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Evaluation of the Implementation of Outpatient Electronic Medical Records

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Abstract—The implementation of Electronic Medical Records (EMR) in X hospital has been running since 2022 but its use is still not optimal, especially in outpatient installations. This study aims to evaluate the implementation of outpatient EMR at X Hospital based on the HOT-FIT (Human, Organisation, Technology, and Net Benefit) framework. The research method with descriptive qualitative, uses a cross sectional approach. The research subjects were the head of medical records, head of outpatient polyclinic, head of outpatient registration, head of pharmacy, head of laboratory, doctor, head of cashier and head of IT team. The object of research was the implementation of outpatient EMR. Data collection through interviews and observations. The results showed that in the human aspect, there were still doctors who could not use EMR due to age. In the organization aspect, the standard operating procedures (SOPs) regarding EMR are still in draft form, have not been approved by the hospital director and have not been socialized. In the technology aspect, EMR system features that are not in accordance with user needs cause the output of health data information to be incomplete. The net-benefit aspect of RME, the use of EMR is more time efficient in health services and paperless. Conclusion, that the development of EMR at Hospital X is still ongoing, starting from improving the competence of medical personnel, organizational commitment, and improving the EMR system coding.
Keywords— Electronic Medical Records (EMR), Outpatient, HOT-Fit Framework

I. BACKGROUND

All health care facilities in Indonesia are required to implement Electronic Medical Records (EMR). Based on data from the Indonesian Ministry of Health as of 1 July 2024, there are 64,251 health care facilities in Indonesia, consisting of hospitals, community health centers, clinics, independent doctors/dentists, pharmacies, laboratories, and blood transfusion units. However, the number of healthcare facilities registered in the SATUSEHAT portal with an EMR is only 37,765 (58.78%).

Health care facilities that have not implemented EMR by the deadline will be sanctioned by the government in the form of written warnings to revocation of accreditation status. Therefore, all healthcare facilities are starting to switch to Electronic Medical Records (EMR) according to the development of digital transformation.

Based on the survey results at Hospital X, the implementation of EMR, especially Outpatient, has not been running optimally because there are still obstacles that hamper the operation of EMR. The types of obstacles are a system down on the EMR server, medical personnel who are less disciplined in filling out the completeness of the patient's electronic medical records, paper forms for medical procedures are still found using patient signatures manually, and there are doctors who do not use EMR due to age factors.

The transition from manual medical records to electronic medical records has provided many changes for medical record users, so an evaluation of the Electronic Medical Records (EMR) that is already running is needed. One way to find out the effectiveness and positive impact of implementing electronic medical records is to use the HOT-FIT method by placing 4 important components in the information system, namely Human, Organization, Technology and Net-Benefit.

The HOT-FIT method was chosen in the evaluation of the electronic medical record information system because of its comprehensive and holistic approach, covering the dimensions of humans, organizations, technology, and the final impact, namely the net benefits generated. Compared to other evaluation methods that may only focus on technological or economic aspects, HOT-FIT considers the entire ecosystem that influences the success of implementation, including user acceptance and suitability to the organizational structure. The advantages of this method lie in its flexibility that can be applied to various types of information systems, as well as a more user-centered and organizational approach. The novelty of the HOT-FIT method is the combination of balanced multidimensional evaluations, which ensure that critical factors in the success of

information system implementation are not ignored, thus providing more in-depth and relevant evaluation results. Based on the background above, the purpose of this study is to determine the effectiveness of the implementation of Outpatient Electronic Medical Records based on the HOT-FIT method at hospital X.

II. METHOD

The method used in this study is a qualitative descriptive method with a cross-sectional approach. The variables in the research consist of (1) Human Aspect; (2) Organization Aspect; (3) Technology Aspect, and (4) Net-Benefit Aspect.

