



Analysis Of Electronic Medical Record System Constraint Factors And Inpatient Registration Waiting Time At AMC Cileunyi Hospital

Marya Asriadisa Nurobul Tabar^{1*}, Sali Setiatin²

*Medical Records and Health Information Study Program, Politeknik Piksi Ganesha, Indonesia

Abstract

Electronic Medical Records (EMRs) are an important component in supporting healthcare delivery, including inpatient registration. Although EMR implementation can make service processes more effective, practical constraints may still disrupt registration and affect patient waiting times. This study aimed to identify constraints in the use of EMRs and describe inpatient registration waiting times at AMC Cileunyi Hospital. A quantitative method with a descriptive observational design was employed. Data were obtained through direct observation of 217 inpatients undergoing registration and interviews with registration staff. The data were analyzed descriptively using frequency distributions and percentages to characterize EMR constraints and registration waiting times. Of the 217 patients observed, 72 patients (33.18%) experienced constraints in EMR use, whereas 145 patients (66.82%) experienced no constraints. By type of constraint, fingerprint verification failure was the most frequently identified problem, affecting 69 patients (31.80%), while BPJS administrative constraints were found in 3 patients (1.38%). Regarding registration waiting time, 140 patients (64.52%) waited ≤ 15 minutes, whereas 77 patients (35.48%) waited > 15 minutes. Thus, most patients did not experience EMR-related constraints and completed registration within 15 minutes. Nevertheless, fingerprint verification remains the predominant constraint, and a substantial proportion of patients still experience waiting times exceeding 15 minutes. These findings may serve as evaluation material for improving EMR system stability and supporting the efficiency and quality of inpatient registration services.

Keywords: Electronic Medical Records, Waiting Time, Patient Registration, Inpatient Care

Correspondent Author: Marya Asriadisa Nurobul Tabar

E-mail: maryadisa113@gmail.com

Resive : 16 September 2026

Revised : 18 September 2026

Accept : 22 September 2026

Publish : 22 September 2026





1. Introduction

The development of information technology in healthcare has encouraged hospitals to transform from conventional medical records to Electronic Medical Records (EMRs). EMRs enable patient data to be recorded, stored, managed, and accessed electronically so that information can be available more quickly, accurately, and in an integrated manner. In Indonesia, EMR implementation has a legal basis in Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022 concerning Medical Records (Ministry of Health of the Republic of Indonesia, 2022). This regulation requires healthcare facilities to maintain medical records electronically and to ensure the security and confidentiality of patient data. EMR implementation is expected not only to support health-information management but also to improve the efficiency of various service processes, including patient registration. Strengthening the implementation of health information systems is also reflected in Regulation of the Minister of Health Number 6 of 2026 concerning Hospitals. The regulation stipulates that hospitals need to integrate documentation of operational activities, including operational records and patient services, into the National Health Information System while maintaining the confidentiality of medical data.

These provisions indicate that hospital service-information management, including data related to patient waiting times, needs to be supported by an integrated and professionally managed information system. In line with this, Regulation of the Minister of Health Number 24 of 2022 specifically regulates the obligation to implement EMRs in various healthcare facilities. Article 3 paragraphs (1) and (2) establish this obligation for healthcare facilities, Article 4 paragraph (1) includes telemedicine providers, and Article 8 paragraph (1) places the Minister as the party facilitating EMR implementation (Ministry of Health of the Republic of Indonesia, 2022). Therefore, EMRs function not merely as administrative instruments but also as an important component in supporting the quality and efficiency of healthcare services. In addition to information-system implementation, timeliness is an important aspect in assessing healthcare quality (Ariani, 2023). Regulation of the Minister of Health Number 30 of 2022 concerning National Healthcare Quality Indicators places timeliness among the quality dimensions that healthcare facilities are expected to fulfill, including in service and patient-registration processes (Ministry of Health of the Republic of Indonesia, 2022). Therefore, the specific time limit for inpatient registration in this study refers to the operational standard or policy applied at AMC Cileunyi Hospital.

