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# Input–Process–Output Evaluation of Inpatient Medical Record Management at Beriman Regional General Hospital, Balikpapan

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**Abstract:** Inpatient medical record management is essential for continuity of care, administrative accountability, claim verification, legal protection, and hospital service quality. However, hospitals still face problems related to incomplete documents, delayed file returns, limited facilities, and the transition from manual to electronic medical record systems. **Objective**: This study aimed to evaluate inpatient medical record management based on the input, process, and output dimensions at Beriman Regional General Hospital, Balikpapan. **Methodology**: This study used a descriptive qualitative design. Data were collected through observation, in-depth interviews, and documentation involving five informants from the Medical Record Unit, consisting of the head of the medical record installation, data processing officer, filing officer, coding officer, and registration officer. Data were analyzed using qualitative descriptive analysis through data collection, data reduction, data display, and conclusion drawing. **Findings**: The results showed that the number of staff was relatively adequate; however, several personnel did not have an educational background in medical records and had not received structured training. The workflow generally followed standard operating procedures, including registration, file distribution, document completion, assembling, completeness analysis, coding, claim verification, and filing. Nevertheless, implementation was constrained by incomplete discharge summaries, blank informed consent forms, missing physician signatures, illegible handwriting, delayed file returns, limited infrastructure, and repeated file movement in the hybrid manual–electronic system. Document access was relatively easy through SIMRS and borrowing logbook procedures, but file completeness and neatness had not been fully achieved. **Implication**: The findings highlight the need to strengthen staff competence, regular training, infrastructure, SOP compliance, internal audits, and integrated electronic medical record implementation. **Originality**: This study provides an integrated input–process–output evaluation model for identifying root causes and improvement priorities in inpatient medical record management.

**Keywords**: electronic medical record; health information management; inpatient medical record; input–process–output evaluation; medical record management.

## INTRODUCTION

Medical record management is a crucial component of hospital health services because it directly affects continuity of care, patient safety, legal accountability, hospital administration, financing, reporting, and the quality of health information. Complete and

accurate medical records support clinical communication and reduce the risk of information gaps during patient care (Sharifi et al., 2021). In inpatient services, medical record files have a more complex movement pattern than outpatient records because the documents pass through several service points, including registration, inpatient wards, medical record processing units, claim verification, and filing rooms. In practice, hospitals still face problems related to incomplete discharge summaries, missing physician signatures, delayed file returns, limited storage space, and the gradual transition from manual records to electronic or hybrid systems. Similar problems have been reported in hospital medical record services, where incomplete documentation may interfere with service quality, accreditation, and administrative continuity (Kencana et al., 2019). Therefore, evaluating inpatient medical record management is important not only for administrative improvement but also for strengthening service quality, regulatory compliance, and health information governance.

Previous studies on medical record management can be grouped into several main categories. The first category focuses on the completeness of medical record documents. Studies have shown that incomplete forms, missing signatures, insufficient documentation, and delayed file returns remain recurring problems in health facilities (Lestari & Muflihatin, 2020). Wirajaya and Nuraini also found that medical record incompleteness in hospitals is influenced by human resource factors, workload, discipline, and monitoring systems (Wirajaya & Nuraini, 2019).

The second category discusses medical record processing activities, including assembling, coding, indexing, analyzing, filing, retention, and document tracking. These activities require consistent implementation of standard operating procedures and coordination among health professionals (Syukria & Wardhani, 2021). In addition, missfile incidents and filing problems indicate that document tracking and storage systems are important components of effective medical record management (Wati & Nuraini, 2019).

The third category emphasizes electronic medical records and health information systems. Electronic health records can improve data availability and service efficiency, but their implementation is often constrained by infrastructure, workflow adaptation, user readiness, and data quality issues (Boonstra et al., 2014). Similar challenges are also found in health information system implementation in low- and middle-income countries, where technology adoption depends on organizational readiness and supporting resources (Khubone et al., 2020). Although these studies have contributed to the understanding of

medical record management, most of them still examine the problem partially, such as document completeness, delayed returns, filing systems, human resource constraints, or electronic system implementation. Studies that integrate input, process, and output dimensions in one comprehensive evaluation are still limited, especially in hospitals undergoing a transition from manual to hybrid electronic medical record systems.

