



Analysis Of The Effect Of Electronic Medical Record Implementation On The Effectiveness Of Outpatient Services At RSUD Kesehatan Kerja

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Abstract

Electronic Medical Records (EMRs) are health documentation systems that utilize information technology to store, manage, and display patient data electronically. This study aimed to analyze the effect of EMR implementation on the effectiveness of outpatient services at RSUD Kesehatan Kerja. A descriptive qualitative approach was employed. Data were obtained through observation, documentation, and semi-structured interviews with five informants selected using purposive sampling, consisting of one Head of the Medical Records Installation, two medical record officers in the outpatient registration unit, one physician, and one nurse. The findings showed that EMR implementation had a positive impact on outpatient service effectiveness, including increased service speed, easier access to patient information, improved readability and accuracy of data, and better integration among service units. Nevertheless, implementation has not yet been fully optimized because the hospital continues to operate a hybrid system and encounters system downtime and network disruptions. Therefore, EMR implementation contributes to improving the effectiveness of outpatient services; however, stronger infrastructure and greater system stability are still required to achieve more optimal implementation.

Keywords: Electronic Medical Records, Service Effectiveness, Outpatient Services

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1. Introduction

Digital transformation has brought significant changes to various sectors, including healthcare. One manifestation of this transformation is the implementation of Electronic Medical Records (EMRs), systems that enable patients' health information to be documented, stored, and managed digitally so that it can be accessed more easily by authorized healthcare professionals. EMR implementation in Indonesia is supported by Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022. Article 3 paragraph (1) stipulates that every healthcare facility is required to implement electronic medical records. According to Law of the Republic of Indonesia Number 17 of 2023 concerning Health, a medical record is a document containing patient identity data, examination results, treatment, procedures, and other services provided to the patient. Along with advances in information technology, medical records have been implemented in electronic form as Electronic Medical Records (EMRs), namely health documentation systems used to store, manage, and display patient data electronically. EMR implementation provides various benefits, including facilitating access to patient data, improving documentation accuracy, reducing the use of paper documents, and increasing the work efficiency of healthcare professionals. In addition, EMRs can accelerate patient service processes in healthcare facilities (Salsabila, 2026).

Outpatient services are among the hospital service units with a high volume of patient visits and therefore require effective and efficient information systems. EMR implementation is expected to support a smooth service process from registration and examination to patient data storage. Trisnawati (2024) showed that EMR implementation positively affects the effectiveness of outpatient services by reducing patient waiting time, improving the accuracy of medical documentation, and increasing patient satisfaction (Trisnawati, 2024). Service effectiveness can also be assessed from the speed of the service process and the ease with which staff obtain the information they require. Patoni and Setiatin (2024) showed that EMR implementation in outpatient services affects the effectiveness of medical record officers. The use of EMRs contributes to improved accuracy and completeness of medical records and reduces the time required for patient admission. However, that study also identified barriers in the form of limited access to technology and the need for continuous staff training (Patoni & Setiatin, 2024). Various studies have shown that EMR implementation has a positive impact on improving the effectiveness and quality of healthcare services. Yunisa and Gunawan (2024) reported that EMR implementation contributed 42.9% to the improvement of outpatient service quality. This finding indicates that EMRs can support improvements in service quality, although other factors also influence the quality of healthcare. The study further emphasized that successful EMR implementation depends not only on the technology used but also on human resource readiness and organizational support (Yunisa & Gunawan, 2024). In line with this finding, Hendratno and Gunawan (2024) found that the effectiveness of EMR use in outpatient services is influenced by four main aspects: human, organization, technology, and net benefit. Their findings indicate that successful EMR implementation requires synergy





among user readiness, organizational support, and the reliability of technological systems so that improvements in service effectiveness can be achieved optimally (Hendratno & Gunawan, 2024).

Another study by Wibowo and Rahayu (2025) also demonstrated that EMR use can improve service-time efficiency, reduce the administrative workload of staff, and improve the accuracy of patient data recording in outpatient services. Nevertheless, the study also identified several obstacles that continue to occur in EMR implementation, including system downtime, network disruptions, and limitations in technological infrastructure that may interfere with the continuity of patient services (Wibowo & Rahayu, 2025). Based on observations during the Field Work Practice (Praktik Kerja Lapangan/PKL) at RSUD Kesehatan Kerja, EMR system downtime was still encountered and affected the continuity of service processes. This condition resulted in delays in patient registration, postponed data entry, and increased patient waiting time. Therefore, this study aimed to analyze the effect of Electronic Medical Record implementation on the effectiveness of outpatient services at RSUD Kesehatan Kerja in order to determine the extent to which EMR implementation contributes to service effectiveness.

