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Analysis of risk factors for incomplete inpatient medical records using the fishbone method

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ARTICLE INFO	ABSTRACT
Article history: Received Mar 3, 2025 Revised Mar 26, 2025 Accepted Apr 1, 2025 Keywords: Electronic Medical Records Fishbone Method Inpatient Medical Summaries Medical Record Completeness	Incomplete inpatient medical summaries remain a persistent issue that affects administrative processes and the quality of patient data. This study aimed to analyze the completeness and contributing factors of incomplete inpatient medical summaries using the Fishbone Method (Ishikawa Diagram). A qualitative descriptive approach was employed, with data collected through observations, interviews, and document reviews of 99 inpatient medical summaries, selected using Slovin's formula with a 10% margin of error. The study involved medical record officers and healthcare professionals, selected through purposive sampling. Data analysis followed the qualitative descriptive method, including data reduction, data presentation, conclusion drawing, and triangulation. The findings identified five primary factors contributing to incomplete medical summaries: Man (low compliance among healthcare professionals), Method (suboptimal Standard Operating Procedures), Machine (ineffective hospital information systems), Money (insufficient investment in training), and Material (medical records not yet fully electronic). The study recommends medical staff training, SOP optimization, and the implementation of an electronic medical record system with a required lock feature to ensure complete documentation of inpatient medical summaries. <i>This is an open access article under the CC BY-NC license.</i> 

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INTRODUCTION

Inpatient medical summaries are essential components of hospital medical records, documenting critical patient information such as diagnoses, treatments, medical procedures, and follow-up care plans (Sakinah & Yunengsih, 2021), (Talib & MARS, 2022). These summaries serve as a reference for medical teams to ensure continuity of care and facilitate accurate decision-making in patient management (Suryani et al., 2024), (Nurfallah, 2021). The completeness of medical summaries is crucial for healthcare service continuity, insurance claims, and hospital service quality evaluations (Permatasari, Sukmaningsih, & Novratilova, 2024). However, incomplete inpatient medical summaries remain a persistent issue in many hospitals, potentially disrupting communication

among healthcare professionals and increasing the risk of medical errors. Inadequate or missing information in medical summaries may lead to poor healthcare service quality and compromise patient safety (Agil et al., 2025), (Noviani et al., 2024).

Several factors contribute to incomplete medical summaries, including healthcare providers' lack of awareness, inefficient documentation systems, and insufficient oversight in medical recordkeeping (Siwayana, Purwanti, & Murcittowati, 2020). A preliminary study at RSUD R. Syamsudin, S.H. revealed that incomplete inpatient medical summaries hinder the validity of patient data and delay hospital administrative processes (Pratama & Khairunnisa, n.d.). To address these gaps, this study employs the Fishbone Method (Ishikawa Diagram) to identify root causes of incomplete medical summaries and develop optimization strategies (Dewi Kurniasih & KES, 2020), (LAMATINULU, 2022).

Previous research highlights multiple challenges in maintaining complete medical records. Darmawan & Suryani (2022) emphasized that compliance among healthcare providers remains a major issue, while Cahyani & Prasetyo (2020) found that manual documentation systems increase the risk of missing or incomplete records (Luthfi & Hasibuan, 2024), (Bamatraf, 2024). Alshammari et al. (2019) further noted that limited medical staff training significantly affects record completeness. Moreover, Novratilova et al. (2022) stated that an adequate number of coding staff is crucial for ensuring comprehensive patient medical documentation. A disparity between coding personnel and the volume of medical records to be processed often leads to delays and incomplete documentation (Tuzzahra, Hakim, Romodon, & Gunawan, 2024), (Umamah & Setiatin, 2024).

Hospitals are responsible for ensuring that medical records are complete, accurate, and detailed, as these serve as a foundation for high-quality healthcare services (Riyanto, 2023), (Talib & MARS, 2022). Well-structured and comprehensive medical records facilitate effective communication among healthcare professionals, including physicians, nurses, and other medical staff. However, incomplete inpatient medical summaries can disrupt communication, delay medical decision-making, and increase the likelihood of medical errors, ultimately jeopardizing patient safety (Sakit, 2017), (Lestari, Hamidya, & Rizqoh, n.d.).

To address these challenges, structured efforts are needed to enhance awareness and compliance among medical personnel, improve documentation systems, and strengthen supervision mechanisms (Sartini, 2023), (Setiawan, 2024). This study aims to analyze the factors contributing to incomplete inpatient medical summaries using the Fishbone Method, providing insights for optimizing hospital record-keeping practices and improving patient care quality (Olutimehin, n.d.), (Kumari et al., 2024).

