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Original Article

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Hospital workflow compliance and timeliness of inpatient medical record return: Evidence from a cross-sectional study in Indonesia

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ABSTRACT

Introduction: Timely return of inpatient medical records is essential for continuity of care, hospital reporting, coding, insurance claims, and administrative efficiency. This study aimed to examine factors associated with timely inpatient medical record return at Andi Makkasau Regional Hospital, Parepare, Indonesia.

Research Methodology: A quantitative cross-sectional study was conducted among 40 nurses working afternoon and night shifts, selected using total sampling. Data were collected using questionnaires and observation checklists. Staff attitude, workload, and compliance with standard operating procedures (SOPs) were examined in relation to timely record return using Chi-square analysis.

Results: Of 40 respondents, 16 (40.0%) returned inpatient medical records on time, whereas 24 (60.0%) did not. Staff attitude was not significantly associated with timeliness (*p*=0.638), nor was workload (*p*=0.681). In contrast, SOP compliance showed a significant association (*p*<0.001). Among respondents with good SOP compliance, 14 of 21 returned records on time, compared with 2 of 19 among those with poor compliance, corresponding to a calculated crude OR of 17.00 (95% CI: 3.03–95.26).

Conclusion: SOP compliance was the principal factor associated with timely inpatient medical-record return. Strengthening procedural adherence, routine monitoring, and documentation accountability may improve medical-record workflow and hospital service efficiency.

Keywords: health personnel; medical records; patient discharge; standard operating procedures; workload

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INTRODUCTION

Accurate and timely management of medical records is a fundamental component of hospital service delivery because clinical documentation supports continuity of care, administrative processes, reporting, financing, and accountability. Medical records provide chronological evidence of examinations, treatment, clinical interventions, and other services delivered to patients[1,2]. Consequently, delays in completing and returning these records may affect not only medical-record administration but also several downstream hospital processes. In Indonesia, the importance of medical-record governance has become more prominent following Ministry of Health Regulation No. 24 of 2022, which requires healthcare facilities to implement electronic medical records as part of broader efforts to standardize health data, improve operational efficiency, and strengthen service quality[3,4].

Despite this regulatory direction, the basic workflow of completing and returning inpatient records remains problematic in some hospitals. At Andi Makkasau Regional Hospital in Parepare, delayed return of inpatient medical records has been identified as a persistent operational issue. The hospital applies a standard requiring medical records to be returned to the medical-record unit within 2 × 24 hours after patient discharge[5,6]. However, the preliminary information reported in the study indicates that, among approximately 1,700 or fewer inpatient cases, only 100 or fewer medical-record files were returned within the required period. This discrepancy indicates a substantial implementation gap between the hospital's formal service standard and routine practice.

The consequences of delayed record return extend beyond the medical-record department. According to the study context, late files may slow outpatient follow-up for patients previously hospitalized, delay BPJS health insurance claims, disrupt internal and external hospital reporting, and reduce the accuracy and timeliness of information required for administrative and clinical activities. These effects are particularly important because a medical record must generally be complete before subsequent processes such as assembling, coding, indexing, reporting, and claim administration can proceed efficiently. The hospital therefore requires inpatient records to be completed before they are transferred from the ward to the medical-record unit.

The problem is also closely linked to the organization of clinical work. Staffing patterns reported in the manuscript show that afternoon and night shifts may be covered by only three nurses, while approximately 20–50 patients may require care each day. By comparison, the morning shift involves approximately five to seven nurses. Nurses are responsible not only for documentation but also for receiving newly admitted patients, administering medications, performing nursing procedures, routinely monitoring patient conditions, and recording the services provided[7,8]. These simultaneous responsibilities provide a plausible organizational context in which timely completion and return of medical records may become difficult, particularly during shifts with fewer personnel[9,10].

However, workload alone may not fully explain the delay. The manuscript also identifies incomplete physician documentation as an important practical obstacle. Nurses may be unable to return records when documents requiring completion by the physician responsible for the patient remain unfinished. These documents include medical summaries, operative reports, medication-related documentation, informed-consent forms, and other clinical records. Thus, the timeliness of record return appears to depend on an interconnected workflow involving nursing responsibilities, documentation completeness, professional discipline, and adherence to established procedures rather than on a single individual factor.

