

## Evaluation of The Effect of Completeness of Inpatient Medical Records on Patient Safety Incidents at Kendari City Hospital

Tara Sander\*, Yeny Sulistyowati, Aliefety Putu Garnida

Universitas Respati Indonesia, Jakarta, Indonesia

Email: tara.sander.wibriansyah@gmail.com\*

### ABSTRACT

Medical records are official documents that contain comprehensive information about a patient's health condition, including medical history, examination results, diagnoses, medical procedures, and therapies provided. Incomplete medical records can hinder communication among healthcare professionals and increase the risk of patient safety incidents. This research aimed to evaluate the effect of medical record completeness on patient safety incidents at Kendari City General Hospital. The research employed a mixed-method approach with a population of 6,026 patients and a sample of 110 documents. The independent variable was medical record completeness, while the dependent variable was patient safety incidents. Data were collected through reviews of electronic medical records (EMR) and analyzed using multiple linear regression. The results showed that the completeness of inpatient medical records did not have a significant effect on patient safety incidents (regression coefficient =  $-0.036$ ;  $p = 0.261$ ). Authentication and digital signatures were the only indicators that significantly influenced patient safety incidents ( $B$  coefficient =  $-0.346$ ;  $p = 0.000$ ). These findings indicate that inpatient medical record completeness is not the sole factor contributing to patient safety incidents. In the short term, hospitals need to strengthen authentication procedures and conduct routine audits; in the medium term, integrating EMR technology with real-time authentication alerts and training on record completeness should be implemented; and in the long term, hospitals may adopt a fully integrated digital authentication system within EMR equipped with Artificial Intelligence (AI)-based automated verification.

**Keywords:** Medical Records; Completeness; Patient Safety Incidents; Inpatient

### INTRODUCTION

Medical records are official documents that contain comprehensive information about a patient's health condition, ranging from disease history, examination results, and diagnoses to medical procedures and the therapies provided (Adeniyi et al., 2024; Gill et al., 2023; Lorkowski & Pokorski, 2022; Mathkor et al., 2024; Yang et al., 2025). The management of medical records serves several key purposes: supporting the improvement of healthcare service quality, providing a legal basis for its implementation, and maintaining the confidentiality, security, integrity, and availability of data (Ministry of Health of the Republic of Indonesia, 2022; Amran et al., 2021).

According to Adawiah et al. (2024), reports from the inpatient ward of Bahteramas Hospital showed that in 2021 the data completeness rate reached 70%, while the remaining 30% were incomplete. This figure decreased in 2022, with only 60% of the data complete and 40% incomplete. However, by August 2023, slight improvements were observed, with 70% completeness and 30% incompleteness. These findings confirm that the issue of incomplete medical records remains a significant problem that must be addressed promptly (Guevara et al., 2024; Shahbodaghi et al., 2024; Syed et al., 2023; Tsiampalis & Panagiotakos, 2023).

The consequences of incomplete medical records extend beyond administrative shortcomings. Several studies have examined the relationship between documentation completeness and patient safety. Nurhayati (2020) identified that the main factors contributing to incomplete medical records include time constraints, the high workload of medical personnel, and low compliance with standard procedures. These factors not only affect documentation quality but may also increase the risk of medical errors. Nuraini (2021) emphasized that while incomplete medical records can heighten the risk of medical errors, they are not the sole determinants of patient safety incidents, as organizational, environmental, patient-related, and individual factors also play important roles.

Patient safety incidents themselves have been characterized in previous research. Sutrisno et al. (2021) demonstrated that the most common incidents in Class B general hospitals in Indonesia fall into the categories of Near Injury (KNC) and Potential Injury (KPC), suggesting that existing systems have the capacity to identify risks early, although prevention efforts remain suboptimal. Understanding the epidemiology of these incidents is crucial for designing targeted interventions.