RESEARCH METHOD

Research Design

This study employs a qualitative descriptive approach to analyze the factors contributing to incomplete inpatient medical summaries and develop optimization strategies based on the findings (Syahira, Rusdi, & Akbar, 2024). The research design focuses on identifying key variables and exploring their interrelations using the Fishbone Method (Ishikawa Diagram), which enables a structured identification of root causes of medical record incompleteness (Zahida, 2018).

Population and Sample

This study was conducted at RSUD R. Syamsudin, S.H., with a total study population of 10,760 inpatient medical summaries from October to December 2024. The sample size was determined using Slovin's formula with a 10% margin of error, resulting in 99 inpatient medical summaries selected through simple random sampling (Roflin & Liberty, 2021).

The study also involved 45 hospital staff, including medical record officers and healthcare professionals. A purposive sampling technique was used to select two key informants (the head of the medical records department and the head of the medical records committee) and one

triangulation sample (the head of the medical records department), based on the following criteria: Knowledge and expertise in medical recordkeeping; Understanding of hospital medical procedures; Willingness to participate as an informant; and Cooperation in providing information (Rahayu et al., 2023).

Research Variables

The primary variables analyzed in this study include the completeness of inpatient medical summaries and factors contributing to their incompleteness. These factors were categorized based on the Fishbone Method, which consists of five major elements: Man – Healthcare personnel compliance and awareness, Method – Standard operating procedures (SOP) and hospital regulations, Machine – Hospital information system and medical record software, Money – Budget allocation for training and infrastructure, Material – Availability of medical record documentation tools (Iskandar et al., 2023).

Data Collection Techniques

Data collection was conducted through two primary approaches:

Observation

Direct document review was performed to assess whether inpatient medical summaries contained all required information. A checklist instrument was used to evaluate compliance with hospital documentation standards (Putri et al., 2022).

Interviews

Semi-structured interviews were conducted with selected hospital staff (medical record officers and healthcare professionals). A structured interview guide was used to explore challenges in completing medical summaries and strategies for improvement (Rahman & Sari, 2022).

Research Procedure

The research procedure follows five key steps, as illustrated in Figure 1: Problem Identification: Reviewing medical record policies and hospital documentation standards. Data Collection: Conducting document analysis and interviews with key informants. Fishbone Analysis: Categorizing causes of incomplete medical summaries into five key elements (Man, Method, Machine, Money, Material). Validation through Triangulation: Cross-checking findings through multiple data sources (document review, interviews, and expert opinions). Formulating Recommendations: Proposing strategies for improving medical record completeness, including SOP refinement, staff training, and system optimization (Dewi et al., 2023).

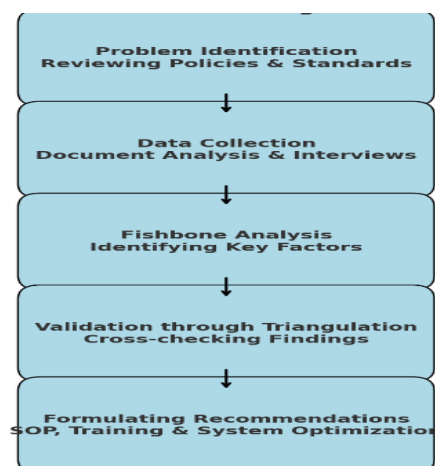


Figure 1. Research flowchart using the fishbone method

Data Analysis

The collected data were analyzed through the following stages: Data Reduction – Filtering relevant data from observations and interviews. Data Presentation – Organizing information into tables and diagrams for better interpretation. Conclusion Drawing – Identifying key factors and recommending solutions for improving medical record completeness. Triangulation – Verifying findings through multiple sources to ensure validity (Nugroho & Fadhilah, 2023).

RESULTS AND DISCUSSIONS

The study findings indicate that out of 99 inpatient medical summaries, 37.37% were incomplete. The completeness rate for different components of medical summaries is detailed in Table 1.

Table 1. Completeness of inpatient medical summaries

Category	Complete (N)	Incomplete (N)	Percentage of Incompleteness
Patient Identity	99	0	0%
Admission Diagnosis			
- Time of Admission	92	7	7.07%
- Reason for Admission	94	5	5.05%
Supporting Examinations	45	54	54.55%
Secondary Diagnosis	24	75	75.76%
Procedures	48	51	51.52%
Discharge Therapy	32	67	67.68%

From Table 1, patient identity was the most well-documented component, with a completeness rate of 100%. This indicates that hospitals maintain strict compliance in recording patient identification. The admission diagnosis and reason for hospitalization were also documented with high completeness, with only 7.07% and 5.05% incompleteness, respectively. This suggests that the initial admission process is well-managed, ensuring that primary patient data are accurately recorded.