2. Research Methods

This study used a qualitative research method with a descriptive approach. According to Sugiyono (2022), qualitative research is used to understand phenomena occurring under natural conditions, with the researcher positioned as the primary instrument. This approach was selected to obtain a comprehensive understanding of the effect of Electronic Medical Record (EMR) implementation on the effectiveness of outpatient services by exploring the experiences, perceptions, and practices of medical record personnel in delivering hospital services. The study was conducted at RSUD Kesehatan Kerja during the Field Work Practice (PKL) period from April 1 to June 1, 2026. Research informants were selected using purposive sampling based on the consideration that they possessed knowledge, experience, and direct involvement in EMR implementation in outpatient services. The informants consisted of one Head of the Medical Records Installation, two medical record officers in outpatient registration, one physician, and one nurse. The Head of the Medical Records Installation was selected because of the role in managing, supervising, and making technical policy decisions related to EMR implementation in the hospital. Registration medical record officers were selected because they are directly involved in patient identification, registration, searching for or accessing patient data, and using EMRs at the initial stage of outpatient services. The physician and nurse were selected because they use EMRs to access patients' health histories, document examination results, and support clinical decision-making. Informant criteria included working in an outpatient service unit, being directly involved in the use or management of EMRs, having experience using EMRs, being willing to participate as an informant, and being able to provide information regarding EMR implementation, benefits, and constraints.

Data collection was conducted through three stages: interviews, observation, and documentation. First, semi-structured interviews were conducted using an interview guide





containing key questions regarding EMR implementation, changes in services before and after EMR use, and constraints encountered during EMR use. Second, direct observation was conducted along the outpatient service flow, particularly patient registration, access to patient information, and relationships among service units. Third, documentation was conducted by reviewing documents or supporting evidence related to EMR implementation, such as outpatient service workflows and medical record forms or documents that were still used manually. Data obtained from interviews, observations, and documentation were then compared to obtain more complete information and to ensure consistency between informants' statements and conditions in the field. Data validity was established using source triangulation, technique triangulation, and member checking. Source triangulation was conducted by comparing information obtained from the informants (Creswell & Poth, 2024). Data were analyzed using the interactive analysis model of Miles, Huberman, and Saldaña, comprising three stages: data reduction, data display, and conclusion drawing and verification (Miles et al., 2020).

3. Results and Discussion

a. Results

Based on interviews with the Head of the Medical Records Installation, Electronic Medical Record (EMR) implementation at RSUD Kesehatan Kerja has been applied to most of the outpatient service workflow, including patient registration, polyclinic services, and medical record management in the Medical Records Installation. However, EMR implementation has not yet been fully completed because the hospital still uses a hybrid system, namely a combination of electronic and manual medical records. The informant explained:

"EMR implementation here is still in a transition period toward full EMR use, so we are still using a hybrid system. For outpatient services, approximately 80% already uses EMRs; only several documents are still manual, one of which is the medical resume used for claims."

Although EMR implementation in the hospital has not yet been fully completed and a hybrid system is still in use, the implementation that has been achieved has had a positive impact on service effectiveness.

1) Improved Service Speed

Based on the interviews, all informants stated that EMRs accelerate the service process, particularly at registration. Before EMRs were used, staff had to search for physical medical record files manually, which required considerable time. After EMR implementation, patient data can be accessed directly through a computer, thereby shortening service time. A registration officer explained:

"Yes, it helps speed up patient registration because we only need to enter the National Identification Number (NIK) or medical record number and the patient data appear immediately, so we no longer need to search for the medical record folder in the storage room."





An informant who was a nurse also explained:

“After using EMRs, patient services no longer have to wait for medical record files to be distributed, so the service is faster.”

2) Ease of Access to Information

EMR implementation facilitates access to patient information. Informants stated that patient data can be obtained quickly without physically searching for medical record documents. Staff need only a few seconds to open patient data through a computer. This condition is substantially more efficient than a manual system that requires file searching in the storage room. One informant, a physician, stated:

“Yes, after using EMRs it is easier to review patients’ visit histories and examination results because they can be accessed through the system by staff who have access rights.”

3) Data Readability and Accuracy

Based on the interviews, EMR implementation helps improve the readability of medical record information compared with the manual system. Because healthcare service data are recorded in digital format, information entered by healthcare professionals becomes clearer, more systematic, and easier for other staff to understand. This reduces the potential for interpretation errors that previously occurred because of difficult-to-read handwriting. One informant also stated:

“Because electronic medical records are used, writing that was previously difficult to read becomes clearer. Staff therefore no longer have difficulty reading handwriting as they did when manual medical records were used.”

