

# The Relationship Between Case Manager Roles and Inpatient Operational Efficiency: A Cross-Sectional Study in Indonesian Referral Hospital

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## Abstract

**Background:** Hospitals globally face increasing pressure to enhance operational efficiency without compromising care quality. In this context, the case manager role is pivotal, yet empirical evidence of its direct impact on quantitative efficiency metrics remains limited, particularly in developing countries.

**Objective:** This study aimed to analyse the relationship between case manager roles and the operational efficiency of inpatient wards at a public referral hospital in Indonesia.

**Material and Method:** A cross-sectional design was employed, including all 39 head nurses selected through total sampling. Data were collected using a validated questionnaire assessing case manager roles, with high reliability (Cronbach's Alpha = 0.963). The Spearman Rho correlation test was used for analysis.

**Results:** The results demonstrated that the overall efficiency revealed that a significant majority of inpatient wards were classified as inefficient. Furthermore, a significant relationship was found between the overall role of case managers and operational efficiency ( $p = 0.036$ ). Analysis of sub-variables also revealed significant relationships: coordination of health services ( $p=0.009$ ), communication ( $p=0.048$ ), care planning ( $p=0.024$ ), prevention of intervention duplication ( $p=0.025$ ), and supervision ( $p=0.046$ ).

**Conclusion:** The study concludes that despite a significant majority of inpatient wards (71.8%) being classified as inefficient, the case manager's role is significantly associated with key operational efficiency indicators. Therefore, optimizing this role through structured training, clear protocols, and enhanced interprofessional collaboration is recommended as a crucial strategy for hospital management to improve resource utilization and service quality.

**Keywords:** Case Manager Role, Operational Efficiency, Inpatient Care

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## Introduction

Hospitals worldwide operate in an increasingly complex environment characterized by rising healthcare costs, growing patient expectations, and pressure to deliver high-quality care with limited resources<sup>1</sup>. A central challenge within this landscape is achieving and maintaining operational efficiency—the optimal utilization of inputs like beds, staff, and equipment to produce maximum outputs of quality patient care. Inefficient operations can lead to prolonged patient wait times, bed shortages, staff burnout, and ultimately, financial instability for the institution. Therefore, continuous pursuit of enhanced operational efficiency is not merely an administrative goal but a fundamental imperative for sustainable healthcare delivery systems globally<sup>2,3</sup>.

This challenge is particularly acute in Indonesia, following the implementation of the Indonesian National Health Insurance (Jaminan Kesehatan Nasional - JKN) scheme. The JKN system, while dramatically expanding population coverage, has intensified financial pressures on hospitals through its case-based funding model<sup>4,5</sup>. Hospitals must now meticulously manage resources, especially in high-cost areas like inpatient wards, where metrics such as Bed Occupancy Rate (BOR) and Length of Stay (LOS) directly impact financial viability and service capacity<sup>6</sup>. Consequently, Indonesian hospital administrators are urgently seeking innovative management strategies to optimize internal processes without compromising the quality of care mandated by national accreditation standards<sup>7,8</sup>.

One strategic role promoted to address these challenges is the case manager. Initially emerging from managed care systems in the United States, the case manager's function is to coordinate patient care across the continuum, ensuring it is timely, appropriate, effective, and efficient<sup>9</sup>. In Indonesia, the role was formally introduced through the hospital accreditation standards by the Hospital Accreditation Commission, positioning the case manager as a key agent in care coordination and integration<sup>10</sup>. The core premise is that a dedicated professional overseeing the patient's journey can prevent delays, reduce duplication of services, and streamline discharge processes, thereby positively influencing key operational metrics.

The effectiveness of a case manager hinges on the execution of several interconnected roles<sup>11</sup>. As outlined by Mailoa, Dedi, and Trihapsari<sup>12</sup> these include (1) coordination of interdisciplinary team meetings and patient rounds; (2) effective communication with patients, families, and healthcare providers; (3) collaborative care planning for complex cases; (4) prevention of duplication of diagnostic tests or interventions; and (5) ongoing supervision and follow-up to ensure adherence to the care plan. Each of these roles is theorized to contribute directly to smoothing patient flow, which is the bedrock of inpatient operational efficiency.

