

Evaluation of the Implementation of Electronic Medical Record Using the PIECES Approach to Support *Satu Sehat* in the Emergency Department

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Abstract

The application of Electronic Medical Records (EMR) has become an integral part of the global and national health service system, along with advances in digital technology that supports data integration among the service facilities. In Indonesia, the implementation of RME is directed at supporting interoperability among the health facilities through the Satu Sehat platform, as mandated by Regulation of the Minister of Health Number 24 of 2022. The research aims to evaluate the implementation of EMR in the Emergency Departement (ED) using the PIECES (Performance, Information, Economic, Control, Efficiency, and Service) approach. The method used is qualitative phenomenology, with data collection from interviews, observations and documentation studies. Research informants consisted of health workers, information technology staff and medical records officers. The research results show that the implementation of EMR in the ER has improved service performance, efficiency and quality of medical information. However, there are still obstacles such as a lack of information technology personnel, limited infrastructure and ongoing training that is not yet optimal. In conclusion, although the implementation of EMR in the ER at Bhayangkara Hospital has had a positive impact in supporting interoperability with Satu Sehat, improvements are still needed in terms of strengthening technological infrastructure and human resource training. This research recommends adding information technology experts, improving infrastructure to ensure data security, and ongoing training for EMR system. users to increase service effectiveness.

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INTRODUCTION

Indonesia's healthcare system is undergoing a digital transformation as part of broader health reform efforts. As outlined in Regulation of the Minister of Health No. 13 of 2022 on the 2020–2024 Strategic Plan, this transformation includes six key pillars, one of which focuses on health technology development to support data integration and digitalization (1). A crucial initiative is the *Satu Sehat* platform, designed to integrate individual health data across healthcare facilities through the implementation of Electronic Medical Records (EMR), which nationally promotes interoperability and standardization of health data. Regulation of the Minister of Health No. 24 of 2022 mandates all hospitals to implement EMR systems for both internal service units and inter-facility exchanges, aiming to enhance data security, confidentiality, and facilitate efficient medical information exchange. According to Circular of the Minister of Health No HK.02.01/MENKES/1030/2023, full integration with *Satu Sehat* must be achieved by December 2024 (2,3).

Level I Bhayangkara Hospital, of the National Police Medical and Health Center (Pusdokkes Polri), as one of the hospitals, which has already connected to *Satu Sehat*, began implementing Electronic Medical Records (EMR) in its Emergency Department (ED) in April 2023. This initiative aims to enhance service efficiency, accelerate administrative processes, and ensure patient data security. However, its implementation faces several challenges, including slow network connections, data entry errors by staff, limited technological infrastructure, and delayed responses from the IT team. With 57,945 patients treated in 2023, averaging 159 patients per day, the adoption of this system presents significant challenges (4). Additionally, compliance with EMR data entry remains suboptimal, and full integration with the *Satu Sehat* platform has yet to be achieved, leading to longer patient wait times and increased administrative burdens that hinder service delivery. Therefore, a comprehensive evaluation of EMR implementation in the ED using the PIECES framework (Performance, Information, Economy, Control/Security, Efficiency, and Service) is necessary to improve system effectiveness and efficiency.

Evaluating the EMR implementation in the Emergency Department is crucial to identify issues and potential improvements within the system. This study uses the PIECES approach (Performance, Information, Economic, Control, Efficiency, and Service) to assess the EMR implementation at Level I Bhayangkara Hospital of the National Police Medical and Health Center (Pusdokkes Polri). The focus is on performance, information, economic, control, efficiency, and service aspects, while also providing recommendations for optimizing EMR implementation to support *Satu Sehat*.

METHODS

This study adopts a descriptive analytic method with a qualitative approach to evaluate the implementation of Electronic Medical Records (EMR) in the Emergency Department (ED) of Level I Bhayangkara Hospital of the National Police Medical and Health Center (Pusdokkes Polri). The qualitative approach is employed to gain a deeper understanding of the phenomena occurring in the ED, particularly regarding medical team dynamics, patient needs, and the challenges of EMR implementation.

Data collection was conducted from January to July 2024, with informants selected based on their relevance to the implementation and evaluation of the Electronic Medical Record (EMR) system in the hospital. These included healthcare workers, information technology personnel, and medical record officers. This study utilized in-depth interviews, both participatory and non-participatory observations, document review, and Focus Group Discussions (FGDs). In-depth interviews were conducted with the hospital management, the head of function development, and the EMR Person in Charge (PIC), while the FGDs involved emergency department physicians,

the information technology team, and other healthcare professionals, as well as from secondary sources through relevant documentation. To enhance validity and reliability, triangulation was applied across three aspects: source triangulation by comparing information from various informants, method triangulation by combining multiple data-collection techniques, and data triangulation by cross-referencing interview and observation findings against official hospital documents. This approach ensures more accurate, objective results that reflect the true conditions of EMR implementation.