Although various regulations have encouraged information-system implementation and compliance with service-time standards, implementation in practice continues to face constraints. Several studies have shown that technical disruptions in information systems can contribute to longer registration waiting times. A study at RSUD dr. Rasidin Padang found that unstable network connections and failure of fingerprint scanners to read patient data were obstacles that prolonged the registration process (Yunita Sari et al., 2025). Similar findings were reported in an evaluation of the BPJS outpatient-registration workflow, in which internal network disruptions and errors in the Virtual Claim application were





identified as major service constraints (Anissa Latifah et al., 2025). At RSUD Provinsi Banten, limited bandwidth and suboptimal server performance were also reported to impede system use and slow the registration process (Fauziyah et al., 2025). Meanwhile, research at RSUD Cilacap identified downtime or system errors and EMR server disruptions, which under certain conditions were handled by waiting until the system returned to normal or temporarily switching to manual registration (Fedora Nurhadiulhaq & Wulandari, 2025). However, EMR implementation does not always have the same effect on waiting time. Research at UPTD Puskesmas Wonorejo, Kediri Regency, showed that EMR implementation supported by online registration through Mobile JKN could help services achieve waiting times within the standard (Dwitama Hidayat et al., 2025). These differences indicate that the effectiveness of EMRs in supporting service speed is determined not only by the existence of the system but also by network reliability, supporting devices, application integration, and system readiness to support the service workflow. Accordingly, technical constraints in EMR implementation need to be examined more specifically because they may affect the smoothness of registration and achievement of service-time standards (Nugroho & Pramudita, 2024).

This condition was also identified during the researcher's initial observations while undertaking Field Work Practice (Praktik Kerja Lapangan/PKL) at AMC Cileunyi Hospital from February to April 2026. The hospital establishes a maximum waiting-time limit of 15 minutes for inpatient registration based on its applicable Standard Operating Procedure (SOP). Nevertheless, patients whose waiting times exceeded this limit were still observed. One of the most frequently encountered constraints was failure of the fingerprint-verification process in the EMR system. This condition may require the registration process to wait until verification succeeds or to involve additional steps before service can continue (Wijanarko et al., 2026). These findings are similar to those of previous studies at several healthcare facilities showing that biometric-verification failures, network disruptions, system errors, and downtime can impede registration. If these constraints are not systematically managed, waiting times exceeding the standard may reduce service efficiency and potentially lower patient satisfaction and hospital service quality. This condition is also related to patients' rights to obtain healthcare according to medical needs, professional standards, and quality-service requirements as regulated in Article 276 of Law Number 17 of 2023 concerning Health. On the other hand, the experience of UPTD Puskesmas Wonorejo, Kediri Regency, indicates that optimizing digital systems through EMR integration and online registration may support achievement of service-time standards.

Based on initial observations at AMC Cileunyi Hospital, EMR implementation in the inpatient-registration process still faces several constraints that may affect service time. One identified constraint is failure or difficulty in patient fingerprint verification. This prevents identity verification from proceeding as intended and increases patient waiting time. The longest inpatient-registration waiting time observed occurred when fingerprint-verification problems were present. These findings indicate that technical constraints in EMR





implementation are not only obstacles to staff workflows but may directly affect the speed of service received by patients. Consequently, EMR system constraints require attention because they can hinder achievement of the service time established by the hospital. This condition provided the basis for this study on EMR system constraint factors and inpatient-registration waiting time at AMC Cileunyi Hospital, with the purpose of identifying the constraints that occur and describing their impact on the inpatient-registration process. The findings are expected to support hospital evaluation of EMR implementation, improvement of registration-related constraints, and the development of faster, more effective, and higher-quality inpatient services.

2. Research Methods

This study used a quantitative method with a descriptive observational design to describe the distribution and types of Electronic Medical Record (EMR) system constraints occurring during inpatient registration at AMC Cileunyi Hospital within a single observation period without follow-up observation. A descriptive design was selected because the study focused on describing the frequency and percentage of EMR constraints occurring in practice, consistent with the descriptive approach used in studies of EMR performance and effectiveness in hospitals (Widyaningrum et al., 2024). The use of consecutive sampling in this study also referred to research examining EMR implementation and patient waiting time in a glaucoma subspecialty polyclinic (Dwitama Hidayat et al., 2025). Although the previous study used a case-control design, the present study employed a cross-sectional approach because data on EMR constraints and patient-registration waiting times were collected during the same observation period. This approach enabled the researchers to describe EMR constraints and waiting times occurring during inpatient registration within one research period.

The study was conducted in the inpatient-registration unit of AMC Cileunyi Hospital, a location selected based on the researcher's initial findings during Field Work Practice at the hospital. The data-collection period was adjusted to the daily volume of inpatient visits so that variation in EMR system constraints across different service hours and shifts could be represented. The study population included all patients undergoing inpatient registration at AMC Cileunyi Hospital during the data-collection period. The sample was determined using total sampling of patients registered through the EMR system and willing to be observed, resulting in 217 patients. This technique was used because all available secondary data in the study population consisted of 217 records and met the study criteria; therefore, all data could be included as the sample. The use of all available data was intended to provide a more comprehensive description of EMR constraints and inpatient-registration waiting times during the study period.

