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Developing an early discharge planning model to optimize the length of stay of national health insurance patients: Evidence from Ari Canti Hospital, Bali, Indonesia

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***Abstract*---**Length of Stay (LOS) is a key performance indicator used to evaluate hospital efficiency and the quality of patient care, particularly for patients covered by Indonesia's National Health Insurance (Jaminan Kesehatan Nasional/JKN). However, discharge planning in many hospitals remains predominantly focused on the day of patient discharge, limiting its effectiveness in reducing unnecessary hospitalization and improving patient flow. This study aims to analyze the current implementation of discharge planning and develop an early discharge planning model to optimize the LOS of JKN patients at Ari Canti Hospital, Ubud, Bali. A qualitative research design was employed using observations, semi-structured interviews, and document reviews. Data were analyzed through triangulation to ensure the credibility and comprehensiveness of the findings. The results revealed several barriers to effective discharge planning, including delayed discharge preparation, inadequate interdisciplinary communication, fragmented care coordination, and the presence of

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non-value-added activities throughout the discharge process. The findings further indicate that implementing an early discharge planning model based on Lean Healthcare principles can improve multidisciplinary collaboration, streamline discharge processes, eliminate operational waste, and facilitate more efficient patient flow. By initiating discharge planning at the early stage of hospitalization, hospitals can better coordinate clinical and administrative activities, resulting in more timely patient discharge without compromising the quality of care. This study concludes that the proposed early discharge planning model has the potential to optimize LOS among JKN patients while enhancing hospital operational efficiency, service quality, and patient-centered care. The findings also provide practical guidance for hospitals seeking to improve discharge management through Lean Healthcare implementation.

***Keywords*---**Early discharge planning, length of stay, Lean Healthcare, hospital efficiency, National Health Insurance.

Introduction

Hospitals play a critical role in delivering safe, effective, and efficient healthcare services while ensuring optimal patient outcomes. In increasingly complex healthcare systems, hospitals are challenged by growing patient demand, regulatory changes, technological advancement, workforce constraints, and financial pressures, all of which require continuous improvement in healthcare delivery processes (Widjaja et al., 2025). Consequently, healthcare organizations are expected to optimize operational efficiency without compromising the quality and safety of patient care.

One of the most widely recognized indicators of hospital efficiency is Length of Stay (LOS), which reflects the duration of inpatient hospitalization from admission to discharge. LOS is not only associated with hospital resource utilization but also influences bed availability, operational costs, patient flow, and healthcare quality (Tipton et al., 2021). Excessively prolonged hospitalization may increase healthcare expenditures, reduce bed turnover, expose patients to hospital-acquired complications, and limit hospitals' capacity to accommodate new admissions. Conversely, unnecessarily early discharge without appropriate planning may increase the risk of readmission and compromise continuity of care. Therefore, optimizing LOS has become a strategic priority for hospitals seeking to improve operational performance while maintaining patient-centered care.

Discharge planning has been widely recognized as one of the most effective strategies for optimizing LOS. Rather than being viewed solely as an administrative activity conducted immediately before patient discharge, discharge planning is increasingly conceptualized as a multidisciplinary process that begins upon patient admission and continues throughout hospitalization. This approach, commonly referred to as early discharge planning, facilitates proactive coordination among healthcare professionals, timely patient and family education, and comprehensive preparation for post-discharge care. Previous studies have

demonstrated that early discharge planning contributes to shorter hospitalization, lower readmission rates, improved bed utilization, and higher patient satisfaction (AlGhaithi et al., 2025; Tipton et al., 2021).

Despite these documented benefits, implementing effective discharge planning remains a significant challenge in many healthcare institutions, particularly in developing countries. In Indonesia, hospitals operating under the National Health Insurance (Jaminan Kesehatan Nasional—JKN) system are expected to deliver efficient care because reimbursement is based on the Indonesian Case-Based Groups (INA-CBG) payment system rather than actual hospitalization costs. Under this financing mechanism, prolonged hospitalization beyond the expected clinical pathway may reduce hospital financial performance while limiting patient access to inpatient services. Consequently, efficient discharge planning has become increasingly important not only for improving patient outcomes but also for ensuring hospital financial sustainability.

