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COMPARISON OF ELECTRONIC MEDICAL RECORDS BETWEEN A PERSONALCOMPUTER AND ANDROID TABLET IN A HOSPITAL

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ABSTRACT
The transformation of the health sector consists of six pillars, one of which is the transformation of health technology. The electronic medical record is the collection, storage, processing, and access of patient medical record data in hospitals using information technology. The Minister of Health, in Regulation of the Minister of Health number 24 of 2022, requires all health service facilities to maintain electronic medical records. In this study, research was conducted on the process of collecting, storing, processing, and accessing medical data at the ERM in a hospital using a personal computer and an Android tablet. This research uses a qualitative case study method that investigates phenomena in real-life contexts and is examined in a case that is carried out intensively, in depth, in detail, and comprehensively. The independent variable is the process of collecting, storing, processing, and accessing medical record data, and the dependent variable is electronic medical records. Data was collected by observing the patient's medical record recording process and interviewing informants consisting of registrars, doctors, nurses, laboratory staff, hospital IT personnel, and hospital administration; triangulation was then carried out on the data obtained. The results of the study found that the process of collecting medical record data on personal computer media was different from that on Android tablet media, from the method of writing to the results of recording medical records. However, the flow from recording to storage, access, processing, and security of medical record data is not much different In the implementation of electronic medical records, there are advantages and disadvantages to each medium, but it would be better if a combination of the two was carried out. In order to create continuity in the process of recording medical records in electronic media.

Keywords: ERM; electronic medical record; medical record on tablet media; medical record on computer media

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INTRODUCTION

Indonesia is currently facing the industrial revolution 5.0 which is an information technology revolution and its application is currently a necessity for an industry. No exception in the health sector which is one of the service industries. Transformation in the health sector refers to 6 pillars, one of which is the transformation of health technology. In people's lives, health services are one aspect that continues to develop. Hospitals are one of the providers of health services to the community, continuing to change according to technological developments. One way to improve services in hospitals is to transform medical records which were initially carried out conventionally, into electronic medical records. (RI Permenkes, 2022).

Talking about patient medical data, of course, it cannot be separated from the recording and recording carried out by the hospital. This certainly requires large storage. Especially when the hospital still uses conventional medical records. Therefore, it is necessary to find a strategy for how this storage is organized and has enough space. In previous years, recording medical records still used paper containing patient data, doctor's notes and supporting examination results and this made the patient data into a thick collection. Along with the

development of the era, on this basis, hospitals are required to update the health service system, especially in the medical record service for 2 patients, to be easier, more efficient and sophisticated. Thus was born electronic media-based medical records or what we call Electronic Medical Records. The Ministry of Health has also required health service facilities to use electronic medical records in recording patient medical records. (Rusdi et al., 2021; Erawantini et al., 2021; RI Permenkes, 2022).

RME was originally introduced in 1991 by the Institute of Medicine (IOM), computer-based medical records (CPR) are patient records created electronically in a system specifically designed to facilitate users in accessing accurate and complete data information, namely by providing warning signs, alertness and systems that support clinical decision-making that has data references to medical knowledge sources and other assistance facilities (Rusdi et al., 2021) RME has been widely used by many countries. In China, RME began to be developed in 1997 promoted by the People's Liberation Army General Hospital. In 2005 in the UK, the National Health System (NHS) made the decision to implement an electronic health record system in every NHS Trusts network. In Indonesia, RME has been used since the end of 2000. The use of technology in the service system in Indonesia was initially limited to recording patient data. However, with the development of the information technology system era, RME began to be used in tiered referral and payment systems. In addition, RME can also be a medium for exchanging patient medical information between health facilities (Li et al., 2017; Gunawan & Christianto, 2020).