Among the various components of medical record completeness, authentication has emerged as a particularly critical element. Setiawan et al. (2021) found that complete authentication in medical records significantly correlates with fast, accurate, and safe clinical decision-making for patients. This finding is reinforced by Saari and Wahyuni (2020), who demonstrated that suboptimal authentication is a major risk factor for medical errors and adverse incidents in hospitals. These studies underscore the importance of examining not only overall completeness but also specific components that may have disproportionate impacts on patient safety.

Kendari City Hospital, classified as a Type B health facility in Kendari, Southeast Sulawesi, recorded relatively stable patient numbers from January to June 2025, ranging from 900 to 1,100 patients per month. The monthly details are as follows: January (1,033), February (1,033), March (943), April (930), May (1,090), and June (978). The implementation of electronic medical records (EMR) in inpatient care still faces challenges regarding the completeness of patient information. Several key elements remain unfilled, including allergy history, fall risk assessment, triage, informed consent, and patient education documents.

Given the significant impact of incomplete medical records on service quality and patient safety, this study aims to evaluate the effect of electronic medical record completeness on patient safety incidents at Kendari City Hospital. The analysis results are expected to reveal the relationship between the two variables and serve as a reference for policy formulation and improvement measures within hospitals.

## RESEARCH METHOD

This study uses a *mixed method approach*, which is a combination of quantitative analytical research with a *cross-sectional study* design and qualitative research, which was carried out in July-August 2025 at the Kendari City Hospital. The research population was all inpatient medical records as many as 6,026 documents, with a sample of 110 documents selected using *purposive sampling* techniques according to inclusion criteria. The research instrument consists of interview sheets to obtain primary data from the sources, secondary data from *checklist* sheets for the completeness of medical records in accordance with hospital accreditation standards (KARS) and/or Permenkes, as well as patient quality and safety report documents to obtain patient safety incident data as. After the data is declared complete and accurate, data analysis is carried out univariate analysis to describe the characteristics of the data in the form of frequency distribution, bivariate analysis with cross-tabulation to test the relationship between variables, and multivariate analysis using multiple linear regression to determine the effect of completeness of medical records on patient safety incidents.

## RESULTS AND DISCUSSION

### A. Univariate Analysis

#### 1. Level of Completeness of Inpatient Medical Records at Kendari City Hospital

**Table 1.** Level of Completeness of Inpatient Medical Records at Kendari City Hospital

No.	RM Equipment	Frequency	Percentage(%)
1.	Incomplete	91	82,7
2.	Complete	19	17,3
<b>Quantity</b>		<b>110</b>	<b>100</b>

Source: Questionnaire data processed by SPSS, 2025

Based on table 1, it can be seen that 91 respondents (82.7%) had incomplete medical records and 19 respondents (17.3%) had incomplete medical records. To see what documents are incomplete and which are complete, here are the details:

**Table 2.** Details of Medical Record Completeness

No.	RM Document	Complete		Incomplete	
		f	%	f	%
1.	Patient Identification	110	100	0	0
2.	Initial Clinical Data	98	89,1	1	10,9
3.	Important Reports	10	99,9	1	0,9
4.	Nursing Documents	11	100	0	0
5.	Authentication and Digital Signatures	10	99,9	1	0,9
6.	Other Supporting Documents (History of drug allergies, risk of falls, triage)	19	17,3	9	82,7

Source: Questionnaire data processed by SPSS, 2025

The results of the review of 110 inpatient medical record files showed that 91 files (82.7%) had not been completed completely, while only 19 files (17.3%) met the completeness requirements. The lowest completeness in other supporting documents (history of drug allergies, risk of falls, triage) was 17.3%.