This challenge is evident at Ari Canti Hospital, Ubud, Bali. Hospital performance data from January to July 2025 indicate that 99.6% of discharge planning activities were conducted only on the day of discharge, while only 0.2% were initiated one day before discharge and another 0.2% were not conducted at all. During the same period, the average LOS reached four days, with approximately 23% of hospitalized patients exceeding the expected LOS based on the applicable clinical pathways. Moreover, inpatient JKN services generated an average monthly reimbursement deficit of approximately IDR 220.9 million, excluding additional revenues from Coordination of Benefits (COB) and upgraded JKN inpatient classes. These findings suggest that discharge planning remains predominantly reactive and administratively oriented rather than functioning as a proactive clinical management process initiated early during hospitalization.

The current practice has several operational consequences. Delayed discharge planning limits interdisciplinary communication, postpones patient and family education, and compresses discharge preparation into the final stage of hospitalization. As a result, unnecessary delays in patient discharge, inefficient bed utilization, prolonged LOS, and financial losses associated with JKN reimbursement continue to occur. These operational inefficiencies ultimately affect hospital capacity, service quality, patient satisfaction, and organizational sustainability.

To address these challenges, many hospitals have adopted Lean Healthcare, a management philosophy aimed at eliminating non-value-added activities while improving patient flow and operational efficiency. Lean Healthcare focuses on identifying waste throughout healthcare processes and redesigning service delivery to maximize value for patients. Several studies have demonstrated that Lean Healthcare tools, including Value Stream Mapping (VSM) and Root Cause Analysis (RCA), effectively identify process bottlenecks, improve care coordination, reduce waiting time, and shorten LOS (Hashbi et al., 2025; Muhammad & Karningsih, 2020; Munaa et al., 2023; Vijverberg et al., 2023). Likewise, AlGhaithi et al. (2025) reported that integrating Lean Six Sigma into early discharge planning increased discharge documentation compliance from 68.10% to 89.54%,

reduced LOS from 9.0 to 6.5 days, and significantly improved bed occupancy efficiency.

Although previous studies consistently report the effectiveness of Lean Healthcare and early discharge planning in improving hospital performance, several important research gaps remain. First, most existing studies have been conducted in developed countries whose healthcare financing systems differ substantially from Indonesia's JKN and INA-CBG reimbursement mechanisms. Second, prior research has primarily focused on evaluating the outcomes of discharge planning interventions, whereas studies aimed at developing context-specific early discharge planning models based on existing service processes, root cause identification, and stakeholder needs remain limited. Third, little empirical evidence is available regarding early discharge planning models specifically designed for hospitals serving JKN patients while considering Indonesian healthcare regulations, reimbursement mechanisms, and the operational characteristics of private hospitals.

Addressing these gaps, this study proposes an Early Discharge Planning Model specifically designed for JKN patients at Ari Canti Hospital using a Lean Healthcare approach. Unlike previous studies that primarily evaluated intervention effectiveness, this research develops a context-specific model by integrating observations of existing discharge processes, root cause analysis, stakeholder perspectives, and Lean Healthcare principles. The proposed model is expected to optimize LOS while improving interdisciplinary coordination, eliminating non-value-added activities, enhancing hospital efficiency, and supporting sustainable healthcare delivery under Indonesia's National Health Insurance system. Therefore, this study aims to analyze the current implementation of discharge planning and develop an early discharge planning model to optimize the Length of Stay of JKN patients at Ari Canti Hospital, Ubud, Bali.

Methods

This study employed a qualitative case study design to develop an Early Discharge Planning model based on Lean Healthcare for optimizing the Length of Stay (LOS) of patients covered by Indonesia's National Health Insurance (Jaminan Kesehatan Nasional/JKN) at Ari Canti Hospital, Ubud, Bali. A qualitative approach was selected to obtain an in-depth understanding of the existing discharge planning process, identify operational barriers, and formulate a context-specific improvement model. To minimize potential bias in LOS interpretation, patient severity was considered a contextual confounding factor through the selection of relatively comparable inpatient cases, review of medical records and clinical pathways, and emphasis on care processes and interdisciplinary coordination rather than clinical outcomes. Model development followed five sequential stages: problem identification, needs assessment, model design, expert validation, and refinement of the final model. Participants were purposively selected based on their direct involvement in discharge planning and included ward managers, a case manager, team leaders, and JKN patients or their family members.

