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Analysis of the Implementation of Electronic Medical Records in Increasing the Efectiveness of Outpatient Registration at Uptd Puskesmas Arcamanik

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Abstract: The development of information technology has brought significant changes to healthcare service systems, one of which is through the implementation of Electronic Medical Records (EMR). This study aims to analyze the implementation of EMR in improving the efficiency of outpatient registration processes at UPTD Puskesmas Arcamanik. This research uses a qualitative descriptive approach with data collection techniques through interviews, observations, and documentation involving five administrative and healthcare staff. The results indicate that EMR implementation can accelerate the registration process, improve data accuracy, and enhance staff work efficiency. However, challenges such as limited infrastructure, dependence on internet connectivity, and human resource constraints remain obstacles. EMR implementation has proven to have a positive impact on service quality, but it requires system strengthening and continuous training.

Keyword: Electronic Medical Records, Outpatient Registration, Community Health

INTRODUCTION

The birth of the medical record system took place along with the emergence of medical disciplines that developed continuously in line with the advancement of the times and technology. In 1902, the American Hospital Association for the first time held a discussion on medical records. In 1905, a number of physicians gave input for the improvement of medical records, highlighting the importance of having complete medical records for the benefit of patients and health workers, so it needed to be compiled as best as possible. This medical record is what we call a medical record (Natsir, 2022). Medical records are documents that include identity, anamnesis, results of physical examinations, laboratory results, diagnoses, and medical procedures recorded manually or electronically. Medical records are more than just records, they are the presentation of medical services and actions obtained by patients (Handiwidjojo, 2009).

The development of technology and information systems has had a great influence in various aspects, including the health sector. Digital innovations such as Electronic Medical Records (RME) are one of the strategies in the six pillars of Indonesia's health digital transformation that focus on the development of health data, healthcare applications, and the improvement of a platform-based health technology ecosystem to improve the quality of health services more effectively and efficiently (Siswati et al., 2024).

Electronic medical records store patients' medical information in digital form and can be accessed quickly and securely by healthcare workers. This system replaces manual logging that is prone to errors and delays. In Indonesia, the implementation of RME has been proven to increase efficiency, speed up the recording process, and support data-driven medical decision-making (Ikawati, 2024). At the primary health service level, especially in health centers, the implementation of RME has high relevance in supporting the integration of work systems. As a frontline service, health centers face a significant workload, especially in outpatient services. A fast and accurate patient registration process is a key aspect in the smooth running of medical services. However, in its implementation, many health centers still rely on manual or semi-digital systems that can cause various problems, such as long queues, data input errors, and duplication of patient identities (Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022 concerning Medical Records, N.D.). UPTD Arcamanik Health Center in the city of Bandung is one of the health centers that has implemented RME in registration and outpatient health services. However, the implementation of this system also faces a number of challenges, including limited IT infrastructure, lack of training, and resistance from officers to the new system. These obstacles show that the success of the RME depends not only on technology, but also on the readiness of human resources and organizational support.

According to data from the Center for Indonesia's Strategic Development Initiatives (CISDI), out of a total of around 9,831 health centers in Indonesia, as many as 4,807 health centers or 48.9% still do not implement electronic medical records, so they still rely on manual recording. This data shows that approximately half of the health centers in Indonesia have not switched digital, so it is urgent to evaluate the effectiveness of RME at the primary service level. Therefore, in-depth research is needed on the implementation of RME at the Arcamanik Health Center UPTD, especially in improving the effectiveness of the outpatient registration process. This research is expected to present a comprehensive picture of the benefits that have been achieved, the obstacles faced, and strategic steps that can be taken to optimize the system. In addition to serving as an internal evaluation material, the results of this research can also be a reference for other health centers in designing better and sustainable health service digitization policies. The novelty of this study lies in the focus of evaluating the effectiveness of the application of Electronic Medical Records (RME) in the registration process at the primary service level (puskesmas), which is still rarely studied in detail. This study contributes to filling the gap in the literature related to RME evaluation, especially regarding its impact on the outpatient registration process.

METHOD

This study uses Descriptive method with a qualitative approach to provide an objective overview of the implementation of Electronic Medical Records (RME) at the Arcamanik Health Center UPTD, Bandung City. The informants in this study are administrative staff, nurses, doctors, midwives and pharmacists. The data collection techniques used by the researcher include interviews, observations, and documentation. The samples taken are health centers that have implemented an electronic medical record system. The data sources used in this study consist of primary data and secondary data. Primary data was obtained directly from interviews and observations conducted on administrative officers and health workers.