Data were collected using an observation sheet to record the type and frequency of technical EMR constraints and a brief interview guide for registration staff, referring to a similar instrument used in research on the relationship between EMR performance and the effectiveness of its use in hospitals (Widyaningrum et al., 2024). Data collection used





complementary techniques, including direct real-time observation of the registration process to record technical constraints and a brief interview with one informant, namely the Head of the Inpatient Registration Unit, regarding the types, causes, and management of constraints. The study used secondary data derived from the distribution and types of EMR system constraints identified during inpatient registration, with descriptive information from staff interviews as supporting data. Descriptive analysis was selected because the study aimed to obtain an overall picture of EMR system constraints occurring in practice, consistent with the use of frequency analysis in hospital EMR performance evaluation (Widyaningrum et al., 2024). Ethical principles were observed, including informed consent from respondents and the hospital, protection of patient and staff confidentiality, and use of the data solely for academic purposes because the EMR system contains patient identity and health-history information.

3. Results and Discussion

a. Results

The research findings were obtained through direct observation of inpatient-registration processes using the Electronic Medical Record (EMR) system. Observation was conducted to identify constraints occurring during registration and determine the types of constraints experienced by patients while receiving services. The observation covered the registration process from the initial stage until completion, with particular attention to constraints associated with EMR use. Among 217 respondents, some experienced constraints in using the EMR system during inpatient registration. These findings indicate that certain conditions capable of disrupting the smooth delivery of registration services remain present. The observation results are presented below as frequency distributions and percentages to describe EMR-use constraints and inpatient-registration waiting times.

Table 1. Distribution of Electronic Medical Record System Constraints

Constraint Status	n	%
Constraint Present	72	33.18
No Constraint	145	66.82
Total	217	100.00

Table 1 shows that, of 217 respondents, 72 respondents (33.18%) experienced constraints in using the Electronic Medical Record (EMR) system during inpatient registration, whereas 145 respondents (66.82%) did not experience constraints. Thus, most respondents did not experience EMR-use constraints (66.82%), although 33.18% still encountered constraints.

Table 2. Distribution of Types of Electronic Medical Record System Constraints

Constraint Classification	n	%
Fingerprint Verification	69	31.80
BPJS Administration	3	1.38
Total	72	33.18





Table 2 shows that, among the 72 respondents who experienced EMR-use constraints, the majority encountered fingerprint-verification problems, affecting 69 respondents (31.80% of the total sample). BPJS administrative constraints were identified in 3 respondents (1.38%). Therefore, fingerprint verification was the most frequently identified EMR-related constraint during inpatient registration, while BPJS administrative problems occurred less frequently.

Table 3. Distribution of Respondents Without Electronic Medical Record System Constraints

Constraint Classification	n	%
No Constraint	145	66.82
Total	145	66.82

Table 3 indicates that, of the 217 respondents observed, 145 respondents (66.82%) did not experience constraints in using the Electronic Medical Record (EMR) system during inpatient registration. This result shows that most respondents were able to complete the inpatient-registration process without EMR-related obstacles.

Table 4. Distribution of Inpatient Registration Waiting Time

Waiting Time	n	%
≤15 minutes	140	64.52
>15 minutes	77	35.48
Total	217	100.00

Table 4 shows that, among the 217 inpatients observed, 140 patients (64.52%) had a registration waiting time of ≤15 minutes, whereas 77 patients (35.48%) had a waiting time of >15 minutes. Therefore, most patients completed registration within the 15-minute limit, although a considerable proportion still experienced waiting times exceeding that threshold.

b. Discussion

Observation of 217 inpatients at AMC Cileunyi Hospital showed that 72 patients (33.18%) experienced Electronic Medical Record (EMR) system constraints during registration, while 145 patients (66.82%) did not. These findings indicate that most registration processes proceeded without EMR-system obstacles. Nevertheless, a meaningful number of patients still experienced constraints, and this condition requires attention to maintain the smooth operation of inpatient registration. This is consistent with Widyaningrum et al. (2024), who reported that EMR system performance is related to the effectiveness of its use in supporting hospital services.

