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Analysis of the Impact of Electronic Medical Record Implementation on Improving the Effectiveness of Health Service at the West Java Provincial Occupational Health Hospital

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Abstract: This study aims to analyze the impact of the implementation of Electronic Medical Records (EMR) on the effectiveness of health services at the West Java Provincial Occupational Health Hospital. The issues raised relate to the effectiveness of the service system, information integration, and the readiness of human resources in facing digital transformation. The method used was a qualitative approach, with data collection techniques through in-depth interviews with health workers, administrative staff, and heads of medical record installations. The results of the study indicate that the implementation of EMR has had a significant impact on improving data access speed, integration between service units, and the accuracy of medical documentation. This system also accelerates administrative processes and clinical actions, reduces the risk of data loss, and strengthens coordination between professions within the hospital environment. However, the implementation of EMR still faces technical challenges such as network disruptions and limitations in supporting infrastructure. From a human resources perspective, adaptation to the new system has been relatively smooth, supported by ongoing training and guidance provided by the hospital. Overall, EMR has proven to be a strategic step toward achieving more efficient, integrated, and data-driven healthcare services in the digital age.

Keyword: Electronic Medical Record, Service Effectiveness, Digital Transformation

INTRODUCTION

Hospitals are healthcare facilities that rely on trained and educated professionals to handle various medical issues in order to maintain and restore patients' health. In today's era, hospitals require information systems to play a crucial role in supporting healthcare services. The quality of information management is one of the key factors in the success of a healthcare institution. A well-designed information system can effectively support clinical workflows, thereby contributing to improved patient care quality (Hariana et al., 2013). Therefore, good service management is an important foundation for hospitals in optimizing the use of information systems to achieve comprehensive and quality healthcare services (Delfina Darianti et al., 2021)

In Indonesia itself, the use of health information systems has also begun to play an important role, particularly in facilitating the efficient storage, management, and exchange of medical data (Adha et al., 2023). By leveraging the power of information systems, healthcare providers can streamline workflows, improve communication, make data-driven decisions, and ultimately deliver better care outcomes for patients (Joseph, 2023).

To compete optimally, hospitals are required to continuously improve the quality of their health services, one of which is by utilizing current technological advances. One technological innovation that plays an important role in this regard is the implementation of electronic medical records (Maha Wirajaya & Made Umi Kartika Dewi, 2020). Effective management and storage of medical records are essential components in ensuring the smooth operation of healthcare services in hospitals (Arfiandi & Sari, 2021). Medical records consist of files or documents that document information about a patient's identity, examination results, medical procedures, treatments, and other healthcare services provided at healthcare facilities (Nurazmi et al., 2020). The availability of good and complete medical record data is one of the benchmarks for assessing the quality of healthcare services in hospitals (Wirajaya & Nuraini, 2019). Currently, many hospitals in various countries have begun implementing Electronic Medical Records as a solution to replace manual medical record keeping using paper (Neng Sari Rubiyanti, 2023).

As part of the government's commitment to supporting digital transformation in the health sector, all healthcare facilities are required to implement electronic medical records in accordance with the Ministry of Health Regulation of the Republic of Indonesia No. 24 of 2022 by no later than December 31, 2023 (Permenkes No. 24, 2022). The readiness of healthcare facilities across various regions in Indonesia to adopt health information systems is a key indicator in assessing the success of digital transformation in the healthcare sector. This level of readiness reflects how effectively healthcare institutions can leverage information technology to meet healthcare information management needs (Chotimah, 2022).

One of the main objectives of implementing electronic medical records is to improve work efficiency in medical record management. With an electronic system, access to information becomes faster and easier, data integration between hospital management systems and other systems can be improved to minimize human error, and the need for medical document storage space can be reduced. In addition, there are many other benefits that support the improvement of health service quality (Aulia & Sari, 2023). It is hoped that the implementation of electronic medical records will also strengthen the accuracy and validity of data, thereby supporting the decision-making process and facilitating reporting within the healthcare system (Surahman & Setiatin, 2024). Structured and systematic management of medical record units is essential to produce accurate and high-quality information, thereby supporting optimal service delivery (Yasin & Sari, 2021).

Globally, the use of electronic medical records has also become a major focus in improving the effectiveness of health services. Electronic medical records are implemented to improve the quality, safety, and efficiency of health services by providing more accurate documentation, accelerating information exchange between professions, and supporting accurate and measurable clinical decision-making (Dittmer et al., 2025). Effective and high-quality healthcare services are one of the key indicators in assessing patient satisfaction, which ultimately influences their decision to return to the same healthcare institution (Budo et al., 2020).