According to the results of the study, in most government hospitals the level of completeness of medical records is still a big challenge, with the completeness rate below 20% for all mandatory elements. Syahrul (2021)

Similarly, his research stated that the main factors for incomplete medical records include time constraints, high workload of medical personnel, and low compliance with standard procedures. Nurhayati (2020)

## 2. Inpatient Safety Incident Rate at Kendari City Hospital

**Table 3.** Inpatient Safety Incident Rate at Kendari City Hospital

No.	Patient Safety Incidents	Frequency	Percentage (%)
1	There is an incident	6	5,5
2	No Incidents	104	94,5
<b>Quantity</b>		<b>110</b>	<b>100</b>

(Source: Questionnaire data processed by SPSS, 2025)

**Table 4.** Classification of Patient Safety Incidents

No.	IKP	Frequency	Percentage(%)
1.	None	104	94,5
2.	KNC	3	2,7
3.	KPC	2	1,8
4.	KTC	1	0,9
5.	KTD	0	0
<b>Quantity</b>		<b>110</b>	<b>100</b>

(Source: Questionnaire data processed by SPSS, 2025)

Based on the results of the study, it was known that out of 110 cases analyzed, there were 6 patient safety incidents (5.5%) and 104 cases (94.5%) did not experience incidents. This figure shows that the level of patient safety incidents at Kendari City Hospital is relatively low, which quantitatively can be considered good.

However, based on the classification of all incidents that occurred were included in the category of non-injury incidents, namely 3 cases of Near Injury (KNC), 2 cases of Potential Injury (KPC), and 1 case of Non-Injury (KTC). There are no Unexpected Events (KTDs) that cause direct injuries, which can be interpreted as a form of success in the mitigation and prevention of more severe incidents.

The study also shows that the most incidents in class B general hospitals in Indonesia fall into the categories of KNC and KPC, which means that the system already has the capacity to identify risks early, although it is not yet fully optimal in prevention. Sutrisno et al. (2021)

### B. Bivariate Analysis

**Table 5.** Bivariate Analysis

Variabel	RM Equipment				Total	
	Complete		Incomplete		n	%
	n	%	n	%		
<b>Patient Safety Incidents</b>						
Ada	2	1,8	4	3,6	6	5,5
None	17	15,5	87	79,1	104	94,5
<b>Quantity</b>	<b>19</b>	<b>17,3</b>	<b>91</b>	<b>82,7</b>	<b>110</b>	<b>100</b>
<b>Significance = 0.276</b>						

(Source: Questionnaire data processed by SPSS, 2025)

Of the 110 inpatient medical records that were reviewed, only 19 files (17.3%) met the completeness criteria, while the other 91 files (82.7%) were still incomplete. There were 6 cases of patient safety incidents (5.5%), of which 2 cases (1.8%) occurred in patients with complete medical records and 4 cases (3.6%) in patients with incomplete medical records. These findings show a tendency for incidents to occur more frequently in a group of patients with incomplete medical records.

However, the analysis using the chi-square test yielded a value of  $p = 0.644$ , greater than the significance limit of  $\alpha = 0.05$ . Thus, statistically no significant relationship was found between the completeness of medical records and patient safety incidents. This means that the difference in the number of incidents seen descriptively is not strong enough to be statistically proven in this study.

The possible cause is that the variable completeness of medical records is not the only factor causing the incident, but there are other factors such as organizational factors, environment, patient conditions, and individual factors that play a role, as explained in the framework of the research concept. It also states that while incomplete medical records can increase the risk of medical errors, they are not the only determinant of patient safety incidents. Nuraini (2021)

### C. Multivariate Analysis

**Table 6.** Test of the Effect of RM Completeness on IKP in Inpatients at Kendari City Hospital

Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Say.
		B	Std. Error			
1	(Constant)	1,256	,321		3,917	,000
	Initial Clinical Data	,026	,034	,070	,782	,436
	Authentication and Digital Signatures	-,346	,080	-,394	-4,333	,000
	Other Supporting Documents	,005	,031	,014	,151	,880

a. Dependent Variable: Patient Safety Incident

(Source: Questionnaire data processed by SPSS, 2025)

Based on the results of multiple linear regression in Table 6, it is known that the variables of patient identification, important reports, and nursing documents are automatically excluded by the analysis system because they have no variance in the data. This is due to uniform and consistent documentation processes in hospitals, although these variables remain theoretically important in the context of patient safety. The initial clinical data variable had a coefficient of  $B = 0.026$  with a value of  $p = 0.436 (> 0.05)$ , indicating no significant effect on patient safety incidents. The authentication and digital signature variables had a coefficient of  $B = -0.346$  with a value of  $p = 0.000 (< 0.05)$  and were found to have a significant negative effect on patient safety incidents. Meanwhile, other supporting document variables had a coefficient of  $B = 0.005$  with a value of  $p = 0.880 (> 0.05)$ , indicating no significant effect on patient safety incidents.