Based on Table 2, fingerprint-verification failure was the most frequent constraint, occurring in 69 patients (31.80%), while BPJS administrative constraints were identified in 3 patients (1.38%). The predominance of fingerprint-related problems indicates that the registration process remains dependent on biometric systems and other supporting systems. This finding is consistent with Yunita Sari et al. (2025) at RSUD dr. Rasidin Padang, where fingerprint-scanner failure was reported as an obstacle in patient registration. According to





an interview with the Head of the Inpatient Registration Unit, fingerprint-verification constraints at AMC Cileunyi Hospital were not always caused by the scanner device itself; they could also be associated with disruptions in the BPJS system or the hospital server, particularly during patient-membership status verification. This condition demonstrates that smooth registration depends not only on the availability of the EMR but also on overall system stability. The finding is consistent with Yunita Sari et al. (2025), who identified registration obstacles resulting from fingerprint-verification system disruptions. In addition, Fauziyah et al. (2025) associated limited bandwidth and server performance with slower registration, while Ningsih and Yunengsih (2025) found that maintenance or system updates can hinder BPJS administrative and patient-registration processes.

Table 3 shows that 145 patients (66.82%) experienced no EMR system constraints, indicating that most registration processes proceeded without system-related obstacles. From the perspective of waiting time in Table 4, 140 patients (64.52%) had registration waiting times of ≤ 15 minutes, whereas 77 patients (35.48%) waited > 15 minutes. Thus, most patients received registration services within the established time limit, but more than one-third still experienced waiting times exceeding 15 minutes. Based on staff interviews, registration delays could become very prolonged under certain conditions. In February 2026, a registration duration of 4 hours 18 minutes was recorded because of system maintenance, while in April 2026 a duration of 3 hours 11 minutes occurred because of fingerprint-verification failure. These events indicate that disruptions in the registration system can substantially prolong registration, particularly when system recovery requires an extended period. Interview findings further indicated that when downtime or system errors occur, registration staff at AMC Cileunyi Hospital tend to wait until the system returns to normal because no specific SOP is yet available to regulate registration procedures during system disruptions.

This situation differs from the findings of Fedora Nurhadiulhaq and Wulandari (2025) at RSUD Cilacap, where staff could temporarily switch to a manual registration process during EMR downtime or system errors. The difference highlights the importance of alternative-procedure readiness in maintaining continuity of services when electronic systems are disrupted. In principle, EMR implementation can support service-process efficiency when the system functions properly and is supported by adequate infrastructure. This is consistent with Dwitama Hidayat et al. (2025), who showed that digital registration systems can help services achieve waiting times within established standards. Therefore, the findings at AMC Cileunyi Hospital indicate that optimizing EMRs to support timely registration should be accompanied by stable networks and servers, effective system integration, and prepared procedures for responding to disruptions.

4. Conclusion

Based on the study of 217 inpatients at AMC Cileunyi Hospital, 72 patients (33.18%) experienced constraints in using the Electronic Medical Record (EMR) system during registration, while 145 patients (66.82%) did not experience constraints. The most frequently identified constraint was fingerprint verification, affecting 69 patients (31.80%),





while BPJS administrative constraints were identified in 3 patients (1.38%). Regarding registration waiting-time distribution, 140 patients (64.52%) had waiting times of ≤ 15 minutes, while 77 patients (35.48%) had waiting times of > 15 minutes. These findings indicate that most inpatient-registration processes were completed within the established time limit, although some patients still experienced waiting times exceeding 15 minutes. Overall, EMR-use constraints remain present in inpatient registration, with fingerprint verification being the most frequently occurring constraint.

Based on the findings, AMC Cileunyi Hospital is expected to conduct periodic monitoring and evaluation of Electronic Medical Record (EMR) system performance, particularly the fingerprint-verification process and supporting inpatient-registration systems. Monitoring may include recording the type of constraint, frequency of occurrence, duration of disruption, and impact on service time. Systematic recording and reporting of constraints can provide evaluation material for the hospital to identify both the most frequently occurring problems and those with the greatest impact on patient waiting time. In addition, the hospital is expected to strengthen coordination among registration staff, the medical-records unit, and the information-technology unit in handling EMR-related constraints. When fingerprint-verification problems occur, a rapid and clearly defined response mechanism is needed so that staff can continue registration without unnecessary difficulty. The hospital may also provide periodic guidance or training to staff regarding EMR use and initial response measures for technical constraints so that services can continue effectively without creating longer waiting times for patients.

Furthermore, the hospital is expected to evaluate the facilities and devices supporting fingerprint verification, including ensuring that equipment functions properly and receives periodic maintenance. Technical constraints should also be evaluated to identify their causes more specifically so that problems are not addressed only after they occur but can also be prevented. These efforts are expected to support the sustainability of EMR implementation and improve the efficiency of inpatient registration. Future researchers are advised to develop analytical studies examining the relationship between the type, frequency, and duration of EMR constraints and inpatient-registration waiting time. Future research may also consider other factors, such as staff workload, facilities and infrastructure, network conditions, and user capability, and involve more diverse informants to obtain more comprehensive findings.

