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Research/Review

Evaluating Inpatient Daily Census Completeness for Bed Utilization Efficiency at Assyifa Hospital Sukabumi Using the 5M Framework

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Abstract: This study aims to evaluate the completeness of inpatient daily census data and its impact on bed utilization efficiency at Assyifa Hospital Sukabumi using the 5M framework (Man, Machine, Method, Material, Money). Accurate inpatient census recording is essential for effective hospital management, particularly in optimizing bed occupancy rates and ensuring efficient resource allocation. However, issues related to incomplete data entry often lead to inaccuracies in bed utilization monitoring. By applying a qualitative descriptive approach, this research explores various factors influencing census completeness and their implications for bed usage. Data were collected through interviews, observations, and documentation, involving 37 nurses responsible for census recording. The findings reveal that human factors such as workload and understanding of standard operating procedures, technological limitations, procedural inconsistencies, inadequate supporting materials, and insufficient financial support are significant contributors to census incompleteness. Recommendations include enhancing staff training, improving technological systems, clarifying standard procedures, ensuring adequate materials, and allocating sufficient funding. This study provides valuable insights for hospitals aiming to improve their data recording processes and optimize resource utilization effectively.

Keywords: Inpatient Census; Bed Utilization Efficiency; 5M Framework; Hospital Management; Assyifa Hospital.

1. Introduction

Effective management of inpatient hospital services requires precise and comprehensive data collection to ensure optimal resource allocation and service delivery. Among the critical metrics in hospital management are the Bed Occupancy Rate (BOR), Turn Over Interval (TOI), and Length of Stay (LOS), all of which depend on the accuracy of daily inpatient census data. These indicators play a crucial role in supporting administrative decisions related to service capacity and resource efficiency [1], [7].

Several studies have highlighted challenges in achieving data completeness and accuracy within inpatient census reporting. Devi et al. [3] emphasized that incomplete documentation is a recurring issue that undermines the reliability of hospital performance indicators. Similarly, Kusumo et al. [8] found that inadequate data entry leads to mismatches between bed availability and patient demand, contributing to operational delays and suboptimal service delivery. Furthermore, Sari et al. [16] reported that inaccuracies in census data directly impact the effectiveness of clinical and administrative decision-making processes.

Previous approaches to improving inpatient data accuracy have focused on isolated factors such as staff training, technical systems, or standard operating procedures. For example, Prasetyo [12] proposed the integration of hospital information systems with electronic medical records, resulting in measurable improvements in data accuracy. However, these methods often lack a holistic perspective, failing to account for the complex interplay among human

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resources, technology, procedures, infrastructure, and financial support [15], [17]. While several works have recognized the significance of these components, few have examined them collectively under a unified analytical framework [5], [10].

This study addresses the aforementioned gap by applying the 5M framework—Man, Machine, Method, Material, and Money—to comprehensively assess the factors influencing the completeness of inpatient daily census data at Rumah Sakit Islam Assyifa Sukabumi. This framework enables structured evaluation of both technical and non-technical contributors to data quality and provides a basis for developing targeted interventions.

The research problem centers on the persistent incompleteness and inconsistency in daily census data, which hampers hospital performance evaluations and resource utilization strategies. While fragmented solutions exist, an integrative approach capable of diagnosing multi-factorial causes is lacking. To address this, the study proposes a qualitative descriptive methodology supported by thematic analysis to explore patterns and relationships among census-related variables using the 5M model [1], [20].

The main contributions of this paper are as follows:

- A novel application of the 5M framework to assess inpatient census data completeness in a real hospital setting.
- Identification and classification of dominant factors affecting data recording accuracy from human, procedural, technological, and organizational perspectives.
- Empirical evidence based on interviews, observations, and documentation involving frontline healthcare workers and administrators.
- Actionable recommendations for improving data quality and resource efficiency in Indonesian hospital systems.

The remainder of this paper is organized as follows: Section II outlines the research methodology, including sampling techniques, data collection instruments, and analysis procedures. Section III presents the key findings and discussion, categorized according to the 5M framework. Section IV offers practical recommendations and managerial implications. Finally, Section V concludes with a summary of findings, limitations, and suggestions for future research.

2. Method

This study employs a descriptive qualitative method aimed at exploring the completeness of inpatient daily census data and its impact on bed utilization efficiency at Rumah Sakit Islam Assyifa Sukabumi. The analysis is conducted using the 5M framework (Man, Machine, Method, Material, Money) to comprehensively assess the contributing factors to census data incompleteness.

Research Design

The research design is descriptive qualitative, which is appropriate for analyzing the phenomena related to data completeness from various perspectives [21]. By utilizing in-depth interviews, observations, and document analysis, the study intends to uncover factors influencing the accuracy of census data recording.