Data were collected through non-participant observations, semi-structured interviews, and document reviews of hospital policies, standard operating procedures, medical records, LOS reports, and JKN claims. The discharge process was analyzed using Lean Healthcare principles to identify value-added and non-value-added activities, while the proposed model incorporated the METHOD approach (Medication, Environment, Treatment, Health Teaching, Outpatient Referral, and Diet) as the framework for early discharge planning. Data were analyzed iteratively using data reduction, data display, and conclusion drawing with continuous verification. The credibility and trustworthiness of the findings were ensured through source and method triangulation, member checking, audit trails, and confirmability procedures based on the framework proposed by Lincoln and Guba, thereby enhancing the validity and applicability of the developed model.

Result and Discussion

Current Discharge Planning Practices and Their Impact on Length of Stay

The findings indicate that the existing discharge planning process at Ari Canti Hospital remains predominantly reactive rather than proactive. Although discharge planning is formally incorporated into inpatient care, its implementation is largely concentrated on the day of patient discharge instead of being initiated upon admission. Hospital data from January to July 2025 show that 99.6% of discharge planning activities were completed on the discharge day, whereas only 0.2% were initiated one day before discharge and another 0.2% were not conducted. These findings demonstrate that discharge planning has primarily functioned as an administrative requirement rather than as a continuous multidisciplinary care process designed to facilitate timely patient discharge.

The study focused on patients covered by Indonesia's National Health Insurance (Jaminan Kesehatan Nasional/JKN), a population requiring efficient inpatient management because hospital reimbursement is determined through the Indonesian Case-Based Groups (INA-CBG) payment system. Within this financing mechanism, prolonged hospitalization beyond the expected clinical pathway does not generate additional reimbursement, placing hospitals at risk of financial inefficiency. During the study period, the average Length of Stay (LOS) reached four days, while approximately 23% of JKN inpatients remained hospitalized longer than the expected clinical pathway. These findings suggest that opportunities to optimize patient flow and discharge efficiency remain substantial. Interviews with healthcare professionals revealed that discharge planning was commonly initiated only after physicians had decided that patients were clinically ready for discharge. Consequently, several essential activities—including multidisciplinary communication, patient and family education, medication preparation, administrative processing, and coordination with supporting services—were performed within a limited timeframe immediately before discharge. This compressed workflow frequently resulted in delays despite patients already being medically fit to leave the hospital. Healthcare providers consistently described discharge planning as an activity that should begin much earlier during hospitalization to allow sufficient time for clinical coordination and discharge preparation.

The delayed implementation of discharge planning also affected operational efficiency. Several non-value-added activities were identified throughout the discharge process, including repeated documentation, prolonged waiting for physician confirmation, delayed pharmacy services, sequential administrative procedures, and fragmented communication among professional groups. These inefficiencies extended discharge completion time, reduced bed availability for incoming patients, and contributed to unnecessary prolongation of LOS. From a Lean Healthcare perspective, such waiting time and process fragmentation represent operational waste that does not add value to patient care while consuming hospital resources.

Beyond operational inefficiency, prolonged LOS generated important financial consequences under the INA-CBG reimbursement system. Hospital financial records indicated an average monthly deficit of approximately IDR 220.9 million from inpatient JKN services during the observation period, excluding additional revenues derived from Coordination of Benefits (COB) and upgraded inpatient classes. Because reimbursement remains fixed regardless of unnecessary hospitalization beyond the expected treatment pathway, extended LOS increases hospital expenditure without corresponding increases in revenue. Consequently, inefficient discharge planning not only limits bed turnover and patient access but also threatens the financial sustainability of hospital services.

Collectively, these findings demonstrate that discharge planning should no longer be viewed merely as an administrative activity performed immediately before patient discharge. Instead, it should be recognized as a strategic hospital management process that directly influences patient flow, bed utilization, operational efficiency, and financial performance. Within the context of Indonesia's JKN reimbursement system, optimizing LOS through early discharge planning represents not only a clinical quality improvement initiative but also an essential managerial strategy to improve hospital efficiency while maintaining high-quality, patient-centered care. These findings provide the foundation for identifying operational barriers and developing an integrated Early Discharge Planning model based on Lean Healthcare principles.

