

QUALITY EVALUATION ON THE IMPLEMENTATION OF ELECTRONIC MEDICAL RECORDS IN PRIMARY HEALTH CENTERS

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ABSTRACT

Primary Health Centers in Indonesia must implement Electronic Medical Records (EMR) through SIMPUS in accordance with PMK/24/2022 concerning Medical Records. Primary Health Center X has implemented EMR since September 2023. However, EMR often experiences downtime, which hampers the process of distributing medical records between health service units and patients must wait until the server returns to normal. This study aims to conduct an evaluation to determine the quality of EMR at Primary Health Center X. This type of research is a qualitative descriptive study with a cross-sectional approach. The population were all health workers in the outpatient service section at Primary Health Center X, with a sample taken using the total sampling technique of 19 respondents. Data analysis was carried out descriptively quantitatively on the EMR system using the PIECES method. The results of the EMR quality evaluation study based on the PIECES method show that the performance aspect is categorized as good (72.9%), the information aspect is categorized as very good (76.5%), the economy aspect is categorized as very good (79.3%), the control aspect is categorized as very good (75.1%), the efficiency aspect is categorized as very good (76.6%) and the service aspect is categorized as very good (76.0%). The conclusion of the calculation of the average percentage index of all aspects is that the EMR system is very good (76.06%).

KEYWORDS

Quality, EMR, outpatient, PIECES method, Primary Health Center



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INTRODUCTION

Electronic Medical Records (EMR) are personal information of patients stored electronically related to the patient's diagnosis and treatment (Usman & Qamar, 2020), so the confidentiality and security of patient medical data must be protected (Daraz et al., 2019) (Yang, Guo, Zhao, Xu, & Bai, 2020). Digitizing medical records is an effort to support the president's program in realizing digital transformation of health in Indonesia. The development of telehealth has continued since the Covid-19 pandemic until now in order to encourage the acceleration of health independence (Mahtta et al., 2021). The implementation of electronic medical records is used to improve service quality, improve documentation accuracy, accelerate access to patient data through information systems, and improve patient satisfaction.

Electronic Medical Records (EMR) must be implemented by all health facilities. Health facilities that have not implemented EMR by the specified deadline will be given sanctions in the form of written warnings to revocation of accreditation status. These health facilities include independent practices of doctors/dentists, health centers, clinics, hospitals, pharmacies, laboratories, centers and other health facilities determined by the Minister of Health. Puskesmas is a health service facility that organises public health efforts and first- level individual health efforts, by prioritising promotive and preventive efforts in its working area. In Indonesia, Puskesmas is included in the Primary Health Center.

The puskesmas management information system is referred to as SIMPUS. SIMPUS is a management application system in primary health centres that functions to identify patient data starting from registration, registration, examination and treatment of patients. The benefits of SIMPUS are to simplify and speed up services, standardise procedures and service standards, and obtain accurate data and information. SIMPUS uses computerised technology that can be accessed easily so as to facilitate the management process that takes place at the puskesmas. To find out whether a system is running well or not, an information system evaluation is needed.

Evaluation of electronic medical records is an attempt to find out the actual conditions. EMR system evaluation can be carried out using the PIECES method. This method is used to correct, improve information systems or identify problems that occur in a system. The PIECES method consists of aspects of performance, information, economy, control, efficiency, and service. Through these aspects, PIECES is able to identify weaknesses, errors, or inefficiencies in the system, and provide specific and focused recommendations for improvement. In addition, this method not only evaluates technical performance, but also considers the economic impact and quality of service provided by the system. This makes PIECES an effective evaluation instrument for continuous improvement in information systems (Varajão, Lourenço, & Gomes, 2022)

Based on a preliminary survey conducted by the researcher, Primary Health Center X has implemented electronic medical records since September 2023, by starting to innovate the health center management information system which was developed into an electronic medical record. Primary Health Center X provides outpatient and inpatient services. However, inpatient services still use manual medical records while outpatient services already use electronic medical records. The problem with EMR is that downtime still often occurs, namely the web, computer systems, servers and networks that cannot be accessed for some time so that the process of distributing medical records between health service units is hampered. Patient status cannot be distributed to polyclinics/pharmacies/laboratories/other units, so patients have to wait until the server returns to normal, this affects the quality of service and patient satisfaction (Brotman & Kotloff, 2021) (Dang et al., 2014).

