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Analysis of Barriers to the Implementation of Electronic Medical Records in the Outpatient Clinic of Gunung Maria Hospital, Tomohon

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ABSTRACT

In accordance with the Regulation of the Minister of Health of the Republic of Indonesia No. 24 of 2022, all healthcare facilities in Indonesia are mandated to implement Electronic Medical Records (EMR) no later than December 31, 2023. The implementation of EMR is expected to improve the quality of healthcare services by facilitating faster access to patient data, reducing recording errors, and enhancing coordination among medical personnel. However, various challenges have been identified in practice, which hinder the system's effectiveness. This study aims to analyze the barriers to EMR implementation in the Outpatient Clinic of Gunung Maria Hospital, Tomohon. A qualitative approach was employed, using in-depth interviews with informants directly involved in the EMR implementation process. The findings reveal that the barriers arise from multiple aspects. From the human resources perspective, additional time and training are needed to enable staff to adapt to the new system. In terms of technological infrastructure, unstable network connectivity and the limited availability of hardware, such as computers and printers in certain service units, hamper the data input process. Regarding software, the existing system does not fully meet the hospital's operational needs. Procedurally, insufficient dissemination of the standard operating procedures (SOPs) has resulted in some staff not fully understanding the system's workflow. Furthermore, the evaluation aspect remains problematic due to the absence of a fully functioning monitoring mechanism. External disturbances, such as power outages, have also contributed to service delays by disrupting the electronic documentation process. In conclusion, the EMR implementation at the outpatient clinic still faces various technical and non-technical challenges. Therefore, improvements and strengthening efforts across multiple aspects are required to ensure that the EMR system can operate more effectively and efficiently in supporting the enhancement of healthcare service quality.

INTRODUCTION

The Government of Indonesia has mandated the implementation of Electronic Medical Records (EMR) across all healthcare facilities, as stipulated in the Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022. This EMR implementation forms part of the sixth pillar of the national Health Transformation agenda, health technology

transformation, which aims to accelerate the digitalization of health services while ensuring the security and confidentiality of patient data (Ministry of Health, 2023; Permenkes, 2022).

EMRs are believed to improve efficiency, service quality, and patient safety by facilitating faster access to medical information, reducing documentation errors, and enhancing coordination among healthcare professionals (Ministry of Health, 2023; Ishikawa, 1992). Several studies have demonstrated that EMR adoption can offer substantial benefits, including ease of data entry, increased accuracy and speed of system access, and more efficient information management compared to manual systems (Amin et al., 2021; Bisrat et al., 2021; Ratnaningsih et al., 2023).

Nevertheless, the implementation of EMRs in various healthcare institutions has not proceeded without challenges. Common barriers include insufficient training and support for health workers, limited infrastructure such as hardware and network connectivity, and inadequate understanding and application of standard operating procedures related to EMR systems (Dewi et al., 2024; Dhamar & Rahayu, 2020; Salsabila & Pujilestari, 2024). In addition, technical issues such as power outages and the lack of system integration to meet users' needs have been reported as significant obstacles that hinder service effectiveness (Silva & Dewi, 2023; Novianti & Akbar, 2023; Khasanah, 2020).

Gunung Maria Hospital in Tomohon began implementing an EMR system in its outpatient clinic in February 2024 as part of efforts to improve the quality of healthcare services. However, initial observations and interviews with several healthcare providers revealed that numerous challenges persist, including increased patient waiting times and disruptions in data entry due to both technical and non-technical factors.

Given this background, the present study aims to analyze the specific barriers to EMR implementation in the outpatient clinic of Gunung Maria Hospital, Tomohon. A comprehensive understanding of these barriers is expected to contribute to the development of strategic and innovative solutions to support the successful adoption of EMRs in similar healthcare settings across Indonesia.

METHODS

This study employed a qualitative approach using in-depth interview methods. The research was conducted over a six-month period, from November 2024 to May 2025, at the Outpatient Clinic of Gunung Maria Hospital in Tomohon. The primary aim of the study was to explore, in depth, the barriers to the implementation of Electronic Medical Records (EMRs) based on the firsthand experiences of field practitioners. A total of five informants were selected using purposive sampling, a technique that involves the deliberate selection of participants based on specific criteria. These criteria included: (1) having a key role in the EMR implementation process, (2) being directly involved in the use of the EMR system within service units, and (3) willingness to provide information openly and reflectively. The informants consisted of both medical and administrative personnel relevant to the EMR implementation.