In line with efforts to improve the effectiveness of healthcare services, the implementation of electronic medical records plays a very important role. By optimally utilizing electronic medical records, hospitals can improve the quality of care by accelerating the diagnostic process, strengthening coordination between service units, and minimizing the risk of medical errors due to inaccurate or incomplete information. Additionally, electronic

medical records support more open communication between healthcare providers and patients, while also encouraging active patient participation in managing their health conditions (Ikawati, 2024)

Although electronic medical records offer various benefits for improving healthcare services, their implementation in the field does not always run smoothly. Problems in the implementation of electronic medical records include suboptimal technical infrastructure, limited integration between service functions, and the readiness of human resources to operate the system according to procedures. Network disruptions, system errors, and reliance on technical support are still commonly encountered in some hospitals. Additionally, there is a gap between national policies on the digitalization of healthcare services and their implementation at the regional hospital level. This situation raises questions about the actual impact of the EHR system on the effectiveness of healthcare services, as well as the factors influencing its success in practice.

Therefore, this study was conducted to analyze in depth the impact of electronic medical record implementation on the effectiveness of health services, particularly at the West Java Provincial Occupational Health Hospital. This study is important to determine the extent to which the electronic medical record system can improve service quality, as well as identify challenges and potential improvements in practice. Thus, the results of this study are expected to serve as an evaluation tool and reference for hospitals in developing and utilizing the electronic medical record system consistently and sustainably.

METHOD

This research method uses a qualitative approach, which is used to explore data in depth, with the aim of obtaining more accurate and qualitatively valuable results (Ibrahim, 2015). Meanwhile, the type of research used is descriptive, which aims to provide a systematic, factual, and accurate description of the current phenomenon, thereby clearly and realistically representing the actual conditions (Rukajat, 2018). The objective is to provide an in-depth understanding of how the implementation of electronic medical records impacts the effectiveness of healthcare services at the Occupational Health General Hospital.

In this study, data was collected through interviews, which are direct conversations between researchers and informants to discuss a specific topic. This process was conducted in a targeted manner with the aim of exploring information in depth through a series of prepared questions (Rivaldi et al., 2023). Interviews were conducted with a number of informants who were directly involved in the use of electronic medical records. They consisted of health workers who used the system in their daily clinical activities, administrative staff responsible for managing patient data, and heads of medical record installations who supervised and ensured that the system ran according to procedures in the hospital environment.

The data obtained through interviews were processed through a series of stages, starting with data reduction to filter relevant information in accordance with the research focus. The simplified information was then organized systematically to facilitate the identification of patterns, trends, and relationships between themes that emerged from the interviews. After that, the data were interpreted to draw conclusions that reflect the reality in the field. Through this process, it is hoped that a deep understanding of the experiences, challenges, and impacts of electronic medical record implementation on the effectiveness of healthcare services at the Occupational Health General Hospital can be obtained.

RESULT AND DISCUSSION

The West Java Provincial Occupational Health General Hospital has taken strategic steps in the digital transformation of healthcare services by implementing an Electronic Medical Record (EMR) based on SIMGos (Generic Open Source Management Information System)

since 2022. The implementation of this system is part of efforts to improve service quality while also complying with Ministry of Health Regulation No. 24 of 2022 on medical records. This transformation is not only aimed at simplifying administrative processes but also at enhancing efficiency, effectiveness, and continuity of medical services through a digitalized and integrated system.

This study aims to comprehensively examine how the EMR system is implemented and its impact on daily service practices in hospitals. The data obtained provides a comprehensive overview of the function and effectiveness of the EMR system, as well as the challenges that arose during the implementation process. These findings serve as the basis for analyzing three key aspects that play a role in the success of this digital transformation: technical and information system aspects, service effectiveness, and the readiness of human resources and organizational structures to adapt to the transition toward a digital and integrated system.

1. Technical and Information Systems

The Electronic Medical Record System (EMR) provides significant convenience in accessing patient information digitally. The data retrieval process, which previously required manual matching of physical files, can now be done instantly through a computerized system. Patient data can be accessed using a medical record number, thereby dramatically increasing search efficiency. This ease of access also contributes to a reduction in administrative burden, particularly in registration processes, medical record monitoring, and clinical decision-making. Staff no longer need to open physical files prone to errors or damage but can instead access a systematically organized database. This also accelerates service delivery, especially in situations requiring immediate attention.

Furthermore, the EMR system allows officers and medical personnel to view comprehensive historical patient data, including previous visit records, examination results, and previous treatments. This access is crucial in ensuring continuity of evidence-based medical care and a complete clinical history. The availability of consistent data directly improves the quality of clinical decision-making. The ease of access through EMR also supports the principles of patient information security and confidentiality. With a digital system, access can be restricted based on user permissions, ensuring greater privacy and security compared to manual systems that are vulnerable to unauthorized access. Therefore, EMR not only accelerates the service process but also ensures the accuracy and security of medical information on an ongoing basis.