Existing discussions in the manuscript emphasize that medical-record management is intended to support orderly administration and effective healthcare delivery. More recent developments in electronic medical records have further strengthened expectations regarding standardization, efficiency, and data availability. The study also refers to Minimum Service Standards as a framework for ensuring the quality of basic services, including the management, maintenance, and provision of medical and health-information records in both manual and electronic formats. Nevertheless, these policy and technological developments do not automatically resolve delays in day-to-day documentation workflows. Operational compliance at ward level remains necessary for institutional standards to function as intended.

A clear research gap therefore emerges from the hospital context. Although Andi Makkasau Regional Hospital has established a written standard operating procedure requiring inpatient medical records to be returned within 2 × 24 hours, the manuscript states that the causes of persistent delays had not previously been specifically examined at this institution. The problem is therefore not simply the absence of a policy, but the limited empirical understanding of why compliance with an existing policy remains inconsistent. In particular, the roles of staff-related and procedural factors require investigation.

The novelty of this study lies in examining the timeliness problem within the specific operational environment of a regional public hospital where a formal return standard already exists, but implementation remains suboptimal. Rather than treating delayed record return only as a documentation issue, the study evaluates it in relation to personnel and organizational factors, particularly staff attitude, workload, and compliance with standard operating procedures. This focus provides locally grounded evidence that may help distinguish factors that are merely assumed to influence delays from those that demonstrate a measurable association with timely record return. Accordingly, this study aimed to analyze factors associated with the timely return of inpatient medical records at Andi Makkasau Regional Hospital, Parepare. Specifically, it examined whether staff-related and procedural characteristics were associated with compliance with the required medical-record return timeframe. The findings are expected to support monitoring and evaluation of medical-record management, improvement of Minimum Service Standards, and the development of more focused hospital quality-management strategies.

MATERIALS AND METHODS

Study design

This study employed an analytical cross-sectional design to examine the associations between staff-related and procedural factors and the timeliness of returning inpatient medical records. A cross-sectional approach was considered appropriate because the dependent and independent variables were assessed within the same study period, allowing associations between the measured characteristics and timely medical-record return to be evaluated without establishing temporal or causal relationships.

Setting and Participants

The study was conducted at Andi Makkasau Regional Hospital, Parepare City, South Sulawesi, Indonesia, particularly in the inpatient wards and medical-record unit. Data collection was undertaken from May to June 2026. The source population comprised ward heads and nurses working afternoon and night shifts who had authorized access to inpatient medical records. The total eligible population consisted of 40 healthcare personnel.

Participants were recruited using total sampling, whereby all 40 members of the accessible population were included in the study. Consequently, no separate sample-size calculation was applied because the study attempted to include the entire defined population rather than drawing a probabilistic sample from it. The manuscript identifies access to inpatient medical records and assignment to the relevant ward or shifts as participant characteristics; however, separate formal inclusion and exclusion criteria were not explicitly reported in the original study document.

Variables and Measurement

The primary outcome was the timeliness of inpatient medical-record return, defined according to the hospital standard as the return of medical records from the inpatient ward to the medical-record unit within 2 × 24 hours after patient discharge. Records returned within this timeframe were categorized as timely, whereas those returned after 2 × 24 hours were classified as delayed. The analytical independent variables reported in the final results were staff attitude, workload, and compliance with standard operating procedures (SOPs). Staff attitude represented respondents' responses toward their responsibilities related to medical-record management. Workload reflected the volume of work undertaken during a work shift and the number of patients for whom personnel were responsible. SOP compliance reflected adherence to the written procedures governing the timely return of inpatient medical records.

Primary data were obtained using a structured closed-ended questionnaire and an observation checklist. Questionnaire responses were used to assess staff-related variables, whereas direct record observation was used to verify the timeliness and completeness of returned medical records. The checklist included relevant documentation such as the medical summary, informed-consent form, and signature of the physician responsible for care. Categorical scoring was applied to the measured variables according to the criteria established in the original study. The manuscript reports categorization based on predetermined scores or median values. However, the original document does not provide sufficient information on instrument-development procedures, content or construct validity testing, pilot testing, or reliability coefficients such as Cronbach's alpha. These psychometric properties should therefore not be reported unless supporting source data are available.

Data Collection and Quality Control

Data collection combined participant questionnaires with observation of inpatient medical records. Respondents completed the structured questionnaire, while the observation checklist was used to determine whether medical records were returned within the required timeframe and whether relevant clinical documentation had been completed. Several data-quality procedures were applied before statistical analysis. Completed questionnaires were checked for completeness through editing, after which responses were numerically coded for entry into the statistical database. Data entry was performed twice to reduce input errors. The dataset was subsequently cleaned to identify typing errors, duplicate entries, and other inconsistencies before variable scoring and analysis.