The research instruments included a semi-structured interview guide developed based on the study objectives, as well as an audio recording device to document the interview sessions. Interviews were conducted face-to-face and lasted between 30 to 60 minutes for each

informant. Data analysis followed the stages outlined by Miles and Huberman as cited in Putra (2013), namely: data reduction, data display, and conclusion drawing. Data reduction involved selecting, focusing, simplifying, and organizing field data. The data were presented in both narrative form and thematic matrices to facilitate interpretation. Conclusions were drawn by identifying thematic patterns and relationships among categories. To ensure the validity and credibility of the data, the study employed source triangulation by comparing information obtained from different informants with varying roles in EMR implementation. In addition, member checking was conducted by returning the interview findings to the informants to confirm the accuracy and consistency of the interpreted data.

RESULTS

This study involved five informants aged between 31 and 46 years. The gender distribution consisted of two female and three male participants. The findings were organized into six thematic categories derived from the analysis:

Man

The implementation of the Electronic Medical Record (EMR) system encountered challenges related to human resources. Based on interviews and observations, older healthcare workers required more time to adapt to the digital system. They experienced difficulties in navigating EMR features, needed longer adjustment periods, and required additional training and supervision. In contrast, younger medical personnel were generally quicker to adapt to the new system. These findings suggest that human resource adaptation to new digital systems necessitates sufficient time and structured training.

Machine

The application of EMR also faced technical challenges related to infrastructure. Unstable network connectivity and frequent server disruptions often hindered the real-time input of medical records. In some outpatient clinics, a limited number of computers and printers caused delays in data entry and prolonged patient service times. Interview and observation data indicated two main machine-related issues: unstable network/server performance and an insufficient number of devices, both of which negatively impacted the efficiency of EMR operations.

Material

From a material perspective, the hospital had partnered with a vendor to provide an EMR system that complies with standards set by the Ministry of Health, the Hospital Accreditation Commission (KARS), and integration with the "Satu Sehat" national health system. The system includes Laboratory Information System (LIS), Radiology Information System (RIS), and Hyperscription, which facilitate services. However, the current features have not fully accommodated the hospital’s operational needs—particularly in terms of integration with support units such as financial reporting. Several processes still require manual input or are managed through separate systems, reducing work efficiency. Interviews and observations revealed that the current software does not yet fully support the hospital's operational requirements.

Method

The EMR system has improved the speed of services in outpatient clinics. However, the implementation of Standard Operating Procedures (SOPs) related to system security and access rights has not been optimal. For instance, nurses were observed accessing the system using specialist doctors' accounts. Several informants reported being unaware of the existence of policies or SOPs governing EMR usage. These findings highlight the need for improved dissemination and socialization of SOPs to ensure all personnel understand and comply with EMR-related protocols.

Measurement

Monthly evaluation meetings concerning EMR usage have been conducted by hospital management. However, the effectiveness of implementation monitoring remains unclear. Some informants indicated the absence of clear indicators for assessing performance and compliance, which makes it difficult to measure unit-level achievements or individual contributions to the success of the EMR system. The findings suggest that effectiveness evaluation is still lacking due to insufficient monitoring practices.

Mother Nature

Environmental factors also affected the EMR implementation in outpatient clinics. One of the main issues was unexpected power outages. Although the generator would activate within approximately five seconds, units without Uninterruptible Power Supply (UPS) experienced sudden computer shutdowns, resulting in the need to re-enter previously inputted data. Additionally, internet connectivity disruptions from the service provider slowed down access to the EMR system in real-time. Interviews and observations confirmed that unexpected power failures and internet disruptions delayed EMR input and extended patient service times.

DISCUSSION

In the era of digitalization, Electronic Medical Records (EMR) have become a crucial innovation to enhance the efficiency and quality of healthcare services. However, the transition from manual to electronic systems faces challenges, particularly in the aspect of Human Resources (HR). According to Laila et al. (2024), human factors constitute the main barrier due to low regulatory understanding, lack of technical skills, and difficulties adapting to new systems. This aligns with findings by Nurlaisa et al. (2025), which indicate that 60% of healthcare workers at Dr. M. Yunus Regional Hospital are unprepared for the EMR transition due to inadequate technical training. Furthermore, Dewi, Prahesti, and Markus (2024) add that older healthcare personnel tend to struggle with digital technology use because of limited experience. To overcome these obstacles, hospitals need to provide continuous training tailored to healthcare workers' needs and conduct regular HR readiness evaluations to ensure effective adaptation and support successful EMR implementation.