In this study, data analysis was conducted manually without the use of qualitative software. The process involved transcribing interviews, recording observations, and compiling relevant documents. The data were then manually coded, by highlighting key themes such as EMR performance, implementation challenges, service impacts, and improvement strategies. Subsequently, a thematic analysis was performed by comparing findings from various sources to identify patterns and relationships among categories. Triangulation was applied by cross-referencing interviews, observations, and documents to ensure data validity and minimize bias. The analysis results were then presented in an analytical narrative linking the findings to relevant theories and policies. Although conducted manually, this approach still produced an in-depth, systematic, and highly accurate analysis.

Qualitative data analysis techniques in this study include data reduction, data presentation, and verification as well as conclusion drawing. The PIECES (Performance, Information, Economic, Control, Efficiency, Service) approach is used to evaluate performance, information, economic, control, efficiency, and service aspects in the EMR implementation. The results of this analysis will offer recommendations for enhancing the effectiveness of EMR in supporting the Satu Sehat platform in the Emergency Department. The researcher ensures all research procedures respect ethical considerations, including informant privacy and confidentiality. Informed consent was obtained from all participants, and the anonymity of the informants is kept throughout both the research process and reporting.

RESULTS AND DISCUSSION

Level I Bhayangkara Hospital of the National Police Medical and Health Center (Pusdokkes Polri) has successfully implemented EMR as part of its digital transformation, aligning with the government's efforts to enhance health information systems through integration with the national *Satu Sehat* program. Healthcare workers have responded positively, citing improved efficiency, faster access to patient information, reduced recording errors, and better medical decision-making. (1) **Performance**, This policy underscores the importance of high performance in the EMR system. Performance is boosted by strengthening infrastructure of information technology, including robust servers and networks, as well as regular maintenance to ensure fast information access and reliable system operation; (2) **Information**, Information is the primary focus of this policy by emphasizing accuracy, completeness, and the timely updating of medical data entered into the EMR system; (3) **Economy**, Although initial investments in EMR implementation are considerable, the policy is regarded as a strategic move to reduce long-term operational costs; (4) **Control**, This policy sets high standards for data security and privacy of the patient, by incorporating features, such as encryption and strict access management; (5) **Efficiency**, EMR adoption strongly emphasizes operational efficiency, ensuring that processes run more smoothly and effectively; (6) **Service**, Service quality is also a main priority. With EMR, patient information can be accessed quickly and accurately, enabling more responsive and timely care, particularly crucial in the Emergency Department (ED). The findings presented in this study were derived from various sources, including in-depth interviews with hospital management, the Head of

Function Development, and the Person in Charge (PIC) of EMR, as well as Focus Group Discussions (FGDs) involving emergency room doctors, IT personnel, and other healthcare staff. Based on the interviews, the hospital leadership emphasized that EMR has significantly contributed to service performance and data security improvements. Meanwhile, the FGD participants—particularly doctors and nurses in the ED—highlighted increased accessibility of patient data and better clinical decision-making, although they also noted challenges such as system downtimes and incomplete data synchronization across departments. IT personnel reported that despite improved system reliability post-implementation, the limited number of technical staff and infrastructure gaps (e.g., insufficient devices) continue to hinder optimal performance. The improvement in service quality was highlighted during the FGDs with emergency department doctors and nurses, who reported that the implementation of EMR enabled quicker access to patient histories and lab results. This facilitated more accurate and timely medical decisions, reducing errors and improving patient satisfaction. Prior to EMR, they often encountered delays due to manual data retrieval, especially during peak hours. These qualitative insights form the basis of the performance evaluation summarized in Table 1, aligned with the PIECES framework.

Table 1. Pre-Implementation and Post-Implementation of EMR

PIECES Aspects	Pre-Implementation of EMR	Post-Implementation of EMR
Performance	Manual recording systems are prone to delays and input errors.	Faster data access and a more stable system through reinforced IT infrastructure.
Information	Patient data is often incomplete and not updated in real time.	Information is more accurate, comprehensive, and automatically updated in the system.
Economy	High operational costs due to paper usage and physical storage.	More efficient operational cost due to reduced paper usage and automated processes.
Control	Low data security, high risk of data loss or breach.	The system is equipped with encryption and strict access management to maintain data security.
Efficiency	Slow administrative processes, resulting in longer patient wait times.	Faster processes, more efficient service with simpler data access.
Service	Medical personnel have difficulty accessing patient data quickly, high risk of errors.	More responsive service, more accurate medical decisions through real-time data access.

