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RESEARCH PAPER

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Efficiency Of Transition From Manual Medical Records To Electronic Medical Records On The Speed Of Patient Service At RSU Royal Prima Medan

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ABSTRACT

In the digital era, the integration of quality and routine data is key to transforming healthcare services. The utilization of information technology continues to grow, spanning from planning to providing individual and community health data. One of the innovations implemented is the transition from manual medical records to electronic medical records (RME), which despite its many benefits, still faces various challenges. RSU Royal Prima Medan started this transition process at the end of 2023 until early 2024, with the main obstacles being infrastructure limitations, suboptimal system integration, and adaptation difficulties that impacted the efficiency of patient services. This study aims to analyze the efficiency of the RME transition in improving patient service speed at RSU Royal Prima Medan. The method used was descriptive qualitative with an exploratory approach, involving in-depth interviews, direct observation, and document analysis. Data were analyzed using the Miles and Huberman interactive model. The results showed that the implementation of RME has achieved about 80% effectiveness in improving service efficiency. The data retrieval process became 50% faster than the manual system, while the RME utilization rate reached 85%. Patient waiting time was also reduced by an average of 15 minutes per consultation. Despite this, obstacles such as network instability and technical issues were still encountered. In conclusion, the transition to RME at RSU Royal Prima Medan has improved service efficiency and patient data management. However, continuous system development, more comprehensive integration, as well as infrastructure improvements are needed to optimize the benefits of RME in improving healthcare quality.

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1. INTRODUCTION

In the digital era, technology continues to evolve, including in the health sector with the utilization of Electronic Medical Records [1]. RME plays an important role in facilitating access to health services, improving operational efficiency, and supporting the accuracy of patient data recording. For example, Singapore has implemented an RME system since the early 2000s through the National Electronic Health Record (NEHR), which allows medical personnel to access patient health history quickly and accurately. The implementation of this system not only improves the efficiency of healthcare services, but also contributes to improving patient safety by minimizing the risk of medical errors [2].

Medical records are essential to healthcare as they include all the data, information and findings needed to treat patients, families, communities and populations [3]. The quality and effectiveness of care is directly dependent on the accuracy and completeness of documentation of services provided to patients. However, manual documentation is often incomplete and inaccurate due to factors such as busy schedules, complexity of care processes, and lack of knowledge about the technical aspects of documentation and its impact on patients [4], [5]. The implementation of Electronic Medical Records (RME) provides a number of significant benefits, such as a 30% reduction in medical errors, a 22% increase in adherence to clinical guidelines, and a 15% long-term operational cost efficiency. In addition, the use of RME also contributed to an 18% increase in average patient satisfaction due to shorter waiting times and more optimized care coordination [6].

Successful implementation of RME depends on four main factors: perceived usefulness, ease of use, institutional support, and infrastructure readiness. The model has been implemented in various healthcare facilities in Southeast Asia, including Thailand and Malaysia, with varying degrees of success. Hospitals that

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implemented a phased approach with intensive training reported higher adoption rates compared to a lump-sum implementation without adequate preparation [7]. To overcome these obstacles, electronic medical records are a solution in improving the recording system from manual to electronic [8]. The application of information technology in medical records not only enables more accurate, fast and comprehensive data access, but can also minimize medical errors and improve cost efficiency, thus contributing to the hospital's financial surplus by providing maximum services and facilities [9]. As a non-clinical service integrated with information technology, electronic medical records play a role in supporting more optimal health services [10].

Medical records are documents that contain patient identity data, examination results, treatment, medical actions, and various health services that have been provided to patients [11]. Medical records aim to support orderly administration and improve the quality of health services by implementing a structured and efficient information system [12]. In today's digital era, the integration of quality health data is a key element in the transformation of the healthcare system [13].

Electronic Medical Records are also supported by the Law of the Republic of Indonesia No.19 Year 2016 on Electronic Information and Transactions (ITE), which regulates electronic systems as devices and procedures for managing and distributing digital information [14]. The implementation of this regulation provides a clear legal framework for the use of RME, including aspects of data security, patient privacy, and the legitimacy of electronic medical records in the national health system. Digitization is the process of converting information from analog form to digital form through scanning, thus enabling electronic storage, search, and transmission of data. T his indicates that digitization converts data for processing through computers. Electronic Medical Records (EMRs) play an important role in healthcare management by ensuring data integrity and accuracy. In addition, RME makes it easier for health workers to record and plan patient care, thus supporting the achievement of optimal public health [15], [16].