Based on this gap, this study aimed to evaluate inpatient medical record file management based on input, process, and output at Beriman Regional General Hospital, Balikpapan City. The input dimension included the number of staff, educational background, staff training, and infrastructure conditions. The process dimension included staff understanding of standard operating procedures, workflow implementation, obstacles in file management, completeness checking, and follow-up mechanisms for incomplete files. The output dimension included file completeness, document neatness, accessibility, and the impact of medical record management on claims and health information services. Through this evaluation, the study is expected to provide a comprehensive picture of the strengths and weaknesses of inpatient medical record management and to identify priority areas for improvement.

This study is based on the argument that the quality of inpatient medical record management is determined by the interaction between adequate input, consistent process implementation, and measurable output quality. Competent human resources, sufficient training, and adequate infrastructure are expected to support the implementation of standard operating procedures and improve the workflow of inpatient medical record management (Ulfa, 2018). In contrast, limited staff competence, insufficient facilities, incomplete documentation, delayed file returns, and fragmented manual–electronic workflows may reduce document completeness, neatness, accessibility, and the effectiveness of claim verification. Electronic medical record implementation may improve efficiency, but its benefits depend on the readiness of human resources, technology, and organizational workflow (Gesulga et al., 2017). Therefore, an input–process–output evaluation is considered appropriate for identifying the root causes of inpatient medical record management problems and formulating practical recommendations for improving hospital medical record services.

## RESEARCH METHOD

The unit of analysis in this study was the inpatient medical record file management system at the Medical Record Unit of Beriman Regional General Hospital, Balikpapan City. The focus of the study was directed at three evaluation dimensions: input, process, and output. The input dimension included the availability of human resources, educational background, staff training, and facilities. The process dimension included the implementation of standard operating procedures, workflow of inpatient medical record files, completeness checking, and follow-up mechanisms for incomplete documents. The output dimension included document completeness, neatness, accessibility, and the impact of medical record management on claim verification and health information services.

This study used a descriptive qualitative design. This design was selected because the study aimed to obtain an in-depth understanding of how inpatient medical record files were managed in the real working context of the hospital. A qualitative approach was considered appropriate because the problems studied were related not only to technical procedures but also to staff experience, workflow practices, organizational constraints, and coordination among health professionals. Through this design, the researcher could explore the actual conditions of medical record management and identify the factors that supported or hindered the achievement of optimal document management.

The data sources consisted of primary and secondary data. Primary data were obtained from five informants who were directly involved in inpatient medical record file management. The informants included the head of the medical record installation, a data processing officer, a filing officer, a coding officer, and a registration officer. Informants were selected purposively based on their involvement, work responsibility, and knowledge of inpatient medical record management. Secondary data were obtained from hospital profile documents, standard operating procedures, observation notes, interview guidelines, documentation records, and supporting files related to inpatient medical record workflow.

**Table 1.** Characteristics of Research Informants

| No. | Informant | Sex | Educational Background | Position |
|---|---|---|---|---|
| 1 | Informant 1 | Male | Diploma III Medical Records | Head of Medical Record Installation |
| 2 | Informant 2 | Female | Senior High School | Data Processing Officer (assembling, indexing, analyzing) |
| 3 | Informant 3 | Female | Senior High School | Filing Officer |

| No. | Informant | Sex | Educational Background | Position |
|---|---|---|---|---|
| 4 | Informant 4 | Female | Diploma III Medical Records | Coding Officer |
| 5 | Informant 5 | Female | Diploma III Medical Records | Registration Officer |

Data were collected through observation, in-depth interviews, and documentation. Observation was conducted to examine the actual workflow of inpatient medical record management, the condition of facilities, the arrangement of files, and the use of manual and electronic systems. In-depth interviews were conducted using a semi-structured interview guide to explore informants' experiences regarding input conditions, process implementation, obstacles, completeness checking, follow-up of incomplete documents, and output quality. Documentation was used to complement interview and observation data through the review of relevant documents, forms, room condition records, and supporting evidence related to medical record management. Data validity was strengthened through source triangulation and technique triangulation by comparing information obtained from different informants, observations, and supporting documents.