Despite strong theoretical support and regulatory mandate, empirical evidence demonstrating the direct impact of case manager activities on quantitative hospital efficiency indicators in the Indonesian context remains strikingly limited. Previous domestic studies have primarily focused on qualitative assessments of implementation challenges. For instance, Auladi<sup>13</sup> qualitatively found the role to be not yet fully effective in a Bandung hospital, while Herlina<sup>14</sup> reported a lack of visible case manager activities in Rokan Hulu. Internationally, while studies like that of Alshabanat<sup>15</sup> have shown that case management can reduce length of stay in specific patient groups, a comprehensive analysis linking all case manager roles to a full suite of efficiency indicators (BOR, LOS, TOI, BTO) in a general inpatient setting is lacking. This creates a significant knowledge-practice gap.

The specific problem is that hospital management lacks robust, data-driven evidence to justify investment in strengthening the case manager role. Decisions regarding staffing, training, and protocol development for case managers are often made without a clear understanding of their measurable return on investment in terms of operational performance. To bridge this gap, a validated and holistic measurement framework for efficiency is required. The Barber-Johnson Index, which synthesizes the four critical indicators (BOR, ALOS, TOI, BTO) into a single graphical efficiency analysis, provides a robust tool for this purpose<sup>16</sup>. Its application offers a comprehensive view of ward performance that is superior to analyzing each indicator in isolation.

In response to this identified gap, this study aims to quantitatively analyze the relationship between the perceived performance of case manager roles and the operational efficiency of inpatient wards, as measured by the Barber-Johnson Index. The study was conducted at dr. Zainoel Abidin Hospital, a large referral hospital in Aceh Province, Indonesia.

## Method

This study employed a quantitative, descriptive correlational design with a cross-sectional approach. The design was chosen to examine the relationship between case manager roles and inpatient operational efficiency at a single point in time. The study was conducted across all inpatient wards of dr. Zainoel Abidin Hospital, Aceh Province Indonesia, a provincial referral and teaching hospital in Banda Aceh, Indonesia. This setting was selected due to its implementation of the case manager model and its representative profile as a large, public Indonesian hospital. The study population comprised all head nurses of inpatient wards (N=39) at the hospital. A total sampling technique was employed, meaning the entire accessible population was invited to participate, eliminating sampling error and providing a comprehensive overview of the phenomenon within the institution. The inclusion criteria were: (1) serving as a head nurses of an inpatient ward and (2) having worked with the case manager team for at least six months. These criteria were established to ensure that all respondents possess adequate, sustained experience and exposure to the implemented case manager model within their respective wards, thereby providing a reliable and informed perception of the case manager's operational impact on efficiency. Data were collected using two primary instruments,

(1) Case Manager Role Questionnaire: This instrument was developed based on the theoretical framework of Mailoa, Dedi, and Trihapsari<sup>12</sup> and KARS<sup>10</sup>, measuring five key roles: coordination, communication, care planning, prevention of duplication of interventions, and supervision. It consisted of 25 items rated on a 5-point Likert scale (1=Strongly Disagree to 5=Strongly Agree). The total score for each role was categorized as "Good" (16-25) or "Poor" (5-15). The questionnaire was rigorously validated; content validity was established through expert review, and construct validity was confirmed

