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# IMPLEMENTATION OF ELECTRONIC MEDICAL RECORDS BASED ON THE PERSPECTIVE OF MEDICAL RECORD AND HEALTH INFORMATION OFFICERS AT RSUD BALARAJA

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**Abstrak**

This study examines the implementation of Electronic Medical Records (EMR) at Balaraja Regional Hospital from the perspective of medical recorders as the main users of the system. Digitalization of health services through EMR aims to improve efficiency and quality of service, but in its implementation there are still various obstacles, such as suboptimal infrastructure, use of hybrid systems, and limited training for officers. Using a descriptive qualitative method with the PIECES approach (Performance, Information, Economics, Control, Efficiency, and Service), this study involved 9 informants who were interviewed in depth. The results of the analysis show that EMR has increased the speed of data access, information accuracy, and work efficiency. However, challenges still arise in the form of double data entry, network disruptions, and lack of system integration. Although the system is considered quite secure in terms of access control, its effectiveness is still influenced by user readiness and compliance. In addition, user satisfaction with the system also depends heavily on system stability and ease of operation. This study recommends strengthening infrastructure, regular training, improving SOPs, and accelerating full digitalization so that the implementation of EMR can run optimally and sustainably.

**Keywords**: Electronic Medical Records, PIECES, Medical Recorder, Balaraja Regional Hospital, Health Information System Evaluation

## Introduction

Conventional medical records still use manual paper-based recording, including medical history and examination results. Documents are stored in folders, making information retrieval time-consuming and inefficient in today's digital era (Yanuar Pribadi, 2018). Humans have begun to use technology to support task completion, including information technology (Roblek et al., 2016). Conventional paper-based medical records have been an old standard, but are now considered inefficient. With technological advancements, this system is starting to shift to a more modern and efficient electronic format (Permenkes, 2022). Electronic medical records are a medical recording system that uses electronic technology to manage patient health data. Every aspect of medical information management in healthcare facilities is included in electronic medical records.

A number of hospitals and healthcare institutions in Indonesia have begun to transform their electronic medical record (EMR) management as a result of the development of information and communication technology in the health sector (Wariyanti et al, 2020). Based on research (Indriadi, 2014), EMR as a medical record includes personal information and patient clinical data, and serves to support decision-making processes in the medical field. The use of electronic medical records has the


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potential to facilitate access to patient health information, improve accuracy in research, improve efficiency in health information management, improve the quality of health services, and strengthen the security of patient health data. The implementation of EMR provides great benefits for healthcare facilities, such as increased efficiency, documentation accuracy, and patient satisfaction. This system facilitates access to patient data, reduces clinical errors, and accelerates healthcare services. (Herlyani et al., 2020). Research conducted by (Intansari et al., 2023) found that EMR implementation at hospital X is easy to access (perceived ease of use) and proven to improve performance and productivity (perceived usefulness), which positively influences users' attitudes and interest in utilizing it (attitude toward using). In addition, research conducted by (Tasbihah & Yunengsih, 2024) found that EMR implementation at RS Hasna Medika Cirebon is running well, especially in terms of security, integrity, and data availability. The system supports document scanning and quick access, and allows account settings according to user preferences.

EMR implementation faces various challenges, such as those related to infrastructure and structure, information technology issues, lack of needs assessment, cultural problems, and high costs for software, hardware, and data exchange standards. In a study conducted by (Sari Dewi & Silva, 2023), it was found that the implementation of EMR by medical personnel still faces a number of challenges and obstacles. These challenges include system performance, operational speed, available modules and features, information accuracy, result quality, data integrity, technical problems, data security, and ease of use of EMR. Research (Risnawati & Purwaningsih, 2024) mentions that challenges in EMR implementation involve the mental readiness of healthcare personnel. To overcome various obstacles arising from EMR implementation, a comprehensive system evaluation is needed in healthcare facilities that have implemented this technology (Hadiyanto et al., 2020). Therefore, to ensure that EMR functions optimally and can meet the needs of healthcare institutions, this research will apply an evaluation method known as PIECES (Performance, Information, Economics, Control, Efficiency, Services) (Divvy, Irda Sari, 2024). The PIECES method is a comprehensive approach to evaluating information systems.by assessing six key aspects: performance, information, economics, control, efficiency, and service. (crystal et al, 2020). With a comprehensive analysis, it is hoped that constructive and practical recommendations will emerge to improve the effectiveness of RME implementation in Indonesia.

Based on initial observations, RSUD Balaraja has implemented Electronic Medical Records (EMR) since 2015, with full implementation in outpatient services starting in 2022 through an HIS called MIRSA. This system has been used by 531 healthcare and non-healthcare personnel, including doctors, nurses, midwives, and medical record officers.

Despite supporting service efficiency, EMR implementation still faces challenges. One of them is that bed data is not automatically integrated into the system when changes occur, requiring manual updates and risking errors. In addition, some registration officers do not have a D3 Medical Records qualification, which can affect data input quality. Some system outputs also do not match the input data, hindering work processes and reducing operational efficiency.

