive teaching techniques and visual aids. HIS implementation still faces several obstacles, including inadequate technological infrastructure in rural areas, lack of technological knowledge among health workers, and network issues that often cause operational disruptions. Although HIS has many benefits, the government and health organizations must continue to support it for it to be successful. Overall, HIS has great potential to improve the standard of health care in Indonesia. The study's recommendations include the need to build adequate infrastructure to facilitate successful HIS adoption and enhance the capacity of health workers through continuous training.
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DISCUSSION

The application of Information Technology (IT) and Health Information Systems (HIS) in Indonesia has become a major focus in supporting digital transformation in the health sector. This development is in line with the need to improve service efficiency, data accuracy, and evidence-based decision making. Several studies have shown that the use of IT, such as the Hospital Management Information System (SIM-RS), e-health, and integration of electronic medical records (EMR), has brought positive changes to health services, both at the hospital and Puskesmas levels.(Lubis & Pratama, 2025;Lelyana, 2024).

(2021)highlights the importance of strategic planning in the implementation of SIK, where SWOT analysis is used to develop an information system implementation plan at RSJ Grhasia. This strategy not only identifies internal strengths and weaknesses, but also formulates external opportunities and threats that affect the success of service digitalization. This is reinforced byAini et al. (2022)which suggests a fishbone approach in identifying the root of the problem, while also compiling a sustainable and integrated SIM-RS development roadmap.

However, obstacles in implementing health IT are still a major challenge, especially in terms of human resources, infrastructure, and organizational culture.. Rambe et al. (2025)found that many hospitals are experiencing a shortage of IT experts and minimal training for medical staff in using the system. In addition, limited infrastructure such as internet connectivity in remote areas is a serious obstacle in implementing an integrated information system.

Lubis & Pratama. (2025)noted that resistance to change, especially from healthcare workers who are not yet familiar with digital systems, can hinder the success of IT implementation. Data security and patient information confidentiality issues are also crucial issues that need to be addressed through strict regulation and data protection.

On the other hand, the positive impacts of SIK implementation cannot be ignored.Lelyana (2024)shows that technologies such as Artificial Intelligence (AI) and big data have been utilized in hospital management to optimize drug distribution, service scheduling, and service quality monitoring. Another study byEliza & Idayanti (2020)proves that the

implementation of e-health at the Ketabang Health Center is able to reduce patient waiting time and increase satisfaction by up to 96.34%. To overcome these various obstacles, comprehensive efforts are needed, including routine training, policy support from the government, and designing easy-to-use applications. Aziz & Alfian (2024) stated that socialization and interactive training in the use of the One Health Data Application (ASDK) can accelerate the integration of service data. Meanwhile, Hanafi et al. (2025) propose the implementation of a digital learning model for health workers at Community Health Centers to improve IT literacy.

Thus, the success of SIK implementation is highly dependent on the integration between implementation strategies, infrastructure readiness, HR competency, and regulatory support. These studies show that digital transformation in Indonesia's health sector is not just a technical innovation, but a systemic change that requires cross-sector synergy.

CONCLUSION

Primary healthcare can be enhanced by digital technologies, which improve operational efficiency, quality of care, and accessibility, especially in remote and underserved areas. Mobile-based health applications, telemedicine services, and electronic medical records (EMRs) have been shown to speed up service delivery processes, reduce administrative burdens, and improve patient satisfaction. Despite their many benefits, these technologies still face several challenges, such as limited infrastructure, lack of digital literacy among healthcare workers, and a shortage of skilled workers. The success of digital transformation in primary healthcare depends heavily on management strategies that adapt to local needs, comprehensively supportive regulations, and collaboration between government, service providers, and communities. To maximize the use of technology, an adaptive, sustainable, and integrated approach to policy and community needs is needed. This will allow the benefits of technology to be felt evenly throughout the community.

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