with all items having a correlation coefficient ( $r$ )  $> 0.423$ . Reliability testing yielded an excellent Cronbach's alpha coefficient of 0.963, indicating very high internal consistency. (2) Operational Efficiency Observation Sheet: Operational efficiency, the dependent variable, was measured using the Barber-Johnson Index method. Data on four key indicators were extracted from the hospital's medical records and management information systems for the period January-April 2025: Bed Occupancy Rate (BOR), Average Length of Stay (ALOS), Turn Over Interval (TOI), and Bed Turn Over (BTO). These individual indicator values were analyzed descriptively to provide context for the overall efficiency classification. An inpatient ward was classified as "Efficient" if its indicators fell within the ideal Barber-Johnson parameters (BOR: 75-85%, ALOS: 3-12 days, TOI: 1-3 days, BTO: ~30-50 times per year) and "Less Efficient" if one or more indicators deviated from these ranges. The Data collection was carried out from April to June, 2025. Prior to distribution, ethical approval was obtained from the Health Research Ethics Committee of dr. Zainoel Abidin Hospital (Ethical Approval No: 140/ETIK-RSUDZA/2025). The researchers distributed the questionnaires directly to the head nurses of inpatient wards after explaining the study's objectives and obtaining written informed consent. Access to the retrospective operational efficiency data (BOR, ALOS, TOI, BTO) from the hospital's central management records was formally granted by the Hospital Director and was covered under the same ethical approval protocol.

Data analysis was performed using Statistics analysis software. The univariate analysis was conducted to describe the frequency and percentage distributions of all variables. Bivariate analysis was conducted using the Spearman's Rho correlation test. This non-parametric approach was specifically selected because the primary variables—case manager roles (categorized as Good/Poor) and operational efficiency (classified as Efficient/Less Efficient)—were measured on ordinal scales and consequently did not meet the assumption of normality required for parametric correlation. The analysis tested the strength and direction of the correlation between the overall case manager role score and efficiency, as well as each of the five sub-roles. A p-value of  $< 0.05$  was considered statistically significant for all tests.

## Results

The study involved all 39 head nurses of inpatient wards. The majority of respondents were female (92.3%), and held a Bachelor Nurse as their highest education (74.4%). Most were experienced, with 43.6% serving as ward heads for 4-9 years. The detailed characteristics are presented in table 1.

Furthermore, the assessment of the case manager's performance by the heads of inpatient wards is presented in table 2. Among the specific functions, coordination of health services received the highest positive rating (82.1%), followed by communication (79.5%) and prevention of duplication of Interventions (76.9%). The functions with the lowest «Good» ratings, though still representing a majority, were Supervision (71.8%) and careplanning (69.2%), indicating potential key areas for performance improvement.

The analysis of overall efficiency revealed that a significant majority of inpatient wards were classified as inefficient. Specifically, only 11 out of 39 wards (28.2%) met the established criteria for ideal efficiency, while the remaining 28 wards (71.8%) were found to be operating inefficiently. This finding highlights the presence of widespread systemic operational challenges within the hospital's inpatient care system. The detailed overall efficiency are presented in Tabel 3.

**Table 1. Characteristics of the Respondents (N=39)**

No.	Variabel	f	%
1	<b>Gender</b>		
	a. Male	3	7.7
	b. Female	36	92.3

2	<b>Age (Years)</b>		
	a. 26-35	1	2.6
	b. 36-45	19	48.7
3	<b>Work As Head nurses (Years)</b>		
	a. 1-3	11	28.2
	b. 4-9	17	43.6
4	<b>Education</b>		
	a. Bachelor Nurse	29	74.4
	b. Magister's Degree	10	25.6

**Table 2. Case Manager Roles by Head Nurses of Inpatient Wards (N=39)**

No.	Variabel	f	%
1	<b>Health Care Coordination</b>		
	a. Good	32	82.1
	b. Poor	7	17.9
2	<b>Communication</b>		
	a. Good	31	79.5
	b. Poor	8	20.5
3	<b>Nursing Plan</b>		
	a. Good	27	69.2
	b. Poor	12	30.8
4	<b>Prevention of Duplication of Interventions</b>		
	a. Good	30	76.9
	b. Poor	9	23.1
5	<b>Supervision</b>		
	a. Good	28	71.8
	b. Poor	11	28.2

**Table 3. Hospital Operational Efficiency Indicators in Inpatient Wards**

No.	Hospital Operational Efficiency Indicators	f	%
1	Efficient	11	28.2
2	Inefficient	28	71.8

