EVALUATION OF THE IMPLEMENTATION OF THE MEDICAL RECORD INFORMATION SYSTEM USING THE HOT FIT METHOD AT BHAYANGKARA HOSPITAL, BANDA ACEH

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Abstract

The implementation of Electronic Medical Records (EMR) in hospitals is a strategic step to enhance the quality of healthcare services. This research aims to evaluate the application of the EMR system using the Human, Organization, Technology, and Net Benefit Fit (HOT-Fit) method at Bhayangkara Hospital in Banda Aceh. The study employs a qualitative approach with a case study design. Sample selection was carried out through purposive sampling, resulting in 10 informants, including the head of medical records, the head of IT, doctors, and nurses. Data collection was conducted through in-depth interviews, structured observations in service units, and document reviews. The validity of the data was tested using source, method, and theory triangulation. The results indicate a misalignment among the components of HOT-Fit. In the Human dimension, there is a gap in computer literacy among senior medical staff, leading to resistance to independent data input. In the Organization dimension, management demonstrates strong regulatory commitment through the obligation to use EMR; however, this is not supported by adequate training duration and the availability of written contingency Sops for system downtime. In the Technology dimension, data integration across units works well, but system performance slows during peak hours due to capacity limitations (bandwidth). These barriers hinder the achievement of net benefits in terms of optimal service time efficiency. Nonetheless, EMR has successfully reduced medical errors and enhanced patient data security. It is concluded that the success of EMR requires a balance between technological infrastructure capacity, ongoing user competence, and organizational governance readiness.

Keywords: Bhayangkara Hospital Banda Aceh. Electronic Medical Records, HOT-Fit, RME Evaluation

1. INTRODUCTION

Hospitals are healthcare facilities that play a vital role in improving the health status of individuals. Hospitals are expected to provide good, quality services and continuously enhance the quality of care in line with the expectations of the community. According to Minister of Health Regulation No. 24 of 2022, the quality of care is no longer assessed solely based on medical services, but also on supporting services. One of the supporting services that need attention is medical records, where digitization through Electronic Medical Records (EMR) has been shown to significantly enhance efficiency, clinical accuracy, and patient safety in hospitals (Rushdie ET AL., 2024; Clinical Journal, 2026).

In this era of digitization, many technologies are developing rapidly, making the implementation of digitization extremely important for people's lives. The existence of digitization today can enhance productivity, workforce efficiency, time efficiency, and the ability to produce goods and services. The development of digitization has spread across various fields, including education, healthcare, economic development, tourism, and others. One implementation of digitization in the medical service sector is electronic medical records.

Before the advent of digitization and computerization, healthcare services, particularly in the field of medical records, were still manual, relying on paper as the medium. However, the development of medical records has now transitioned to the use of electronic medical records. Electronic Medical Records (EMR) are a subsystem of the information system for healthcare facilities, which is connected to other information subsystems within the healthcare facility. Electronic medical records can replace paper medical records to reduce service time and the storage of medical record documents. The content of electronic medical records must include personal, demographic, social, and clinical data throughout the service process from various data sources (multimedia) and must actively function for service decision-making (Amri Handayani ET AL., 2023).

The development of information and communication technology has brought about significant transformations across various sectors, including the healthcare sector. According to the Minister of Health Regulation (Permenkes) Number 24 of 2022, all healthcare facilities in Indonesia are required to implement Electronic Medical Records (EMR). This policy has been enacted by the government to modernist health administration, minimize the risk of medical errors, and ensure rapid, accurate, and secure integration of health data through a national platform.

The Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022 explains about medical records, which are defined as documents containing patient identity data, examinations, treatments, procedures, and other services that have been provided to the patient. Medical records are extremely important documents as they serve as a source of information related to clinical documentation, administration, finance, research, and legal matters, thus requiring management by a competent and authorized individual in accordance with existing legislation.

Health information systems are a set of arrangements that encompass data, information, indicators, procedures, devices, technology, and human resources that are interconnected and managed in an integrated manner to guide actions or decisions that are useful in supporting health development (Regulation of the Minister of Health of the Republic of Indonesia No. 18 of 2022). A good information system should be able to provide relevant sources of information to its users to support effective decision-making and hospital administration (Padilla, 2020). The implementation of health information systems and the development of Electronic Medical Records (EMR) have brought remarkable changes for patients, doctors, and other health services as well as healthcare facilities both in Indonesia and abroad (Rosalinda ET AL., 2021). EMR can be a solution to maintaining the quality of safe, high-quality, and efficient services (Amri Handayani ET AL., 2023).