According to its definition, Medical Records are files containing notes and documents about patient identity, examination, treatment, actions 3 and other services that have been provided to patients. It can be seen that electronic medical records are part of medical records that use computer-based which have been widely used by hospitals around the world to provide complementary materials as a replacement for paper-based medical records. (Permenkes, 2008; Rusdi et al., 2021; RI Permenkes, 2022) In its use, EMR can provide great benefits for health services, especially in health facilities that provide basic health services and referral health services such as hospitals. Many benefits are felt, one of which is the increased availability of electronic patient records in hospitals. For hospital administrative staff, the use of EMR can make it easier to recall patient medical records. other benefits are efficiency of health service costs, shortening health service time, and efficiency of human resources. In addition, the benefits of RME can also be felt by patients, such as increased efficiency in the health service process (Erawantini, 2013; Wilcox et al., 2011; RI Permenkes, 2022).

However, behind the benefits felt, there are also several obstacles in the use of EMR in health services. In carrying out EMR, doctors spend more of their practice time just to fill in patient data electronically rather than contact or communicate with patients. In a study conducted on doctors at a health facility that uses EMR, it was shown that doctors spent an average of 43% of their time entering data and only 28% of their time in contact with patients. This could happen because previously doctors wrote patient medical records using conventional notes that could be done directly in front of the patient, but with EMR doctors must write patient medical records on an electronic device (Saniotis, 2007; Gunawan & Christianto, 2020). To support the transformation of health technology, the Minister of Health in the Regulation of the Minister of Health Number 24 of 2022, requires all health service facilities to organize electronic medical records. Where health facilities are required to register electronic systems at the Ministry of Health no later than December 31, 2023. The electronic system that will be implemented in electronic medical record organizers can use an electronic system that has been developed by the Ministry of Health, the health facility itself or from other electronic

system organizers that are registered and regulated through cooperation (RI Permenkes, 2022).

Based on a survey conducted by Persi, it was found that out of 3,000 hospitals in Indonesia, 50% of hospitals have implemented electronic medical records, and 16% of hospitals have implemented electronic medical records well. Assessed from the aspect of technology development, 40% of hospitals have stated that they are ready to implement electronic medical records. Data from the Directorate of Referral Health Services in 2020, showed that 74 out of 575 hospitals (12.87%) had implemented electronic medical records integrated into the service system organized by the Ministry of Health. (Konny, 2022; Sumarwanto, 2023). Based on this phenomenon, health facilities are required to be able to choose which electronic media is more efficient in writing medical data of 5 patients by doctors and other medical personnel. So that in the health services provided, it does not ignore the rights of patients in terms of obtaining information about their health history. Penelitian ini bertujuan untuk mengetahui perbandingan rekam medis elektronik antara komputer pribadi dan tablet android.

METHOD

This study used a qualitative research design, using the case study method. This study was conducted in hospitals that have implemented ERM, namely: RS Putri Bidadari Stabat and RSIA Abby Lhokseumawe which uses android tablets. The sample in this study consisted of 8 informants consisting of; patient registration officers, doctors, nurses, supporting examination officers such as laboratories, IT personnel and administrative officers. In this study, data collection used observation, interview and documentation analysis techniques.

RESULT

Medical Record Data Collection

From the results of the observations made, it was found that in the process of collecting medical record data on electronic media, the initial stage was patient registration, then writing was carried out in the medical record based on the results of the doctor's anamnesis, the nurse wrote down the interventions carried out on the patient, writing the results of supporting examinations, writing electronic prescriptions and electronic signatures into the electronic medical record file.

Registration

From the observation results, the initial step in collecting medical record data is patient registration. In this activity, patient identity data is inputted or the patient's initial registration is carried out to obtain the patient's medical record number.

"*So far I have not encountered any difficult obstacles when registering patients*"

"*However, it will be difficult if there is a network disruption because an error will occur when it is saved, and another obstacle is if the patient does not bring identification such as an ID card, it will be difficult to find the patient's medical records if the patient comes for the next visit*."

"*To be able to register faster, BPJS patients can register via Mobile JKN, then just enter it into the registration form.*"

"*When registering patients, we fill in the data on the registration computer, during the data entry process, we have never encountered any difficulties, in fact it is easier for us to register patients and faster*"

"*To get a faster queue, patients can register via JKN mobile or from WA*"

Writing Medical Records

After registering in the initial process, the medical record will then be directly connected to the service user, in the polyclinic service, emergency room or inpatient room, so that doctors and nurses who provide services can write the patient's medical records on the available medical record form in the form of Integrated Patient Progress Notes (CPPT).

