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The Role of Health Information Systems in Health Services

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ABSTRACT

The development of information technology has had a significant impact on healthcare service systems, especially in primary healthcare facilities such as community health centers (Puskesmas). This study aims to gain an in-depth understanding of the role of health information systems in supporting healthcare services at Puskesmas X. The method used is qualitative research with data collection techniques through semi-structured interviews with healthcare workers and Puskesmas managers who are directly involved in using the health information system. The data were also supplemented with field observations and relevant document studies. The results show that health information systems, such as Electronic Medical Records (EMR) applications, play an important role in improving the efficiency of healthcare workers, accelerating services, and enhancing the accuracy of patient data recording. In addition, the system facilitates access to information that supports medical decision-making and coordination among healthcare staff. However, the study also identifies various challenges, such as limited technological infrastructure, insufficient training for healthcare workers, and user resistance to the transition from manual to digital systems. The study concludes that with continuous training support, infrastructure improvement, and policy strengthening, the implementation of health information systems at Puskesmas can be optimized to improve the quality of healthcare services.

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INTRODUCTION

The development of information technology has made a significant contribution to improving the effectiveness and efficiency of various sectors, including the health sector. In the current digital era, the need for fast, accurate, and integrated information is increasingly urgent, especially in the world of health services which heavily relies on data and information to support timely and evidence-based medical decision-making. One tangible manifestation of digital transformation in the health sector is the implementation of Health Information Systems (HIS) which aims to support health data management and promote standardized, quality, and sustainable services (Maharani, 2023). Community Health Centers (Puskesmas) as primary healthcare facilities play a very important role in the national health service system. Puskesmas are tasked with carrying out comprehensive health efforts, ranging from promotive, preventive, curative, to rehabilitative services for the community in their working area. To carry out this role optimally, Puskesmas require an effective and efficient information management system so that the services provided can run smoothly, be measurable, and accountable. Therefore, the implementation of health information systems becomes one of the strategic

solutions to overcome various challenges faced by Puskesmas in daily services (Sevtiyani & Putriningrum, 2022).

Health Information Systems, such as Electronic Medical Record (EMR) applications, are important tools for documenting patient data digitally, replacing manual recording which has been prone to errors, delays, and even data loss. The implementation of EMR not only simplifies the process of recording and retrieving data but also allows quick access to information by healthcare professionals to support faster, more accurate, and personalized services. EMR also assists in the reporting process to higher levels, so that public health data can be analyzed in real-time and become the basis for data-driven health program planning (Putri et al., 2023). However, the implementation of health information systems in Puskesmas is not without various obstacles, both technical and non-technical. Some common challenges faced include limited technological infrastructure (such as internet networks and hardware), minimal training and understanding of healthcare professionals regarding system usage, and persistent resistance or rejection from users accustomed to manual systems. In addition, the high workload of healthcare professionals often makes it difficult for them to adapt to digital-based administrative processes that demand accuracy and consistency (Halimah et al., 2023). Amidst these conditions, it is important to conduct studies and evaluations regarding the role of health information systems, especially in the Puskesmas work environment, so that their benefits can be maximized and existing obstacles can be overcome appropriately. This study aims to examine how health information systems are implemented in Puskesmas, and to evaluate their impact on the quality of health services provided. The research focus includes aspects of healthcare professional work efficiency, service speed, documentation accuracy, and ease of information access by staff and patients (Amin et al., 2024).

By knowing the extent of the effectiveness of health information systems in service practices at Puskesmas, it is hoped that relevant solutions can be found to overcome implementation barriers. In addition, the results of this study are also expected to provide input for Puskesmas managers, local governments,as well as the Ministry of Health in formulating policies and strategies for strengthening health information systems at the primary care level. Digital transformation in the health sector is not just about applying technology, but also about building a new work culture that is adaptive, efficient, and oriented towards the quality of service for the community (Hatibie & Bata, 2023). Therefore, the author is interested in conducting research titled "The Role of Health Information Systems in Health Services at Puskesmas X".