Barriers to Early Discharge Planning

The analysis identified four major themes that hinder the effective implementation of early discharge planning at Ari Canti Hospital: (1) interprofessional communication and coordination, (2) patient and family engagement, (3) human resources and organizational readiness, and (4) administrative and technological barriers. These themes illustrate that the challenges extend beyond individual performance and are closely related to organizational processes, interdisciplinary collaboration, and hospital management systems.

Theme 1. Interprofessional Communication and Coordination

The findings indicate that ineffective communication and delayed coordination among healthcare professionals constitute the primary barrier to early discharge planning. Discharge preparation generally begins only after the attending physician confirms that the patient is medically fit for discharge, leaving limited time for nurses, pharmacists, case managers, and administrative staff to complete

their respective responsibilities. This sequential rather than integrated workflow frequently delays the discharge process and prolongs patient hospitalization.
One participant explained:
"Discharge planning usually starts after the doctor has decided that the patient can go home. At that point, every unit begins preparing its own tasks, which often causes delays because everything is done simultaneously." (Head Nurse)
Similarly, another participant emphasized the importance of earlier interdisciplinary coordination:
"If discharge planning starts when the patient is admitted, every healthcare professional can prepare their responsibilities much earlier, making the discharge process smoother." (Case Manager)
These findings demonstrate that discharge planning has not yet functioned as a collaborative multidisciplinary process. Instead, each professional group performs its responsibilities independently, creating fragmented communication, duplicated activities, and prolonged waiting times. From a Lean Healthcare perspective, poor coordination represents a form of process waste because delays are generated not by patients' clinical conditions but by inefficient communication and workflow.

Theme 2. Patient and Family Engagement
Patient and family involvement was identified as another important factor influencing discharge readiness. The findings revealed that education regarding medications, home care, follow-up appointments, dietary management, and warning signs was frequently delivered only shortly before discharge. Consequently, patients and their families often had insufficient time to understand discharge instructions, ask questions, or prepare for post-discharge care.
One nurse stated:
"Patients and families often receive all discharge information just before leaving the hospital, making it difficult for them to absorb everything in a short time." (Ward Nurse)
This delayed educational process reduces patients' readiness for discharge and may increase uncertainty after returning home. Early discharge planning would allow education to be delivered gradually throughout hospitalization, thereby improving patients' understanding, encouraging shared decision-making, and supporting continuity of care after discharge. These findings reinforce the patient-centered care principle that effective discharge planning should actively involve patients and families from the early stages of hospitalization rather than limiting their participation to the final discharge process.

Theme 3. Human Resources and Organizational Readiness
The study further identified organizational readiness and human resource capacity as significant barriers to implementing early discharge planning. Although healthcare professionals recognized the importance of initiating discharge planning earlier, the absence of standardized workflows, inconsistent role allocation, and limited staff familiarity with early discharge planning principles hindered implementation. Furthermore, discharge planning responsibilities were frequently perceived as additional administrative tasks rather than integral components of clinical care.
A participant explained:

"We understand the importance of discharge planning, but there is still no standardized workflow that clearly defines when each professional should begin preparing for patient discharge." (Case Manager)

These findings indicate that successful implementation of early discharge planning requires organizational commitment beyond individual initiative. Standard operating procedures, multidisciplinary collaboration, staff training, and clearly defined responsibilities are essential to ensure that discharge planning becomes embedded within routine clinical practice. Organizational readiness therefore represents a critical prerequisite for sustainable implementation.

Theme 4. Administrative and Technological Barriers

Administrative procedures and limited integration of hospital information systems also contributed to discharge delays. Several discharge activities—including physician approval, pharmacy preparation, insurance verification, and administrative documentation—were conducted sequentially rather than concurrently. As a result, patients frequently experienced unnecessary waiting despite already being clinically eligible for discharge.

One participant described the situation as follows:

"Sometimes patients have already been declared fit for discharge, but they still have to wait because medications, administrative documents, or insurance verification are not yet completed." (Administrative Officer)

The findings also indicate that discharge-related information remains fragmented across different hospital units, limiting real-time coordination among healthcare professionals. Without an integrated discharge monitoring system, identifying potential discharge delays becomes difficult, reducing opportunities for early intervention. According to Lean Healthcare principles, these fragmented administrative processes represent non-value-added activities that increase waiting time without contributing to patient outcomes. Integrating digital discharge tracking with standardized early discharge planning procedures would therefore improve workflow transparency, facilitate multidisciplinary communication, and reduce operational waste throughout the discharge process.