Data were analyzed using qualitative descriptive analysis through the stages of data collection, data reduction, data display, and conclusion drawing. The collected data were first organized according to the themes of input, process, and output. Irrelevant or repetitive information was reduced, while important findings related to human resources, facilities, SOP implementation, workflow barriers, document completeness, and accessibility were retained. The reduced data were then displayed in narrative form and summarized in an evaluation table to facilitate interpretation. Conclusions were drawn by comparing field findings with relevant regulations, standard operating procedures, and previous studies. This study also maintained research ethics by obtaining permission from the research site, explaining the purpose of the study to informants, ensuring voluntary participation, and protecting the confidentiality of informant identities.

## RESULT

The findings of this study are presented based on three evaluation dimensions: input, process, and output. This presentation was designed to describe the relationship between resource conditions, implementation of procedures, and the quality of inpatient medical record file management outcomes at Beriman Regional General Hospital, Balikpapan City.

**Table 2.** Summary of the Evaluation Results of Inpatient Medical Record File Management

| Dimension | Aspect | Main Findings | Implications for Improvement |
|---|---|---|---|
| Input | Number and qualifications of human resources | Most informants considered the number of staff to be adequate; however, some staff members still had senior high school or vocational high school backgrounds, which were not fully aligned with the competency needs of medical record management. | Inappropriate qualifications may affect technical understanding of assembling, completeness analysis, indexing, and filing. The hospital needs to strengthen competency-based recruitment and human resource development. |
| Input | Staff training | No structured special training had been provided on inpatient medical record file management. Competency improvement was mostly carried out through knowledge transfer, informal guidance, or activities related to accreditation. | Regular training is needed to standardize understanding of SOPs, confidentiality ethics, SIMRS use, and procedures for following up incomplete documents. |
| Input | Facilities and infrastructure | Facilities were not yet fully adequate. Informants reported several constraints, including outdated computers, printers that occasionally malfunctioned, unstable network signals, limited shelves and storage space, and a hybrid manual-electronic system. | Device upgrades and improved storage-room arrangement are needed to make document retrieval, processing, and storage more efficient. |
| Process | SOP implementation and workflow | Staff generally understood the SOPs. The management workflow began with registration, distribution to inpatient wards, completion by health professionals, file retrieval after patient discharge, data entry, assembling, completeness | The workflow is already structured, but implementation consistency still requires supervision, particularly in the stages of completion, return, and completeness checking. |

| Dimension | Aspect | Main Findings | Implications for Improvement |
|---|---|---|---|
| | | analysis, coding, claim verification, and filing. | |
| Process | Main barriers | The dominant barriers included incomplete discharge summaries, missing physician signatures, blank informed consent forms, illegible physician handwriting, file returns exceeding the 2 × 24-hour standard, and repeated file movement caused by the hybrid system. | These barriers lead to delays in assembling, coding, BPJS claim verification, and final storage. Cross-professional coordination and stronger discipline in document completion are required. |
| Process | Completeness checking and follow-up | Completeness checks were carried out using a checklist and were performed alongside the assembling process. Incomplete documents were marked, returned to the relevant physician or unit, coordinated with professional care providers, recapitulated, and reported to management. | The follow-up mechanism is already available, but its effectiveness depends greatly on the commitment of medical staff and management follow-up on incompleteness recapitulation reports. |
| Output | Completeness and neatness | File completeness and neatness had not been fully achieved. Some documents remained incomplete and were not neatly arranged when returned from inpatient wards. Internal audits were conducted periodically by the medical record committee. | Audits need to be strengthened with feedback, timeliness indicators, and sanction or coaching mechanisms to ensure continuous improvement in document quality. |
| Output | Ease of access | Document access was relatively easy. Discharge summaries and laboratory results could be viewed through SIMRS, while physical documents could be borrowed through a borrowing logbook procedure. The main | Full integration toward electronic medical records needs to be accelerated so that data access becomes faster, safer, and less dependent on physical documents. |

| Dimension | Aspect | Main Findings | Implications for Improvement |
|---|---|---|---|
| | | access constraint still came from incomplete documents. | |