Several hospitals in the world, including in Indonesia, have begun to adopt Electronic Medical Records (RME) as an alternative or complement to the manual medical record system that has long been used [17]. Along with the development of technology in the health sector, RME functions as an information center in the hospital system, thus becoming one of the main components in medical data management. This system allows medical personnel to access, record, and store patient information in a faster, more accurate, and integrated manner [18]. There are still many health facilities that continue to use manual medical records for reasons of convenience, habit, and cost considerations that are considered cheaper than the implementation of RME [19]. In fact, as one of the technological innovations in the health sector, RME is designed to replace or complement paper-based medical records to improve work efficiency, speed up the service process, and ensure the security and quality of patient health data [20]. With optimal implementation, RME is expected to bring positive changes in the healthcare system by providing easier and more efficient access for medical personnel and improving patient safety [21], [22].

A comparison between electronic medical records (RME) and manual medical records shows that the use of RME is much faster and more efficient in managing patient data. With RME, patient information can be accessed directly through a computer connected to a local server (LAN), so medical personnel can easily search, update, and store data in a short time [23]. Unlike the manual medical record system, the data search process takes a longer time because medical personnel must search for physical documents directly in the storage room which often has limited space and requires complex archive management [24]. In addition, in terms of storage capacity, RME has the advantage of being digital and can store large amounts of data without requiring additional physical space. Meanwhile, manual medical records still rely on conventional storage spaces such as filing cabinets or document shelves, which require special places and regular maintenance to keep the documents preserved and undamaged [25]. With these advantages, RME is a more efficient solution in supporting a faster, safer, and more integrated healthcare system [26].

This study aims to analyze the efficiency of the transition from manual medical records to electronic medical records (RME) in improving patient service speed at RSU Royal Prima Medan. The results of a pre-survey at RSU Royal Prima Medan through interviews with medical record officers showed that the transition began in February 2024, with an efficiency of only 50% and a utilization rate of 85%. Manual medical records are still used as a backup to anticipate system errors, while the main obstacles faced include network and technical issues that are still under evaluation. This study contributes to evaluating the effectiveness of RME implementation, identifying key challenges in the digital transition, and analyzing its impact on patient safety and quality of care. In addition, the results of this study can serve as a reference for other hospitals in developing optimal strategies in RME implementation, including in strengthening IT infrastructure and improving the effectiveness of medical personnel training. This research is expected to support digital transformation in the healthcare sector to create a more efficient, safe and integrated service system.

2. MATERIALS AND METHOD

A. Study Design and Study Setting

This study used a qualitative descriptive approach to explore and understand the transition process from manual to electronic medical records at RSU Royal Prima Medan. The qualitative approach was chosen due to its ability to capture the complexity of socio-technical phenomena in health technology implementation. Qualitative research allows researchers to gain an in-depth understanding of individual experiences and

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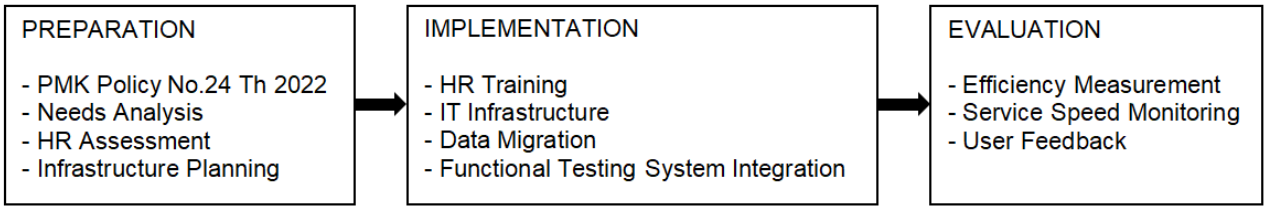

Fig. 1. Block Diagram of the Implementation of the Transition from Manual Medical Records to Electronic Medical Records on the Speed of Patient Services at Royal Prima Hospital Medan.

organizational dynamics during technology transition [27]. A qualitative descriptive framework was chosen specifically because it can reveal the nuances of the adaptation, resistance, and learning processes that occur during RME implementation [28] (Fig. 1). Compared to quantitative approaches that focus on measuring efficiency through numbers alone, qualitative approaches allow researchers to explore contextual factors that influence implementation success, including aspects of organizational culture, user perceptions, and change dynamics that are difficult to measure numerically. The implementation of RME at RSU Royal Prima Medan started in February 2024, making it an ideal location to observe the initial phase of transition and adaptation to the new system.