Organizational Culture in Level I Bhayangkara Hospital supports EMR Implementation. Respondents indicated that collaboration among healthcare professionals facilitated by the EMR has improved performance and technological adaptation. **(1) Performance**, an organizational culture oriented toward high performance has created an environment that supports the optimal use of EMR. Adaptation to new technology has become an integral part of the work culture, despite initial challenges experienced by some senior staff; **(2) Information**, an organizational culture emphasizing accuracy and transparency of information strongly supports EMR implementation; **(3) Economy**, the efficiency culture at Level I Bhayangkara Hospital of the National Police Medical and Health Center (Pusdokkes Polri) has driven EMR adoption as a strategic step to reduce long-term operational costs; **(4) Control**, an organizational culture that upholds data security and privacy has shaped positive perceptions of EMR; **(5) Efficiency**, the emphasis on efficiency at Level I Bhayangkara Hospital of the National Police Medical and Health Center (Pusdokkes Polri) supports the of EMR use to enhance operational efficiency; **(6) Services**, the commitment

to excellent service at Level I Bhayangkara Hospital of the National Police Medical and Health Center (Pusdokkes Polri) encourages EMR implementation to improve the quality of patient care.

Hospital Information System (HIS), which is web-based, allows EMR integration with various other systems such as laboratories, radiology, and BPJS claims. The SIMRS at Bhayangkara Hospital is considered successful in reducing the use of physical documents, improving service speed, and supporting both administrative and clinical functions. **(1) Performance**, The SIMRS at Level I Bhayangkara Hospital of the National Police Medical and Health Center (Pusdokkes Polri) has been designed to support high EMR performance, particularly in terms of faster patient information access, reducing recording errors, and ensuring system reliability; **(2) Information**, The SIMRS supports the integration of data from various sources—such as laboratories, radiology, and medical records—into a single platform that simplifies access and consistent management of medical information; **(3) Economy**, The integration of SIMRS with EMR and the BPJS claims system has led to significant cost efficiencies for the hospital; **(4) Control**, Within the SIMRS, maintaining patient data security and privacy is critical. Security protocols—such as data encryption, strict access management, and audit trails—help track every activity within the EMR system, ensuring transparency and security; **(5) Efficiency**, The SIMRS integrated with EMR and the pharmacy inventory management system helps to enhance the hospital's operational efficiency; **(6) Service**, The SIMRS support for EMR facilitates allows easier patient data storage and retrieval, thereby improving service quality.

Table 2. Document Review on IT Usage

Aspect	Document Title	Document Use	Contents
Facilities	Penanganan Gangguan <i>DownTime</i> Aplikasi SIMRS pada Operator Ruang Pelayanan No :SKEP/152/VI/2021 (1 Juni 2021)	Standard Operating Procedure (SOP)	SOP issued by the HIS installation for handling disruptions in HIS application access for service room operators. Patient services must be recorded and stored on the HIS server. If there is a down time, services provided to patients can be recorded manually; if the system is down, an emergency number is used or manually registered at the Patient Reception. Once the system is back up, data must be manually entered into the HIS.
	Penanganan Gangguan <i>Down Time</i> Aplikasi SIMRS Tempat Penerimaan Pasien (TPP) No:SKEP/151/VI/2021 (1 Juni 2021)	Standard Operating Procedure (SOP)	Guidelines for handling disruptions to the SIMRS application. The SOP is based on Decree of the Head of Bhayangkara Hospital Decree No. KEP/130/XII/2020 concerning SIMRS Service Guidelines at Level I Bhayangkara R. Said Sukanto Hospital. The procedure includes checking network connections, restarting the web service application (front end and back end), checking resources on the server, and restarting Windows Server if needed.
	Keamanan data dan informasi <i>Elektronic Medical Record</i> pada fungsi pelayanan dilingkungan Rumah Sakit BhayangkaraPusdokkes Polri No:SKEP/80/IV/2023 (6 April 2023)	Standard Operating Procedure (SOP)	SOP issued by the HIS installation to regulate the security of data and information in Electronic Medical Records and to determine who can access and use the medical data and information, as well as who performs data entry into the Electronic Medical Record.