"This electronic medical record is a patient's medical record that we write on a computer media, later the patient's data will be stored as a whole so that it is easy for us as doctors to see the patient's medical history. I write notes about the patient's health by clicking on the media for the patient's CPPT then typing via the keyboard on this computer and then I click the save sign"

"Because we now use computers, we can clearly read the doctor's instructions for patients, and we can also clearly write what the doctor has written on the computer."

"Electronic medical records are records of a patient's medical history written in electronic media, such as the example I am using now is that this patient's medical record no longer uses paper, but has moved to a tablet media. I write about the patient's illness in this tablet media using a pen tablet, just like I write on a paper medical record, only the media moves to the tablet screen, only I cannot write the patient's medical record if this pen tablet is damaged"

"It is easier to write patient medical records using this pen tablet, but reading the doctor's instructions is more difficult and requires more attention because some parts are illegible, but because I am used to it, I can read little by little."

Writing the results of supporting examinations

In the process of collecting medical record data, there is also writing of supporting examination results. This activity is carried out after the doctor writes the patient's medical records. Requests for medicines to be given to patients or requests for supporting examinations through order forms that will be inputted by nurses. Requests for supporting examinations, in accordance with the doctor's instructions written in the CPPT

"After writing the CPPT, for supporting examinations, we will order through the request form, then it will be directly connected to the examination section such as X-ray or CT-scan"

"The results of X-rays or CT scans and laboratory results can be read clearly because the writing is clear"

"Because it's like lab results, the results are written using a computer".

"The lab results can be read clearly because the writing is clearly typed on a computer"

Electronic prescription writing

The next activity after the supporting examination, will be continued for the request for medicines that are assumed to be the same as the doctor's prescription. The medicines that will be given to the patient are typed on the electronic prescription form by inputting the name of the medicine, the amount and how to use the medicine.

"*Patients after finishing from the polyclinic will go to the pharmacy, then to the cashier. But if the patient is referred, then after finishing from the polyclinic or inpatient, an online referral will be given and will end up at the cashier to be closed. Once it has been closed by the cashier, all medical records cannot be changed anymore."*

"To request medicine from the pharmacy, I write the medicines on this prescription, writing it the same way we write on a paper prescription, starting from the name of the medicine and the amount of medicine and how to take it is the same as the general prescription format."

"The patient comes out of the polyclinic, then goes to the pharmacy to get medicine, after that the file will be closed at the cashier, if the patient is referred, from the polyclinic the patient will be given an online referral then the final file is at the cashier".

Signing of medical record documents

In the process of recording medical records, in addition to writing down the patient's medical records, in medical records using a personal computer, the patient's document files are also signed.

"The patient's signature for consent to the action is done on the Action Consent Sheet paper and will then be scanned to be uploaded into the medical record, while the doctor's signature is no longer necessary because it is represented by the doctor's user usage history."

"For approval of the action, the patient directly signs the action consent form on this tablet using a pen tablet, for the doctor's signature, it is also done directly on this tablet using a pen"

Medical Record Data Storage

Medical Record Data Storage Media

Medical record data storage media is an electronic device used to store all patient medical record data.

"All patient medical records are stored in a database on the server computer. The stored data are all patient medical records from years ago when patients received initial health services at this hospital. Because the stored data is large, we need a large storage memory."

"To anticipate any data damage, we have implemented an auto data backup system, so if there is damage and error, it can be repaired more quickly. We also do this data backup every month and burn it on DVD."

"Medical record data will be saved automatically when the save button is clicked. Medical record data is saved according to the patient's RM number and treatment date and the data will be saved on the E-doc server computer. This computer must have a large storage capacity because the data stored is large"

"So the backup of the patient's medical record data is in our database and is also backed up by Farmagitech, so if there is any data damage, we contact Farmagitech to make repairs."

Medical Record Data Storage Security

In the process of storing patient medical record data on the server, it is necessary to ensure the security of the stored medical record data.

"So far, our patient data has been safe and has never been hacked by outsiders because we have a network security system, we implement a firewall system so that data traffic is monitored and can be detected if there is an attack from outside and the system that is running is still limited to the hospital's internal."