The EMR system is implemented with an integrative approach that connects various service units in the hospital, such as laboratories, pharmacies, radiology, and registration. This integration aims to build an integrated information system, where patient data can flow seamlessly between each unit. This is very important in creating an efficient service flow and minimizing data duplication. With an integrated system, coordination between units becomes faster and more effective. For example, when a doctor orders a laboratory test, the results can be immediately accessed by other medical staff within the same system without the need for physical document delivery. Similarly, when dispensing medication, prescription information is directly readable by the pharmacy unit without the need for re-entry, thereby reducing the potential for errors.

In addition to supporting internal hospital operations, integration has also been expanded by connecting EMR to platforms such as JKN Mobile and Satu Sehat from the Ministry of Health. Through these platforms, patient data can be stored and accessed nationally by authorized health facilities, supporting health data interoperability between agencies. This integration is important to avoid fragmentation of information between hospitals and ensure continuity of service across institutions. The success of system integration heavily depends on infrastructure readiness, compliance with interoperability standards, and data consistency

across units. Data inconsistencies or input format discrepancies between units remain barriers to full integration. Therefore, strengthening the integration system requires robust technical policies and commitment from all units to align data input processes and management.

Although implementation provides many benefits, technical challenges remain a major obstacle that requires ongoing attention. One of the most common problems is internet network disruption, which causes data access delays and even system failures. Full dependence on internet connections makes this system highly vulnerable to network instability. In addition to network disruptions, the EMR system also faces challenges such as software errors or internal server failures. These issues arise due to high usage loads, suboptimal system updates, or integration failures with external systems like BPJS. These conditions directly impact delays in data input, patient information retrieval, and overall medical and administrative processes.

Recurring technical problems can cause additional burdens on healthcare workers, who must wait for the system to stabilize before they can continue their work. This situation not only disrupts the flow of services, but also risks reducing patient satisfaction and work efficiency. In certain cases, system errors can even cause critical delays in service. In response to these technical challenges, the hospital has implemented various mitigation efforts through coordination with the Information Technology unit and relevant agencies such as the Department of Information and Communication Technology. Issues are addressed based on their source, whether from the application, network, or central server. The success of managing technical disruptions heavily depends on enhancing digital infrastructure capacity, implementing regular performance monitoring systems, and conducting technical evaluations to prevent the recurrence of the same issues.

2. Effectiveness of Service

The implementation of Electronic Medical Records (EMR) has been proven to improve the overall speed of healthcare services. This system shortens the time needed for registration, examination, and treatment, as all data can be accessed and entered instantly without the need for manual searches of physical files. Processes that previously required lengthy waiting times can now be completed in a shorter timeframe. The speed of service is further supported by integration between units, enabling medical staff to access the necessary data without having to move physical documents. Information such as laboratory results, previous medical records, and treatment data can be directly accessed through the system, accelerating decision-making. This creates a more efficient and uninterrupted service flow.

With the implementation of an online queuing system that is directly connected to the EMR, patient waiting times from arrival to receiving service have also decreased significantly. Patients do not need to queue directly to register, but can simply use available applications such as JKN Mobile. This also helps reduce patient congestion in the waiting room and improves comfort while waiting. The time efficiency achieved through the use of EMR directly impacts the productivity of healthcare staff. Time previously spent searching for or re-entering data can now be redirected toward improving the quality of clinical interactions and direct patient care. As a result, this system makes a tangible contribution to enhancing the speed and effectiveness of healthcare delivery processes.

EMR plays an important role in providing accurate, consistent, and timely patient information. This system is designed to store data systematically, including subjective and objective data, supporting examination results, diagnoses, and treatments administered. Information stored electronically can be accessed without risk of loss or damage, as is often the case with manual paper-based systems. Accurate information greatly supports medical decision-making. Healthcare professionals can rely on the data stored in the system to conduct a comprehensive assessment of a patient's condition and establish treatment plans based on

evidence. This reduces the likelihood of duplicate medical procedures or medication errors due to direct access to a patient's medical history.

In addition, this system supports accurate documentation through data entry based on standard formats and fixed columns. With a structured format, the potential for errors in data recording is reduced compared to manual systems. The audit and data tracking processes are also easier to perform, as each entry has a clear digital trail. The consistency and reliability of data generated through EMR provide a strong foundation for the implementation of data-driven healthcare services. This is important not only for individual care but also in the context of quality evaluation, program reporting, and hospital policies based on performance indicators.

The EMR system contributes significantly to improving the continuity of healthcare services. With patient data recorded comprehensively and stored in a single digital system, every stage of service, from registration, medical history, diagnostic tests, to treatment, can be carried out sequentially without losing important information. This enables the service process to run seamlessly and continuously. The continuity of care is evident in the system's ability to store and manage longitudinal medical histories, disease histories, previous treatments, laboratory test results, and previous medical decisions, all of which can be accessed by healthcare professionals at any time. This enriches clinical decision-making when determining the appropriate next steps in patient care.