Therefore, there needs to be an evaluation so that it can be used as a recommendation for improving the quality of EMR (Rieke et al., 2020) (Schmidt et al., 2019). This will be useful for improving the quality of EMR-based health services in a sustainable manner (Melnick et al., 2020). This study aims to conduct an evaluation to determine the quality of EMR at Primary Health Center X.

RESEARCH METHOD

This type of research is a qualitative descriptive study with a cross-sectional approach. The population were all health workers in the outpatient service section at Primary Health Center X, with a sample taken using a total sampling technique of 19

respondents. The research instruments included a questionnaire, a checklist, observation guidelines, and an interview guide. Data processing was carried out through the stages of data collection, editing, coding, classification, and tabulation. Data analysis was carried out descriptively quantitatively on the EMR system using the PIECES method. The research variables consist of aspects of performance, information, economy, control, efficiency, and service

RESULT AND DISCUSSION

Evaluation of the quality of EMR implementation based on the PIECES method can be seen in table 1,

Table 1. Average Presentation Index of All Aspects in PIECES for EMR System Assessment

Number	Review Aspects	Average Index %	Information
1.	<i>Performance</i>	72,9 %	Good
2.	<i>Information</i>	76,5 %	Very Good
3.	<i>Economy</i>	79,3 %	Very Good
4.	<i>Control</i>	75,1 %	Very Good
5.	<i>Efficiency</i>	76,6 %	Very Good
6.	<i>Service</i>	76,0 %	Very Good
Overall average		76,06 %	Very Good

Implementation of Electronic Medical Records Based on Performance Aspects

In terms of performance aspects, there are measurements based on 3 review, (1) response time review, research data shows that the system is very good at responding to every command, such as performing data entry processes, searching for patient data, and printing the required forms. (2) Throughput review, namely the system's ability to access is good and easy, the amount of data needed is as expected, and the data produced is in accordance with that stored in the system. However, sometimes there is network trouble, sudden power outages that cause delays in patient service. If the patient waits too long, the patient will be disappointed, and may even complain. Patient satisfaction can affect public trust in the quality of health services at the health center (Dang et al., 2014) (Daraz et al., 2019). (3) Review of system error tolerance, if the user fills in the wrong data or there is data duplication, the EMR system will reject it and the system cannot save the data. For example, indicators of data completeness quality in the patient registration section consist of identity data and social data. Identity data includes medical record numbers, patient names, and population registration numbers. While social data includes religion, occupation, education, and marital status (Suryadi & Balakrishnan, 2023) (Rosita et al., 2021).

Implementation of Electronic Medical Records Based on Information Aspects

In terms of information aspects, there are 4 reviews, namely (1) accuracy review, showing that the system is good at providing accurate information for EMR users in health centers. EMR is able to produce accurate data because the recording and storage process is done digitally. Errors that often occur in manual medical records, such as illegible handwriting or data loss, can be minimized. This can be risky for errors in disease diagnosis codes (Wong & Bradley, 2009). With data validation features and real-time updates, this system maintains the accuracy of medical information. (2) Review the relevance of information, EMR can provide information that is in accordance with clinical and managerial needs. The information recorded and displayed in the EMR can be arranged to be relevant to the needs of the user, such as a doctor who needs a patient history or an administrator who needs a statistical report. With automatic filters and grouping, the system displays only the information needed for proper decision making.

(3) Review of information presentation, EMR presents data in a format that is easy to access and understand. This system supports information visualization, such as patient health development graphs, statistical reports in the form of tables or administrative data reports. With an intuitive interface, EMR facilitates the presentation of information quickly and in a structured manner, helping health workers in making diagnoses and planning treatment.

(4) Data flexibility review, EMR is able to manage data more flexibly. Data can be easily accessed from various devices and locations, supporting interoperability between different health systems. In addition, EMR can be customized to user needs, both in terms of format, information category, and access method. This flexibility also includes the system's ability to accommodate new medical procedure updates or changes.