Based on the input dimension, the study found that the number of medical record staff was considered relatively adequate. However, the suitability of staff qualifications remained an important issue because several personnel did not have an educational background in medical records. This condition may affect staff readiness in carrying out technical activities such as assembling, indexing, completeness analysis, coding support, and filing. In addition, structured training on inpatient medical record file management had not been implemented regularly. Competency development was mostly conducted through informal guidance, knowledge transfer among staff, or activities related to accreditation preparation.

The availability of facilities and infrastructure also influenced the input dimension. The findings showed that several facilities were not yet fully adequate to support efficient medical record management. Informants reported constraints such as outdated computers, printers that occasionally malfunctioned, unstable network connections, limited filing shelves, limited storage space, and a management system that was still in a hybrid phase between physical and electronic documents. These conditions affected the speed and effectiveness of document processing, retrieval, and storage.

In the process dimension, staff generally understood the standard operating procedures for inpatient medical record management. The workflow began with patient registration, file distribution to inpatient wards, completion of documents by health professionals, file retrieval after patient discharge, data entry, assembling, completeness analysis, coding, claim verification, and filing. This indicates that the hospital already had a structured workflow for inpatient medical record management. However, consistency in implementation still required strengthening, especially in the stages of document completion, file return, completeness checking, and follow-up of incomplete files.

The main barriers in the process dimension were related to incomplete documents and delayed file returns. Several documents were often found incomplete, including discharge summaries, informed consent forms, and physician signatures. In addition, illegible physician handwriting and file returns exceeding the 2 × 24-hour standard were also

reported as obstacles. The hybrid manual-electronic system also caused repeated file movement, which increased the risk of delays in assembling, coding, claim verification, and final storage. Completeness checking had been conducted using a checklist during the assembling process. Incomplete files were marked, returned to the relevant physician or unit, coordinated with professional care providers, recapitulated, and reported to management.

In the output dimension, document completeness and neatness had not been fully achieved. Some inpatient medical record files were still returned in an incomplete and poorly arranged condition. Internal audits had been conducted periodically by the medical record committee, but the results indicated that audit follow-up still needed to be strengthened. In terms of accessibility, document access was relatively easy because discharge summaries and laboratory results could be viewed through SIMRS, while physical files could be borrowed through a borrowing logbook. However, the main obstacle to access remained the incomplete condition of documents, which reduced the quality and usability of medical record information.

## DISCUSSION

The findings of this study show that inpatient medical record file management at Beriman Regional General Hospital, Balikpapan City, has been implemented through a structured workflow based on the input, process, and output dimensions. In the input dimension, the number of staff was considered relatively adequate, but several personnel did not have an educational background in medical records and had not received structured training related to inpatient medical record file management. Facilities and infrastructure were also not fully adequate, as shown by outdated computers, printer problems, unstable network connections, limited filing shelves, and limited storage space. In the process dimension, the workflow had generally followed standard operating procedures, including registration, file distribution, document completion, file retrieval, data entry, assembling, completeness analysis, coding, claim verification, and filing. However, implementation was still constrained by incomplete discharge summaries, blank informed consent forms, missing physician signatures, illegible handwriting, delayed file returns, and repeated file movement in the hybrid manual–electronic system. In the output dimension, document access was relatively easy through SIMRS and borrowing logbook procedures, but file completeness and neatness had not been fully achieved.

These findings indicate that the quality of inpatient medical record management is influenced by the interaction between human resources, infrastructure, workflow discipline, and document control mechanisms. Although the number of staff was considered sufficient, adequacy in quantity did not automatically ensure quality in document management. Medical record work requires specific competencies related to assembling, coding, indexing, completeness analysis, filing, confidentiality, and the use of hospital information systems. Therefore, staff members without a medical record educational background may require structured training and continuous supervision to ensure that technical procedures are implemented correctly. The absence of regular training may create variation in staff understanding, especially in handling incomplete documents, maintaining document order, using SIMRS, and following up medical record deficiencies.