"For the security of medical record data here, so far it is still safe, there has never been any infiltration or damage to patient data, because we use a local server network, so that data traffic is more monitored and the scope is limited to the hospital only."

Medical Record

Data Processing

Coding

From the results of observations at Putri Bidadari Hospital, it was found that the process of coding diseases and medical actions was carried out at the time of final data collection.

"In the coding process, we fill in the disease code and action code according to ICD 10 and ICD 9 CM"

"Our medical record system has been bridged with the E-Claim application from the Ministry of Health"

"For coding, we input it in the inacbg form with the disease code that we see from ICD 10 and the procedure code seen from ICD 9 CM"

"Our e-doc application has been bridged with the e-claim application, so we enter the disease coding through the e-doc application only."

Reporting process is the process of reporting the condition of services in the hospital

Reporting is done to the hospital internally and externally such as the Health Service, Ministry of Health and other stakeholders.

"For example, if you want to see the number of visits per day, you must first click on the visit date, then process it and then see how many visits there are."

"For data to be analyzed, we usually pull the data on the computer. For example, data for claims, download from the computer for further analysis."

Analysis

Medical record data analysis is the process of analyzing medical record data qualitatively and quantitatively. The results of observations conducted at Putri Bidadari Hospital found that medical record data analysis can be carried out during the health service payment claim process.

"This withdrawal data is to see how many patients will be claimed and the amount of money that will be paid."

"The data is processed and then analyzed to see how many patients will be claimed and how much the total cost is and we can also analyze the completeness of the contents of the medical records."

Accessing Medical Record Data

In the process of accessing medical record data, interviews were conducted with informants who were directly involved in this electronic medical record.

"I can read the entire contents of the patient's medical records, I can read the results of supporting examinations such as laboratory results, but I cannot change or write, because each has its own section."

"I can see the entire contents of the patient's medical record, such as deafness"

"We can see all the contents of the patient's medical records, but we cannot write in the medical records the results of the supporting examinations, so we write them in the form provided for us to write the results."

"When we want to change data, for example, correcting typos or incomplete words, the time it was typed and when we opened the patient's medical record will be recorded."

"I log in using a user ID, which is my name, and a password that contains all numbers, so other people cannot use my user ID to view patient medical records."

"I log in using a user ID, which is my name, and a password that contains all numbers, so other people cannot use my user ID to view patient medical records."

"My user ID uses my name and the password uses a combination of numbers, letters and symbols, so if I want to enter the e-doc I have to log in first."

DISCUSSION

Medical Record Data Collection registration

Registration The patient registration process is the first process in the electronic medical record data collection activity. In this activity, the patient's identity data is inputted or the patient's initial registration is carried out to obtain the patient's medical record number. At Putri Bidadari Hospital as a user of medical records using a personal computer, the registration process is carried out by inputting data on the computer device by filling in the patient's identity in the form of name, date of birth, age, occupation, address, medical record number, mobile phone number and Population Identification Number (Erawantini et al.), and

if it is a patient with BPJS Kesehatan as a guarantor, the BPJS Kesehatan membership number and referral letter number from the FKTP are also inputted to obtain a Participant Eligibility Letter (SEP) which is a guarantee that the patient is a guarantor of BPJS Kesehatan. The patient registration form on the HMS application has been integrated with the BPJS Kesehatan VClaim application, so that after being entered on the registration form, the SEP output from the VClaim application will be printed directly. And for the future, this SEP will be the basis for guarantees for patients and as proof of service so that BPJS Kesehatan will pay the hospital for the cost of health services that have been received by the patient.

Writing Medical Records

Writing medical records is a process consisting of recording and documenting the results of examinations, treatments, actions, and other health services provided to patients. At Putri Bidadari Hospital, in writing patient medical records, informants type patient medical data using the keyboard and then after typing the patient's medical data, the informants click the save button and then the medical data will be saved according to the date and time of writing. Writing medical records carried out by health service providers such as doctors and nurses is done in the CPPT form. In the form, it is recorded based on the SOAP structure, namely Subject containing the results of the patient's anamnesis, Object containing the results of the physical examination performed on the patient, Assessment, namely the diagnosis established by the doctor and Planning, namely the Action plan or therapy plan given to the patient. The results of recording medical records using personal computer media produce clear and easy-to-read writing. So that nurses or other parts that are part of the health service can clearly read how the medical records of the patients being served.