The development of RME plays a crucial role in improving the quality of healthcare services in hospitals. To further enhance the quality of these services, it is necessary to conduct evaluations to ensure that the implementation is optimal and that its positive impacts on the delivery of healthcare can be felt. Evaluation is a system of information and a form of effort to ascertain whether the existing conditions align with the implementation. It is hoped that this evaluation will reveal the achievements of the administration of an information system, allowing for performance and implementation improvements (Mahfudhoh, 2022). Evaluations are also conducted to determine whether the current system is functioning well compared to the previous system (F. D. Lestari et al., 2020).

Bhayangkara Hospital Banda Aceh is one of the healthcare institutions under the auspices of the Aceh Regional Police (Polda Aceh). In addition to serving members of the Police Force, civil servants, and their families, this hospital also serves as a healthcare provider for the general public in Banda Aceh and its surroundings. To maintain service quality and comply with national regulations, Bhayangkara Hospital Banda Aceh has implemented a Hospital Management Information System (SIMRS) that is integrated with electronic medical records.

The digital transformation from conventional paper-based systems to computer-based medical record information systems brings fundamental changes to daily work patterns. The shift to a digital system demands a comprehensive adaptation of the daily workflows in hospitals. In practice, the adoption of new technology in clinical settings does not always proceed smoothly. The implementation of medical record information systems is not merely an issue of procuring hardware and software. The success and sustainability of these systems in the field greatly depend on the dynamics of the socio-technical interactions between the system itself and the environment in which it is applied. Common phenomena encountered in the field include variations in the digital literacy levels of medical staff, resistance to changes in work culture, and technical infrastructure challenges such as fluctuations in internet stability, which can potentially hinder the speed of services in critical units like emergency departments and outpatient services.

However, the application and implementation of the RME information system at Bhayangkara Hospital Banda Aceh continues despite various obstacles. The success of the system is not only determined by the sophistication of the software or hardware (Technology) but is also greatly influenced by the readiness of its users' behaviour (Human) and the alignment of management and governance within the institution (Organization). Challenges on the ground, such as fluctuations in network stability, varying adaptation times for clinical staff, and the synchronization of internal regulations, often pose real challenges in pursuing the net benefits (Net Benefit) of this system.

The initial observation results to evaluate the success of the implementation of this complex hospital information system and medical records require a comprehensive evaluation framework. One relevant and widely recognized information system evaluation model is the HOT-Fit method (Human, Organization, Technology, and Net Benefit) developed by Yusof ET AL. This method integrates four important components: 1. Human: assessing user readiness, competence, satisfaction, and behavior. 2. Organization: evaluating management support, availability of regulations/Sops, and organizational culture. 3. Technology: assessing system quality, information quality, and the quality of technological services provided. 4. Net Benefit: evaluating the actual impact of the system on time efficiency, work productivity, and patient service quality.

The objectives of this research include:

1. Conducting an in-depth analysis of the behavioral readiness, complaints, skill levels, and user satisfaction (Human) regarding the operation of the medical record information system.
2. Exploring the role of leadership, policy commitment, availability of written guidelines (SOP), and adaptation of organizational work culture (Organization) in supporting the sustainability of the system.
3. Assessing the technical reliability of the application, interface aspects, accuracy and security of data, and supporting network constraints (Technology) used in the service units.
4. Identifying the contributions and net benefit value (Net Benefit) generated by the medical record system towards accelerating workflow and improving the quality of hospital health services.

Research Contribution:

For the Management of Bhayangkara Hospital Banda Aceh: as strategic input, objective evaluation material, and concrete recommendations to determine the direction of policy improvements for the SIMRS/RME, both in terms of infrastructure enhancement, SOP revisions, and medical staff training mapping.

2. METHODOLOGY

The research conceptual framework is based on a modification of the HOT-Fit (Human, Organization, Technology, and Net Benefit) model developed by Yusof et al. (2008). This model is employed to evaluate the success of Electronic Medical Record (EMR) system implementation in hospitals, aiming to explore, understand, and describe in depth the alignment (fit) and dynamic interactions among human, organizational, and technological aspects. The evaluation focuses on identifying the enablers and barriers influencing the successful implementation of Electronic Medical Records (EMR) in hospitals.

