IJPHS:
International Journal of Psychology and Health Science
GREENATION PUBLISHER
+62 812 1046 7572 http://greenpub.org greenation.info@gmail.com
DOI: https://doi.org/10.38035/ijphs.v3i3

Analysis of Infrastructure and Human Resources Readiness in the Transition of Outpatient EMR at Sartika Asih Hospital

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Abstract: The transition from manual filing to Electronic Medical Records (EMR) is a strategic step to improve the efficiency and effectiveness of healthcare services. This study aims to analyze the readiness of infrastructure and human resources (HR) in supporting the transition to the EMR system at the Outpatient Department of Bhayangkara Hospital Level II Sartika Asih Bandung. A descriptive qualitative method was used, with data collected through field observations, interviews, and open-ended questionnaires. The results show that the infrastructure, including hardware and information systems, is already available and functioning in each service unit. However, technical issues such as unstable internet connectivity at certain times were still reported. In terms of HR, most healthcare personnel have understood how to use the EMR system through formal training, peer guidance, and direct work experience. The adaptation process has gone relatively well, although there are still differences in comfort levels and technical understanding among healthcare workers. These findings indicate that the overall readiness of infrastructure and HR is at a fairly good level. However, improvements in network quality and equitable distribution of training are still needed to support the successful, comprehensive, and sustainable implementation of the EMR system.

Keyword: Electronic Medical Records, Infrastructure Readiness, Human Resources Readiness, System Transition, Outpatient

INTRODUCTION

Hospitals are healthcare facilities that provide comprehensive medical services, including inpatient care, outpatient care, and emergency care (Kemenkes RI, 2019).

One of the key components of healthcare services is the medical record. Medical records are documents that contain patient identification, examination results, diagnoses, treatments, procedures, and other services provided to patients (Permenkes No. 24, 2022).

Medical records can be maintained in either paper-based or electronic form. With the advancement of technology, many hospitals have begun transitioning from manual medical records to Electronic Medical Records (EMRs) (Eryanan et al., 2022).

Ideally, medical records should include a patient's complete health history from birth to the present in a continuous and integrated manner. However, the lack of integration among health information systems and limited information technology support have caused patient medical records to be scattered across various healthcare facilities. This condition hinders effective coordination of care and makes it difficult to comprehensively monitor patients' medical histories (Handiwidjojo et al., 2015).

Medical records play a crucial role across various dimensions, including administrative, legal, educational, research, and documentation aspects. In hospital settings, the scope of medical record services encompasses patient registration, the recording of medical information, and the systematic and continuous storage of documents. A thorough understanding of these functions is essential for developing a more integrated, effective, and efficient health information system (Setiatin & Syahidin, 2017).

Although medical records play a broad and vital role, their implementation in the field has not yet fully reflected these ideal functions. In practice, the development of this system still shows significant variation. This results in the lack of integrated health information and limited two-way data exchange (Ningsih et al., 2022).

Thus, the implementation of medical records will be more optimal if all medical record data are interconnected through a network among hospitals across Indonesia (Hadiwidjojo et al., 2015).

Given the critical role of medical records, all hospitals and healthcare facilities are mandated to implement an electronic medical record system that guarantees the protection, confidentiality, and completeness of patient information, in accordance with existing regulations (Permenkes No.24 et al., 2022).

The implementation of Electronic Medical Records (EMR) is not merely a technical policy but also a legal obligation that has direct implications for the operational legality and service standards of hospitals. The Ministry of Health has established a deadline for EMR implementation in all hospitals, which must be integrated with the SATUSEHAT platform. Class A and B hospitals are given a six-month timeframe, while Class C, D, and D Pratama hospitals have twelve months from the issuance of the regulation. Failure to meet this deadline may result in administrative sanctions, including accreditation downgrades or the revocation of operational licenses. These regulations underscore the critical importance of infrastructure readiness and human resource capacity within the limited implementation period (Kementerian Kesehatan, 2023).

The procedures implemented in the EMR system have shortened the process of medical record transfer. Consequently, patient services have become more efficient and time-saving, allowing simultaneous access by multiple parties, thereby enhancing the continuity of healthcare procedures (Mudzakir & Medika, 2024).

One of the main objectives of implementing EMR is to enhance the effectiveness of the medical recording system. EMR enables fast and efficient data access, facilitates information exchange between systems, reduces the potential for user errors, and minimizes the need for physical storage space (Aulia & Sari, 2023).

The implementation of the electronic medical record system needs to be carried out gradually, as it requires an adjustment and preparation process, including the provision of hardware, software, and human resources to ensure the continuity of healthcare services (Riyanti et al., 2023).