However, other categories showed significant deficiencies. Supporting examinations had an incompleteness rate of 54.55%, indicating that more than half of the records lacked documentation of laboratory and imaging results. Procedures had an incompleteness rate of 51.52%, which implies that many performed interventions were not adequately recorded. The most concerning findings were in secondary diagnosis (75.76%) and discharge therapy (67.68%), highlighting that essential details regarding additional medical conditions and follow-up care were often missing.

These findings indicate that while basic patient data and primary diagnoses are generally well-documented, gaps remain in recording examination results, performed procedures, and discharge planning. This raises concerns about the continuity of care and the quality of medical documentation. A more structured documentation approach is needed to improve the completeness of inpatient medical summaries.

Interview Findings

Interviews with key informants, including the head of the medical records department and the head of the medical records committee, provided insights into the main factors contributing to incomplete medical summaries. These findings align with the Fishbone (Ishikawa) analysis, which categorizes causes into Man (Human Resources), Method (Procedures), Machine (Technology), Money (Funding), and Material (Documentation System).

The Man factor was identified as one of the primary causes of incomplete medical summaries. Many healthcare providers demonstrated low compliance in completing documentation due to high workloads and lack of awareness regarding the importance of complete medical records. Some healthcare providers admitted to postponing documentation, while others failed to complete it altogether. This issue aligns with previous findings by

Novratilova & Sukmaningsih (2022), who found that staff shortages and heavy workloads negatively impact medical documentation practices.

The Method factor was also a major concern. Although the hospital had Standard Operating Procedures (SOPs) for medical record documentation, they were not always followed consistently. Some healthcare providers lacked awareness of the established SOPs, and there was insufficient training or reinforcement of documentation protocols. According to Supriyadi & Handayani (2022), continuous SOP reinforcement and training programs are essential to improve compliance in medical documentation.

The Machine factor revealed limitations in the Hospital Information System (HIS). Many medical summaries were incomplete because the system lacked an automated validation feature. The absence of a required lock system allowed healthcare providers to save incomplete records, leading to documentation gaps. Additionally, technical issues such as system errors and downtime further contributed to incomplete data entry. Similar findings were reported by Setiawan & Maulida (2020), emphasizing that integrated electronic medical records significantly improve documentation completeness.

The Money factor indicated that limited funding for medical record training programs and staff incentives contributed to the problem. Many healthcare facilities did not allocate sufficient budgets for continuous professional development on medical documentation standards. Hospitals with low financial investment in medical recordkeeping often experience higher rates of incomplete documentation, as observed by Permatasari & Wulandari (2022).

The Material factor revealed that a hybrid system of electronic and manual documentation increased the risk of incomplete records. While the hospital had transitioned to electronic medical records, some sections were still documented manually, leading to issues such as misfiled, lost, or damaged documents. According to Novratilova et al. (2024), hospitals that fully transition to integrated electronic medical records experience fewer cases of missing or incomplete medical summaries.

The findings of the interviews are illustrated in Figure 1, which represents the Fishbone Diagram Analysis of incomplete inpatient medical summaries.