The implementation of EMR is supported by fairly adequate technological infrastructure, although there is still a lack of devices in some units, such as tablets in the inpatient department. The system is already equipped with a robust server, an intranet network that supports the Hospital Management Information System (SIMRS), and backup power sources such as generator sets to ensure smooth operations during power outages. **(1) Performance.** Adequate facilities and Infrastructure, such as computers, tablets, printers, and a stable network infrastructure, support EMR performance by ensuring fast and reliable patient information access; **(2) Information,** The web-based SIMRS allows data integration from various sources, including PACS and LIS, which enhances the consistency and quality of medical information; **(3) Economy,** The integration of SIMRS with the financial system and BPJS Vclaim provides operational cost efficiencies by reducing the use of physical documents and automating administrative processes; **(4) Control,** The implementation of security protocols such as data encryption, credential-based access management, and trail audit ensures strict control over patient data; **(5) Efficiency,** Good facilities and infrastructure support operational efficiency through automated medication stock reminders, tracking of medication usage history, and integrated pharmacy inventory management; **(6) Service,** Adequate facilities and infrastructure improve the quality of healthcare services by enabling quick and accurate access to patient data.

Shifting from a long-established manual system to a digital system like EMR involves not only technological changes but also alterations in work culture, processes, and mindset of the human resources. Therefore, an effective change management approach is essential to ensure a smooth transition that is well-received by all involved parties. **(1) Performance,** Effective human resource support, particularly from information technology staff and healthcare workers, is crucial for the successful implementation of EMR; **(2) Information,** Comprehensive training for personnel helps ensure the validity and completeness of the data entered into the EMR; **(3) Economy,** Investment in training and human resource development, especially for IT staff with specific qualifications, is essential to support efficient EMR implementation; **(4) Control,** Regular monitoring and evaluation of EMR implementation help ensure compliance with security standards and protocols, as well as improving discipline in completing medical records; **(5) Efficiency,** Well-trained personnel can use the EMR to reduce administrative workloads, enhance inter-departmental coordination, and speed up patient care processes; **(6) Service,** With competent personnel, the EMR is utilized to deliver faster, safer, and more accurate healthcare services, ultimately increasing patient satisfaction and supporting the “*Satu Sehat*” program through more responsive and coordinated healthcare services.

The “*Satu Data Kesehatan*” Program on the ‘*Satu Sehat*’ platform is a major effort to integrate national health data into a centralized system, enhancing access, service quality, and efficiency within Indonesia's healthcare system. Implementation of the Electronic Medical Record (EMR) at Level I Bhayangkara Hospital, of Pusdokkes Polri, has demonstrated significant progress in performance, efficiency, and healthcare services through integration with *Satu Sehat*. This system has been integrated into 15 variables and is already capable of data transfer or bridging. The quality of exchanged data is crucial to ensure the accuracy and consistency of medical information, which supports clinical decision-making and healthcare service coordination.

The policy for implementing the Electronic Medical Record (EMR) at Level I Bhayangkara Hospital, of Puskokkes Polri, is supported by hospital policies in line with government regulations and emphasizes the importance of high performance in the EMR system. This includes the system's ability to handle large volumes of data and provide a fast response. Additionally, the policy highlights the importance of strict control over data access and security. Operational efficiency is one of the main focuses of the EMR implementation policy. This policy is also aimed at improving the quality of patient care.

The organizational culture at Level I Bhayangkara Hospital, of Puskokkes Polri, reflects openness to technological innovation and commitment to improve the quality of healthcare services. Based on in-depth interviews and Focus Group Discussions (FGD) with various healthcare professionals, it was revealed that most informants have a positive view of the implementation of the Electronic Medical Record (EMR). However, the performance of the EMR in the Emergency Department (IGD) of Bhayangkara Hospital still needs improvement. Although there have been enhancements in patient data access and reduced waiting times, the accuracy and availability of medical information provided by the EMR remain among the most valued aspects by healthcare professionals in the Emergency Department. Economically, the EMR has helped the hospital reduce operational costs, particularly in paper and film usage. Its implementation has strengthened internal control in medical record-keeping and auditing. Work efficiency in the Emergency Department has improved with the EMR, especially in reducing patient waiting times and streamlining workflow processes. The quality of patient care has also improved, particularly in terms of speed and accuracy of medical services.