B. Sample Size and Sampling

This study used purposive sampling technique to identify and recruit key informants who have in-depth knowledge and experience related to the implementation of RME at RSU Royal Prima Medan. Purposive sampling allows researchers to select information-rich informants for in-depth studies, which is very much in line with the objective of this study to understand the complex dynamics of the RME transition process [29].

This study used six key informants who were strategically selected based on the concept of data saturation in qualitative research. The informants consisted of the Head of Medical Records, two medical records staff, IT Manager, Head Nurse, and Specialist Doctor, representing various perspectives in the implementation of electronic medical records (RME). Inclusion criteria included a minimum of two years of work experience at RSU Royal Prima Medan, direct involvement in RME implementation, and experience using both manual and electronic systems. This sample size was validated through data saturation, ensuring that follow-up interviews did not yield significant new insights. This approach emphasized depth of information over statistical representativeness, in accordance with best practices in qualitative research.

C. Variables

This study explores key variables in the transition from manual to electronic medical records, including human resource readiness, infrastructure, and its impact on patient care efficiency. Human resource readiness included staff technical competence, attitude towards change, effectiveness of training, and adaptation to new workflows. In terms of infrastructure, the study highlighted hardware adequacy, system reliability, integration with hospital systems, and data security. Meanwhile, the impact on the efficiency of patient care was analyzed through changes in waiting time, accuracy of records, accessibility of information, and continuity of care. In addition to the main variables, this study remains flexible in identifying emergent themes according to the inductive approach in qualitative research.

D. Data Collection Instruments

This study applied triangulation of data collection methods to increase the credibility and validity of the findings, using semi-structured interviews, direct observation and document analysis [30]. Semi-structured interviews provided flexibility in topic exploration while maintaining data consistency, with an interview guide developed based on a literature review and piloted in advance. Interviews were conducted for 45-60 minutes with questions customized for each informant, such as the Head of Medical Records, IT Staff, and Nurses. Direct observation was conducted in various work areas to record RME usage patterns, barriers that arose, as well as solutions developed by users, with a total of 12 hours of observation across various shifts and departments. In addition, document analysis of policies, procedures, user manuals, technical incident reports, and training records were used to support data triangulation and provide historical context of RME implementation

E. Statistical Analysis

Data analysis in this study used the Miles and Huberman interactive model which includes data reduction, data presentation, and conclusion drawing. Data reduction was done by coding interview transcripts, observation notes, and documents [31]. Data reduction was done by summarizing and selecting relevant data to focus on the research topic. After that, the data was presented in the form of tables, graphs, or narrative descriptions to facilitate understanding of the relationship patterns in the research. The final stage is conclusion drawing, where the results of the analysis are compared with the problem formulation to find new findings that can clarify the phenomenon under study. This process takes place interactively and iteratively until the data reaches a saturation point.

F. Ethical Concerns

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This research has been approved by the University of Prima Indonesia, with the Health Research Ethics Commission on August 08, 2024 and approval number 027/KEPK/UNPRI/VIII/2024. Before data collection was carried out, all respondents were explained about the purpose of this study and asked to fill out a written consent form, where all respondents expressed their willingness to participate in this study.

3. RESULTS

A. Overview of Research Informants

An overview of research informants including age, position, length of work and education can be seen in Table 1.

Table 1. General description of research informants

Informant's Number	Age	Department	Length of Service	Education
1	43 Year	Head of Medical Records	10 Year	S2
2	30 Year	Medical Records Member	4 Year	S1
3	33 Year	IT Officer	5 Year	S1
4	30 Year	Inpatient Nurse	6 Year	D3
5	27 Year	ICU Nurse	5 Year	S1
6	31 Year	Poly Nurse	3 Year	S1

Based on Table 1, the informants in this study consisted of six people with different positions at RSU Royal Prima Medan. Their ages ranged from 27 to 43 years old, with educational backgrounds ranging from Diploma 3 (D3) to Masters (S2). The informants' length of service varied from 3 to 10 years, with the Head of Medical Records having the longest experience (10 years) and the only one with a master's degree. Meanwhile, poly nurses have the shortest tenure of 3 years. This diversity of positions and experience provides a broad picture of the implementation of the medical record system in the hospital.