Implementation of Electronic Medical Records Based on Economy Aspects

In terms of economy aspects, there are measurements based on 2 review, namely

(1) Reusability, the ability of the EMR system to be reused in various clinical situations. All health services can access, update, and reuse EMR data without the need to repeat data entry. Thus, EMR reusability can save operational costs and investments in the long term because existing functionality can be utilized for other needs with minimal changes. (2) Resources, EMR can create efficiency in the use of resources, both in the form of labor, technology infrastructure, and operational costs. An effective EMR system must maximize the use of available resources by minimizing expenses. For example, through the automatic data entry process, the workforce can be focused on other tasks. So that EMR provides a more positive economic impact (Półchłópek et al., 2020).

Implementation of Electronic Medical Records Based on Control Aspects

In terms of control aspects, there are 2 reviews, namely (1) Integrity, data in the EMR system must be precise, accurate, and consistent from the time the data is entered until it is stored and used (Tominanto, Purwanto, & Yuliani, 2019) (Firdaus, n.d.). Integrity evaluation includes examining how the system keeps data from being damaged, changed without permission, or lost. In this case, the EMR system must have a mechanism to ensure that the data entered is correct and verifiable, and does not experience unauthorized changes. An example is the implementation of an audit trail that can track every change in data and who made the change. With integrity maintained, clinical decisions made based on the data can be relied upon and trusted. (2) Security, EMR systems must be secure and protected from unauthorized access, data theft, information leakage, or cyberattacks. Evaluation of security aspects includes an assessment of data access policies, for example, user authentication and authorization, data encryption, and data backup and recovery. A secure system must be able to protect sensitive patient information from external and internal threats. Implementation of strong security protocols and continuous monitoring are key to maintaining data confidentiality, availability, and accessibility (Sugiarti, Iii, Poltekkes, & Tasikmalaya, 2020) (Usman & Qamar, 2020). With guaranteed data security, users and stakeholders will trust the quality of health services.

Implementation of Electronic Medical Records Based on Efficiency Aspects

In terms of control aspects, there are 2 reviews, namely (1) Usability, this refers to the ease of use and user experience when interacting with the EMR system. Usability evaluation assesses based on how smooth the EMR system interface is, how the EMR menu and features are laid out, whether EMR users find it easy to perform tasks, and how quickly EMR users can complete tasks without experiencing difficulties or errors (Mahtta et al., 2021). An efficient EMR system must be designed with the needs of users such as doctors, nurses, and administrative staff in mind, so that they can access information or input data quickly and without obstacles. (2) Maintainability, refers to the ease of

maintaining, repairing, and updating the EMR system over time. Maintainability evaluation includes an assessment of the system's structure and modularity, clear documentation, and the system's ability to be adapted or updated according to changing needs and regulations. An efficient EMR system should be easy to repair if problems occur, and allow for the addition or modification of features without disrupting overall operations. A high level of maintainability will reduce the costs and time required for maintenance, thus supporting the system's long-term sustainability.

Implementation of Electronic Medical Records Based on Service Aspects

In terms of service aspects, there are 3 reviews, namely (1) Accuracy, EMR systems must be able to produce and present accurate and precise data. Accuracy evaluation involves assessing whether the EMR system can store and display data correctly without error or bias according to the data that has been entered into the system, such as patient information, diagnoses, and examination results. An accurate EMR system ensures that medical and administrative decisions made based on the data are reliable and in accordance with the actual conditions. High accuracy reduces the risk of errors in patient care and improves the quality of health services. (2) Reliability: EMR system reliability relates to the consistency and stability of the system in providing services. Reliability evaluation includes how often the system experiences disruptions, downtime, or technical failures. A reliable system should be accessible at any time and provide stable performance, especially in emergency situations. With high reliability, healthcare workers can confidently use the system without worrying about data loss or delays in obtaining important information. Good reliability also reflects adequate technical support, such as routine maintenance and data backup. (3) Simplicity, EMR systems refer to the design of the system that is easy to understand and use by a variety of users, from physicians to administrative staff. Simplicity evaluation assesses whether the system has an intuitive interface, easy navigation, and uncomplicated processes. A simple system minimizes training time and maximizes work efficiency. Simplicity also relates to how the system facilitates a smooth workflow without redundant steps or unnecessary complexity. A simple yet effective EMR system can help users focus on their core tasks, such as providing health care, without being bogged down by system technicalities.

CONCLUSION

In conclusion, the implementation of EMR systems requires careful consideration of performance, information, economy, control, efficiency, and service aspects. By addressing these aspects, EMR systems can enhance patient care, reduce costs, and promote long-term sustainability in healthcare.

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