The Effect Of Using Electronic Medical Records on Outpatient Waiting Times at Majalaya District Hospital

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Abstract. The implementation of electronic medical records (EMR) in hospitals has emerged as a pivotal strategy for enhancing the efficiency of healthcare services, particularly in reducing outpatient waiting times. This study examines the impact of EMR adoption on outpatient waiting times at RSUD Majalaya, employing a quantitative approach with a cross-sectional analytical design. Data were gathered through direct observations, interviews with hospital staff, and document analysis. The findings reveal that EMR implementation significantly shortens patient waiting times across key service stages, including registration, consultation, and medication collection. Additionally, EMR adoption improves patient satisfaction and streamlines the workflows of medical staff. Despite these benefits, challenges such as inadequate staff training and limited technological infrastructure were identified. The study concludes that EMR implementation has a positive impact on outpatient waiting times and recommends prioritizing staff training and infrastructure enhancement to maximize its potential. The implementation of EMR led to a significant improvement in total waiting time, which decreased from 250.86 minutes to 197.57 minutes (p-value 0.000 < 0.05). Specifically, the waiting time for doctor consultations was reduced from 125.42 minutes prior to EMR implementation to 102.45 minutes afterward (p-value 0.000 < 0.05), while the waiting time for pharmacy services declined from 96.48 minutes to 82.32 minutes (p-value 0.038 < 0.05). Statistical analysis using the t-test confirmed a significant positive impact of EMR on reducing waiting times.

Keywords: *Electronic Medical Records, Waiting Time, Outpatient Services, RSUD Majalaya, Healthcare Service Efficiency*

Introduction

Quality healthcare services are a key indicator of a hospital's success in meeting patient needs. One of the critical aspects of healthcare service delivery is patient waiting time, particularly in outpatient care. Long waiting times are often a primary complaint from patients, as they can significantly affect their satisfaction with the provided services. Therefore, hospitals need to adopt innovative solutions to optimize service efficiency, one of which is through the implementation of electronic medical records (EMR). Electronic medical records (EMR) are digital systems designed to replace conventional paper-based medical records. EMR usage offers various benefits, including faster data access, reduced risk of recording errors, and improved administrative efficiency. The implementation of EMR is expected to expedite various service stages, from patient registration and doctor consultations to medication collection at the pharmacy.

The use of electronic medical records (EMR) in healthcare facilities in Indonesia is not yet fully widespread. According to data from the Directorate of Referral Health Services, only 74 out of 575 hospitals in Indonesia have implemented integrated electronic medical records, and not all of them have fully optimized its use. Research suggests that implementing electronic medical records (EMR) has the potential to reduce waiting times in outpatient clinics. However, these findings require further validation, as some studies indicate that EMR implementation can lead to increased waiting times and delays in service delivery. Another frequently reported issue is patient dissatisfaction stemming from the repetitive nature of answering the same questions during each visit to healthcare facilities.

RSUD Majalaya, as one of the advanced healthcare facilities in Bandung Regency, has implemented EMR to enhance the quality of outpatient services. However, the effectiveness of EMR implementation in reducing patient waiting times requires further evaluation. Based on this issue, this study aims to analyze the impact of EMR implementation on outpatient waiting times at RSUD Majalaya. The research findings are expected to provide strategic recommendations for improving service efficiency and patient satisfaction.

Methodology

This study is a quantitative research that utilizes secondary data that has already been collected. The secondary data comes from a survey conducted by the hospital quality team regarding outpatient waiting times before the implementation of EMR, and system data extracted from the hospital's IT department for waiting times after the implementation of EMR. The research design used is an analytical observational design with a retrospective cohort approach.

In this study, a t-test was used to test the research hypothesis regarding the impact of each independent variable on the dependent variable. The t-test is a statistical test used to assess the validity or falsity of a hypothesis that suggests no significant difference between the means of two random samples taken from the same population. The research was conducted at Hermina Solo Hospital, focusing on regular outpatient services for BPJS-insured patients. The study took place between January 2023 and June 2024. The target population included secondary data on the total number of regular outpatients with BPJS insurance visiting the hospital, both before and after the implementation of electronic medical records, amounting to 189,240 patients. Using the Slovin formula with a 5% margin of error, the sample size was determined to be 327.

The inclusion criteria for the study were as follows: patients with previous visits, data on regular outpatient visits (including specialties such as internal medicine, pediatrics, surgery, obstetrics and gynecology, neurology, ENT, ophthalmology, dentistry, dermatology, urology, pulmonology, and cardiology), patients who received full outpatient services from registration to pharmacy completion, and those who underwent supporting examinations such as laboratory and radiology.

Stratified random sampling was employed, ensuring that each patient in the population had an equal chance of being selected, with the samples being drawn randomly without considering population strata. The research utilized secondary data collection, including a waiting time recording form previously compiled by the hospital. Additional supporting data were gathered through field observation forms, where the hospital's quality team recorded the time patients spent waiting for services at each unit, as well as EMR data on waiting times for outpatient consultations, doctor visits, and pharmacy services. Other supporting data included patient visit records, doctor practice schedules, doctor delays, use of the mobile JKN system, and pharmacy human resource ratios.

Results and Discussion

1. Total Outpatient Waiting Time Before Use of RME

Waiting time data obtained from the hospital quality team showed an average waiting time before RME of 4 hours 10 minutes 52 seconds, with details of outpatient waiting time as seen in Table 1 below.