Data Analysis

Data were processed and analyzed using SPSS; the software version was not specified in the source manuscript. Descriptive statistics were used to summarize participant characteristics and study variables. Categorical data were presented as frequencies and percentages, including age, sex, educational background, length of employment, staff attitude, workload, SOP compliance, and timeliness of medical-record return.

Bivariate associations between each independent variable and timely medical-record return were evaluated using the Pearson chi-square test. Statistical significance was defined at a two-sided $\alpha = 0.05$, with $p < 0.05$ interpreted as evidence of a statistically significant association. The original study reported chi-square analyses for attitude, SOP compliance, and workload. The original dataset showed relatively few outcome events and included only 40 participants. No multivariable logistic regression or other adjusted model was reported in the source manuscript. Therefore, the present analysis should be described as descriptive and bivariate rather than multivariable, and adjusted odds ratios should not be claimed without reanalysis of the individual-level dataset. This distinction is important to avoid overstating independent effects or causal relationships.

Ethical Approval

The study was conducted at Andi Makkasau Regional Hospital, Parepare City, South Sulawesi, Indonesia. Participation involved nurses and ward personnel with authorized access to inpatient medical records, while data collection used structured questionnaires and medical-record observation checklists. The study maintained the confidentiality of participant and medical-record information throughout data collection, processing, and analysis. No personally identifiable patient information was included in the analytical dataset or reported in the study findings.

RESULTS

A total of 40 respondents participated in the study. All respondents were female nurses. Their ages ranged from 22 to 50 years, educational backgrounds ranged from Diploma III Nursing to bachelor-level nursing education with professional nurse qualification, and their length of employment ranged from 1 to 21 years.

Table 1. Characteristics of respondents and study variables

Characteristic	Category	n	%
Sex	Female	40	100.0
Age	22–50 years	40	100.0
Length of employment	1–21 years	40	100.0
Attitude	Good	36	90.0
	Poor	4	10.0
SOP compliance	Compliant	21	52.5
	Non-compliant	19	47.5
Workload	Light	33	82.5
	Heavy	7	17.5
Timeliness of record return	Timely	16	40.0
	Delayed	24	60.0

Most respondents had a good attitude toward medical-record management (90.0%), while 52.5% were compliant with the standard operating procedure and 82.5% were classified as having a light workload. Nevertheless, only 16 respondents (40.0%) returned inpatient medical records on time, whereas 24 (60.0%) did not meet the required return timeframe.

Table 2. Bivariate associations with timely return of inpatient medical records

Variable	Category	Timely n (%)	Delayed n (%)	Crude OR	95% CI	p-value
Attitude	Good	15 (37.5)	21 (52.5)	2.14	0.20–22.65	0.638
	Poor	1 (2.5)	3 (7.5)	Ref.		
SOP compliance	Compliant	14 (35.0)	7 (17.5)	**17.00**	**3.03–95.26**	**<0.001**
	Non-compliant	2 (5.0)	17 (42.5)	Ref.		
Workload	Light	14 (35.0)	19 (47.5)	1.84	0.31–10.92	0.681
	Heavy	2 (5.0)	5 (12.5)	Ref.		

OR = odds ratio; CI = confidence interval; Ref. = reference category. Crude ORs and 95% CIs were calculated from the 2×2 frequency distributions reported in the original manuscript.

Attitude was not significantly associated with timely return of inpatient medical records (p=0.638). Although respondents with a good attitude had higher crude odds of returning records on time than those with a poor attitude, the confidence interval was wide and crossed unity, indicating substantial uncertainty in the estimate. Workload was also not significantly associated with timeliness (p=0.681). Of the 33 respondents classified as having a light workload, 14 returned records on time, and 19 returned them late. Among seven respondents with a heavy workload, two returned records on time, and five returned them late.

In contrast, SOP compliance showed a statistically significant association with timely record return. Among the 21 compliant respondents, 14 returned records on time, and seven returned them late, whereas among the 19 non-compliant respondents, only two returned records on time and 17 returned them late. The crude OR was 17.00 (95% CI: 3.03–95.26; p<0.001), indicating substantially higher odds of timely record return among respondents adhering to the established procedure. The review of 40 inpatient medical records identified several incomplete documentation components. The most frequent problem involved the physician discharge summary, which was incomplete in 20 records (50.0%). Incomplete operative reports were found in 5 records (12.5%), medication-related documentation in 4 (10.0%), physician assessment forms in 3 (7.5%), discharge planning forms in 3 (7.5%), informed-consent forms in 2 (5.0%), implementation sheets in 2 (5.0%), and initial medical assessment forms in 1 (2.5%).