The problems found in the input dimension also explain several obstacles in the process dimension. Limited infrastructure, outdated devices, unstable networks, and insufficient storage space may slow down document processing and increase dependence on manual work. The hybrid system provides benefits because some information, such as discharge summaries and laboratory results, can be accessed through SIMRS. However, when the electronic system is not fully integrated, physical documents still need to be moved repeatedly between wards, medical record units, coding units, claim verification, and storage rooms. This repeated movement increases the risk of delayed returns, misplaced files, incomplete tracking, and slower claim verification. Thus, the transition from manual to electronic medical records requires not only technology adoption but also workflow redesign, staff readiness, infrastructure support, and clear control mechanisms.

The process dimension shows that document incompleteness and delayed file returns are the most dominant obstacles in inpatient medical record management. This condition occurs because medical record completion does not depend solely on medical record officers, but also on physicians, nurses, and other professional care providers. Discharge summaries, informed consent forms, and physician signatures are clinical-administrative documents that must be completed by authorized health professionals. When these documents are incomplete, the medical record unit must return the file to the relevant unit, which delays assembling, coding, BPJS claim verification, and final filing. Therefore, the problem of incomplete medical records should be understood as a cross-professional coordination issue rather than merely an administrative weakness of the medical record unit.

The findings of this study are consistent with previous studies showing that incomplete medical record documents remain a common problem in health facilities. Lestari and Muflihatin found that incompleteness of inpatient medical records may be influenced by limited time, lack of awareness, and weak monitoring (Lestari & Muflihatin, 2020). Wirajaya and Nuraini also emphasized that human resource factors, discipline, workload, and supervision contribute to incomplete medical record documentation in hospitals (Wirajaya & Nuraini, 2019). Similarly, Kencana showed that compliance in completing inpatient medical record files is closely related to the commitment of health professionals and the effectiveness of monitoring mechanisms (Kencana et al., 2019). The present study confirms these findings, but provides a broader contribution by showing that document incompleteness is not an isolated problem. It is connected to input limitations, process barriers, and output quality in one integrated system.

This study also supports previous findings on the importance of filing systems, document tracking, and electronic health information systems. Wati and Nuraini reported that missfile incidents indicate weaknesses in storage and document tracking systems (Wati & Nuraini, 2019). Boonstra explained that electronic health record implementation in hospitals is often influenced by organizational, technical, and human factors (Boonstra et al., 2014). Gesulga also noted that electronic health record implementation may face barriers related to infrastructure, information system resources, and user readiness (Gesulga et al., 2017). The findings of this study are in line with these studies because Beriman Regional General Hospital has begun to use SIMRS, but the system is still hybrid and has not fully reduced dependence on physical documents. The novelty of this study lies in its integrated input–process–output evaluation, which shows that electronic transition, staff competence, SOP implementation, document completeness, and access quality must be evaluated as interconnected components of medical record management.

The meaning of these findings is important for hospital management and health information governance. Medical records are not merely administrative archives, but strategic documents that support patient safety, clinical continuity, legal protection, financing, quality assessment, accreditation, and hospital decision-making. When medical records are incomplete, poorly arranged, or returned late, the hospital may experience delays in claims, difficulties in retrieving patient information, reduced data reliability, and potential legal risks. Conversely, when medical records are complete, neat, accessible, and

supported by an integrated information system, the hospital can improve service efficiency, claim accuracy, reporting quality, and accountability in health services.

The findings also show both functional and dysfunctional aspects of the current system. Functionally, the hospital already has SOPs, a structured workflow, checklist-based completeness analysis, a borrowing logbook, SIMRS access, and periodic internal audits. These elements indicate that the foundation of medical record management has been established. However, the dysfunctional aspects are still visible in the form of incomplete clinical forms, delayed file returns, limited infrastructure, lack of structured training, and incomplete integration between manual and electronic systems. If these weaknesses are not addressed, the hospital may continue to face recurring problems in assembling, coding, claim verification, filing, and health information quality.