METHOD

This research uses a qualitative approach with the aim of gaining an in-depth understanding of the role of health information systems in improving health services at Puskesmas X. A qualitative approach was chosen because the focus of this research is to explore the experiences, perceptions, and views of health workers and Puskesmas managers regarding the implementation and use of health information systems, as well as their impact on the quality of services provided. With this method, researchers can capture the social, cultural, and technical contexts that influence the success or obstacles in the use of health information systems in the Puskesmas environment.

The variables that are the focus of this study include: (1) Effectiveness of the Health Information System, which is how the system is able to facilitate the process of recording, storing, and accessing health data quickly and accurately; (2) Impact on Health Service Quality, which includes the influence of using the information system in improving the speed, accuracy, and personalization of services to patients; and (3) Challenges of Health Information System Implementation, namely various technical, human resource, and work culture constraints faced during the implementation of the system at the Puskesmas. To obtain in-depth and rich information, the data collection technique used was semi-structured interviews with a number of key informants selected purposively. Informants were chosen based on their direct involvement in the operation of the health information system at Puskesmas X, including health workers such as doctors, nurses, medical record officers, and Puskesmas managers or administrators. Semi-structured interviews allowed researchers to explore information flexibly according to the informants' views and experiences, while still focusing on the main themes of the research.

The interview process was conducted face-to-face at Puskesmas X with varying durations between 30 to 60 minutes per session. Interviews were recorded with the informants' permission to ensure that the data obtained was complete and accurate. During the interview, the researcher used an interview guide that had been prepared based on the research variables, with questions designed to explore experiences of system use, perceived benefits, and encountered obstacles. In addition to interviews, supporting data was also collected through direct observation at the Puskesmas regarding health information system usage activities, as well as documentation in the form of activity reports and relevant administrative records. This observation served to strengthen and complement the interview results, so that data analysis could be triangulated and the validity of

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the findings enhanced. In addition, documentation of the data collection that had been carried out was also performed.

In data analysis, the researcher used thematic analysis techniques consisting of data collection, interview transcription, coding, and grouping data based on emerging themes according to the research variables. The coding process was done manually or with the aid of qualitative data analysis software. The organized data was then interpreted to provide a comprehensive picture of the effectiveness, impact, and challenges of health information system implementation at Puskesmas X. To maintain the quality and credibility of the research,data sources were triangulated by comparing information from various informants and data collection methods. In addition, researchers conducted member checking with several informants to ensure that the interpretations and conclusions drawn were consistent with the meanings they conveyed during the interviews. Research ethics were also an important consideration in this study. All informants were given an explanation of the research objectives and guaranteed confidentiality and anonymity of their identities. Informants were also given the freedom to refuse or stop the interview at any time without coercion. Written consent (informed consent) was collected before the interviews were conducted.

RESULTS

This study successfully revealed various important aspects related to the role of health information systems (HIS) in improving health services at Puskesmas X based on the experiences and views of health workers and Puskesmas managers who were key informants. The results of the thematic analysis grouped the main findings into three focus variables: the effectiveness of the health information system, its impact on the quality of health services, and challenges in its implementation.

1. Effectiveness of Health Information Systems

From interviews and observations, the health information system at Puskesmas X, especially the Electronic Medical Record (EMR) application, proved to be quite effective in facilitating the process of recording, storing, and accessing patient data. Health workers stated that with this system, medical data recording became faster and more accurate compared to previous manual methods. Patient data can be accessed in real-time by doctors and nurses, thus accelerating the diagnosis process and medical actions. In addition, Puskesmas managers also assessed that this system facilitates the reporting of health data to the district and provincial levels, supporting more integrated and systematic monitoring of public health. Field observations showed routine digital recording activities with workflows that were beginning to form and adapt to the new system.