Table 1. Total outpatient waiting time before RME

Waktu tunggu	Rata-rata (menit)
Pendaftaran	12.55
Nurse Station	16.41

Dokter	125.42
Farmasi	96.48
Total rata-rata	250.86

2. Doctor Waiting Time Before Using RME

The results of processing the doctor's waiting time before using RME were 2 hour 5 minutes 24 second. Related to this, there is also supporting data on doctor delays obtained from the report of the head of JKN Outpatient Care during the period using RME. Based on data on doctor delays per KSM, eye KSMs were obtained with a frequency of 32 times during the period before RME with an average delay of 60 minutes.

3. Pharmacy Waiting Time Before Using RME

Data obtained from the Hospital Quality team shows that the pharmacy waiting time before using RME is 1 hour 36 minutes 29 second. Supporting data for pharmacy waiting time is the ratio of pharmacy human resources to prescriptions or sub-prescriptions obtained from the head of the pharmacy installation. Based on the data on the ratio of pharmacy human resources to sub-prescriptions, there is a shortage of 6 pharmacists and 1 pharmacy technical staff to support JKN outpatient services.

4. Total Outpatient Waiting Time After Using RME

The total waiting time data sourced from the hospital IT team shows that the average waiting time after using RME is 3 hours 17 minutes 31 seconds with details of outpatient waiting time as in Table 2.

Table 2. Total outpatient waiting time after RME

Waktu tunggu	Rata-rata (menit)
Pendaftaran	2.4
Nurse Station	10.4
Dokter	102.45
Farmasi	82.32
Total rata-rata	197.57

5. Doctor Waiting Time After RME

Based on the results of processing the doctor's waiting time after using RME is 1 hour 42 minutes 27 seconds. Related to this, there is also supporting data on doctor delays. Based on data on doctor delays per KSM, it was found that in the Eye KSM

the average doctor delay was 75 minutes, with a frequency of 32 times during the period after RME.

6. Waiting Time After Using RME

From the data obtained by the hospital IT team, it shows that the pharmacy waiting time after using RME is 1 hour 22 minutes 19 seconds. Supporting data for the pharmacy waiting time is the ratio of pharmacy human resources to prescriptions or sub-prescriptions obtained from the head of the pharmacy installation. Based on the data on the ratio of pharmacy human resources to sub-prescriptions, there is a shortage of 6 pharmacists and 3 Pharmaceutical Technical Personnel (TTK) to support JKN outpatient services. Meanwhile, based on the PMK, the pharmacist ratio is 1: 50 outpatients with an average of 626 patients per day, 15 pharmacists are needed.

Analysis of Differences in Outpatient Waiting Time Before and After RME

Statistical analysis was used to test the hypothesis of the effect of RME on outpatient waiting time. For statistical analysis, outpatient waiting time data in hours: minutes was converted into minutes and the average was calculated. Furthermore, a normality test was performed to determine whether the data in both groups were normally distributed or not. The normality test for total outpatient waiting time, doctors, and pharmacists used the Kolmogorov-Smirnov test because the sample size in each population was 212 (> 50), where the results showed that in both groups the data was normally distributed p value> 0.05.

Berdasarkan uji normalitas Kolomogorov-Smirnov di atas menunjukkan nilai sig. (2-tailed) masing-masing variabel >0,05 maka dapat disimpulkan bahwa ketiga variabel diatas terdistribusi normal dan Analisa menggunakan t-test deskriptif. The implementation of electronic medical records at Majalaya Hospital affects the workflow which is often slowed down by the difficulty of reading the doctor's writing or seeing supporting results or previous examinations that are sometimes not in the manual medical record or are not brought by the patient when checking with the doctor and the delay in delivering manual medical records. However, there is research that states that there are several other factors that affect the total waiting time, including older age, visits to the internal medicine department, earlier registration times, and undergoing supporting examinations significantly affecting the total waiting time.

The registration time is also influenced by the low usage of mobile JKN at Majalaya Hospital. Mobile JKN is one of the means of registration and appointment of JKN patients. Before the implementation, the number of registrants via mobile JKN was 28 patients per day and after the implementation increased to 48 patients per day. Therefore, with the existence of SIMRS that has been bridged with mobile JKN, there

is an increase in utilization. This is also supported by the existence of mobile JKN ambassadors. This utilization is also useful for the next consultation scheduling system and provides recommendations to patients not to come earlier than 30 minutes before the scheduled appointment. This is in line with research by Nguyen, et al in 2018 which showed that the results of the introduction of a scheduling or appointment system can be recommended to reduce waiting time.

Conclusion

There was a decrease in the total waiting time for JKN outpatients before and after the use of RME, which decreased by 21.24%, which means that there was an effect of RME use on the total waiting time for JKN outpatients. The decrease in pharmacy waiting time before and after RME was 14.6%, which means that there was an effect of RME use on pharmacy waiting time. There was a difference in doctor waiting time before and after RME, which was a decrease of 18.831%, which means that there was an effect of RME use on doctor waiting time. Several factors that affect JKN outpatient waiting time include the scheduling and appointment system, doctor delays, and the length of action per doctor. Efforts that have been made include the addition of 2 pharmacists as an effort to reduce outpatient waiting time. The benefits of implementing RME have reduced the number of complaints from JKN outpatients by 52.42% and increased the satisfaction of JKN outpatients by 12.32%.

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