Overall, these four themes demonstrate that barriers to early discharge planning are multidimensional, encompassing clinical, organizational, administrative, and technological factors. Rather than resulting from isolated operational problems, prolonged LOS arises from interconnected inefficiencies across the discharge process. These findings provide a strong empirical foundation for developing an integrated Early Discharge Planning model based on Lean Healthcare principles that emphasizes early multidisciplinary coordination, patient engagement, standardized workflows, and continuous discharge monitoring.

Lean Healthcare Analysis

Lean Healthcare analysis was conducted to identify operational inefficiencies throughout the discharge process and to distinguish between value-added (VA) and non-value-added (NVA) activities that influence the Length of Stay (LOS) of JKN patients. Using Lean Healthcare principles, the existing discharge process was mapped through Value Stream Mapping (VSM) to visualize the sequence of activities, identify process bottlenecks, and determine opportunities for workflow improvement. The analysis revealed that although several discharge activities directly contributed to patient care and discharge readiness, a considerable

proportion of the process consisted of non-value-added activities that prolonged hospitalization without improving clinical outcomes.

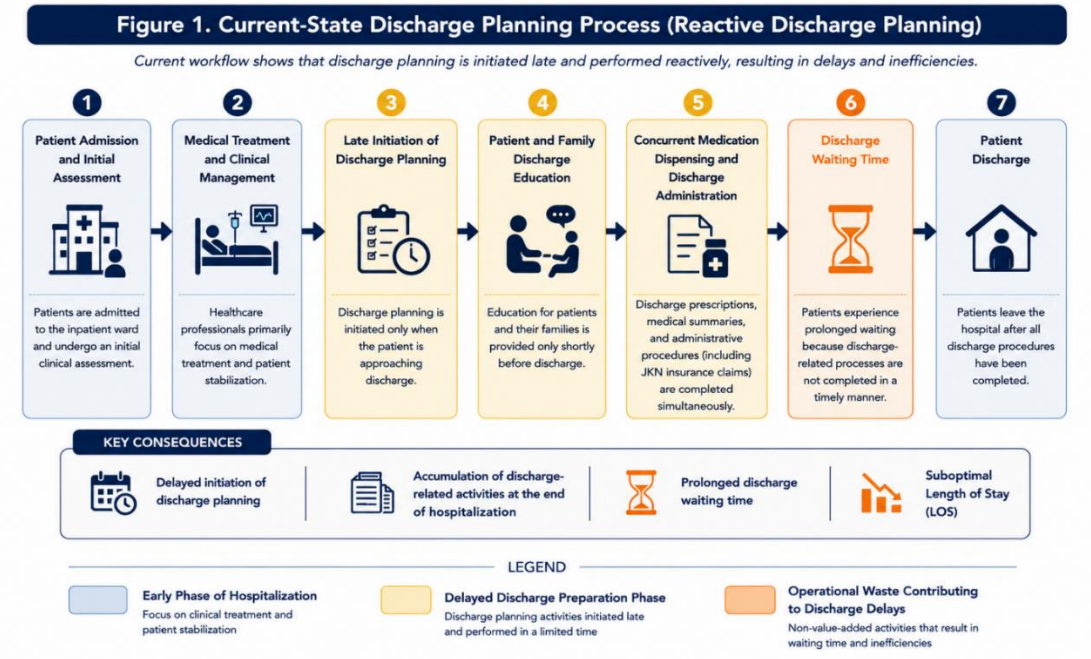

Figure 1. Current-State Value Stream Mapping of the Existing Discharge Planning Process

The value-added activities identified during the study included medical assessment by the attending physician, nursing assessment, multidisciplinary discharge planning, patient and family education, medication reconciliation, discharge counseling, and preparation of follow-up care. These activities directly contributed to patients' clinical readiness, continuity of care, and safe discharge. In contrast, numerous non-value-added activities were identified, including repeated documentation, duplicated administrative verification, prolonged waiting for physician approval, sequential communication among healthcare professionals, delays in pharmacy services, and repeated coordination between clinical and administrative units. Although some administrative procedures remain necessary within the hospital system, many were performed sequentially rather than simultaneously, unnecessarily extending the discharge process.