Based on these findings, several improvement actions are recommended. First, the hospital needs to strengthen competency-based human resource development by providing regular training on inpatient medical record management, confidentiality, coding support, filing, SIMRS use, and procedures for following up incomplete documents. Second, management needs to improve infrastructure by upgrading computers and printers, stabilizing network connections, increasing filing shelves, improving storage-room arrangement, and ensuring the availability of document tracking tools. Third, the hospital should reinforce SOP compliance through routine monitoring, measurable indicators, and feedback mechanisms. Indicators may include the percentage of complete files, timeliness of file returns, number of incomplete discharge summaries, number of missing signatures, and duration of claim verification.

Fourth, the hospital needs to strengthen cross-professional coordination involving physicians, nurses, medical record officers, coders, claim officers, and hospital management. Completion of inpatient medical record files should become a shared responsibility supported by clear deadlines, regular reminders, and management follow-up. Fifth, internal audits should not stop at recording findings, but should be followed by corrective actions, coaching, and periodic evaluation of improvement progress. Sixth, the hospital needs to accelerate the gradual implementation of integrated electronic medical records so that document access becomes faster, safer, and less dependent on physical files. However, during the transition period, physical document management must still be controlled carefully to maintain completeness, neatness, traceability, and information quality.

Overall, this study emphasizes that improving inpatient medical record management requires an integrated approach. Strengthening only one aspect, such as adding staff or implementing SIMRS, is not sufficient if document completion discipline, infrastructure readiness, audit follow-up, and interprofessional coordination are not improved simultaneously. Therefore, the input–process–output framework can be used by hospital management as a practical evaluation model to identify the root causes of medical record problems and determine improvement priorities in a more systematic manner.

## CONCLUSION

This study concludes that inpatient medical record file management at Beriman Regional General Hospital, Balikpapan City, has been implemented through a structured workflow, but has not yet reached an optimal level when evaluated through the input, process, and output dimensions. The main finding of this study is that the quality of inpatient medical record management is not determined only by the existence of standard operating procedures, but also by the readiness of human resources, the adequacy of facilities, the consistency of document completion, the timeliness of file returns, and the effectiveness of follow-up mechanisms. In the input dimension, the number of staff was considered relatively adequate, but several personnel did not have an educational background in medical records and had not received structured training. In the process dimension, the workflow had generally followed standard procedures, but implementation was still constrained by incomplete discharge summaries, blank informed consent forms, missing physician signatures, illegible handwriting, delayed file returns, and repeated file movement in the hybrid manual–electronic system. In the output dimension, document access was relatively easy through SIMRS and borrowing logbook procedures, but file completeness and neatness had not been fully achieved.

The scientific contribution of this study lies in its integrated evaluation of inpatient medical record management using the input–process–output framework. Unlike studies that focus only on document completeness, delayed file returns, filing systems, or electronic medical record implementation, this study shows that the problems of inpatient medical record management are interconnected across resource, procedural, and output dimensions. The findings provide a practical evaluation model for identifying the root causes of medical record management problems in hospitals undergoing a transition from manual to hybrid electronic systems. This study also emphasizes that improving medical

record quality requires simultaneous improvement in staff competence, infrastructure, SOP compliance, interprofessional coordination, internal audit follow-up, and electronic medical record integration.

This study has several limitations. First, the study was conducted in one hospital, so the findings cannot be generalized to all hospitals with different organizational structures, resources, and information system readiness. Second, the informants were limited to medical record unit staff and did not include physicians, nurses, BPJS claim officers, hospital management, or patients, although these parties are also related to the completeness and use of inpatient medical records. Third, this study used a qualitative descriptive approach and did not quantitatively measure indicators such as the percentage of incomplete files, average delay in file returns, claim verification time, or the frequency of missing documents. Future studies are recommended to use a mixed-method approach by combining qualitative interviews with quantitative measurement of medical record completeness, return timeliness, claim delays, and electronic medical record readiness. Further research may also involve multiple hospitals to obtain broader evidence on inpatient medical record management and health information governance.

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