4) Integration Among Service Units

The findings showed that EMR implementation provides positive benefits for integration among service units. The EMR system has connected the service flow from registration and the polyclinic to the pharmacy and cashier, allowing patient information to be accessed and used by each unit according to service needs. Before EMR implementation, information exchange depended on physical medical record files that had to be transferred from one unit to another. This condition could impede service continuity because staff had to wait for the files to become available before the next service process could be performed. Based on the interview, an informant who was a nurse stated:

“Because the units are already integrated, especially in my clinic (psychiatry), for the first time in my clinic we can now display laboratory and radiology results in the Hospital Management Information System (SIMRS).”

5) Constraints in Electronic Medical Record Implementation

Although EMR implementation provides various benefits in improving service effectiveness, its implementation still faces several constraints, particularly system downtime that can hinder or even temporarily halt healthcare service processes.





All informants stated that the constraints encountered involved network or server disruptions. When the system is disrupted, the service process becomes slower because staff must coordinate with the IT team and wait for the system to return to normal or temporarily record information manually. This condition increases patient waiting time. A registration officer stated:

“The most common problem is system downtime. When it occurs, the first thing staff do is coordinate with IT, and if it continues for a long time, we have already prepared manual medical records.”

In addition to system downtime, EMR implementation is highly dependent on a stable network connection. Network instability may cause system access to become slow or disconnected, thereby hindering documentation, patient data searches, and the continuity of services in every unit that uses the EMR. One informant also explained:

“Because everything is now digital, a stable connection is very necessary so that the service process is not disrupted.”

Accordingly, network infrastructure is one of the most important factors supporting successful and optimal EMR implementation.

b. Discussion

The findings showed that Electronic Medical Record implementation at RSUD Kesehatan Kerja had a positive effect on the effectiveness of outpatient services, although implementation has not yet been fully optimized because the hospital still uses a hybrid system combining EMRs and manual medical records. In outpatient services, EMR implementation has reached approximately 80%; however, several documents are still maintained manually, including the medical resume used for claim purposes. This condition indicates that EMRs have become an important component of the outpatient service process, while the hospital remains in a transitional stage toward fully electronic implementation.

This finding is consistent with Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022, Article 3, which requires every healthcare facility to implement Electronic Medical Records. In addition, Article 2 of the same regulation explains that medical record regulation aims to improve the quality of healthcare services, provide legal certainty in medical record administration and management, ensure the security, confidentiality, integrity, and availability of medical record data, and establish digital and integrated medical record administration. Therefore, EMR implementation at RSUD Kesehatan Kerja is not merely a technological innovation but also part of regulatory compliance and efforts to improve hospital service quality.

1) Improvement in Service Speed

Electronic Medical Record implementation made a positive contribution to increasing service speed, particularly during outpatient registration. Before EMR implementation, staff had to search for, retrieve, and distribute physical medical record files from the storage room. This process could prolong waiting time, particularly when





patient visit volumes were high or files were difficult to locate. After EMR implementation, patient identity and history can be traced directly through the system using the National Identification Number (NIK) or medical record number. This reduces administrative steps that were previously performed manually, enabling registration and preparation for clinical services to proceed more efficiently.

This finding supports Trisnawati's study, which stated that EMRs positively affect outpatient service effectiveness because they can reduce patient waiting time, improve the accuracy of medical documentation, and increase patient satisfaction (Trisnawati, 2024). In addition, Nurhasanah and Wahab explained that EMR implementation in outpatient registration has the potential to improve service speed, accuracy, and efficiency so that patient waiting time can be minimized. However, successful transition from manual medical records to EMRs still requires human resource readiness, device availability, stable networks, and management support from healthcare facilities (Nurhasanah & Wahab, 2024). Thus, the improvement in service speed obtained through EMRs does not merely shorten the process but also directly contributes to reducing patient waiting time.

2) Ease of Access to Patient Information

In addition to improving service speed, EMRs facilitate access to patient information. Patient data, including visit histories, examination results, and other supporting information, can be opened directly through the system by authorized staff. With faster and more structured access, healthcare professionals can make clinical decisions more efficiently. Physicians can also easily trace a patient's disease history without having to open physical documents.