Among all forms of waste identified, waiting emerged as the most dominant contributor to prolonged LOS. Patients who had already met clinical discharge criteria frequently remained hospitalized while awaiting physician confirmation, medication preparation, insurance verification, laboratory completion, or administrative documentation. These waiting periods did not provide additional clinical benefits and therefore represented classic examples of Lean Healthcare waste. Similar findings have been reported by Vijverberg et al. (2023), who demonstrated that unnecessary waiting throughout hospital processes significantly reduces patient flow and bed utilization, while Hashbi et al. (2025)

emphasized that eliminating waiting time is one of the most effective strategies for improving hospital efficiency.
Another important source of inefficiency was rework, which occurred when healthcare professionals repeatedly corrected documentation, re-entered patient information, clarified incomplete discharge instructions, or repeated communication because information had not been transferred completely between departments. Rework increased staff workload without adding value to patient care and reflected deficiencies in process standardization. According to Lean Healthcare principles, these repetitive activities represent operational waste because they consume time and organizational resources while contributing little to patient outcomes (Muhammad & Karningsih, 2020).

The Value Stream Mapping analysis further identified several process bottlenecks that delayed patient discharge. The principal bottlenecks included delayed discharge decisions by physicians, fragmented communication among multidisciplinary teams, sequential medication dispensing by the pharmacy, and disconnected administrative and insurance verification processes. Rather than operating through an integrated workflow, each department completed its responsibilities independently, causing downstream delays across subsequent discharge activities. Consequently, discharge planning functioned as a reactive process concentrated at the end of hospitalization instead of a proactive process initiated upon admission.

From the perspective of Lean Healthcare, these findings demonstrate that prolonged LOS was influenced not only by patients' clinical conditions but also by inefficiencies embedded within hospital operational processes. Lean emphasizes maximizing patient value while eliminating activities that do not contribute to healthcare outcomes. In the present study, Value Stream Mapping clearly illustrated that delayed interdisciplinary coordination, duplicated administrative procedures, waiting time, and fragmented workflows represented major sources of waste that reduced patient flow and bed turnover. Similar conclusions were reported by Munaa et al. (2023), who found that Value Stream Mapping effectively identifies operational waste and supports continuous process improvement in healthcare organizations.

Overall, the Lean Healthcare analysis provides strong empirical evidence that optimizing LOS requires process redesign rather than isolated operational improvements. Eliminating non-value-added activities, reducing waiting time, minimizing rework, and strengthening multidisciplinary coordination would substantially improve patient flow while maintaining service quality. These findings form the analytical foundation for developing the proposed Early Discharge Planning model, which integrates Lean Healthcare principles with structured discharge management to improve operational efficiency and support sustainable hospital performance under Indonesia's National Health Insurance (JKN) system.

Development of the Early Discharge Planning Model
The findings of this study culminated in the development of an integrated Early Discharge Planning (EDP) model designed to optimize the Length of Stay (LOS) of JKN patients at Ari Canti Hospital. The proposed model was developed in

response to the operational inefficiencies identified throughout the discharge process, including delayed discharge initiation, fragmented multidisciplinary communication, repeated administrative procedures, prolonged waiting time, and the absence of standardized discharge coordination. These findings indicate that discharge planning should no longer be regarded as a single administrative activity performed immediately before patient discharge but rather as a continuous multidisciplinary process initiated at the time of hospital admission.

Figure 2. Proposed Early Discharge Planning Model Based on Lean Healthcare and the METHOD Framework

Unlike conventional discharge planning practices, the proposed model adopts a proactive approach by integrating Lean Healthcare principles into every stage of inpatient care. Lean Healthcare emphasizes the elimination of non-value-added activities while maximizing value from the patient's perspective through continuous process improvement and multidisciplinary collaboration. The analysis using Value Stream Mapping demonstrated that most discharge delays originated from operational inefficiencies rather than patients' clinical conditions. Therefore, the proposed model redesigns the discharge process by shifting discharge preparation from a reactive, end-of-care activity to an integrated workflow that begins upon admission and continues until post-discharge follow-up.