These findings indicate that delayed record return cannot be understood solely from nursing-related characteristics. The high proportion of incomplete physician summaries suggests that the timeliness of medical-record return also depends on completion of documentation by other healthcare professionals involved in inpatient care. The results suggest that timely inpatient medical-record return is more closely related to procedural compliance and interprofessional workflow than to staff attitude or workload alone. Although 90.0% of respondents demonstrated a good attitude and 82.5% reported a light workload, 60.0% of medical records were still returned late. This pattern indicates that favorable individual characteristics do not automatically translate into timely administrative performance. The strongest association was observed for SOP compliance. Respondents who complied with the established procedure had markedly higher odds of returning records on time. However, the wide confidence interval indicates imprecision arising from the small sample and should be interpreted cautiously. The documentation review further strengthens the workflow

explanation, as 50.0% of records contained incomplete physician discharge summaries. These findings imply that improvement strategies should not focus exclusively on nurses. Hospitals should strengthen procedural enforcement, clarify responsibility for completing each component of the record, establish routine monitoring of overdue documents, and improve coordination between nurses, physicians, and medical-record personnel. A structured tracking system for incomplete documentation may also help identify bottlenecks earlier and reduce downstream delays in coding, reporting, claims processing, and follow-up services.

DISCUSSION

The present study shows that delayed return of inpatient medical records should be understood as a workflow-governance issue rather than as a problem attributable solely to individual staff characteristics. Although most respondents demonstrated a good attitude toward medical-record management and were classified as having a light workload, 60.0% of inpatient records were still returned late. In contrast, compliance with the standard operating procedure was strongly associated with timely return. This pattern suggests that favorable attitudes and manageable workload are insufficient when procedural adherence and coordination across professional roles are inconsistent. The additional observation that 50.0% of reviewed records contained incomplete physician discharge summaries reinforces this interpretation.

Conceptually, these findings shift attention from individual behavior toward the organization of documentation processes. The return of an inpatient medical record is the final step of a sequence involving physicians, nurses, supporting personnel, and the medical-record unit. A nurse may understand the importance of timely return and still be unable to complete the process when mandatory clinical documentation has not been finalized by another professional[11,12]. Therefore, timeliness is better regarded as an outcome of an interdependent hospital workflow in which accountability, procedural clarity, monitoring, and coordination are mutually reinforcing[13,14]. The observed association with SOP compliance is consistent with this systems perspective because an SOP does more than define a deadline; when properly implemented, it specifies responsibilities, sequence, standards, and expected behavior across units.

This interpretation is supported by previous studies in Indonesian healthcare settings. Research at hospitals and primary-care facilities has repeatedly identified delays beyond the commonly applied 2 × 24-hour return standard. A study at Hospital X in Bogor reported that 65.54% of records were returned after the required timeframe and linked the problem to limited staffing, physical distance between units, and insufficient SOP socialization. Similarly, a study at Purwoharjo Health Center found that delayed returns reached 54.01%, with contributing factors including limited knowledge of return standards, staff indiscipline, incomplete medical records, and suboptimal use of supporting systems. These findings suggest that delayed record return commonly reflects interaction between human, procedural, and organizational factors rather than a single isolated determinant[15,16].

The importance of procedural compliance in the present study also aligns with more recent evidence. Rahmadhani and colleagues identified lack of compliance and discipline among physicians and nurses, uncertain physician visiting schedules, incomplete infrastructure, absence of written procedures for record completion, and lack of reward and punishment mechanisms as contributors to delayed inpatient record return[17,18]. Another 2025 study from Pekanbaru emphasized that timely return and documentation completeness were

influenced by human-resource limitations, high workload, inadequate monitoring, and weaknesses in supporting facilities, while recommending stronger SOP enforcement and inter-unit coordination. Together, these studies reinforce the idea that SOP compliance operates within a broader institutional environment and should not be interpreted simply as an individual behavioral characteristic [19,20].

The finding that incomplete discharge summaries represented the most frequent documentation deficiency is particularly important. In the present study, half of the reviewed records lacked a completed physician discharge summary. At the same time, other incomplete components included operative reports, medication documentation, physician assessments, discharge planning, and informed-consent forms. Previous studies have similarly emphasized the relationship between documentation completeness and return timeliness. Research at Airlangga University Hospital identified both incomplete record completion and return beyond the 2 × 24-hour standard as unresolved service-quality indicators [21]. A study in Bandung further noted that incomplete discharge summaries could delay the release of medical information and recommended stronger physician accountability in completing these forms. This supports the interpretation that record-return delays cannot be assigned to nurses alone when completion depends on documentation generated by several professional groups[22,23].