This study employs a qualitative research design to evaluate the implementation of Electronic Medical Records (EMR) at Bhayangkara Hospital Banda Aceh, utilizing the HOT-Fit method within a descriptive qualitative case study framework.

The combination of a case study design and the HOT-Fit (Human, Organization, Technology, and Net Benefit) framework is ideal, as the HOT-Fit method requires the gathering of comprehensive and specific data across various dimensions of the hospital environment.

In this study, the types and sources of data utilized include both primary and secondary data, with the operational structure of the HOT-Fit method integrated into a qualitative case study design—specifically regarding:

1. Research design characteristics,
   a. The exploratory/descriptive case study focuses on answering the question of "How" the alignment between humans, organizations, and RME technology at Bhayangkara Hospital Banda Aceh occurs, as well as "Why" certain obstacles still persist.
   b. The unit of analysis at Bhayangkara Hospital Banda Aceh is evaluated as a single system (including interactions between units such as registration, outpatient clinic, pharmacy, and IT).
2. The HOT-Fit Operational Matrix within the qualitative design: HOT-Fit Components, Qualitative Variables Evaluated, and Key Informant Candidates (Purposive)
3. Data collection and triangulation techniques, Data triangulation to ensure that the evaluation results are objective and valid.
   a. In-depth Interviews: using semi-structured interviews based on the HOT-Fit components above
   b. Direct Observation: directly observing the RME application interface, page loading speed, and the real challenges faced by doctors when inputting patient data in the outpatient clinic.
   c. Documentation Study: examining the decision letter (SK) on the implementation of RME, written SOPs, IT system complaint reports, and the completeness rates of medical records.
4. Qualitative data analysis (thematic approach): The interview transcript data was analyzed using thematic analysis methods. The informants' response codes will be grouped into 4 main themes according to the HOT-Fit components (Human, Organization, Technology, Net Benefit) to draw conclusions about which aspects are not yet fit and require improvement.

3. RESULTS

The implementation of Electronic Medical Records (EMR) at Bhayangkara Hospital Banda Aceh was analyzed using the HOT-Fit framework to examine the extent to which the alignment between Human, Organization, and Technology aspects influences the benefits of the system. Based on data reduction and coding of transcripts from in-depth interviews with 10 informants, several main themes were identified as follows.

3.1 Human Dimension: Acceptability and User Enjoyment

Based on the interview results, the system's ease of use component (HUM-USE-EAS) was rated quite well by the group of young medical staff. The clear menu characteristics accelerated their adaptation process. However, real obstacles were found among the senior user group, who experienced technology capability limitations (HUM-KNOW-GAP). This triggered a specific resistance (HUM-ATT-RES) where some senior doctors were still reluctant to type independently during service. This was confirmed by Informant 3 (Outpatient Nurse):

"For the younger nurses, there is no problem; the menu is easy to understand. But for the older specialist doctors, they often hesitate to type because they feel it takes longer. In the end, we nurses are the ones asked to input the data into the EHR."

3.2 Organization Dimension: Policies and Training Support

From a regulatory aspect, Bhayangkara Hospital in Banda Aceh has a strong management commitment (ORG-CUL-MNG), evidenced by the issuance of a Decree (SK) from the hospital commander regarding the obligation to use the Electronic Medical Record (ORG-POL-SK). However,

the implementation in the field remains sub optimal due to the perceived brevity of training quality (ORG-RES-TRN). Additionally, there is currently no specific Standard Operating Procedure (SOP) for emergency handling when the system suddenly goes down (ORG-POL-SPO). Informant 1 (General Practitioner in the Emergency Installation) stated:

"According to the regulations from the head of the hospital, it is indeed mandatory, but at the time of the initial release, we were only trained for one day. As a result, on the first day of service, everything was chaotic because many forgot how to do it. Additionally, if suddenly the power goes out or the server is down, we did not have a written standard operating procedure on which format to switch to for paper."