Writing Supporting Examination Results

In collecting medical record data, in addition to writing down the patient's medical information, in the action plan that will be carried out on the patient, supporting examinations will be carried out. The supporting examinations in question are laboratory examinations and radiological examinations such as CT-scans, X-rays and USG. To input data from supporting examination results, informants still use computers to write the results of the examination in the patient's medical records. From the results of observations and interviews conducted at Putri Bidadari Hospital, it was found that in writing the results of supporting examinations in the radiology section, the reading results were written by typing using a keyboard on a personal computer by a doctor or radiology officer. The written results that were inputted can be read clearly. So that it can clearly describe the results of the supporting examinations given to the patient. Then after the reading results are typed, a signature is given on the examination results sheet. At Putri Bidadari Hospital, they no longer use signature specimens because the system is computerized and the signature is represented by the user.

Electronic Prescription Writing

Prescription writing is an activity carried out by doctors as a final manifestation of the doctor's competence in providing comprehensive health services in applying knowledge and expertise in the field of pharmacology and therapeutics appropriately. Electronic prescriptions are also known as E-prescribing, which is an electronic prescription that allows doctors and other medical practitioners to write electronic prescriptions and directly connect to the desired pharmacy computer. The results of observations and interviews conducted at Putri Bidadari Hospital found that part of the end of the service is the provision of drugs by making a request for drugs that are assumed to be the same as the doctor's prescription. From the results of interviews conducted with informants, it was found that after writing the CPPT, the doctor will make a request for drugs that will be given to the patient by writing a prescription

electronically by typing it on the electronic prescription form by inputting the name of the drug, the amount and how to use the drug. Furthermore, the prescription will be directly connected to the pharmacy or hospital pharmacy installation.

Signing of Medical Record Documents

The process of signing electronic medical record documents is an activity of providing a signature specimen on a document. From the results of interviews and observations at Putri Bidadari Hospital, it was found that in the process of signing medical record documents written by doctors, nurses and other medical personnel, they did not provide a signature specimen on the document but had been implemented and represented computerized using a User ID and Pin or password. However, for the process of signing medical consent, Putri Bidadari Hospital still uses paper media which is then scanned and then uploaded into the patient's medical document folder and stored on the server. Compared to RSIA Abby as a user of electronic medical records using an android tablet, the process of signing patient medical record documents is carried out directly using a pen tablet, both in the patient's medical information record documents written by doctors and other health workers and the action consent file signed by the patient directly. And this is the advantage of electronic medical records using tablet media.

Medical Record Data Storage

Medical Record Data Storage Media

Storing patient medical records is very important because it concerns the patient's health history. At Putri Bidadari Hospital as a user of electronic medical records that uses personal computer media, patient medical data is stored on a server or data bank managed by the hospital's IT staff. The stored data includes the entire history of the patient's medical services at the hospital. The media used as a server is a set of computers with a capacity specification of 7 terabytes that stores all patient medical record data from the beginning of the treatment history to the end of treatment.

Medical Record Data Storage Security

In terms of the security of medical record data stored on the server, the organizer of electronic medical records must ensure that the storage of medical record data must be safe from external attacks. Putri Bidadari Hospital stated that their data security was felt to be safe, although it had been hacked by an external party to damage the data, but the hacking process was unsuccessful because they had a high security system so that they could know if there was an attempted data attack and they had an SOP to recover the data. The IT staff at Putri Bidadari Hospital also backed up data every month so that when a hack occurs, the data can be recovered quickly.

Medical Record Data Storage Flow

Electronic storage of medical records is an activity in which medical records are stored on digital-based storage media carried out by health service providers. In terms of electronic storage of medical records, it must guarantee data security, integrity, confidentiality and availability of the electronic medical records. Electronic medical records organized by health care facilities must have Compatibility capabilities, meaning that the electronic medical record system is integrated and compatible with other electronic systems. In this aspect, Putri Bidadari Hospital and Abby Hospital have fulfilled the compatibility aspect, namely that the medical records written in each section are directly connected to other sections and stored directly on the data server. So that there is a mutual relationship between one section and another.