A distinguishing feature of the proposed model is the integration of the METHOD framework—Medication, Environment, Treatment, Health Teaching, Outpatient Referral, and Diet—into the discharge planning process. Rather than functioning solely as a patient education checklist at discharge, the METHOD framework is embedded throughout hospitalization, allowing healthcare professionals to initiate discharge preparation progressively. Medication reconciliation, discharge education, home environment assessment, dietary counseling, referral planning, and treatment continuity are therefore addressed continuously instead of being

concentrated on the day of discharge. This structured approach enables patients and their families to become active participants in discharge preparation while providing sufficient time for multidisciplinary teams to coordinate clinical and administrative activities.

The proposed model further emphasizes interdisciplinary collaboration involving physicians, nurses, case managers, pharmacists, nutritionists, rehabilitation staff, and hospital administrative personnel. Each professional group assumes clearly defined responsibilities according to the patient's clinical progress, thereby replacing the fragmented sequential workflow identified in the existing discharge process with parallel and coordinated activities. Continuous communication among team members enables earlier identification of discharge barriers, faster clinical decision-making, and more efficient allocation of hospital resources.

From the perspective of Lean Healthcare, the proposed model systematically addresses the principal sources of operational waste identified during the study. Waiting time is minimized through earlier discharge decision-making and parallel task execution. Rework is reduced by standardizing documentation and communication procedures. Process bottlenecks are addressed through multidisciplinary discharge coordination and continuous monitoring of discharge readiness. Consequently, the redesigned workflow improves patient flow while maintaining the quality and safety of patient care.

The proposed Early Discharge Planning model also responds specifically to the characteristics of Indonesia's National Health Insurance (JKN) reimbursement system. Under the INA-CBG payment mechanism, hospitals receive predetermined reimbursement regardless of unnecessary extensions of hospitalization. Therefore, improving discharge efficiency is essential not only for enhancing patient care but also for maintaining hospital financial sustainability. By integrating Lean Healthcare principles with the METHOD discharge framework within the context of JKN service delivery, the proposed model offers a practical and context-specific strategy for optimizing LOS while ensuring compliance with Indonesian healthcare regulations.

The principal novelty of this study lies in the development of an integrated Early Discharge Planning model that combines Lean Healthcare principles, the METHOD discharge framework, multidisciplinary care coordination, and the operational characteristics of Indonesia's JKN reimbursement system. Previous studies have predominantly evaluated the effectiveness of discharge planning interventions or Lean Healthcare implementation independently. In contrast, this study proposes a comprehensive process redesign that integrates organizational workflow improvement with structured discharge management, thereby providing a context-specific model that can be adapted by hospitals operating under similar healthcare financing systems.

Practical Contribution of the Proposed Model

The proposed Early Discharge Planning model offers several practical contributions for hospital management. First, initiating discharge planning upon patient admission enables earlier multidisciplinary coordination, allowing

potential discharge barriers to be identified and resolved before they delay patient discharge. This proactive approach is expected to reduce unnecessary Length of Stay while maintaining continuity and quality of care.

Second, the integration of Lean Healthcare principles improves patient flow by eliminating non-value-added activities identified during the discharge process. Standardized communication, concurrent clinical and administrative preparation, and continuous discharge monitoring reduce waiting time, minimize duplicated work, and accelerate patient transitions from inpatient care to home or subsequent healthcare facilities. Consequently, hospitals can improve bed turnover and increase inpatient capacity without requiring additional physical resources.

Third, the structured implementation of the METHOD framework strengthens patient-centered care by ensuring that medication management, patient education, nutritional counseling, environmental preparation, treatment continuity, and outpatient referrals are addressed progressively throughout hospitalization. This approach enhances patients' readiness for discharge, improves family engagement, and reduces the likelihood of discharge delays associated with incomplete preparation.

Fourth, improved operational efficiency contributes directly to hospital financial sustainability under the INA-CBG reimbursement system. By reducing unnecessary hospitalization and optimizing bed utilization, hospitals may minimize expenditure that is not reimbursed under the fixed-payment mechanism while simultaneously increasing service capacity and resource efficiency. This is particularly important for private hospitals serving a large proportion of JKN patients.