Meanwhile, secondary data is obtained from archives or documents as well as documentation related to registration services at health centers. The research lasted for two months, from April to May 2025, and the results of the analysis were used to evaluate the existing system and provide recommendations for improvement.

RESULT AND DISCUSSION

Research on the Analysis of the Implementation of Electronic Medical Records in Improving the Effectiveness of Outpatient Registration was carried out at the Arcamanik Health Center UPTD. The Arcamanik Health Center is located on Sports Street No. 7 RT.02 RW.09, Sukamiskin Village, Arcamanik District, Bandung City. This health center has two service areas, namely Sukamiskin Village and Cisaranten Binaharapan Village, Arcamanik District with a total population of 31,744 people. In January 2024, the Arcamanik Health Center UPTD has implemented Electronic Medical Records (RME) in the registration process as well as health and medical services. Previously, this health center had started using RME, but in its implementation there were obstacles in the form of a lack of completeness in the application, so that the collection of patient data from registration to service, including disease history and pharmacy, was still done manually, which resulted in incomplete data.
Before being implemented in services, RME is first socialized by the Bandung City Health Office and its policies to the Head of the Health Center. The information was then conveyed to all health center staff. The Health Office also conducts training for health workers so that they understand and can use RME at health centers.

In the initial phase of implementing RME in health centers, various common obstacles emerged, including limitations in technological infrastructure, because not all health centers have adequate computer equipment. Human resources also play a role, there are some employees who are not ready due to lack of experience with more complex RME applications, resulting in an increase in workload. Limited budgets can also hinder the implementation of RME, because not all health centers get priority for RME facility assistance. The researcher conducted interviews with administrative staff and four health workers who served at the Arcamanik Health Center UPTD. Among the health workers interviewed were nurses, doctors, midwives, and pharmacists.

Based on the results of interviews with the administrative officer of the Arcamanik Health Center UPTD, it is known that before the implementation of Electronic Medical Records (RME), the patient registration process was carried out manually, namely by filling in patient data in a register book using handwriting. This process takes quite a long time, especially when there are long queues. However, after the implementation of RME, patient data filling becomes faster and more efficient. The officer only needs to enter the patient's Population Identification Number (NIK) into the system, and the patient's data will be automatically displayed. This speeds up the registration process and reduces the chances of errors in patient data writing. "In the past, I had to look for physical medical records in the roll pack cabinet, physical archives were piled up, it needed a large enough room, files were prone to loss/damage, and anyone could access the files, if filling out medical records was a long process, it would take a long time to fill out manual administration." (Interview with Administrative Staff, April 4, 2025).

"But now the data directly appears in the computer system, so there is no need to search for the physical files, now they are stored digitally, so there is no need for a special archive room. For security, there is already a username/password so it can only be accessed by authorized officers. In terms of time or efficiency, registration is now faster, so working time is more efficient and easier" (Interview with Administrative Staff, April 4, 2025)

In terms of time and effort efficiency, staff productivity, and quality of service to patients, prior to the implementation of RME, the administrative process was slow because data filling was done manually, took a long time, and made staff more focused on recording and archiving physical files. This condition causes the patient's waiting time to be longer, and sometimes the data recorded is incomplete because the process is carried out in a hurry. "Originally, the staff only focused on recording and manual archives, so the waiting time could be longer, sometimes incomplete because of the rush. The good thing used to be that it didn't depend on the network, but it was slow and easily damaged. For the problem at the beginning, not all staff can launch the computer, so sometimes there is a wrong input." (Interview with Administrative Staff, April 4, 2025).

"Now staff can focus more on service because administration is simpler, services can be done quickly, accurately, and patient history is easily accessible. For the network depends on the internet connection and server. Not only that, otherwise bridging with other systems will hinder the service process using BPJS. If there is a problem with the network, then it will be all in trouble." (Interview with Administrative Staff, April 4, 2025).

In the early stages of implementation, the challenges faced included the limited ability of some staff to operate computers, which resulted in data input errors. "Not all staff can use computers smoothly and quickly, so input errors often occur. Maybe later we can hold training and technical assistance" (Interview with Administrative Staff, April 4, 2025). Previous manual systems did not depend on the network, but the process was slow and at risk of damage. These problems can be minimized through training and technical assistance for staff. However, the use of RME is entirely dependent on an internet connection and a server. If it is not integrated (bridging) with other systems, the service process, especially those that use BPJS, can be hampered. Network disruptions can also cause the entire data input process to be delayed.