Previous research System speed, information accuracy, and data integrity are crucial factors in the successful implementation of Electronic Medical Records (EMR). However, the EMR system at RST dr. Soedjono Magelang still faces various challenges, such as slow system response, incomplete integration of modules and features, and technical issues like network problems that hinder system efficiency according Sari Dewi and Silva (2023). The implementation of EMR in the Emergency Department of Level I Bhayangkara Hospital, Puskokkes Polri, has significantly improved access to medical information, enhanced team coordination, and integrated laboratory, radiology, and patient records into a single, easily accessible platform, thereby increasing service speed and accuracy while reducing errors. Its connection to financial and claims systems like BPJS has also improved cost efficiency and administrative processes. Although the system ensures data security and operational efficiency, challenges in reporting and delays in updating test results in several units remain a concern, requiring further evaluation and improvement. (5). Future prospects for EMR expansion and integration with national health platforms like *Satu Sehat* are promising, supported by ongoing infrastructure improvements and continuous training to enhance service quality and decision-making accuracy.

Several records indicate the need for enhanced access control features, particularly for sensitive data related to radiology and laboratory examinations. The EMR system has proven to improve operational efficiency in the Emergency Department (ED) by minimizing the time required to access and process medical information. However, this efficiency is occasionally hindered by technical issues, such as delays in transmitting radiology and laboratory test results. The hospital's information technology team acknowledges room for improvement, especially in minimizing system downtime and accelerating the integration process of data from various sources (5).

The successful implementation of the Electronic Medical Record (EMR) system depends on robust infrastructure managed by the Hospital Information System (HIS) unit. An infrastructure assessment evaluates the hospital's technical capacity to support the system. While EMR has performed well in supporting healthcare operations, it has yet to deliver

optimal economic value due to high investment and maintenance costs. Despite this, it has significantly improved efficiency in medical service processes.

The management of hospital information technology and electronic data falls under the responsibility of the Hospital Information System (HIS) unit. The HIS unit is led by a Head of HIS Installation, who has a background in hospital administration and an understanding of information technology. In the implementation of the Electronic Medical Record (EMR) system and its integration with *Satu Sehat*, information technology management is considered a driving force in managing hospital information technology operations. This is because the role of the Head of HIS Installation includes decision-making on various activities related to computerized health information systems, mapping the availability and needs of information technology, developing information technology guidelines, as well as coordinating and monitoring vendor-related activities.

The technical readiness assessment for the Electronic Medical Record (EMR) system implementation evaluates the hospital's capacity to meet necessary technical requirements, including technology utilization, information technology support, and staffing according Ajami et al (2011). Level I Bhayangkara Hospital of Puskor Polri has a well-established infrastructure, with adequate technology for clinical information collection, such as computers, tablets, networks, servers, and backup power. The integration of the Hospital Information System (HIS) with various departments, including outpatient, inpatient, ED, registration, radiology, and pharmacy, is more advanced than many Indonesian hospitals, where HIS is often limited to administrative functions. In contrast, a study on a hospital in Bitung showed that its HIS, though available, was not fully integrated across all departments due to limited human resources and ineffective use of open-source systems (6)

One of the key components of technical readiness is the assessment of technical requirements. This evaluation includes the need for hardware, software, electricity, backup power, internet, and security systems. The hospital conducts mapping and inventory of available hardware, such as computers and printers. This mapping process includes details on software, RAM and memory capacity, processor specifications, and network topology, ensuring minimal disruptions to data transfer. Before implementing the Electronic Medical Record (EMR) system, hospital management identifies the hardware used, along with its quantity, as documented in the Terms of Reference (TOR).

In addition to hardware, software, and supporting infrastructure, the hospital also utilizes antivirus software on every computer and encryption systems in the Hospital Management Information System (SIMRS) to ensure data security. This condition aligns with the literature, which states that technological support in the implementation of Electronic Medical Records (EMR) and the Hospital Management Information System (SIMRS) is crucial to ensuring the security, speed, and accuracy of patient data management. The available infrastructure includes primary and backup servers for data storage and recovery, internet connectivity linking all devices within the system, and computers installed in various hospital departments (7).

Implementation of the Electronic Medical Record (EMR) system in the hospital has demonstrated fairly good performance in supporting healthcare operations. However, some challenges remain, particularly regarding the availability of devices in certain units, such as the Emergency Department (ED). The use of personal devices by staff has served as a temporary solution to address the device shortage. The information generated by the EMR system is generally accurate and relevant to the needs of medical personnel. Nevertheless, technical issues sometimes cause delays in data processing, especially during network or system disruptions. Integration of the EMR system with other systems, such as the Picture Archiving and Communication System (PACS) and the Laboratory Information System (LIS), has helped expedite medical information access, although further improvements are still needed (8).