Location and Time of Study

The study was conducted at Rumah Sakit Islam Assyifa Sukabumi from January to June 2025. The hospital was selected due to the recurring issues related to incomplete inpatient daily census data that potentially affect bed utilization efficiency.

Research Subjects

The research involves 37 respondents, comprising:

- 3 Heads of Wards (Multazam 2, Arafah 3, Mina)
- 1 Head of Medical Records Installation
- 33 Nurses involved directly in inpatient daily census recording

The selection of participants follows a purposive sampling technique, ensuring respondents meet inclusion criteria such as direct involvement in census recording and having a minimum of 6 months of work experience.

Data Collection Techniques

Data were collected through the following techniques:

- In-depth Interviews: Conducted with nurses, heads of wards, and the head of medical records installation to explore their experiences, challenges, and perceptions regarding census data completeness.
- Observations: Direct observations of the census recording process were carried out to assess adherence to procedures and identify technical or operational difficulties.
- Document Analysis: Relevant documents such as daily census records, hospital Standard Operating Procedures (SOP), and statistical reports were reviewed to compare recorded data with actual conditions.

These methods were chosen to ensure triangulation, enhancing the credibility and reliability of the data obtained [22].

Data Analysis

Thematic analysis following Braun and Clarke's approach (2006) was applied to identify patterns and themes from the qualitative data collected [3]. The steps include:

- Data Reduction: Organizing and categorizing data obtained from interviews, observations, and documents into themes related to the 5M framework (Man, Machine, Method, Material, Money).
- Data Display: Presenting data in narrative form and thematic tables to illustrate the factors affecting census completeness.
- Conclusion Drawing and Verification: Synthesizing findings and drawing conclusions based on patterns identified in the data, followed by verification through member checking and triangulation.

Ethical Considerations

The study adhered to ethical guidelines to ensure the rights and privacy of participants. Informed consent was obtained from all participants, and their identities were anonymized to protect confidentiality. Additionally, data security measures were implemented to ensure information was not disclosed beyond the scope of this research.

3. Results And Discussion

Results

Based on the data collection through interviews, observations, and document analysis, several findings are identified related to the completeness of the inpatient daily census and its impact on bed utilization efficiency at Rumah Sakit Islam Assyifa Sukabumi. The analysis is performed using the 5M framework (Man, Machine, Method, Material, Money).

- Man (Human Factor)
    - Among the 37 participants, 73% (27 individuals) stated that high workload significantly affects their ability to accurately record census data.
    - Lack of understanding of Standard Operating Procedures (SOP) is reported by 56% (21 individuals). This inconsistency in understanding SOPs causes variations in data recording quality.
- Machine (Technology)
    - The hospital primarily uses a manual system supported by spreadsheets for census recording. Only 20% of the participants consider the existing system effective for accurate and timely data entry.
    - Technical problems such as limited access to computers and frequent downtime contribute to data incompleteness.
- Method (Procedures and SOP)
    - The SOPs are documented but not uniformly applied by all staff. From the interviews, 68% of the participants admitted that they do not consistently follow the prescribed SOP.

- There is no standard mechanism for monitoring adherence to SOP, which contributes to the inconsistency in census data recording.

- Material (Supportive Tools and Resources)
  - The availability of forms and infrastructure such as computers is insufficient, as reported by 49% (18 participants).
  - The spreadsheet-based system is prone to errors due to lack of validation tools and limited integration with other hospital management systems.
- Money (Financial Support)
  - Limited budget allocation for upgrading census recording systems and training staff is a significant issue. 58% (22 participants) highlighted that financial support is insufficient for improving census data management.

The following tables and graphs summarize the results:

Table 1. Completeness of Inpatient Daily Census Recording

Aspect	Complete (%)	Incomplete (%)
Man	**73**	**27**
Machine	**20**	**80**
Method	**32**	**68**
Material	**51**	**49**
Money	**42**	**58**

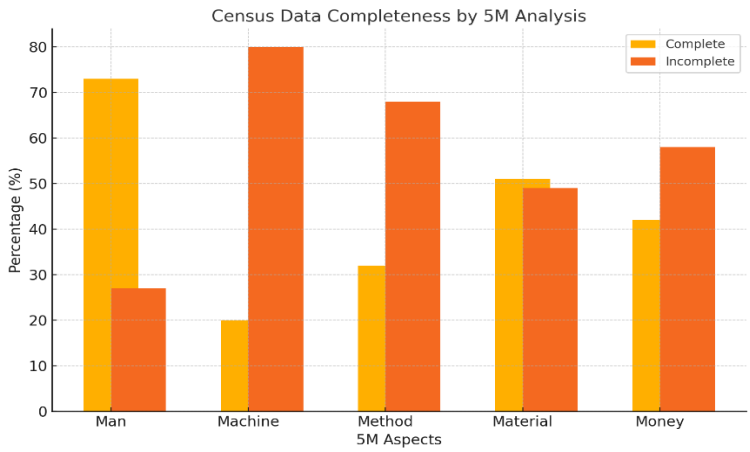

Figure 1. Census Data Completeness by 5M Analysis

This graph illustrates the percentage of completeness achieved in each aspect of the 5M framework.