Nevertheless, paper-based systems are still widely used by hospitals and healthcare facilities, indicating low efficiency, a high error rate, and limitations in storage capacity. Several challenges in the implementation of electronic medical records (EMRs) include the need for intensive training for medical record staff, limited internet connectivity, issues regarding data protection, and system synchronization (Aulia & Sari, 2023).

Although several previous studies have explored the implementation of Electronic Medical Records (EMR) in various hospitals in Indonesia, most have primarily focused on post-implementation evaluation, technical challenges, and data protection concerns. However, assessing the readiness for EMR implementation remains a critical area, as system users play a key role in ensuring successful adoption (Pribadi, 2019).

Pre-implementation readiness evaluation for EMR is crucial, as it informs priority setting, workflow design, and role allocation among implementers to enhance system effectiveness. Key components that must be assessed include human resources, organizational values, management structures, leadership involvement, and infrastructure (Sudirahayu & Harjoko, 2017).

The selection of Bhayangkara Hospital Tk. II Sartika Asih Bandung as the research site was based on observations made during fieldwork, where the outpatient department had successfully implemented Electronic Medical Records (EMR) comprehensively. This makes the hospital a relevant case study to analyze, particularly in examining the forms of preparedness in terms of infrastructure and human resources. The outpatient department was chosen due to its vital role in service delivery, as well as the high frequency and complexity of medical data recording. This study specifically focuses on analyzing the readiness of two main aspects—infrastructure and human resources—in supporting the transition from manual to electronic medical records in the outpatient unit.

METHOD

This study employs a qualitative method with a descriptive approach. The qualitative research method is used to examine the object in its natural setting. The researcher serves as the main instrument in the data collection process. Data were obtained through triangulation (a combination of techniques), processed qualitatively, and the analysis output focuses more on meaning than generalization (Sugiyono, 2016).

This study involved 54 healthcare professionals—including medical record staff, nurses, radiographers, and others—at the Outpatient Department of Bhayangkara TK. II Sartika Asih Hospital, Bandung. All participants had been directly involved in the transition from manual to electronic medical records.

Data for this study were collected through the distribution of online questionnaires to healthcare workers via Google Forms, as well as through secondary data collection. The questionnaire was designed to assess the extent to which the hospital and healthcare personnel are prepared for the transition from manual to electronic medical records, focusing on aspects such as infrastructure, human resources, and the adaptation process to the new system. Direct observations were also conducted to examine service workflows, infrastructure readiness, and challenges encountered in the field.

Thematic analysis was employed by categorizing findings into two main themes: infrastructure readiness and human resource readiness. Each theme was examined to identify recurring patterns, existing barriers, and supporting factors contributing to the implementation of the EMR system.

Two primary instruments were used in this study: a digital questionnaire and an observation form. The questionnaire was distributed via Google Forms, while direct observations were conducted by the researcher and documented through field notes.

RESULT AND DISCUSSION

Infrastructure Readiness

The data collected show that hardware facilities such as computers, printers, and scanners are available in each work unit and are in good condition. The availability of these physical devices indicates that the hospital has fulfilled several key components required for the

implementation of the Electronic Medical Records (EMR) system. However, internet connectivity remains a major challenge. Several participants reported experiencing technical issues such as slow loading times, disconnections, or unstable connections at certain times.

Overall, the infrastructure in the Outpatient Installation of Bhayangkara Hospital Tk. II Sartika Asih Bandung has generally met the basic requirements to support the implementation of the EMR system. Although technical challenges remain, particularly in terms of internet stability, the availability of supporting devices in each service unit demonstrates that the hospital is on the right track toward digital transformation in healthcare services.

Human Resource Readiness

Several healthcare workers involved in this study demonstrated adequate knowledge of the EMR system and have successfully operated it. Their knowledge and skills were influenced by formal training, peer guidance, and hands-on experience during daily work. The training provided helped respondents learn system features, data input procedures, and how to overcome technical issues. After the implementation of the EMR, most participants reported understanding the newly applied workflows. Respondents also acknowledged having sufficient time and opportunities to adapt to the new system.

Participants did not encounter significant obstacles in their work, and only a few experienced occasional issues. The level of comfort varied, with many healthcare workers feeling very comfortable, while a few expressed discomfort, primarily due to technical problems such as unstable network connections and slow system performance. Despite this, the EMR system was reported to facilitate work processes. From the internal communication aspect, the transition was supported by adequate socialization efforts. This indicates that internal communication played a significant role in supporting healthcare workers' adaptation to the new system.