2. Impact on the Quality of Health Services

The informants agreed that the implementation of the health information system had a positive impact on the quality of services at Puskesmas X. Service speed increased because health workers no longer needed to spend a lot of time manually searching for patient files. In addition, patient data accuracy was better maintained, minimizing the risk of misdiagnosis and medication errors. Some doctors and nurses also stated that this system supports more personalized and integrated services, for example, with complete patient medical history features that facilitate follow-up of chronic cases. Health workers also felt it was easier to coordinate internally, as information could be accessed jointly by the medical team without hindrance. This provided significant benefits for patients in obtaining more responsive and quality services.

3. Challenges in Implementing Health Information Systems

Although the benefits are clear, this study found several significant obstacles that hinder the optimization of health information system use at Puskesmas X. One of the main challenges is the limitation of technology infrastructure, such as unstable and inadequate internet networks, as well as a limited number and specification of computer hardware. This sometimes causes the system to experience disruptions or slow access, thus disrupting the smooth flow of service processes. In addition, the lack of training and understanding of health workers regarding system use is also an obstacle. Some informants stated that they need more intensive and continuous training to operate the system optimally, especially for health workers who are not accustomed to digital technology.Cultural resistance to the new workflow also emerged, especially from healthcare workers who had long been accustomed to manual record-keeping and felt that the digitalization process added to their administrative workload. High workload and time constraints made it difficult for them to adapt to these changes.

4. Efforts and Handling Strategies

In overcoming these various challenges, the management of Puskesmas X has made several efforts, such as conducting regular system usage training, improving technological facilities, and carrying out intensive

socialization to raise awareness of the importance of health data digitalization. Coordination with the local health office was also carried out to increase infrastructure and resource support. However, more systematic efforts and strong policy support are still needed so that the implementation of the health information system can be truly optimal.

Overall, the results of this study indicate that the health information system plays an important role in improving the effectiveness and quality of health services at Puskesmas X, although there are still technical and non-technical obstacles that need to be overcome through training, infrastructure improvement, and changes in work culture. These findings provide a comprehensive overview as a basis for recommendations for Puskesmas managers and policymakers in optimizing the use of information technology in primary healthcare facilities.

DISCUSSION

1. Effectiveness of Health Information System

The effectiveness of the health information system (HIS) at Puskesmas X is evident from its ability to facilitate the process of recording, storing, and accessing patient data quickly and accurately. The implemented Electronic Medical Record (EMR) system allows healthcare professionals to input patient data digitally, which is far more efficient than the previously used manual method. Manual recording is often prone to errors, data loss, and delayed information access. With EMR, patient data is stored centrally and can be easily accessed by authorized healthcare professionals, thereby accelerating the service process (Hanafi et al., 2025). In addition, the effective use of health information systems also contributes to increased productivity of healthcare professionals. Fast and easily accessible data reduces the time previously spent searching for physical files or performing manual recording, allowing healthcare professionals to focus more on patient care. This is in line with the theory of health information systems which states that information technology in healthcare must be able to accelerate workflow and reduce administrative burden (Widodo & Renaldi, 2021). However, the effectiveness of this system is still highly dependent on infrastructure readiness and user competence. At Puskesmas X, some informants revealed that sometimes internet network disruptions and hardware limitations hinder quick data access. In addition, the lack of intensive training causes some healthcare professionals to be less proficient in operating the system, making the recording process less optimal. Therefore, the effectiveness of HIS is not only about the technology installed, but also supported by adequate human resources and infrastructure (Susanti et al., 2023). Human resource capacity building through continuous training is key to maximizing the use of this technology. In addition, maintenance and development of technology infrastructure must be a priority so that the system can run stably and be accessible at any time without significant disruption. Thus, the effectiveness of health information systems is a combination of technical and human aspects that must work synergistically.

2. Impact on Quality of Health Service

The implementation of the health information system at Puskesmas X significantly has a positive impact on the quality of health services provided to the community. The EMR system allows for more accurate, complete, and easily accessible data recording, thereby supporting healthcare professionals in providing fast and appropriate services. The benefits of this faster service process are felt by patients, as they do not have to wait long for data retrieval or medical information processing. Another impact is the increased accuracy in patient data recording, which is an important factor in medical decision-making. Recording errors common in manual systems, such as duplicate entries or missing records, can be minimized with data digitalization. This is crucial, especially in continuous care and patient referrals to higher facilities, where accurate and complete data is highly needed to maintain continuity and patient safety (Chotimah, 2022).