This system also supports continuity of care across visits. When patients return at a later date, medical staff can immediately resume care based on well-documented historical data. This reduces the risk of unnecessary repetition of medical history taking, improves consultation time efficiency, and enhances the accuracy of follow-up therapy. EMR also strengthens long-term care planning, especially for patients with chronic conditions or requiring ongoing monitoring. Comprehensive medical documentation enables healthcare teams to develop progressive, planned, and protocol-driven interventions. As a result, continuity of care through the EMR system is a critical component in delivering holistic, patient-safety-focused, and patient-satisfaction-oriented care.

3. Human Resources and Organization

Training is essential for the successful implementation of an Electronic Medical Record (EMR) system in hospitals. To ensure a comprehensive understanding of the system, training is provided to all personnel involved, both technical and operational. Training is conducted through various methods, such as workshops, on-the-job training, and comprehensive theory and practical sessions. The training is implemented in phases and involves the internal medical records team and the information technology unit. The hospital also involves policy makers from the Ministry of Health to provide formal socialization. This approach demonstrates that training is not only internal but also takes into account national considerations.

The availability of adequate training helps reduce resistance to change from manual to electronic systems. Health workers become more confident in using the new system after receiving sufficient understanding through structured training. Training also provides an opportunity to assess the technical readiness of each unit in adopting digital systems. However, limited training has not yet fully ensured long-term competency improvement. Hospitals need to implement a continuous training system based on actual needs assessments in the field. Training should also be accompanied by self-learning modules and feedback systems to ensure ongoing adaptation to the dynamic evolution of the system.

Human resource adaptation to the EMR system is a complex and time-consuming process. In the initial stages, some staff experienced difficulties in switching from manual to digital systems due to differences in workflows and technical limitations. With increased frequency of use, most health workers began to adapt and showed improvements in the speed and accuracy of system use. The main factors in the success of human resource adaptation are

individual willingness to learn and organizational readiness to support the transition process. Adaptation needs to be demonstrated through improved skills in data entry, reading digital information, and completing system-based medical services. A willingness to learn and support from the information technology and medical records teams are key assets in accelerating this adaptation process.

In addition to technical support, adaptation also requires a psychological approach. The process of changing work systems that affect daily routines requires good communication between management and service providers. The development of human resource adaptation shows that success does not only depend on technological sophistication, but on the active involvement of all parties in accepting and implementing change. It is important for organizations to continue creating a work environment that supports learning and flexibility to ensure that EMR implementation runs smoothly.

The implementation of the EMR system must be aligned with the Standard Operating Procedures (SOP) applicable in the hospital. This alignment is important to ensure that all electronically documented service processes continue to meet legal, patient safety, and professional accountability requirements. The EMR system in the hospital has been adapted to the internal regulatory framework, although there are still challenges in terms of data completeness. The use of EMR has achieved a high level of implementation, but it has not been fully accompanied by consistent data completeness across all departments. This indicates that procedural aspects have been adopted, but discipline in data entry and routine evaluation of compliance with implementation still require strengthening. Some units are still in the process of adjusting to follow SOP workflows optimally through the electronic system.

Strengthening compliance with SOP requires the involvement of all levels of the organization, from management to technical staff. Hospitals need to conduct regular internal audits to monitor compliance with SOP and make system adjustments if any non-compliance is found. System development should also consider ease of use to avoid hindering service delivery due to excessive administrative procedures. By updating SOP in alignment with the capabilities of the EMR system and field dynamics, hospitals can ensure that services remain within quality and safety standards. Documentation in accordance with procedures also serves as a crucial foundation for legal compliance and performance reporting, making the implementation of EMR a strategic tool in supporting good and responsible service management.

CONCLUSION

Based on the results of an analysis of the implementation of Electronic Medical Records (EMR) at the Occupational Health Hospital, it can be concluded that the application of EMR has had a positive impact on improving the effectiveness of health services in three main aspects, namely technical and system, service effectiveness, and human resources and organization. From a technical perspective, the EMR system has proven to facilitate patient data access, support integration between service units, and identify technical issues that require ongoing attention. In terms of service effectiveness, the system has improved service speed, ensured the accuracy of available medical information, and promoted efficiency in service processes, directly reducing waiting times and enhancing service quality. Meanwhile, in terms of human resources and organization, structured training has been provided to support human resource readiness, the adaptation process of users to the digital system has been progressive although gradual, and the alignment of system implementation with SOPs demonstrates a commitment to accountable service management. Thus, EMR not only improves the effectiveness and quality of services but also strengthens the foundation of an integrated and sustainable health information system within the hospital environment.

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