**Tabel 4. Relationship Between Nurse Case Manager Roles on Hospital Operational Efficiency**

Case Manager Roles	Hospital Operational Efficiency				Total		r	α	P value
	Efficient		Inefficient		f	%			
	f	%	f	%					
<b>Health Care Coordination</b>									
Good	10	31.3	22	68.8	32	100	0.411	0.05	0.009
Poor	1	14.3	6	85.7	7	100			

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<b>Communication</b>									
Good	8	25.8	23	74.2	31	100	0.319	0.05	0.048
Poor	3	37.5	5	62.5	8	100			
<b>Nursing Plan</b>									
Good	7	25.9	20	74.1	27	100	0.362	0.05	0.024
Poor	4	33.3	8	66.7	12	100			
<b>Prevention of Duplication of Interventions</b>									
Good	9	30.0	21	70.0	30	100	0.359	0.05	0.025
Poor	2	22.2	7	77.8	9	100			
<b>Supervision</b>									
Good	10	35.7	18	64.3	28	100	0.321	0.05	0.046
Poor	1	9.1	10	90.9	11	100			
<b>Case Manager Roles</b>									
Good	11	38,2	23	67,6	34	100	0,337	0,05	0,036
Poor	0	0	5	100	5	100			
Total	11		28		39	100			

The results Tabel 4 above demonstrated a significant relationship between the case managers role and inpatient operational efficiency. Analysis of sub-variables also revealed significant associations: coordination of health services ( $p=.009$ ), communication ( $p=.048$ ), nursing plan ( $p=.024$ ), prevention of duplication of intervention ( $p=.025$ ), and supervision ( $p=.046$ ).

Beyond the statistical findings, the observed significant positive association between the case manager's role and operational efficiency (Spearman's  $\rho = 0.337$ ,  $p = 0.036$ ) holds substantial practical significance. This suggests that enhancing the execution of case manager responsibilities particularly in coordination and resource management serves as a tangible, high-leverage intervention point for hospital administrators seeking to address the pervasive inpatient inefficiency observed in this study. In essence, improvements in the case manager function translate directly into better utilization of bed resources and reduced length of stay.

## Discussion

This study demonstrates a significant positive relationship between the role of the case manager and the operational efficiency of inpatient wards at dr. Zainoel Abidin General Hospital.

Prior to examining the role of the case manager, a fundamental finding of this study was the confirmation of underlying operational challenges, as detailed in Table 3. It was observed that a significant majority of inpatient wards (71.8%) were classified as inefficient according to the Barber-Johnson index. This reality depicts a situation where patient care processes are likely hindered, leading to implications such as prolonged waiting times, suboptimal resource utilization<sup>17</sup>, and financial strain on the institution under the JKN's INA-CBGs case-based funding model<sup>6, 18</sup>. Therefore, identifying factors that can reverse this condition becomes crucial. It is within this framework that the significant relationship between case manager performance and operational efficiency, uncovered in this study, gains its paramount importance. The strong positive correlation indicates that strengthening the case manager role could represent a strategic intervention pathway to improve the suboptimal operational performance prevalent across most wards.

The overall perception of the case manager's role was positive, with specific strengths noted in health care coordination (82.1% rated good) and communication (79.5% rated good). These findings align with contemporary research emphasizing the case manager's pivotal function as a coordinator and communication hub within interdisciplinary healthcare teams<sup>12, 19</sup>. Effective coordination ensures

that patient information from medical records is utilized optimally, preventing delays and redundant interventions, which are critical for efficient bed turnover and patient flow.

The significant correlation ( $p=0.009$ ) between the case manager's coordination and operational efficiency underscores its foundational importance. This result is consistent with the literature stating that case managers facilitate formal forums like case conferences and patient rounds, which are essential for aligning multidisciplinary actions and streamlining care processes<sup>20, 21</sup>. Inefficient coordination often leads to prolonged patient stays and suboptimal bed utilization, as reflected in the Barber Johnson indicators where 71.8% of wards were classified as inefficient.