The subjects in this study were officers who run outpatient EMR at hospital X including the head of registration, head of medical record unit, head of polyclinic, full-time doctor of polyclinic, head of laboratory, head of Information Technology Team, head of pharmacy and head of cashier. The object of this study is the implementation of outpatient electronic medical records based on the HOT-FIT method.

III. RESULTS AND DISCUSSION

Implementation of EMR Based on Human Aspects

Based on the results of observations and interviews, the following data was obtained:

Table 1. Frequency of EMR Evaluation Results Based on Human Aspects

No	Description	Quantity
1.	EMR System Users	
	a. Appropriate	85,7%
	b. Not Appropriate	14,3%
2.	User Experience	
	a. Have experience	58,2%
	b. No experience	42,9%
3.	User Satisfaction	
	a. Very Satisfied	14,3%
	b. Satisfied	57,1%
	c. Quite Satisfied	28,6%
	d. No Satisfied	0%

The results of the study showed that EMR users still found discrepancies because there were still doctors who assigned nurses to input medical information into the patient's EMR. However, in the validation process, the filling in of medical information carried out by nurses was still with the approval of the relevant doctor. In terms of delegation of tasks to nurses, it was not given through a letter of assignment but on instructions from the director. This happened to elderly doctors who did not use EMR, especially psychiatrists and heart specialists. The delegation of tasks to nurses is in line with the fact that the work that must be done by nurses has increased, this is because there are additional processes such as the stages of inputting medical information into EMR before the doctor discharges the patient. Because the workload of nurses is greater than the work ability, the result is job burnout in nurses[1][2]. They said that their concentration easily decreases, decreased work motivation, and they are not focussed[3][4]. If this is ignored, it could threaten patient safety[5].

Based on the experience of operating EMR, it is known that laboratory, polyclinic and cashier officers have never operated the EMR system. They need time to adapt to operating the EMR system. Employee knowledge affects the abilities and expertise they have according to their fields. User capability is not only measured through experience. However, it can be supported by personal training. The interview results stated that all respondents answered that officers had received supporting training related to the implementation of EMR. The hospital's training division has conducted training related to EMR implementation. There are 2 types of training, namely internal training and external training. The internal training was organized by the field of training with the assistance of the information technology team and the medical records unit as resource persons. Participants are taken from representatives of each section such as the head of the polyclinic, head of pharmacy, head of laboratory, full-time doctors and other medical officers. Meanwhile, external training is organized by the Ministry of Health and Professional Organisation of Medical Records at Central Java level.through seminars and workshops. Training is a worthwhile investment, both for the individual health worker and for the organization[6]. Through training, it can improve the knowledge, attitude and behavior of medical staff in implementing EMR[7][8].

Each EMR user at hospital X has access rights with different usernames and passwords. There is already a standard operating procedure (SOP) in regulating information system access rights. EMR users have access time of less than 8 hours according to the length of work. The system will log out automatically if not operated for 30 minutes. This aims to maintain the security of medical data[9][10]. All medical staff must protect the confidentiality and privacy of patient data[11].

Based on the measurement of EMR user satisfaction in hospital X, the staff stated that they were very satisfied because administrative health service activities became faster and more time efficient, and supported the go-green programme in Indonesia. However, there are also users who are not satisfied with the EMR in hospital X, especially the registration section because the patient demographic data fields are incomplete. There are no fields for the patient's marital status and occupation. The patient's age is not automatically filled in by the system but the user must calculate the patient's age from the patient's date of birth. In addition, there are still obstacles in the pharmacy section, copies of prescriptions from doctors cannot enter the EMR so users have to input manually. In the laboratory unit, it is also not appropriate because there are still doctors who use paper proof of laboratory requests but the type of examination action is not available in the EMR system. User satisfaction is the result of the user's experience in using the EMR system which is associated with the success of the system[12]. If the data entry in the EMR is incomplete so hinders the process of submitting reports to the leadership[13]. This will affect the quality of health data information. Therefore, EMR system developers should make feature improvements according to the needs of EMR users and policy makers in hospitals and stakeholders.