The characteristics of the informants show that they have sufficient experience and competence in their respective fields to provide valid and relevant data for this study. The Head of Medical Records provided strategic insights regarding the medical record system, while medical record members and IT officers played a role in the technical aspects of its management. On the other hand, nurses who interact directly with the system were able to assess its effectiveness and the constraints faced in daily practice. This diversity of perspectives allowed the research to gain a comprehensive understanding of the implementation of the medical record system at RSU Royal Prima Medan.

B. Factors for Switching Manual Medical Records to Electronic Medical Records

Electronic Medical Records (RME) improves the efficiency and quality of hospital services with faster and more integrated data recording. RSU Royal Prima Medan began transitioning to Electronic Medical Records (RME) from late 2023 to early 2024, in accordance with PMK Number 24 of 2022, which requires all health facilities to implement it. This transition aims to simplify recording, speed up services, and reduce errors. In addition, RME supports regulations, improves the work efficiency of medical personnel, and facilitates access to patient data, making services more accurate and effective.

The results showed that RSU Royal Prima Medan has switched from manual to electronic medical records since late 2023 to early 2024. This transition aims to improve patient services as well as comply with the PMK No. 24 Year 2022 policy that requires electronic recording of medical records. Electronic medical records provide various benefits, such as improving work efficiency, facilitating communication between medical personnel, and making it easier to record and store patient data. In addition, this system acts as legal evidence, supports the ethics of the medical profession, and is useful in education and research.

C. Readiness of Manual to Electronic Medical Record Transition to Speed of Service at Royal Prima Hospital Medan

RSU Royal Prima Medan has made the transition from manual medical records to electronic medical records (RME) by considering the readiness of human resources (HR) and the facilities and infrastructure needed. The results showed that the number of human resources available was sufficient, and they had competencies and training that supported the use of RME. Each doctor in the clinic is accompanied by a nurse in data entry, so that medical record recording can be done more quickly and efficiently. This ensures that the implementation of RME is in line with the hospital's vision and mission in improving the quality of health services.

From the facilities and infrastructure aspect, the majority of informants stated that the current facilities are sufficient, but still require some improvement, especially in terms of manual medical record storage and hardware such as computers with better specifications. The main obstacles faced are the unstable internet network and the RME system that still experiences errors when accessed. Nevertheless, the hospital continues to evaluate, improve, and monitor regularly to ensure a smooth transition and optimization of the use of RME in the future.

The results showed that RSU Royal Prima Medan has sufficient human resources for the transition of manual to electronic medical records, with the number of medical personnel according to standards and training that has been provided. The ability of human resources to operate

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computers is an important factor in the successful implementation of electronic medical records (RME).

D. The Effectiveness of the Switching of Medical Records to Electronic on the Speed of Service at Royal Prima Hospital Medan

The transition from manual to electronic medical records at RSU Royal Prima Medan aims to improve the quality and speed of patient services and to fulfill government regulations. From the interview results, the effectiveness of the current RME implementation has reached around 80%, although there are still some obstacles in the system that need to be improved. The majority of informants stated that the use of RME makes finding patient data faster and makes it easier to access medical information compared to manual medical records. In addition to speeding up services, RME also reduces the risk of loss or errors in recording patient data. Although there are challenges in the system that are not fully optimized, such as data that has not been updated in real-time, the use of RME is still considered more efficient in hospital operations. With continuous improvement, the effectiveness of the system is expected to reach 100%, so that services to patients are optimized.

The results showed that the transition from manual to electronic medical records at RSU Royal Prima Medan has improved the speed of patient service, although it has not yet reached 100% effectiveness. The use of electronic medical records (RME) allows for faster, more accurate and systematic recording of patient data compared to manual medical records. Although there are still some obstacles, such as a system that needs to be refined and a lack of standardization of operational procedures, the majority of medical personnel stated that services are more efficient with RME One of the main advantages of implementing RME at RSU Royal Prima Medan is the reduction of medication errors. The electronic system overcomes the classic problem of manual medical records, which is hard-to-read handwriting that is often the cause of medication errors. As supported by research [32], [33] cited in the document, RME reduces recording errors and makes it easier to trace patient data. With RME, prescriptions can be input electronically and directly integrated with the pharmacy system, reducing the risk of transcription errors. The system can also verify drug dosages based on parameters such as the patient's weight, age, and kidney function, and provide alerts on potential drug interactions or contraindications. Informants from the medical records department confirmed that since the implementation of RME, the incidence of medication errors has decreased significantly.