5. Compliance with Ethical Standards

Acknowledgements

The authors express their appreciation to AMC Cileunyi Hospital, the inpatient-registration unit, and all parties who supported data collection and the completion of this study. The authors also acknowledge the support of the Medical Records and Health Information Study Program, Politeknik Piksi Ganesha.

Disclosure of Conflict of Interest

The authors declare that there is no conflict of interest related to this study.





Statement of Informed Consent

The study observed ethical principles, including informed consent from respondents and the hospital, confidentiality of patient and staff data, and use of the data solely for academic purposes, as stated in the original manuscript.

References

- Ningsih, A.T. and Yunengsih, Y. (2025) 'Analisis Penggunaan Aplikasi HFIS BPJS Guna Menunjang Kelancaran Pendaftaran Pasien BPJS di RSUD Bandung Kiwari'.
- Latifah, N.A., Suryani, A.I. et al. (2025) 'Evaluasi Alur Pendaftaran Pasien BPJS Rawat Jalan di RS Humana Prima', 9.
- Ariani, S. (2023) 'Analisis keberhasilan implementasi rekam medis elektronik dalam meningkatkan efisiensi dan mutu pelayanan', *Jurnal Kesehatan dan Kedokteran*, 2(2), pp. 7–14.
- Hidayat, A.D. et al. (2025) 'Akurasi Kode Diagnosis Premature Rupture of Membrane (PRM) di Rumah Sakit Ibu dan Anak Tipe C Kota X / Accuracy of Premature Rupture of Membrane (PRM) Diagnosis Codes in a Type C Maternal and Child Hospital in X City', 4(1).
- Nurhadiulhaq, R.F. and Wulandari, S. (2025) 'Analisis Pelaksanaan Rekam Medis Elektronik di Pendaftaran Rawat Jalan', *Jurnal Ilmiah Multidisiplin*, 4(6).
- Ministry of Health of the Republic of Indonesia (2022) Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022 concerning Medical Records. Available at: www.peraturan.go.id.
- Ministry of Health of the Republic of Indonesia (2022) Regulation of the Minister of Health of the Republic of Indonesia Number 30 of 2022 concerning National Healthcare Quality Indicators. Available at: www.peraturan.go.id.
- Ministry of Health of the Republic of Indonesia (2026) Regulation of the Minister of Health Number 6 of 2026 concerning Hospitals. Available at: www.peraturan.go.id.
- Republic of Indonesia (2023) Law of the Republic of Indonesia Number 17 of 2023 concerning Health.
- Purwanti, I., Syarifah, Y., Hidayat, N. et al. (n.d.) 'Hubungan Penerapan Rekam Medis Elektronik dengan Waktu Tunggu Pasien di Poliklinik Sub Spesialis Glaukoma Rumah Sakit Mata Dr. Yap Yogyakarta'.
- Nugroho, Y.W. and Pramudita, F.A. (2024) 'Peran rekam medis elektronik dalam meningkatkan efisiensi, kualitas layanan kesehatan, dan keselamatan perawatan pasien: Analisis systematic literature review', *Media Publikasi Promosi Kesehatan Indonesia*, 7(2), pp. 343–350. doi: 10.56338/mppki.v7i2.4867.
- Widyaningrum, N., Meisari, W.A., Permatasari, A.A., Nuraini, F.A. and Sari, C.F. (2024) 'Hubungan Kinerja Rekam Medis Elektronik (Metode PIECES) terhadap Efektivitas Penggunaan Rekam Medis Elektronik di Rumah Sakit', *Jurnal Kesmas Asclepius*, 6(2), pp. 297–311. doi: 10.31539/jka.v6i2.11650.
- Wijanarko, F.N., Zachary, N.Y., Rahmadani, S.B.O., Putri, S.A., Rusdi, A.J., Ansyori, A., Efendi, F. and Asroruddin, M. (2026) 'Optimalisasi waktu pelayanan pasien saat gangguan sistem BPJS Kesehatan di Rumah Sakit Islam Aisyiyah Malang dengan metode PDCA', *Jurnal Pengabdian Masyarakat Bangsa*, 3(12), pp. 7199–?.
- Sari, F.Y., Putra, A.S. and Natsir Bukittinggi, M. (n.d.) 'Tinjauan Waktu Tunggu Pasien Rawat Jalan di RSUD dr. Rasidin Padang', *JPAMS: Journal of Public Administration and Management Studies*, 3. Available at: <https://journal.umnyarsi.ac.id/index.php/JPAMS>.