Analysis of Infrastructure Readiness for Electronic Medical Record System

The availability of hardware in each service unit serves as an indicator that the hospital has fulfilled the physical readiness required to support the implementation of the EMR system. However, the quality and sustainability of connectivity remain critical aspects that need to be evaluated. Unstable internet networks have caused disruptions in data entry processes and hindered integration between service units. This indicates that although the hospital's technological infrastructure appears to be ready in terms of availability, the operational technical quality still requires improvement, particularly in network capacity and regular system maintenance.

In conclusion, the infrastructure readiness has met most of the key indicators, but enhancements in network stability are still needed to ensure the optimal transition to the EMR system.

Analysis of human resource readiness for the Electronic Medical Record system

The level of mastery among healthcare workers in utilizing the EMR system indicates that the adaptation process has proceeded optimally. Some healthcare workers acquired knowledge through formal training organized by the hospital, while others learned from peer guidance. Additionally, several individuals gained understanding independently through direct field involvement. This demonstrates that the learning process did not rely solely on structured training. Although this approach has been relatively effective in supporting the adaptation process, the diversity of learning sources may lead to varying levels of system proficiency among healthcare workers. The lack of standardized training materials can result in inconsistencies in understanding and implementation in the field.

Therefore, equitable and standardized technical training remains necessary to ensure that all healthcare workers possess knowledge aligned with the established SOPs. Several respondents reported having adequate time and opportunities during the adaptation period, indicating that the transition was carried out in well-planned phases.

Based on observations, it can be concluded that human resource readiness has shown positive outcomes; however, improvements are still needed in terms of competency equalization and technical understanding to support the successful transition to the EMR system.

Analysis of Service Waiting Time (SWT) and Outpatient Waiting Time

According to the Ministry of Health's standards, the Waiting Time at outpatient Clinics (WTC) should ideally not exceed 60 minutes, while the total Service Waiting Time (SWT) must remain under 180 minutes.

Referring to the summary of service waiting times at the Outpatient Department, in March 2025, the SWT at Bhayangkara Hospital TK. II Sartika Asih was recorded at 01:32:46 (92 minutes), still within the maximum allowable limit of 3 hours. This indicates that, overall, the service delivery process was relatively efficient. However, the WTC reached 62 minutes, slightly exceeding the standard, which may be attributed to the initial adaptation phase following the full implementation of the Electronic Medical Record (EMR) system.

In April 2025, the SWT decreased to 01:25:46 (86 minutes), indicating improved efficiency. This improvement was influenced by healthcare workers' growing familiarity with the digital workflow. However, the WTC increased to 64 minutes, suggesting that technical constraints and workload issues within the clinic had not yet been fully resolved.

In May 2025, the SWT rose again to 02:20:35 (141 minutes), although it remained within the acceptable limit. This increase was caused by network disruptions and a surge in patient volume. Meanwhile, the WTC also increased to 66 minutes, highlighting that service efficiency at the initial care stage was still suboptimal. These findings emphasize the need for strengthened network infrastructure and continued technical training to accelerate the service process, despite the full implementation of the EMR system.

A review of the service and outpatient clinic waiting times shows that most processes are aligned with the established standards. The monthly variations in waiting times reflect the ongoing adaptation process to the EMR system. Nevertheless, the hospital has demonstrated a strong commitment to maintaining service quality and making continuous improvements.

CONCLUSION

Based on the results of the research conducted at Bhayangkara Hospital TK. II Sartika Asih Bandung, it can be concluded that the hospital has generally demonstrated readiness in transitioning from manual filing to the Electronic Medical Record (EMR) system. In terms of infrastructure, the necessary facilities are available and support the implementation of EMR across all outpatient service units. However, internet network stability remains a major challenge, affecting data entry delays and overall system efficiency.

From the human resource perspective, most healthcare workers have understood and are able to operate the EMR system, either through formal training, peer guidance, or self-learning. Nevertheless, training has not been evenly distributed, and there are still variations in users' comfort levels and understanding of the system. A small number of healthcare workers continue to experience technical difficulties in using the EMR system.

The hospital needs to improve internet network stability and speed to support the smooth operation of the EMR system, particularly in data entry and inter-unit synchronization processes. Additionally, more equitable, continuous, and field-relevant technical training is

needed to ensure all healthcare workers have a uniform understanding and are able to operate the system optimally.

These findings are expected to serve as valuable input for hospital policymakers in formulating strategies to optimize digital health services. Furthermore, the results of this study may be used as a reference by other healthcare institutions undergoing similar transitions to ensure both infrastructure and human resources are adequately prepared

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