"Hopefully in the future it can increase integration between health facilities, increase system capacity and further training for health center staff." (Interview with Administrative Staff, April 4, 2025).

The results of interviews conducted with other medical personnel as users of advanced services have been obtained. After the patient registration process by the administrative staff is completed, the next step is to check using the identical SIKDA application, but with a different account. The account used by other health workers is an account specifically designed for screening and examination purposes. The following are interviews conducted by researchers regarding services before and after the implementation of electronic medical records at the Arcamanik Health Center UPTD.

Based on an interview with a nurse, the process of registering patients in the manual method takes a long time because the officer has to write data manually, "Patients wait a long time, because the officer writes manually, sometimes I help find files to facilitate the search process and speed up the service process" (Interview with a nurse at the Arcamanik Health Center, April 4, 2025).

The implementation of RME makes the registration process faster; Simply by entering the NIK, patient data can be directly displayed on the monitor screen. "Registration can be faster, I just need to input the NIK, the patient's data directly appears on the monitor screen so it is easier to summon the patient for examination" (Interview with a nurse at the Arcamanik Health Center, April 4, 2025). Nurses can also immediately find out the list of patients registered on that day so that services can be carried out faster and more precisely.

"Sometimes patients are ready to be examined but cannot be served because the patient file does not exist yet" (Interview with a nurse at the Arcamanik Health Center, April 4, 2025).

However, the use of RME still faces obstacles, such as a slow system or errors if the internet connection is unstable, so that patient data does not appear and hinders services. Nurses also sometimes cannot input patient screening results due to the disruption "sometimes the system is slow and can be an error if the internet is unstable, so the data of the examined patients does not appear, which hinders services. I also sometimes can't input the results of patient screening." (Interview with a nurse at the Arcamanik Health Center, April 4, 2025).

This is also supported by the results of interviews with doctors that manual patient registration has a weakness in the form of incomplete patient data that is sometimes lost, so it is necessary to create new medical records. "The completeness of patient data is sometimes lost so I use new medical records and I can't know the patient's previous disease history." (Interview with general practitioner UPTD Arcamanik Health Center, April 4, 2025).

This condition results in doctors not being able to know the patient's previous history of disease. In addition, the recording of disease diagnoses is done manually, and sometimes the diagnosis filling form runs out or is damaged, thus slowing down the examination process. The implementation of RME makes patient data can be displayed in full immediately, including disease history and medications that have been given. "Patient data immediately appears and there is already a history of disease with the previous medication." (Interview with general practitioner UPTD Arcamanik Health Center, April 4, 2025).

All records are neatly documented and can be accessed quickly, making them very helpful in the diagnosis process. RME also makes it easier to make patient referrals easily and efficiently. "Disease diagnosis is written manually, sometimes the diagnosis form runs out or is torn, so it slows down the examination process. RME is very helpful, as all records are neatly documented and quickly accessible. helps me in making referrals easily and quickly." (Interview with general practitioner UPTD Arcamanik Health Center, April 4, 2025).

According to an interview with a midwife, it shows that the process of registering patients in the manual method is carried out by checking the register book, then looking for data in the KIA book. If the data is lost, the officer must recreate the patient's data. "You have to check the register book, then look for the data in the KIA book. If it is lost, the data must be recreated." (Interview with the midwife of the Arcamanik Health Center UPTD, April 4, 2025).

This process takes a long time to search archives and synchronize data, so it does not speed up services and has an impact on the length of the patient examination process. With the implementation of RME, data on pregnant women and toddlers can be directly displayed in the system during registration, complete with antenatal care (ANC) history. Services are faster because there is no need to search for physical files, and patients feel more satisfied. This is very helpful, especially in the schedule of family planning services and examinations for pregnant women which take longer, so that the existence of RME is able to speed up the registration process and pe Data of pregnant women and toddlers immediately appears in the system when registering, complete with their ANC history. "No, it takes time to search the archives and synchronize the data. faster. No need to look for physical files, patients are happy. Moreover, the schedule of family planning and pregnant women whose examinations are quite long, so the presence of RME helps speed up the process of examining patients. "(Interview with the midwife of the Arcamanik Health Center UPTD, April 4, 2025).