Medical Record Data Processing

Coding

Coding is the activity of providing codes for diseases and actions or procedures that have been diagnosed and performed by a doctor. Coding of disease diagnoses uses the International Statistical Classification of Diseases and Related Health Provlem Tenth Revision (ICD10). ICD 10 contains a diagnostic classification of diseases with international standards that are arranged based on a category system and grouped into disease units according to internationally agreed criteria. In ICD 10 there are ± 14,500 disease codes. Then in coding operative or non-operative actions and procedures, the Action is coded using the International Classification of Diseases and Revision Clinical Modification (ICD 9 CM).

In ICD 9 CM there are ± 7,500 procedure or action codes (WHO, 2010; NCHS, 2010) In the process of coding diseases and actions or procedures carried out by doctors are not done carelessly, but must follow the coding rules regulated in each code both in ICD 10 and ICD 9 CM. Currently in Indonesia, in the process of coding diseases in hospitals and other service facilities, in addition to using the coding rules in ICD 10 and ICD 9 CM, they also use the Regulation of the Minister of Health Number 26 of 2021 concerning INA-CBG Guidelines in the implementation of JKN. So that uniformity is obtained in the process of coding diseases in electronic medical record data.

Reporting

Electronic medical record data reporting is the process of presenting reports derived from electronic medical record data. The report will be presented according to the needs required. At Putri Bidadari Hospital as a user of electronic medical records on personal computer media, reporting is carried out periodically, namely every month. The report is in the form of an inpatient and outpatient report. The report is for the internal needs of the hospital to see the number of visits from inpatient and outpatient care and how much income is obtained from these services. From the report data, we can calculate the figures showing the percentage of beds used in one year (BOR), the figures showing the average length of time a patient is treated (ALOS), the figures showing the level of use of a bed, the average number of patients using each bed in the year in question (BTO) and the average number of days a bed is unoccupied, which is the time between a bed being left by a patient until it is occupied again by the next patient (TOI).

Analysis

Electronic medical record analysis is the process of qualitatively and quantitatively analyzing electronic medical record data. As stated in (Permenkes, 2022) Article 28 (2) the Ministry of Health has the authority to utilize and store the contents of Electronic Medical Records in order to process health data. (3) The processing of health data as referred to in paragraph (2) is carried out for the development of science and technology, and/or the creation of health policies, by paying attention to the principles of evidence-based medicine, medical ethics, and provisions of laws and regulations.

Accessing Medical Record Data

The process of accessing patient medical record data is the process when a user accesses medical record data and writes patient medical records in the medical record. Data access may only be carried out by users who are given medical record access rights. At Putri Bidadari Hospital, data access rights are given to doctors, nurses and other health workers. The access rights granted are limited to their work section, and the granting of access rights is given in accordance with the decision of the health facility leader. Likewise at Abby Hospital, the data

access process is only given to users who provide health services such as doctors, nurses and other health workers. Users can only see the contents of the medical record, but to change the contents of the medical record, only limited access is given to their respective work sections. Access rights are given to users who provide services in accordance with the decisions of each hospital leader.

CONCLUSION

Based on the results of the study that has been conducted to see the comparison of electronic medical records using personal computers and android tablets, it was found that Putri Bidadari Hospital uses electronic medical records using personal computer media with the application name Hospital Management System (HMS) produced by PT Abiyosoft. While RSIA Abby uses electronic medical records using android tablet media with an application named Electronic Documents (E-Doc) produced by PT Farmagitechs. From the results of observations and interviews, it was found that from the process of collecting medical record data, there was a significant difference in the process of writing the contents of the medical record, namely on personal computer media, writing was done using a keyboard by producing clear writing that can be read by users who have access to medical records, while on Android tablet media, medical records were written using a pen tablet by producing writing like handwriting on conventional medical records but moving to electronic media with writing that is rather difficult to read if the doctor's handwriting is not clearly written.

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