The implementation of EMR relies on hardware such as servers, computers, and printers connected through networks to efficiently and integratively manage patient data (SIMRS Cendana, 2024). However, technical constraints like unstable network connections and hardware limitations in certain service units represent major challenges. At Gunung Maria

Tomohon Hospital, unstable networks and servers frequently impede data entry, consistent with findings from Salsabila and Pujilestari (2024) at Bandung Kiwari Regional Hospital, who reported network instability as the primary impediment. Network disruptions cause the EMR application to slow down or become inaccessible, forcing staff to revert to manual systems, which delays service delivery (Amin, Setyonugroho & Hidayah, 2021). Another challenge is the limited number of computers and printers in several outpatient clinics, leading to prolonged patient data entry time, as observed in Panti Rini Hospital and Dr. Soetomo Regional Hospital (Dhamar & Rahayu, 2020; Ratnaningsih, Sanjaya & Asikin, 2023). Therefore, improving information technology infrastructure and increasing hardware availability are critical to accelerating data input processes, enhancing healthcare quality, and optimizing EMR utilization in hospitals.

From a software perspective, one of the main challenges in EMR implementation is the limitation of applications that cannot fully accommodate all hospital operational needs. Studies show that EMR systems often fail to meet specific requirements of various service units, such as the lack of automated prescription features and data integration across clinics, which forces healthcare workers to perform manual documentation, thereby slowing services and increasing the risk of errors (Risnawati & Purwaningsih, 2024). Additionally, EMR users experience frustration due to difficulties in rapidly accessing important information such as medical history or previous examination results, especially in emergency situations (Silva & Dewi, 2024). To address these issues, hospital management must conduct thorough evaluations of the software in use and invest in system development as well as capacity building for human resources to ensure the EMR functions optimally and meets healthcare service needs.

The implementation of EMR is frequently hindered by insufficient socialization and understanding of the Standard Operating Procedures (SOP) related to the new system. Research indicates that unclear and unsocialized SOPs cause some healthcare workers to continue using old procedures related to manual medical records, which obstructs adaptation to the EMR (Dewi, Prahesti & Markus, 2024; Novianti & Akbar, 2023). This leads to resistance to change and decreases the effectiveness of EMR implementation. SOPs play a vital role as work guidelines to minimize documentation errors and ensure data consistency (Taufiq, 2019; Darianti, Dewi & Herfiyanti, 2021). Therefore, hospitals must promptly develop, socialize, and conduct intensive training regarding EMR SOPs so that staff can comprehend and apply the procedures correctly. This measure is expected to reduce methodological barriers and facilitate the smooth adoption of EMR while improving healthcare service quality.

The application of EMR in healthcare facilities requires appropriate measurement methods to evaluate readiness and effectiveness. At Gunung Maria Tomohon Hospital, the absence of comprehensive program effectiveness measurement constitutes a major obstacle. Bisrat (2021) argues that suboptimal monitoring systems hinder the evaluation of EMR's impact on healthcare services. Effective monitoring enables problem identification, progress measurement, and program adjustments (Khasanah, 2020). However, limitations in human resources, lack of monitoring training, and unclear performance indicators result in incomplete data that are difficult to use for evaluation purposes (Aviat.id, 2023). Without clear measurements, management struggles to identify areas for improvement and allocate resources appropriately (Bisrat et al., 2021). Consequently, hospitals need to formulate

relevant performance indicators, provide monitoring training to staff, adopt digital technology for real-time supervision, and regularly collect feedback from EMR users to enhance program effectiveness and overall healthcare quality.

EMR implementation in hospitals is also often impeded by physical environmental factors, especially unexpected power outages. At Gunung Maria Tomohon Hospital, such disruptions hinder the EMR data entry process, thereby delaying patient care. The study by Salsabila and Pujilestari (2024) confirms that power outages disrupt power distribution and force staff to wait for electricity to resume. Solutions such as generators and Uninterruptible Power Supply (UPS) systems have been implemented in several hospitals, including the National Brain Center Hospital and Mitra Keluarga Hospital in Surabaya, to maintain electronic device operations (Khasanah, 2020). However, UPS failures and the lack of intelligent monitoring systems remain challenges. Hospital technical guidelines recommend the use of high-quality generators and backup systems to minimize the impact of power outages. Moreover, analytic technologies to predict electrical disturbances can reduce downtime by up to 40% and lower operational costs. Therefore, investment in reliable electrical infrastructure and smart monitoring technologies is essential to ensure smooth EMR operations and the overall quality of healthcare services.

CONCLUSION

The implementation of the Electronic Medical Records (EMR) system at the Outpatient Polyclinic of Gunung Maria Hospital Tomohon still faces various challenges. Major obstacles include the limited capacity of human resources to adapt to the new system, inconsistent network connectivity and hardware availability, as well as suboptimal features within the existing EMR software. Additionally, inadequate dissemination and understanding of the Standard Operating Procedures (SOP) for EMR usage, along with the absence of an effective monitoring system, further exacerbate the implementation issues. External factors such as power outages also prolong patient service times. Therefore, strengthening human resource capacity, improving technical infrastructure, and optimizing systems and supportive policies are essential to ensure the successful, comprehensive, and sustainable implementation of the EMR system.

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