3.3 **Technology Dimension: System and Infrastructure Performance**

The aspect of data integration between units (TEC-INT-ALL) at Bhayangkara Hospital is considered very helpful because laboratory and radiology results are directly connected to the doctors' screens. However, the system's quality experiences a drop in performance during peak hours. Complaints were found regarding the system being slow or lagging (TEC-SYS-LAG) due to limited internet bandwidth (TEC-INF-NET), especially in the corner area of the service building. Informant 2 (Head of the Medical Records Unit) explained:

"This RME application is actually good because patient data from registration is directly linked to the outpatient and pharmacy. The problem arises when it's 10 a.m., during peak hours for BPJS patient visits. The hospital's Wi-Fi network often overloads, causing the system to take a long time to load and hindering doctors from inputting diagnoses. As a precaution, we still keep patient data manually."

The evaluation of the implementation of RME at Bhayangkara Hospital in Banda Aceh shows a mismatch in the relationships among the HOT-Fit components, which affects the optimization of the net benefits of the system.

Human-Technology Fit, the mismatch between the capabilities of senior staff technology (HUM-KNOW-GAP) and the RME interface design that requires many clicks (HUM-USE-DIF) causes the medical service process to be hindered. When technology is perceived to take more time from doctors than traditional paper records, it triggers a decline in user satisfaction. The HOT-Fit theory emphasizes that successful technology adoption requires systems that have high usability and align with the clinical workload of users in the field.

Organization-Technology Fit, the findings indicate a gap between the mandatory RME policies from management (ORG-POL-SK) and the provision of supporting infrastructure (TEC-INF-NET). High organizational commitment will not have an optimal impact if it is not accompanied by an increase in internet bandwidth capacity and the provision of proportional computers at each polyclinic desk. The surge in traffic from 9:30 AM to 11:00 AM WIB at Bhayangkara Hospital triggered a system bottleneck, demonstrating that technological readiness has not been able to keep pace with the demands of organizational regulations.

Impact on Net Benefit, overall, the RME at Bhayangkara Hospital Banda Aceh has provided significant benefits in reducing prescription reading errors (BEN-ERR-DEC) and enhancing data security (BEN-SEC-SAFE). However, service time efficiency (BEN-EFF-TIM) has not been maximized during peak hours due to network issues and gaps in staff operational capabilities. To achieve the ideal maturity level of RME, the management of Bhayangkara Hospital is advised to increase bandwidth capacity, formulate emergency contingency standard procedure, and conduct periodic refreshment training grouped by staff computer literacy levels.

Cross-informant triangulation involves triangulating sources by cross-referencing the results of interviews between primary informants (doctors and nurses as front line users) and key informants

(head of the IT unit and head of the medical records unit as system and policy managers) at Bhayangkara Hospital in Banda Aceh.

Triangulation System Lag Issues During Busy Hours, the system latency issue (Technology) has been proven valid not due to damage to the RME application, but rather due to the lack of separation of the network transmitter paths between the clinical needs of the organization and the public visitor facilities.

Triangulation: Senior Doctors' Resistance and the Delegation of Electronic Medical Record (EMR) Entry. The researcher cross-referenced the phenomenon of senior doctors not independently completing EMR entries with insights from the perspective of medical record management.

The phenomenon of delegating the completion of Electronic Medical Records (EMR)—reflecting a "Human-Organization Fit" issue—is driven by a mismatch between complex system interface designs (Technology) and the limited computer literacy of senior users; a situation ultimately tolerated by the organization to ensure the smooth delivery of patient care.

Triangulation: Preparedness of Emergency Sops During System Downtime. The researcher cross-referenced clinical staff's understanding of emergency procedures with the availability of regulatory documents at the structural level.

Claims by field staff regarding a lack of knowledge about emergency procedures proved valid, as they were supported by organizational documentation showing that the Standard Operating Procedure (SOP) for Electronic Medical Record (RME) emergencies had not yet been finalized or officially disseminated to the service units at Bhayangkara Hospital Banda Aceh.

4. CONCLUSIONS

Based on the results of the research and discussion regarding the evaluation of the implementation of the Electronic Medical Record (EMR) system using the HOT-Fit method (Human, Organization, Technology, and Net Benefit) at Bhayangkara Hospital in Banda Aceh, it can be concluded that.

The implementation of RME at Bhayangkara Hospital in Banda Aceh has proven successful in reducing medical errors and enhancing patient data security, as well as integrating well between units. However, the benefits of time efficiency have not been maximally achieved due to gaps in computer literacy among senior staff, which burdens nurses, insufficient training duration and SOPs during system downtimes, and slow Wi-Fi network speeds during peak service hours.

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