However, problems can still occur, for example when there is a power outage or signal interference, so the last alternative is to record manually.

The results of an interview with a pharmacist show that in the manual method, the drug prescription is submitted directly in physical form, so there is a risk of illegible or even lost writing. This condition also makes pharmacists sometimes not know the patient's history of drug use, which can affect the accuracy of drug administration. With the implementation of RME, prescriptions can be automatically displayed in the system after the patient has completed the examination. This system allows pharmacists to view the history of allergies and previous drug use, so that medication administration becomes safer, more precise, and in accordance with the patient's needs." Prescriptions must be submitted manually, sometimes the writing is illegible or lost, sometimes you don't know the patient's drug use history, now the prescription directly appears automatically from the system after the patient is checked you can see the history of allergies, previous use, to be safer. Sometimes if the system is slow, the input of prescriptions can pile up, you need a stable internet." (Interview with pharmacist UPTD Arcamanik Health Center, April 4, 2025).

From the results of interviews conducted by the researcher with administrative staff and health workers, it is clear that there is a significant difference between the conditions before and after the implementation of electronic medical records (RME) in the outpatient registration process as well as examinations and treatment at the Arcamanik Health Center UPTD. The use of RME in health centers does not cover the possibility of various problems in its implementation. The implementation of electronic systems certainly requires a lot of infrastructure support so that the data input process can run efficiently and regularly. In the opinion of the health center officers, almost all experienced challenges related to internet network problems, because RME is very dependent on the internet connection. Without stable internet access, the electronic-based service system will be stopped, so the process of using medical records manually will be carried out temporarily until the internet connection returns to normal and input can be resumed.

Initially, health centers in Indonesia used a paper-based manual medical record system to record patients' health histories. With the advancement of information technology and digital transformation from the government, health centers have begun to switch to Electronic Medical Records (RME), including the Arcamanik Health Center. In January 2024, the Arcamanik Health Center UPTD Arcamanik Health Center has used Electronic Medical Records (RME).

Around 100 patients are served every day at the Arcamanik Health Center Uptd. In the city of Bandung, the health center uses an application called SIKDA (Regional Health Information System) for the input of health services and information, although it still relies on manual medical records. As the application develops, the form becomes more comprehensive and detailed. SIKDA is not only used in registration, but also in every aspect of health services, from health screening, examinations, to drug administration. Therefore, RME is very important in health services at the health center until the patient finishes undergoing treatment.

This study shows that the implementation of RME speeds up the registration process, access to medical history, and pharmaceutical services. This is consistent with journals “Preparation for the Integration of Manual Medical Record System to Electronic Medical Record System at Puri Asih Karawang Hospital” (Firjatullah, T. Q. A., & Ade Irma Suryani, 2023).

In the study, researchers noted that manual systems generated 0.07% of duplicate medical records per month and 0.11% of document loss, indicating significant risks in manual systems that need to be minimized through integration into electronic versions. The presence of an RME has been shown to reduce such irregularities, as you will find in the results of the interview. Journal titled "The Effectiveness of Electronic Medical Records in Supporting the Quality of Medical Recorder Performance at Bandung Kiwari Hospital”

(Maliala, S. P., & Suryani, A. I. 2024). It stated that RME improves aspects of security, integrity, and data availability, as well as improving the efficiency and discipline of officers with a discipline score of 90%. Your findings are consistent with these results—for example, nurses and doctors report ease of access to patient data through the NIK, and pharmacists feel safer because they can quickly see their allergy and medication history.

Technical constraints such as unstable connections and outages—which you found are in line with a journal from Hermina Solo that reports that EMR implementation reduces wait times, but still faces system bottlenecks and infrastructure limitations. Likewise, the Tajinan Health Center study highlighted that the lack of SOPs, limited hardware, and training are serious obstacles in RME optimization

According to health workers at the health center, many changes were felt before and after the implementation of RME. They support the presence of RME because it simplifies the service process and provides comfort for all parties, including patients. The researcher conducted direct observations on the implementation of the Electronic Medical Record (RME) system at the Arcamanik Health Center UPTD, including the data input process, challenges faced, benefits felt, and responses from officers and patients.

The results of the observation which cover various aspects at the Arcamanik Health Center and the steps taken if there are obstacles in the service process are as follows.