These findings are consistent with Yunisa and Gunawan, who found that EMR implementation contributed 42.9% to the improvement of outpatient service quality (Yunisa & Gunawan, 2024). This figure indicates that the contribution of EMRs to service quality is substantial, although other factors also influence healthcare quality. Furthermore, Hendratno and Gunawan emphasized that the effectiveness of EMR use in outpatient services is influenced by four main aspects: human, organization, technology, and net benefit (Hendratno & Gunawan, 2024). These findings show that ease of access to information is determined not only by system availability but also by user readiness and organizational policies governing access rights to patient data.

3) Data Readability and Accuracy

EMR implementation also affects improvements in data accuracy and readability. Healthcare service information is recorded digitally, thereby reducing the risk of errors caused by illegible handwriting. This makes data clearer, more standardized, and easier for healthcare staff to understand. By changing the documentation format from manual to digital, the potential for misinterpretation of clinical information can be minimized, thereby improving the quality of medical documentation.





Improved data accuracy and readability through EMR implementation is consistent with Article 780 of Government Regulation Number 28 of 2024 concerning Health, which requires healthcare facilities to record and document all actions provided to patients completely and clearly. In this regard, Arifin et al. (2022) showed that EMR implementation can improve data readability, reduce the risk of reading errors, and minimize the loss of patient information. Nevertheless, medical record completeness continues to depend on users' discipline and compliance in entering data according to applicable standards (Arifin et al., 2022).

4) Integration Among Service Units

From the perspective of interunit integration, EMRs provide substantial benefits because patient information can be accessed across units beginning at registration without waiting for physical files to be transferred. Before EMR implementation, patient information was exchanged through physical medical record documents that had to be distributed from one unit to another, often resulting in service delays. This integration accelerates the service flow, particularly in units requiring supporting examination data such as laboratory and radiology results. With laboratory and radiology results displayed directly in the system at the polyclinic, coordination among staff becomes more effective and services can proceed more smoothly. This demonstrates that EMRs not only improve processes within a particular unit but also transform the overall outpatient service ecosystem into a more connected system.

This finding is consistent with Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022 concerning Medical Records. Article 2 states that medical record regulation aims to establish digital and integrated medical record administration and management. The integration achieved at RSUD Kesehatan Kerja is also consistent with Saryadi et al. (2025), who showed that EMR implementation facilitates staff in tracing patients' medical histories and supports coordination among service units through the availability of patient information that can be accessed more quickly and in a structured manner (Saryadi et al., 2025). Therefore, EMRs not only accelerate administrative processes but also support continuity of patient care across units.

5) Constraints in EMR Implementation

Despite providing various benefits, this study also found that EMR implementation continues to face constraints in the form of system downtime and network disruptions. All informants stated that the most frequent constraints were network or server instability. When the system is down, the service process becomes slower because staff must wait for the system to return to normal or perform temporary manual documentation. This condition increases patient waiting time and reduces overall service effectiveness. To anticipate prolonged system disruptions, the hospital has prepared manual medical records as a contingency measure.





This finding supports Wibowo and Rahayu, who reported that network disruptions, infrastructure limitations, and system downtime remain major barriers to EMR implementation (Wibowo & Rahayu, 2025). In addition, the findings reinforce Trisnawati's statement that successful EMR implementation is determined not only by technological readiness but also by the institution's capacity to manage and maintain the system sustainably (Trisnawati, 2024). Thus, EMR effectiveness is highly dependent on the readiness of technological infrastructure, network stability, and staff preparedness in responding to disruptive situations.

4. Conclusion

Overall, Electronic Medical Record implementation at RSUD Kesehatan Kerja has had a positive effect on improving the effectiveness of outpatient services. EMR implementation helps accelerate registration and service processes, facilitates healthcare professionals' access to patient histories and information, improves the readability and accuracy of medical documentation, and strengthens information integration among units, particularly registration, polyclinics, laboratories, and radiology.

However, EMR implementation has not yet been fully optimized because the hospital continues to use a hybrid system, in which EMRs are accompanied by several manual documents, including medical resumes for claim purposes. In addition, network disruptions and system downtime remain barriers that can slow services, increase patient waiting time, and require staff to conduct temporary manual documentation. Therefore, RSUD Kesehatan Kerja needs to improve network and system stability, provide adequate technological infrastructure, conduct continuous training for EMR users, and strengthen standard operating procedures for downtime management and data reconciliation after the system returns to normal. These efforts are necessary to ensure that EMR implementation becomes more optimal and sustainable and supports comprehensive improvement in the quality of outpatient services.

5. Compliance with Ethical Standards

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Disclosure of Conflict of Interest

The authors declare no conflict of interest related to this study.

Statement of Informed Consent

Participation in the interviews was voluntary. Information obtained from informants was used solely for research purposes and was presented without disclosing personal identities.





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