Implementation of the Electronic Medical Record (EMR) system has not yet fully provided optimal economic value. The investment and maintenance costs for technological infrastructure remain significant, while the economic benefits, such as reduced operational expenses, have not yet been substantially realized. However, in the long run, the use of this technology is expected to reduce service time and improve work efficiency. The control system within the EMR has been well implemented, with strict access regulations through the use of usernames and passwords. Each user has different access rights based on their roles and responsibilities, which helps safeguard patient data security (8).

Use of the Electronic Medical Record (EMR) system in the hospital has improved efficiency in medical service processes. Medical staff can easily access and update patient data, which accelerates clinical decision-making. Though, some devices still need to be upgraded to achieve greater efficiency. From a service perspective, the EMR system has made a positive contribution to enhance the quality of healthcare services in the hospital. It helps to reduce data entry errors and ensures that all critical patient information is properly recorded. However, improvements are still needed in terms of the system's response speed to data input (8).

The availability of Information technology staff at Level I Bhayangkara Hospital, Puskokkes Polri, based on interviews with informants, is considered insufficient in terms of both quantity and capability. Implementation of the Electronic Medical Record (EMR) system requires changes in the established work culture. Hospital staff who were previously accustomed to manual systems must adapt to a new, and more complex system. Training is a key aspect in ensuring that human resources can effectively adopt and utilize the EMR system. Regular monitoring and evaluation of EMR implementation are crucial to ensure compliance with security protocols and established operational standards.

Information technology staff from both the vendor and the internal HIS installation team can anticipate the lack of staff. This condition is in line with literature suggesting that collaboration with third parties in system operations is recommended when there is a staffing shortage (9). It also supports the consideration that system disruptions and concerns about service delays due to technical failures can be minimized if there are sufficient Information technology technicians available (10). This transition requires human resources not only to understand new technology but also to change their mindset and work habits that have been established over the time (11). Previous research has shown that poorly managed changes can lead to staff resistance, lack of understanding, and even a decline in service quality during the transition period. Therefore, effective change management is essential to ensure a smooth transition (12).

Digitalization in the healthcare sector has become a global priority in improving efficiency and the quality of healthcare services. In Indonesia, digitalization initiatives are realized through the implementation of the *Satu Sehat* platform by the Ministry of Health, aiming to integrate national health data into an integrated system. One of the key elements of this transformation is the Electronic Medical Record (EMR), which enables real-time health data exchange among healthcare facilities. Level I Bhayangkara Hospital of Puskokkes Polri, has adopted and integrated EMR with the *Satu Sehat* platform, facilitating smoother and more structured data exchange. This study uses the PIECES approach (Performance, Information, Economic, Control, Efficiency, Service) to evaluate the implementation of EMR and its connection with the *Satu Sehat* platform in the Emergency Department (ED) of Level I Bhayangkara Hospital of Puskokkes Polri.

Level I Bhayangkara Hospital of Puskokkes Polri, has successfully addressed several challenges in integrating the Electronic Medical Record (EMR) system with the *Satu Sehat* platform. This achievement is largely due to the use of standardized interoperability protocols such as HL7 FHIR (Fast Healthcare Interoperability Resources), which enables more efficient data exchange and reduces the possibility of data errors. Adoption of the HL7 FHIR standard within the *Satu Sehat* platform enhances system performance by ensuring that exchanged data remains consistent and quickly

accessible by healthcare professionals. The implementation of this interoperability standard not only improves system efficiency but also accelerates the diagnostic and treatment processes in the Emergency Department (ED), as medical information can be retrieved and updated swiftly without significant technical obstacles (13). Nevertheless, the optimal performance of this integrated system still faces challenges (14) noted that network issues and unstable internet connections remain frequent obstacles, particularly in areas with underdeveloped digital infrastructure. The information generated from an Electronic Medical Record (EMR) system integrated with a national platform tends to be more comprehensive and accurate compared to standalone systems (15). An integrated health information system can reduce operational costs through automation and the decreased reliance on physical documents (16). Effective control in health information systems includes strict user authentication, data encryption, and rigorous access audits to prevent unauthorized access and data misuse (17). An integrated health information system can enhance operational efficiency by eliminating duplicated tasks and reducing data errors (17). An integrated health information system can enhance operational efficiency by eliminating task duplication and reducing data errors (18).