Research by Setiawan et al. (2021) found that complete authentication in medical records significantly correlates with fast, accurate, and safe clinical decision-making for patients. This finding is reinforced by Saari and Wahyuni (2020), who showed that suboptimal authentication

is a major risk factor for medical errors and adverse incidents in hospitals.

Research findings indicate that authentication and digital signatures are the only indicators of medical record completeness that significantly influence the reduction of patient safety incidents at Kendari City Hospital. In the short term, the hospital needs to strengthen authentication procedures by ensuring that every medical record, both printed and electronic, is accompanied by a valid digital signature before being declared final. Daily or weekly audits of authentication elements and supporting elements (allergy history, fall risk, and triage) should be conducted by medical records staff to detect discrepancies in documentation or missing digital signatures, thereby minimizing potential legal and clinical risks.

In the medium term, electronic medical record (EMR) technology integration with a real-time alert feature specifically for authentication can be implemented. This feature will provide automatic notifications if a medical record lacks a digital signature or if there are inconsistencies between diagnosis, therapy, and authentication data. Furthermore, Natural Language Processing (NLP) technology can be used to extract and validate clinical information from unsigned records, thereby reducing the risk of manual input errors. Scheduled training on the importance of complete electronic medical records should also be conducted.

In the long term, hospitals can adopt a digital authentication system that is fully integrated with the EMR and has automatic verification capabilities based on Artificial Intelligence (AI). This system not only validates the presence of digital signatures but also cross-checks the identity of healthcare workers entering data, the time of input, and the validity of documents, thereby minimizing the risk of omissions or document falsification. This integration also allows for historical tracking of any data changes (Zhou et al., 2021). Furthermore, the implementation of hospital standard operating procedures (SOPs) in each unit is crucial and must be continuously disseminated as a reminder for healthcare workers in providing patient care.

To prevent patient safety incidents, hospitals can also implement a Clinical Decision Support System (CDSS), which analyzes medical record data to predict potential patient safety incidents before they occur. This system provides early warnings if discrepancies are detected between diagnoses, procedures, and examination results, allowing medical personnel to make timely corrections. The implementation of the CDSS aligns with the Ministry of Health's digital transformation policy through the SATUSEHAT program and will proactively strengthen a sustainable culture of patient safety (Ministry of Health of the Republic of Indonesia, 2023).

## CONCLUSION

Most of the medical records of inpatients at Kendari City Hospital are still incomplete (82.7%), particularly in supporting documents, a condition that is allegedly related to the high workload of health workers. The percentage of patient safety incidents is relatively low (5.5%) and does not result in physical injuries, but this should not be used as an excuse to overlook the importance of complete medical records, considering that they serve as the main source of information in clinical decision-making. The results of the analysis showed that the completeness of medical records did not have a significant effect on patient safety incidents ( $p = 0.261$ ), indicating that document completeness is not the sole contributing factor. Meanwhile, authentication and digital signature variables were found to have a significant effect ( $p = 0.000$ ) on patient safety incidents because they function as legal evidence while strengthening the validity of clinical information. Thus, digital authentication has a direct contribution to improving patient safety.

Based on these findings, it is recommended that hospitals strengthen authentication procedures through regular audits and real-time verification features in electronic medical records (EMR). Training programs should be enhanced to improve healthcare workers' compliance with complete documentation, particularly for supporting elements. In the medium term, the integration of EMR technology with automated alerts for missing authentication and documentation inconsistencies should be implemented. In the long term, the adoption of Artificial Intelligence (AI)-based verification systems and Clinical Decision Support Systems (CDSS) can proactively identify potential safety risks. Future research should explore additional factors influencing patient safety incidents beyond documentation completeness, including organizational culture, communication patterns, and workload management.

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