## Method

This research uses a qualitative descriptive approach to deeply understand the implementation of the Electronic Medical Record (EMR) system from the perspective of medical record officers as primary users. This approach allows for a comprehensive exploration of informants' experiences and social context. The research refers to the PIECES framework (Performance, Information, Economics, Control, Efficiency, and Service) to evaluate system aspects, and also considers the testing and maintenance stages in the SDLC system development model. Informants were selected using a purposive sampling technique, namely medical record officers with at least a D3 education and who

have used EMR for more than one year. A total of nine informants were interviewed in depth. Data collection techniques included participatory observation of EMR use and structured interviews, with instruments based on PIECES indicators. Data analysis was conducted thematically with the help of NVivo 12 Plus, through an open to selective coding process. Data was analyzed using the Miles and Huberman model, including data reduction, presentation in descriptive narrative form, and drawing conclusions. This approach provides a complete picture of the effectiveness and challenges of EMR implementation in the field from the perspective of direct system users.

## Result

### 3.1.1. Identifying performance barriers faced by medical record officers in EMR implementation

Based on PIECES theory, the performance aspect shows that the Electronic Medical Record (EMR) system at RSUD Balaraja has made a real contribution to accelerating work and service efficiency, especially in response time and throughput indicators. Most informants (7 out of 9) stated that the system was able to display patient data quickly as long as the network was stable. Real-time access to medical information facilitates the process of data retrieval, patient history tracking, and more efficient medical decision-making. In addition, integration between service units through the EMR system also increases throughput, which is the system's ability to process and synchronize data simultaneously. This speeds up the workflow of medical record officers, especially in recording activities, distributing examination results, and coordinating between departments, compared to the manual method previously used. However, on the time tolerance indicator, 6 informants stated that the system still showed instability when there were network disruptions or downtime. This condition caused delays in information access and forced officers to return to using manual documents as an alternative. This practice risks reducing service effectiveness and increasing the possibility of recording errors or data duplication. This finding indicates that although the system already supports service performance, system reliability still needs to be improved, especially in maintaining stable access during peak service hours. Strengthening network infrastructure, providing adequate servers, and responsive technical support are important factors for the RME system's performance to run optimally and consistently, without creating an additional burden for healthcare professionals.

### 3.1.2. Identifying the quality of information generated by RME, and obstacles in accessing and utilizing information from the perspective of medical record keepers

On the information aspect, the data quality in the Electronic Medical Record (RME) system at Balaraja Hospital is considered quite good by most informants. Based on the accuracy indicator, 6 out of 9 informants stated that the information available in the system is already accurate and complete, as long as the input process is carried out according to procedures. However, 3 other informants still found inconsistencies or missing data, especially in the initial diagnosis section, which indicates that accuracy is highly dependent on user compliance in filling in data carefully and on time. In terms of relevance, the system is considered capable of presenting information that is in accordance with user needs, both for medical service and administrative purposes. Information can be accessed easily and quickly, thus supporting the efficiency of staff work and the smooth process of patient services. Meanwhile, in terms of information presentation, 7 out of 9 informants assessed that the RME system, through the MIRSA application, is very helpful in displaying patient data efficiently. Information can be searched only by using a name, date of birth, or medical record number, thus speeding up the search process and supporting real-time services. In general, the quality

of information in the RME system is considered to have supported a more efficient and coordinated service flow. Nevertheless, the effectiveness of the system is still highly dependent on user discipline in inputting data, so strengthening the aspect of compliance and adjusting system features to operational needs are still necessary to ensure the optimization of available information.

### 3.1.3. Identifying economic barriers affecting RME implementation

On the economics aspect, the implementation of the Electronic Medical Record (RME) system at Balaraja Hospital faces a major challenge in the need for large initial investment. Several informants stated that the procurement of hardware such as computers, servers, and digital support tools requires a significant budget. In addition, the hospital does not yet have a dedicated internal server, so it still relies on rental services from third parties, which adds to the ongoing operational costs. In terms of human resources, the available training is considered not optimal. Informants mentioned that the training only covers basic system introduction, without discussing advanced features such as data integration, automatic reporting, or medical record analysis. As a result, most users only utilize basic functions such as patient data entry and search, while more complex features have not been maximally used. This indicates a gap between the system's potential and the users' ability to operate it. Most training is conducted during new staff onboarding or system updates from vendors, and there is no specific budget allocation for advanced training. The lack of technical training impacts the low utilization of efficiency features provided by the system. Thus, the cost efficiency and long-term benefits of RME have not been fully achieved, as limitations in infrastructure and user competence are still major obstacles.

### 3.1.4. Identifying control barriers in maintaining the security and privacy of electronic medical record data and evaluating the effectiveness of these controls from the perspective of medical record keepers.