4. DISCUSSION

The results showed that the transition from manual to electronic medical records at RSU Royal Prima Medan has improved the speed of patient service, although it has not yet reached 100% effectiveness. The use of electronic medical records (RME) enables faster, more accurate and systematic recording of patient data compared to manual medical records. One of the main advantages of implementing RME at RSU Royal Prima Medan is the reduction of medication errors. The electronic system overcomes the classic problem of manual medical records, namely hard-to-read handwriting which is often the cause of medication errors. RME reduces recording errors and makes it easier to trace patient data [34]. With RME, prescriptions can be entered electronically and directly integrated with the pharmacy system, reducing the risk of transcription errors. The system can also verify drug dosages based on parameters such as the patient's weight, age, and kidney function, and provide warnings about potential drug interactions or contraindications. Informants from the medical records department confirmed that since the implementation of RME, the incidence of medication errors has decreased significantly [35].

The transition from manual to electronic medical records (RME) at RSU Royal Prima Medan has significantly influenced the efficiency and speed of patient services. The findings indicate that although the implementation of RME has reached approximately 80% effectiveness, there are still challenges, particularly in system optimization and infrastructure readiness. The shift towards the use of electronic medical records is a step driven by national policy in an effort to improve the quality of health services. The implementation of RME has proven to be effective in supporting outpatient services, especially in reducing patient waiting time and improving workflow efficiency in health facilities.

Comparative analysis with previous studies shows the same trend. The transition from manual medical records to electronic medical records significantly improved data accessibility and reduced documentation errors in hospitals [36]. The successful adoption of mobile electronic medical records is influenced by factors such as technology readiness, user training, and system usability [37]. These findings align with the observations at RSU Royal Prima Medan, where infrastructure limitations and system errors remain key obstacles in achieving full RME efficiency.

Despite the positive impact of RME, limitations in implementation remain. One of the primary challenges is the instability of the hospital's internet network, leading to occasional disruptions in accessing patient records. Additionally, some medical personnel have expressed concerns about the learning curve associated with RME usage, highlighting the need for continuous training programs. Readiness of electronic medical records in hospitals in Indonesia and emphasized the importance of comprehensive user training and system reliability [38].

Another significant finding from this study is the reduction of medication errors following the implementation of RME and digital transformation in healthcare improved patient safety by minimizing prescription errors and improving record accuracy [39]. At RSU Royal Prima Medan, the integration of electronic prescriptions with the pharmacy system has reduced transcription errors and improved medication safety.

The implications of these findings are substantial. First, hospital management must prioritize continuous

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system evaluation and infrastructure improvements to ensure a seamless transition. Second, training programs should not only focus on technical system usage but also emphasize workflow integration to enhance operational efficiency. Lastly, policymakers should consider providing additional support to healthcare facilities in their digital transformation journey, ensuring compliance with regulatory standards while optimizing patient care [40].

While the transition to RME at RSU Royal Prima Medan has shown promising results in improving service speed and data accuracy, further enhancements are needed to overcome existing challenges. Future research should focus on long-term performance evaluations and the development of best practices for RME implementation in Indonesian healthcare settings.

5. CONCLUSION

This study aims to analyze the efficiency of the transition from manual medical records to electronic medical records (RME) in improving the speed of patient service at RSU Royal Prima Medan. The results showed that the implementation of RME had achieved an effectiveness of around 80%, with data retrieval efficiency increasing by 50% compared to the manual system. The utilization rate of RME in the hospital reached 85%, and the average patient waiting time was reduced by about 15 minutes per consultation. In addition, RME implementation also contributed to the reduction of medication errors through integration with the pharmacy system. Challenges such as network instability, technical constraints, and lack of integration of clinical workflows remain barriers to RME optimization. The current training focuses more on the technical aspects of using the system and still needs to be improved to include integration with the work processes of medical personnel. To improve the effectiveness of RME in the future, hospitals need to conduct continuous system evaluations, improve technological infrastructure, and expand the scope of training for medical personnel to be more skilled in using the system. In addition, further research is needed to evaluate the long-term impact of RME implementation and develop the best strategies to improve the efficiency and quality of healthcare services in Indonesia.

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