CONCLUSION

The conclusion of this study indicates that the implementation of the Electronic Medical Record (EMR) system integrated with the *Satu Sehat* platform at Level I Bhayangkara Hospital of Puskokkes Polri has significantly improved the performance of hospital's health information system, particularly in real-time data exchange, which is crucial in the Emergency Department (ED). This integration provides more accurate and comprehensive medical data, helps in clinical decision-making and reduces the risk of medical errors, although improvements in knowledge transfer and user training are still needed. From an economic perspective, the EMR system offers long-term benefits by reducing operational costs and speeding up healthcare services, despite the high initial investment. Patient data security is maintained through strict protocols, though enhancing technical capacity and server management remains an area for development. Operational efficiency in the Emergency Department has also improved, with reduced patient waiting times and streamlined workflows, although technical challenges such as system downtimes persist. Overall, integration of the EMR system with *Satu Sehat* has enhanced the quality of healthcare services, particularly by enabling more responsive patient care and faster administrative processes, ultimately increasing patient satisfaction.

This study focuses solely on the implementation of the Electronic Medical Record (EMR) system in the Emergency Department (ED) at Level I Bhayangkara Hospital of Puskokkes Polri, in support of the *Satu Sehat* platform. Therefore, future research is recommended to explore external factors that influence EMR implementation more deeply, conduct a more detailed evaluation of how internal hospital policies and government regulations affect adoption, and further investigate the long-term economic effects of EMR implementation.

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REFERENCES

1. Depkes RI. Peraturan Menteri Kesehatan Republik Indonesia Nomor 13 Tahun 2022 Tentang Perubahan Atas Peraturan Menteri Kesehatan Nomor 21 Tahun 2020 Tentang Rencana Strategis Kementerian Kesehatan Tahun

- 2020-2024. 16 Januari 2022 [Internet]. 2022;(3):1–592. Available from: [https://peraturan.bpk.go.id/Home/Download/212694/Permenkes Nomor 13 Tahun 2022.pdf](https://peraturan.bpk.go.id/Home/Download/212694/Permenkes%20Nomor%2013%20Tahun%202022.pdf)
2. Kemenkes RI. Permenkes RI Nomor 24 tahun 2022 tentang Rekam Medis. Kemenkes. 2022;(8.5.2017):2003–5. <https://peraturan.bpk.go.id/Details/245544/permenkes-no-24-tahun-2022>
3. Kementerian Kesehatan. Surat Edaran Nomor Hk.02.01/Menkes/1030/2023 Tentang Penyelenggaraan Rekam Medis Elektronik Di Fasilitas Pelayanan Kesehatan Serta Penerapan Sanksi Administratif Dalam Rangka Pembinaan Dan Pengawasan. Menteri Kesehatan Republik Indonesia [Internet]. 2023;2022–5. Available from: <https://www.eclinic.id/wp-content/uploads/2023/12/SE-No.-HK.02.01-MENKES-1030-2023-ttg-Penyelenggaraan-Rekam-Medis-Elektronik-di-Fasyankes-Serta-Penerapan-Sanksi-Administratif-signed.pdf>
4. RS Bhayangkara Tk.I Puskokkes Polri. Laporan Kegiatan Pelayanan Rumah Sakit Bhayangkara Tk.I Puskokkes Polri Tahun 2023. 2023.
5. Listiyani E, Hardiani T. Analisis Sistem Informasi Management Rumah Sakit Menggunakan Metode PIECES (Studi Kasus: RS Tk. IV 04.07.03 dr. Asmir Salatiga). https://www.academia.edu/108878808/Analisis_Sistem_Informasi_Management_Rumah_Sakit_Tk_IV_04_07_03_dr_Asmir_Salatiga_dengan_Metode_PIECES
6. Handry Lumingkewas P, Umboh A, Manampiring AE. Analysis of hospital management information system implementation in Manembo-Nembo General Hospital, Bitung City [Internet]. Available from: <https://gemawiralodra.unwir.ac.id/index.php/gemawiralodra/article/download/536/357/2687>
7. Kapitan R, Farich A, Aji A, Program P, Magister S, Masyarakat K, et al. Analisis Kesiapan Penerapan Rekam Medis Elektronik di RSUD Bandar Negara Husada Provinsi Lampung Tahun 2023 Analysis of Readiness to Implement Electronic Medical Records at RSUD Bandar Negara Husada Lampung Province in 2023. Vol. 12, Jurnal Kebijakan Kesehatan Indonesia : JKKI. 2023. <https://doi.org/10.22146/jkki.89841>
8. Supriyanti, Syamsu Windarti MM. Analisis Simrs Pada Bagian Pendaftaran Pasien Menggunakan Metode PIECES di RSKIA Umami Khasanah. Jurnal Informasi Kesehatan Indonesia. 2023;9(1):35–46. <https://ojs.poltekkes-malang.ac.id/index.php/JIKI/article/download/3934/612>
9. Sudirahayu I, Harjoko A, Moeloek HA, Lampung P. Analisis Kesiapan Penerapan Rekam Medis Elektronik Menggunakan DOQ-IT di RSUD Dr. H. Abdul Moeloek Lampung. Vol. 1, Journal of Information Systems for Public Health. 2016. <https://doi.org/10.22146/jisph.6536>
10. Rosyada A, Lazuardi L, Ilmu Kesehatan Masyarakat P, Kesehatan Masyarakat F, Sriwijaya U, Kebijakan dan Manajemen Kesehatan D, et al. Persepsi Petugas Kesehatan Terhadap Peran Rekam Medis Elektronik Sebagai Pendukung Manajemen Pelayanan Pasien di Rumah Sakit Panti Rapih. Vol. 1, Journal of Information Systems for Public Health. 2016. <https://doi.org/10.22146/jisph.6659>
11. Meiyola Pradanthi I, Weka Santi M, Deharja A, Kesehatan J, Negeri Jember P. J-REMI : Jurnal Rekam Medik Dan Informasi Kesehatan Evaluasi Electronic Health Record (Ehr) Dengan Metode Pieces Di Unit Rekam Medis Pusat RSUPN Dr. Cipto Mangunkusumo. Vol. 1. 2020. <https://doi.org/10.25047/j-remi.v1i3.2047>
12. Savitri Anggita. Evaluasi Sistem Informasi Pendaftaran Dengan Metode Pieces Di Rumah Sakit TNI AD Dr. Soedjono Magelang. 2017. <https://eprints.ums.ac.id/51333/>
13. Kinanti N, Putri1 A, Dwi A. Penerapan PIECES Framework sebagai Evaluasi Tingkat Kepuasan Mahasiswa terhadap Penggunaan Sistem Informasi Akademik Terpadu (SIKADU) pada Universitas Negeri Surabaya.