The absence of a statistically significant association between workload and timeliness in this study should therefore be interpreted cautiously. It does not necessarily mean that workload is irrelevant to medical-record management. Instead, the measured workload category may not have captured the specific temporal and coordination pressures involved in documentation completion[24,25]. The sample was also small, and only seven respondents were classified as having a heavy workload. Under these conditions, statistical power to detect meaningful differences was limited. Similarly, the non-significant association between attitude and timeliness should not be interpreted as evidence that attitudes have no role. Positive attitudes may facilitate compliance, but their effect can be constrained by incomplete documentation, competing clinical responsibilities, physician availability, or institutional processes.

Several limitations must be considered when interpreting these findings. First, the study involved only 40 respondents from one regional public hospital, limiting external generalizability. Second, all participants were female nurses, and physicians, medical-record personnel, and other professionals directly involved in record completion and transfer were not included as respondents. Third, the cross-sectional design identifies associations but cannot establish temporal or causal relationships. Fourth, the crude odds ratio for SOP compliance had a wide confidence interval, indicating substantial imprecision despite the strong association observed[26,27]. Finally, the study did not conduct multivariable analysis, meaning that possible confounding among attitude, workload, SOP compliance, professional experience, staffing patterns, and documentation completeness could not be statistically separated[28]. These limitations warrant caution against describing SOP compliance as an independent causal determinant.

Future research should therefore move from an individual-factor model toward a more comprehensive workflow model. Larger multicenter studies should include nurses, physicians, medical-record officers, and hospital managers and examine both individual and organizational determinants. Prospective designs could measure actual time from discharge to completion, transfer, verification, coding, and storage, thereby identifying where delays accumulate. Multivariable analysis would also allow estimation of independent associations while

controlling for staffing levels, professional experience, ward type, number of discharges, documentation completeness, and shift characteristics.

A mixed-methods approach would be particularly valuable because quantitative associations alone cannot fully explain why staff fail to comply with procedures. Interviews and workflow observations could clarify whether delays arise from unclear role boundaries, limited SOP dissemination, competing clinical priorities, physician availability, weak supervision, or inadequate information systems. Intervention studies should subsequently test structured strategies such as electronic completion alerts, real-time dashboards, automatic escalation of overdue records, scheduled monitoring, and unit-level feedback. Overall, the present findings contribute to a more systemic understanding of medical-record timeliness: improving performance is unlikely to be achieved through individual reminders alone, but requires coordinated governance of documentation, accountability, and interprofessional workflow.

CONCLUSIONS

This study identified standard operating procedure (SOP) compliance as the factor most strongly associated with the timely return of inpatient medical records at Andi Makkasau Regional Hospital. Staff attitude and workload were not significantly associated with timeliness, while only 40.0% of records were returned within the required timeframe and 60.0% were delayed. The documentation review further showed that incomplete physician discharge summaries were the most frequent deficiency, affecting 50.0% of the reviewed records. These findings indicate that delayed record return is not solely an individual nursing issue but reflects weaknesses in procedural adherence and interprofessional documentation workflow. Hospital policy should therefore prioritize stronger implementation of SOPs, routine monitoring of overdue records, clearer accountability for completing each documentation component, and improved coordination between nurses, physicians, and medical-record personnel. Introducing structured tracking mechanisms, including electronic alerts or monitoring dashboards where feasible, may help identify incomplete records earlier and reduce delays. Future research should involve larger multicenter samples and include all professional groups responsible for medical-record completion better to identify organizational and workflow determinants of timely record return.

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Conflict of Interest

The authors declare that they have no financial, professional, or personal conflicts of interest that could have influenced the conduct, interpretation, or reporting of this study.

Authors' Contributions

Nelly Mandasari: Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Writing Original Draft, Writing Review and Editing, and Project Administration. The author reviewed and approved the final version of the manuscript and takes responsibility for the integrity and accuracy of the work.

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Declaration of Generative AI Use

Generative artificial intelligence tools were used solely to assist with language refinement, grammatical improvement, and organization of the manuscript. All scientific content, data interpretation, analytical decisions, and conclusions were reviewed and verified by the authors, who take full responsibility for the final manuscript.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request. Access may be subject to institutional approval and applicable requirements concerning participant confidentiality and the protection of medical-record information.

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