Finally, the proposed model provides hospital managers and policymakers with an evidence-based framework for redesigning discharge planning processes. Because the model was developed from empirical observations, stakeholder perspectives, Lean Healthcare analysis, and the operational realities of Indonesia's healthcare financing system, it has the potential to serve as a practical reference for other hospitals seeking to optimize Length of Stay, improve patient flow, enhance patient safety, strengthen multidisciplinary collaboration, and achieve more sustainable healthcare service delivery.

Conclusion

This study developed an integrated Early Discharge Planning (EDP) model to optimize the Length of Stay (LOS) of patients covered by Indonesia's National Health Insurance (JKN) at Ari Canti Hospital, Ubud, Bali. The findings demonstrate that the existing discharge planning process remains predominantly reactive, with discharge-related activities concentrated on the day of discharge. This practice results in delayed multidisciplinary coordination, fragmented communication, repeated administrative procedures, prolonged waiting time, and operational inefficiencies that contribute to extended LOS and reduced hospital performance under the INA-CBG reimbursement system.

Using Lean Healthcare principles, this study identified multiple sources of operational waste, including waiting, rework, duplicated activities, and process bottlenecks throughout the discharge pathway. These findings provided the basis for redesigning the discharge process into a proactive and integrated model initiated at the time of patient admission. The proposed model incorporates the METHOD framework within a multidisciplinary discharge planning process supported by continuous communication, daily discharge review, standardized workflows, and ongoing patient and family education.

The principal contribution of this study lies in the development of a context-specific Early Discharge Planning model that integrates Lean Healthcare, the METHOD framework, and the operational characteristics of Indonesia's National Health Insurance system. Unlike previous studies that primarily evaluated the effectiveness of discharge planning interventions, this research proposes a comprehensive process redesign capable of improving patient flow while simultaneously enhancing hospital efficiency and financial sustainability. The model therefore provides both theoretical and practical contributions to hospital discharge management and may serve as a reference for healthcare organizations seeking to optimize LOS without compromising patient safety and quality of care.

This study extends the current discharge planning literature by demonstrating that integrating Lean Healthcare principles with the METHOD framework within the context of Indonesia's National Health Insurance system provides a practical and sustainable strategy for optimizing Length of Stay through comprehensive process redesign rather than isolated clinical interventions.

Managerial Implications

The proposed Early Discharge Planning model offers several practical implications for hospital management. First, hospitals should reposition discharge planning as a continuous clinical management process that begins within the first 24 hours of patient admission rather than as an administrative activity performed immediately before discharge. Early identification of discharge needs enables healthcare professionals to anticipate potential barriers, improve multidisciplinary coordination, and prepare discharge requirements progressively throughout hospitalization.

Second, hospital administrators should institutionalize multidisciplinary discharge rounds involving attending physicians, nurses, pharmacists, case managers, nutritionists, rehabilitation professionals, and administrative personnel. Regular interdisciplinary communication supported by standardized discharge checklists and clearly defined responsibilities will facilitate timely decision-making and reduce unnecessary waiting throughout the discharge process.

Third, Lean Healthcare principles should be incorporated into hospital quality improvement programs to continuously identify and eliminate operational waste. Routine application of Value Stream Mapping (VSM), Root Cause Analysis (RCA), and discharge performance monitoring can help hospitals detect bottlenecks,

reduce non-value-added activities, improve patient flow, and increase bed turnover without additional infrastructure investment.

Fourth, hospitals should strengthen digital integration of discharge planning through hospital information systems that support real-time monitoring of discharge readiness, documentation completeness, medication preparation, and administrative requirements. Such integration would improve workflow transparency, facilitate multidisciplinary collaboration, and reduce delays caused by fragmented information systems.

Finally, the proposed model provides strategic value for hospitals operating under Indonesia's INA-CBG reimbursement mechanism. By optimizing LOS, accelerating patient flow, improving bed utilization, and minimizing unnecessary hospitalization, hospitals can reduce operational costs and mitigate financial deficits associated with JKN reimbursement while simultaneously enhancing patient safety, service quality, and patient satisfaction. Beyond Ari Canti Hospital, the model has the potential to be adapted by other Indonesian hospitals with similar organizational characteristics and healthcare financing systems, thereby supporting broader efforts to improve hospital efficiency and sustainable healthcare delivery.

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