- Journal of Emerging Information System and Business Intelligence (JEISBI). 2021;2(2):78–84. <https://ejournal.unesa.ac.id/index.php/JEISBI/article/view/39730/34599>
14. Cordylia Amelinda Jeannette Sulistya R. Literature Review: Tinjauan Kesiapan Penerapan Rekam Medis Elektronik Dalam Sistem Informasi Manajemen Di Rumah Sakit. *Indonesian Journal of Health Information Management (IJHIM)*. 2023;1(2):7. <https://www.researchgate.net/publication/357800588>
 15. Yulida R, Lazuardi L, Pertiwi AAP. Tantangan Implementasi Rekam Medis Elektronik Berdasarkan Dimensi Sumber Daya Manusia Di Rsgm Prof. Soedomo Yogyakarta. *Prosiding Diskusi Ilmiah" Inovasi dan Teknologi Informasi untuk Mendukung Kinerja PMIK dalam Masa Pandemi Covid 19"*. 2021;102–106. <https://publikasi.apfirmik.or.id/index.php/prosidingdiskusiilmiahhyogya/article/view/228/0>
 16. Indrawati SD, Nurmawati I, Muflihatin I, Syaifuddin S. Evaluasi Rekam Medis Elektronik Bagian Coding Rawat Inap RSUD K.R.M.T Wongsonegoro Kota Semarang. *J-REMI : Jurnal Rekam Medik dan Informasi Kesehatan*. 2020;1(4):614–623. <https://doi.org/10.25047/j-remi.v1i4.2164>
 17. Sari Dewi T, Silva AA. Hambatan Implementasi Rekam Medis Elektronik dari Perspektif Perekam Medis Dengan Metode PIECES. *Jurnal Manajemen Informasi Kesehatan Indonesia (JMIKI)*. 2023;11(2). <https://doi.org/10.33560/jmiki.v11i2.597>
 18. Darmawanti. Analisis Kualitas Sistem Informasi Manajemen Rumah Sakit Umum dr. Fauziah Bireun. *Serambi Akademika*. 2019;7(4). <https://ojs.serambimekkah.ac.id/serambi-akademika/article/view/1482>