In terms of control, the implementation of the Electronic Medical Record (EMR) system at RSUD Balaraja has been equipped with various data security mechanisms aimed at maintaining the confidentiality, integrity, and authentication of patient medical information access. Access control is applied through user accounts with access rights divided based on function and position. The system is also limited to a local network (intranet), and data backups are performed periodically as a mitigation measure against technical disruptions.

In addition to technical security, administrative controls are also implemented through the signing of integrity pacts by officers, as a form of commitment to maintaining patient information privacy. However, the effectiveness of controls does not only depend on the system built, but also on user compliance and awareness. Several informants emphasized the importance of regular education and socialization of data protection policies, as violations often occur due to internal negligence, not external disturbances. The risks if controls are not implemented properly can have serious impacts, including legal and ethical violations, and the potential damage to patient trust. Therefore, the control system needs to be strengthened through regular training, compliance audits, and routine supervision. Although features such as audit logs and traceability were not explicitly mentioned by informants, their existence is important to ensure transparency of user activities and prevent misuse of access. Thus, strengthening controls in EMR must be carried out comprehensively, covering technical security, internal regulations, and the formation of a work culture that is aware of its responsibility in maintaining medical data security.

### 3.1.5. Identifying the efficiency of EMR use compared to manual systems and identifying barriers affecting the efficiency of medical record keepers' work processes.

In terms of efficiency, findings indicate that the use of the Electronic Medical Record (EMR) system at RSUD Balaraja has increased operational efficiency compared to manual systems. Patient data can now be recorded and accessed in real-time, accelerating the information retrieval process and streamlining coordination between units. This has a positive impact on accelerating services and reducing patient waiting times. However, this efficiency is not yet fully optimal because the system is still running in a hybrid manner, a combination of manual and digital recording. One consequence is double entry, which is the process of entering the same data into two different media. Officers must copy data from paper forms into the digital system, whether for initial assessments, examination results, or daily reports. This process is considered time-consuming and labor-intensive, and leads to fatigue and confusion in the workflow. An informant stated: "We have to type twice, once on the computer and once on paper. Sometimes we even have to photocopy for hardcopy files. That makes us tired and sometimes we lose focus." (Informant A) Redundancy due to the hybrid system prolongs administrative work duration and diverts the focus of medical personnel from direct patient care. In addition, differences in procedures between manual and electronic systems also confuse new staff who are not yet familiar with digital systems. Thus, although the EMR system has made a real contribution to improving the efficiency of recording and data access, technical barriers and unintegrated workflows remain challenges. Optimization of efficiency can only be achieved if there is accelerated comprehensive digitalization, improved supporting infrastructure, and harmonization of workflows so as not to create recurring administrative burdens for health workers.

### 3.1.6. Identifying the impact of RME implementation on healthcare service quality and obstacles in providing optimal service from the perspective of medical record officers.

In terms of service, the implementation of the Electronic Medical Record (EMR) system at RSUD Balaraja is considered to have made a positive contribution to improving the quality of healthcare services. This system accelerates patient data access, facilitates the search for patient history, and supports faster and more efficient service processes. Integration between service units also streamlines coordination, thereby reducing patient waiting times. However, the implementation of a still-hybrid system leads to reliance on manual systems during downtime or network disruptions. This condition directly impacts patient services, such as delayed actions, queuing backlogs, and potential recording errors due to manual re-entry. An informant stated: "If the system runs smoothly, it is indeed faster and neater. But if the network goes down, we end up doing double work, and patients also have to wait longer." (RM-06) From the user satisfaction perspective, most informants felt helped by the system's presence, especially in terms of work efficiency. However, this satisfaction decreases when the system experiences disruptions, as it creates additional workload and slows down the service process. These findings indicate that although the EMR system has supported service quality in terms of speed and accessibility, the success of its implementation heavily depends on system stability, infrastructure readiness, and users' ability to handle unstable technical situations. Therefore, strengthening infrastructure, refining the hybrid system, and increasing user capacity are important steps to ensure that the service benefits generated by the EMR system can be consistent and optimal.

## Conclusion

Based on the PIECES analysis, the implementation of Electronic Medical Records (EMR) at RSUD Balaraja shows significant potential in improving operational efficiency, information quality, and healthcare service quality. This system is considered capable of accelerating patient data access and recording (performance), generating accurate and relevant information (information), and providing economic efficiency in the long term despite requiring a large initial investment (economics). However, there are still a number of obstacles such as network stability, limited technical training for human resources, the sustainability of using a hybrid system, and the suboptimal understanding of users regarding access control and data security (control, efficiency, service). Therefore, strategic steps are needed in the form of strengthening infrastructure and networks, increasing human resource capacity through regular training, developing a roadmap for the elimination of the hybrid system towards full digitalization, periodic updating and socialization of SOPs, and mechanisms for monitoring and collecting user feedback. These strategies are expected to maximize the utilization of EMR and encourage the transformation of healthcare services at RSUD Balaraja towards a more efficient, secure, and fully integrated system.

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