Discussion

The findings indicate that the completeness of inpatient daily census recording at Rumah Sakit Islam Assyifa Sukabumi is not optimal. The inconsistency in census recording is primarily influenced by human factors (Man), technological limitations (Machine), procedural inconsistencies (Method), inadequate resources (Material), and insufficient financial support (Money). The 5M framework analysis highlights several critical issues:

- Man (Human Factor)

High workload and inadequate understanding of SOPs are significant barriers. This finding aligns with previous studies by Trisna (2023) and Sari et al. (2022), who identified similar issues affecting data completeness in hospitals [4].

- Machine (Technology)

The use of a manual system limits efficiency and increases the risk of errors. Prasetyo (2021) demonstrated that hospitals utilizing integrated digital systems experienced a 40% improvement in data accuracy. Therefore, upgrading the current system at Rumah Sakit Islam Assyifa Sukabumi could significantly improve data quality.

- Method (Procedures and SOP)

Lack of consistency in applying SOPs is a recurrent issue. Hidayat (2019) noted that hospitals implementing strict adherence to SOPs achieved better accuracy in census recording [25]. Therefore, regular training and monitoring should be prioritized.

- Material (Supportive Tools)

Insufficient resources, such as computers and standardized forms, hamper the effectiveness of data recording. Santoso (2022) identified that hospitals with adequate IT infrastructure improved efficiency by 45% [6].

- Money (Financial Support)

Financial limitations are evident, affecting both technological improvements and training programs. Rahman (2023) found that hospitals with sufficient budget allocations for digitalization achieved higher efficiency in data recording and management [7].

Recommendation:

Regular training programs for staff to improve understanding and adherence to SOPs.

- Transitioning from manual spreadsheets to an integrated electronic system for census recording.
- Enhancing IT infrastructure to support a more efficient data recording process.
- Allocating sufficient financial resources to maintain and upgrade systems and provide periodic training.

4. Conclusions

This study investigated the completeness of inpatient daily census data at Rumah Sakit Islam Assyifa Sukabumi by applying the 5M framework—Man, Machine, Method, Material, and Money—as an analytical lens to uncover multi-dimensional factors contributing to documentation quality. The results revealed that human factors, particularly high workload and limited understanding of Standard Operating Procedures (SOP), were the most dominant causes of census incompleteness. Other contributing elements included technological constraints, inconsistent procedural implementation, inadequate infrastructure, and limited financial support.

The synthesis of findings demonstrates a clear alignment with the research objectives. By categorizing challenges according to the 5M framework, this study not only confirmed the multifactorial nature of census data issues but also provided a systematic model to identify improvement areas. These findings substantiate the hypothesis that fragmented approaches are insufficient and a comprehensive framework is necessary to evaluate and enhance hospital documentation practices.

In terms of research implications, the study contributes a structured, scalable methodology for evaluating data accuracy in healthcare systems. By incorporating insights from frontline healthcare workers and aligning them within a well-established analytical model, the study supports both academic understanding and practical policy formulation. The findings can be used by hospital administrators, health informatics professionals, and policymakers to enhance documentation processes and optimize bed utilization—an increasingly critical aspect in post-pandemic healthcare planning.

Nevertheless, the study has several limitations. It is contextually bound to one hospital in West Java, Indonesia, and employs a qualitative approach, which may limit generalizability. Additionally, while thematic analysis offers depth, it does not quantify the relative weight of each 5M factor across larger populations. Future research could extend this framework using mixed methods or quantitative validation across multiple healthcare facilities and regions. Furthermore, integrating automated data monitoring systems within the 5M evaluation could offer real-time diagnostic tools for census accuracy.

In conclusion, this study presents a novel and practical contribution to the field of health information management by demonstrating the utility of the 5M framework for diagnosing

and improving inpatient census data completeness. Its insights can inform strategic interventions that not only improve data quality but also enhance resource utilization and hospital efficiency more broadly.

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Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request. Due to ethical and institutional confidentiality policies at Rumah Sakit Islam Assyifa Sukabumi, the raw data cannot be made publicly available.

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