Implementation of EMR based on the Organisation Aspect

The director and leaders at Hospital X are very supportive of EMR implementation. The director as a decision maker has organized the budget, approved the procurement of servers, facilitated the implementation of EMR evaluation meetings every month, and made policies on implementation for all units and health workers[8]. There are various kinds of medical record SOPs in RS X such as SOP for unplanned downtime management, SOP Review of EMR, SOP for Cancellation of Electronic Validation of Outpatient Medical Records, SOP for Insurance, *Jasa Raharja, Jamsostek*, Medical Certificate, Visum and Other Medicolegal Forms with EMR, SOP for Lending EMR and SOP for Changing/Editing Electronic Data for Inpatient Medical Records.

In addition to the organizational structure, it is necessary to pay attention to the organizational environment. The application of EMR is for doctors who are elderly. They have difficulty in operating the EMR, inputting clinical information data on patient examinations. This can be used as an evaluation by the hospital even though in the implementation of the current EMR implementation, an evaluation has been carried out in stages from the beginning of the RME implementation on a daily basis through the delivery of the *WhatsApp group*. Weekly evaluation reports are carried out through EMR team meetings by each section head. While the 3-month evaluation meeting has involved all representatives of related units. System monitoring is very important to oversee system performance so that if there is an obstacle, system users report it to the engineering officer so that it is immediately repaired and resolved[13]. The implementation of evaluation should be carried out regularly, not only when accreditation or obstacles occur because the evaluation will reduce the risk[14].

Implementation of EMR based on the Technology Aspect

EMR implementation still often occurs downtime. On Monday and Tuesday at 07.00-11.00 am there are frequent server interruptions in the registration section. In addition, at the beginning of the month, the system must have experienced errors and not responding in the reporting section and sudden power outages. The quality of Hospital X's EMR still depends on the server. If there is a server disruption, the EMR system cannot be used to serve patients. As a result, it can hamper health services and can affect patient satisfaction[15][16]. The EMR data storage system in hospital X uses Cloud Computing and double servers. In terms of backup systems using a backup server that is placed in a different place from the location of the health facility. If the EMR system is not used for 30 minutes, it will log out automatically. This serves to maintain the security and confidentiality of medical data[17][18]. The EMR system implemented by Hospital X is still in the process of integration with the Ministry of Health's SATU SEHAT platform. The information available in the system is used for decision making and the content submitted must be accountable[10].

Based on service quality criteria, there are still features that are not in accordance with the needs of EMR users at X hospital. Meanwhile, the performance of information systems is one of the successes in providing services to patients. The information systems in health care institutions concern the linkage of features in the system including system performance

and user interface. EMR must meet the standards of ease of use, ease of learning, response time, usefulness, availability, flexibility and data security.

Implementation of EMR based on the Net-Benefit Aspect

The advantages of implementing EMR can improve performance, make it easier to do work, increase user work efficiency and can reduce officer workload. In addition, the existence of RME can control hospital expenditure and also minimize inputting errors so as to reduce the inconsistency of filling in patient data. The existence of the RME system reduces the use of paper and is more efficient[19][20].

The benefits aspect of EMR implementation in Hospital X is in accordance with which states that the benefits of system users can be assessed using direct benefits, job effects, efficiency and effectiveness. In addition, it can reduce the error rate, easy communication, can control expenses and costs. The higher the positive impact produced, the more successful the implementation of the information system[21][22]. In addition to being beneficial for staff, EMR is also beneficial for management, namely the efficiency of resources, office stationery, time, accelerating service and data presentation, increasing data accuracy, and facilitating data integration.

IV. CONCLUSIONS AND SUGGESTIONS

Overall, improving EMR implementation at Hospital X requires addressing technical challenges, ensuring data security, integrating systems, and aligning with user needs to maximize benefits for staff and management. Organizational support, regular evaluation and monitoring of the system are essential for continuous improvement and successful implementation.

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