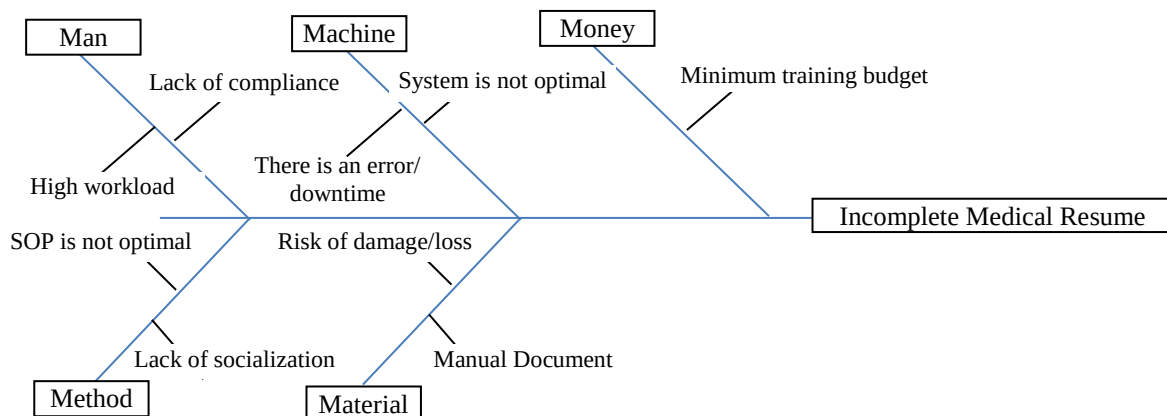


Figure 1. Fishbone diagram of interview findings

Based on the findings presented in Table 1, the most frequently incomplete components of inpatient medical summaries were secondary diagnoses (75.76%), discharge therapy (67.68%), and supporting examinations (54.55%). These components are crucial for ensuring the continuity of care and guiding future treatment plans. The failure to document these details could lead to mismanagement in follow-up care, increased medical errors, and potential risks for patient safety.

The Fishbone analysis demonstrated that five major factors influence the completeness of medical summaries. The Man factor plays a critical role, as healthcare providers' compliance is directly tied to their workload and awareness. Studies by Novratilova & Sukmaningsih (2022) and Permatasari et al. (2024) support the idea that insufficient training and high workloads contribute significantly to incomplete documentation.

The Method factor highlights the importance of implementing and enforcing SOPs effectively. Hospitals that fail to reinforce documentation guidelines often experience inconsistencies in recordkeeping, as supported by Supriyadi & Handayani (2022).

The Machine factor suggests that improving the Hospital Information System (HIS) could lead to better documentation practices. According to Setiawan & Maulida (2020), hospitals that implement electronic medical record systems with validation features see an improvement in data completeness.

The Money factor emphasizes the importance of investing in continuous training and system improvements. Hospitals with higher financial investment in staff development tend to achieve better compliance in documentation, as noted by Permatasari & Wulandari (2022).

The Material factor indicates that partial reliance on manual documentation increases the risk of missing information. A study by Novratilova et al. (2024) found that hospitals implementing fully electronic medical record systems reduce the likelihood of incomplete documentation.

In conclusion, addressing human resource challenges, enforcing SOPs, upgrading hospital information systems, increasing financial investment in training, and transitioning fully to electronic documentation are crucial strategies for improving the completeness of inpatient medical summaries. Implementing these recommendations will contribute to better healthcare quality, improved patient outcomes, and enhanced hospital efficiency.

CONCLUSION

This study reveals that the incompleteness of inpatient medical summaries is influenced by multiple interrelated factors. One of the primary causes is the lack of awareness and compliance among healthcare professionals in completing medical records accurately. The findings indicate that improving medical staff education and awareness is crucial to ensuring that medical summaries are documented comprehensively. Additionally, the suboptimal implementation of Standard Operating Procedures (SOPs) contributes to inconsistencies in record-keeping, necessitating a more structured enforcement of regulations and routine compliance monitoring.

Another significant factor is the inefficiency of hospital information systems. The continued reliance on manual documentation increases the risk of errors and omissions. The study highlights the need for a more integrated electronic medical record system equipped with automated validation features to ensure that every required field in the inpatient medical summary is completed before submission. However, the most critical issue remains the limited human resources and the absence of a robust support system. Given the high workload and shortage of medical personnel, the completion of medical summaries is often deprioritized. The lack of systematic reminders or mandatory completion mechanisms further exacerbates the issue, leading to incomplete documentation.

To enhance the completeness of inpatient medical summaries, a comprehensive strategy is required, encompassing medical staff training, SOP optimization, hospital information system improvements, and the allocation of sufficient human resources. By implementing these measures, hospitals can significantly improve the quality of healthcare services through more accurate and reliable medical documentation.

Future research could explore the impact of fully integrated electronic medical records (EMRs) on medical documentation accuracy and the effectiveness of mandatory completion alerts within hospital information systems. Additionally, studies examining the long-term benefits of compliance training programs for healthcare providers may provide deeper insights into

sustainable improvements in medical record completeness. Based on the results of the study, medical personnel compliance in completing medical records can be improved through routine training programs that emphasize the importance of medical record completeness for patient safety and effectiveness of health services and provide rewards for medical personnel who are disciplined in recording and implementing consequences for those who do not comply with standards.

Technology plays an important role in strengthening the supervision and monitoring system of environmental impacts due to mining activities, through the installation of automatic sensors to measure the quality of water, air and soil in real-time, so that pollution detection can be done faster and map environmental impacts in the long term and help in more sustainable spatial planning.

Based on the results of the study, medical personnel compliance in completing medical records can be improved through routine training programs that emphasize the importance of medical record completeness for patient safety and effectiveness of health services and provide rewards for medical personnel who are disciplined in recording and implementing consequences for those who do not comply with standards.

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