In addition, health information systems also improve service personalization. Complete patient data allows healthcare professionals to provide treatment that is more appropriate to the patient's medical history, allergies, or other special conditions. Thus, health services become more responsive and targeted (Hakam, 2024).

Coordination among healthcare professionals at the Puskesmas also increased due to the ease of shared data access. For example, doctors, nurses,and medical record officers can share information in real time, so that services run more integrated and coordinated. This supports the creation of holistic and sustainable services, in accordance with the principles of primary health care (Firmansyah et al., 2023). However, this positive impact still faces implementation constraints such as a lack of training for health workers, which causes some users to not yet be able to maximize the system's features. In addition, the change in work culture from manual to digital creates resistance among certain health workers, who feel burdened by the new administrative process. Therefore, to optimize the positive impact of health information systems on service quality, a good

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change management approach, continuous training, and motivation for health workers to adapt to new technology are needed.

3. Challenges in Implementing Health Information Systems

The implementation of health information systems at Puskesmas X faces various challenges, which are common in the digital transformation process in the primary health sector. Based on interview results, there are three main challenges: limitations in technology infrastructure, lack of training and human resource competence, and resistance to work culture. First, limitations in technology infrastructure are a major obstacle in running health information systems optimally. Some parts of the Puskesmas still experience unstable internet network problems, causing data access to be slow or intermittent. Hardware such as computers or servers used also sometimes experience disruptions or are outdated, which reduces system performance. This condition causes services that rely on information systems to sometimes be disrupted, and health workers have to revert to less efficient manual methods (Hidayat et al., 2025).

Second, the lack of training and competence development is a significant obstacle. Some health workers do not yet fully understand how to operate the system optimally. This is due to training that has not been conducted regularly and comprehensively. In fact, mastery of information technology is an important prerequisite for the system to be fully utilized. This unpreparedness has the potential to cause recording errors and hinder the smooth flow of service work (Handayani et al., 2023). Third, resistance to work culture from some health workers who are accustomed to manual methods becomes a psychological and social challenge. Digital transformation requires a change in mindset and habits, which is not easily accepted by everyone in a short time. Some informants mentioned concerns about losing control over data or fear that technical errors would cause problems in services. Therefore, the aspect of change management needs to be considered with a good communication approach and the involvement of all parties in the change process (Khairunnisyah & Heltian, 2022).

In addition to these three main challenges, the high workload of health workers also makes it difficult for them to focus on learning and adapting to the new system. This condition needs to be anticipated so that the implementation of the health information system does not add pressure and actually lowers morale. To overcome these challenges, support from Puskesmas management and local government is needed in terms of providing adequate infrastructure, regular and continuous training, and mentoring programs for health workers. A participatory approach that involves health workers in system development will also increase ownership and reduce resistance.

CONCLUSION

Based on the research results,It can be concluded that the implementation of the health information system at Puskesmas X has a positive impact on increasing the work effectiveness of health workers and the quality of services provided to the community. The electronic medical record (EMR) system allows for faster, more accurate, and integrated patient data recording, thereby accelerating medical decision-making processes and improving coordination among health workers. However, the successful implementation of health information systems is not without various challenges that must be faced. Some of the obstacles found include limited technological infrastructure, lack of technical training for users, and resistance to work culture from some health workers who are still accustomed to manual systems. These challenges become obstacles in maximizing the system's functions, which, if not overcome, can reduce the benefits that should be obtained from this digital transformation. Thus, the effectiveness and sustainability of health information systems greatly depend on the readiness of service facilities, the competence of human resources, and policy support from management and the government. Integrated efforts are needed through continuous training, improvement of facilities and infrastructure, and change management approaches to ensure that this system can run optimally and support higher quality health services in the future.

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