Based on the results of observations at the health center, each service unit, such as registration, polyclinic, and pharmacy, already has adequate computers to support operations, although some computers are still working slowly and their specifications are relatively low, so it is necessary to improve device specifications and repair those that are damaged so that service performance is more optimal. The internet network has covered all polyclinics and service rooms so that it can be accessed by all units, but it is not always stable, so it is necessary to increase server capacity and network quality so that access remains stable and optimal.

Officers have used the Electronic Medical Record (RME) application in the process of registering and recording services, but not all features are used to the fullest, so the use of application features gradually with assistance is expected to increase the optimal utilization of RME. The majority of administrative staff and health workers have received training, but some staff still need assistance, especially due to the limited number of administrative staff in the registration section which has only one officer, so assistance from other staff and independent training is required, and health workers can be scheduled alternately to assist with registration, accompanied by the submission of additional medical record personnel and the patient registration process has been carried out in a systematic manner electronic devices so that it is faster and more efficient, but patients are still required to bring their identity cards as supporting documents to anticipate network disruptions or data input errors.

Doctors and nurses record patient complaints, diagnoses, and actions digitally, although at times of high patient burden, data input is sometimes delayed, so input outside of service hours is needed to keep the patient examination process smooth. Physical files are still stored as backups, while data searches are more often done through the RME system, so that a combination of conventional and digital storage still maintains data security while making it easier for patients to access information.

Electrical or internet network disruptions are the main obstacles in RME's operations, and the system is sometimes inaccessible when the central server is disrupted, so the use of temporary manual systems and the procurement of backup electricity such as UPS or generators needs to be implemented if possible. Patients feel happy and comfortable with the speed of service provided, showing that the implementation of electronic systems has succeeded in increasing patient satisfaction. The support of the health center leaders is seen

through regular monthly evaluations and quarterly workshops, which aim to monitor staff performance, evaluate service processes, and improve service quality on an ongoing basis.

At the beginning of the move, a number of problems arose, one of which was caused by the officers' unfamiliarity with this electronic medical record system which caused a pile of patients due to the hampered service process. In addition, doctors and nurses also still have to refer to manual medical record files or previous data that have not been recorded in the new system, this certainly makes the work process take longer because officers need to perform two tasks, namely searching for manual medical record files and also using an electronic medical record system. This is in line with the study at the Jabung Health Center, Malang Regency, which revealed that the resistance of officers to the new system, the limitations of the e-Puskesmas (e-Pus) application features, the frequent occurrence of application bugs, as well as network and electricity disruptions, caused the use of hybrid systems, namely a combination of manual and electronic, to continue for a long time even after the implementation began. These findings illustrate the real challenges in the digital transition, where in the initial phase, the workload actually increased due to double adjustments to two systems at once as experienced by the service team at the Arcamanik Health Center.

The implementation of RME at the Arcamanik Health Center has been going quite well, as can be seen from the use of the system by officers in almost all units. Although there are still technical constraints and the need for further training for some staff, overall the system has succeeded in improving service efficiency, data accuracy, and quality of medical records.

In the initial phase of RME adoption at the Arcamanik Health Center, it was found that the electronic system succeeded in speeding up the registration process, although challenges such as the adaptation of officers to the new system and technical obstacles still arose. This is strengthened by research at the Nanjungmekar Health Center which shows that the implementation of RME significantly improves the accuracy and completeness of medical records, as well as reduces outpatient enrollment time and increases patient satisfaction with the services received. These findings are in line with research conducted that the use of electronic systems not only speeds up the registration flow, but also improves the quality and comfort of service for patients and administrative officers

CONCLUSION

The Arcamanik Health Center UPTD has started using Electronic Medical Records (RME) since January 2024. The use of RME in health centers in general has a positive impact on improving the quality of health services. RME can speed up patient administrative processes, improve accuracy in medical data input, and make it easier for healthcare workers to access health information. With the existence of RME, coordination between polyclinics in health centers becomes more effective, the medical decision-making process takes place faster and more precisely, and reduces the risk of data loss or damage. However, the success of the implementation of RME is highly dependent on the readiness of infrastructure, training for health workers at health centers, and support from management and applicable regulations.

Based on the findings of this study, it is recommended that the Electronic Medical Record (RME) system be integrated with BPJS to simplify the administrative process and improve the efficiency of patient services. In addition, it is necessary to hold regular training for health workers based on the national RME module, in order to improve the competence of human resources in the optimal use of the system. The implementation of these two steps is expected to improve the quality of health services and support the operational effectiveness of health centers.

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