Communication emerged as another critical factor significantly linked to efficiency ( $p=0.048$ ). The case manager's role in disseminating clear and timely information to healthcare professionals mitigates misunderstandings and prevents service duplication. However, the study also revealed that socialization regarding the case manager's functions remains incomplete among operational staff, a challenge previously noted by Mailoa, Dedi<sup>12</sup>. This indicates that while communication is effective among those who understand the role, broader awareness is needed to maximize its impact on hospital efficiency.

The Nursing plan function of case managers, though rated good by a smaller majority (69.2%), showed a significant influence on operational efficiency ( $p=0.024$ ). This involves comprehensive patient assessment and collaborative discharge planning, which directly affects key metrics like Length of Stay (LOS). Similar findings were reported by Auladi<sup>13, 22</sup>, who noted that integrated care planning for complex patients is crucial for reducing unnecessary hospitalization days and optimizing resource use, ultimately reflected in improved Bed Turn Over (BTO) rates.

Furthermore, the case manager's role in preventing duplication of interventions was perceived positively (76.9% good) and was statistically significant ( $p=0.025$ ). This function involves coordinating with attending physicians to schedule multidisciplinary meetings and ensure aligned interventions. This

finding corroborates the study by Ulfa, Agustin<sup>23, 24</sup>, which highlighted that preventing redundant services through proactive case management is a key strategy for enhancing cost-effectiveness and operational throughput in hospitals accredited under national standards.

Supervision, which includes patient follow-up and compliance monitoring, was also a significant predictor of efficiency ( $p=0.046$ ). Intensive monitoring by case managers ensures that treatment plans are adhered to, reducing complications and readmissions. This aligns with the standards set by the Case Management Society of America<sup>25, 26</sup>, which advocates for continuous oversight to maintain care quality and efficiency. However, the study notes that this function requires full support from hospital management and other health professionals to be fully effective.

The positive correlation across all sub-variables indicates that the case manager operates as a multidimensional role. Its effectiveness is not reliant on a single function but on a synergistic combination of coordination, communication, planning, prevention, and supervision. This holistic approach is essential for navigating the complexities of inpatient care and achieving systemic efficiency<sup>27</sup>.

In conclusion, the findings strongly support the strategic importance of the case manager in enhancing hospital operational efficiency. The role's functions are significantly interrelated with key performance indicators like BOR, LOS, TOI, and BTO. To maximize this impact, hospitals should invest in standardized training for case managers, ensure comprehensive socialization of their role across all operational staff, and strengthen support from hospital management. For policymakers, these results advocate for the formal integration and strengthening of case management roles within national health insurance (JKN) frameworks to promote cost-effective and efficient hospital care.

### Limitations of the Study

The findings of this cross-sectional study should be interpreted within the context of several limitations. First, the cross-sectional design prevents the establishment of a temporal or causal relationship between the case manager's role and operational

efficiency. Future longitudinal studies are needed to confirm causality. Second, the data collection for case manager roles relied on a questionnaire measuring head nurses' perceptions, which may be subject to reporting bias or social desirability bias, even though the instrument demonstrated high reliability. Third, the study was conducted at a single Indonesian referral hospital. While this provides depth, the generalizability of the efficiency findings (Barber-Johnson Index results) to other healthcare settings with different patient populations or management structures may be limited. These limitations should be considered when applying the study's conclusions.

### Conclusion and Suggestions

This study confirms that the role of the case manager significantly and positively influences the operational efficiency of inpatient wards at dr. Zainoel Abidin General Hospital, as evidenced by key Barber Johnson indicators (BOR, LOS, TOI, and BTO). The results demonstrate that effective case management particularly through coordination, communication, care planning, prevention of duplicated interventions, and supervision is strongly associated with enhanced hospital efficiency. To fully leverage case manager in optimizing operational performance, hospital administrators should establish standardized training programs to strengthen case managers' competencies, promote role clarification through systematic socialization across all operational units, and cultivate interdisciplinary collaboration. For policymakers, these findings support the formal integration and reinforcement of the case manager role within national health insurance systems to advance sustainable, efficient, and high-quality patient care. Further multi-center studies with longitudinal designs are recommended to investigate causal mechanisms and contextual factors affecting case management effectiveness.

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