THE ECONOMIC BURDEN ON PRIVATE HOSPITALS IN TREATING ICU VS NON-ICU PATIENTS: INVESTIGATING THE FINANCIAL GAP BETWEEN INDONESIAN CASE BASE GROUPS (INA-CBG) RATES AND HOSPITAL BILLING

Ida Juita Halim[1]*, Sidharta Kusuma Manggala[1], W.F.P. Kaunang[2]

[1]Department of Anesthesiology and Intensive Care, Cipto Mangunkusumo General Hospital, Universitas Indonesia, 6th Salemba Raya, DKI Jakarta 10430, Indonesia [2]Hermina Galaxy Hospital, 11th Gardenia Raya Block BA1, Grand Galaxy City, Bekasi, West Java 17147, Indonesia

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Corresponding Author
Name : Ida Juita Halim
Email : ijhalim328@gmail.com

Abstract

Objectives: Indonesia's healthcare financing relies on a bundled payment system, the Indonesian Case Base Groups (INA-CBG) rates, whereas private hospitals calculate costs using Activity-Based Costing (ABC). This difference can lead to significant financial gaps, especially in ICU and non-ICU care. **Methods:** A random sample of 93 ICU and non-ICU patients from a private hospital in Bekasi, West Java, was analyzed. We compared the INA-CBG rates and hospital billing for ICU and non-ICU care by considering comorbidities, hospital length of stay (LOS), and mortality rates. **Results:** The average LOS was longer for ICU patients (6.78 days) than non-ICU (4.98 days). The ICU mortality rate was 20%, while non-ICU was 2.33%. Globally, ICU LOS averages 5-7 days, with a 30% mortality rate. INA-CBG covered only 41.89% of costs for non-ICU patients and 57.14% for ICU patients. **Conclusion:** This study demonstrates the significant financial strain created by the discrepancy between the INA-CBG claims and the actual costs particularly for private hospitals handling patients with high severity.

Keywords

ICU, health insurance, INA-CBG, hospital claim

Introduction

The healthcare financing system in Indonesia employs a case-mix approach based on disease diagnosis, referencing the International Classification of Diseases, 10th Revision (ICD-10). This system, known as Indonesia Case-Based Groups (INA-CBG), is a standardized payment mechanism implemented nationwide, especially in the National Health Insurance program managed by *Badan Penyelenggaraan Jaminan Sosial Kesehatan* (BPJS Kesehatan). INA-CBG claims are determined according to specific diagnostic groups and do not account for clinical variations or patient complexity.[1,2] While designed to enhance cost efficiency, the package-based system often fails to reflect patient-specific needs. For example, patients with identical diagnoses receive standardized claims despite varying clinical requirements, including differences in length of stay, medication usage, or advanced medical interventions.[3]

In contrast, private hospitals in Indonesia adopt a different cost-calculation method called Activity-Based Costing (ABC). This approach allocates expenses based on actual activities performed during patient care. It captures real-time resource usage, such as equipment use duration, medications provided, and working hours for healthcare professionals, including physicians and nurses.[4] The ABC method reflects patient-specific needs as it provides detailed cost breakdowns for each healthcare service activity.

This discrepancy often leads to significant financial gaps, particularly in high-complexity services like the Intensive Care Unit (ICU). ICU services are resource-intensive, requiring expensive equipment and highly specialized medical personnel. In other developing countries, health insurance may cover 60-80% of treatment costs, with the remainder paid by patients through cost-sharing.[5] A study indicates that the difference between INA-CBG claims and actual costs can reach up to 30–50% of total expenses.[6] This gap imposes a substantial financial burden on private hospitals, which are often forced to absorb the deficit due to inadequate cross-subsidization mechanisms.[7]

Furthermore, this financial shortfall can negatively impact the quality of healthcare services in private hospitals. Insufficient reimbursement may compel hospitals to limit resource utilization or even decline treatment for patients with severe and resource-intensive conditions.[8] Addressing these challenges requires a comprehensive evaluation of the INA-CBG system, particularly on claim-setting transparency and the flexibility to accommodate clinical variability. Such measures are critical to ensuring the sustainability and equity of Indonesia's healthcare financing system.

Materials and Methods

This study was conducted at a type C private hospital in Bekasi, West Java, using a cross-sectional design to investigate the gap between hospital claims and INA-CBG claims for patients in the ICU and non-ICU settings. A stratified random sampling method was implemented to ensure a proportional representation of patient subgroups based on specific characteristics, such as the number of comorbidities. The sample consisted of 93

adult patients, including 50 ICU patients and 43 non-ICU patients, admitted between January and June 2024.

Inclusion criteria included patients with1 to 5 comorbidities recorded in the hospital's medical database during the study period. Patients with incomplete medical records were excluded from the analysis.

Data collection involved two primary sources:

1. Primary data were obtained from the hospital's medical records.
2. Secondary data were retrieved via the hospital's e-claim system, an integrated claims platform used to input and verify patient claims in accordance with INA-CBG coding.

The collected data included:

1. Length of stay (LOS) in both ICU and non-ICU settings.
2. Actual hospital costs, representing the expenses incurred by the hospital for each patient.
3. Claim tariffs approved by the e-claim system, based on INA-CBG.
4. Patient outcomes, categorized as survival, referral, or death at the conclusion of treatment.
5. The ICU mortality rate in this study does not reflect the final status of patients referred to other facilities, as they were still counted as "alive."

Data processing and analysis were performed using SPSS version 24 and carried out in several stages:

1. Descriptive analysis: Demographic and clinical characteristics, such as age, sex, number of comorbidities, and length of stay, were summarized.
2. Billing gap analysis: The differences between actual hospital costs and e-claim-approved tariffs were calculated in absolute monetary values (IDR) and percentages.

Inferential statistical analysis: Regression linear was employed to evaluate associations between key variables, such as length of stay, number of comorbidities, severity level and outcome with claim discrepancies.

Results

A total of 93 patients were included in the analysis, consisting of 50 ICU patients and 43 non-ICU patients. The study sample included 57 female patients and 36 male patients, with a mean age of 57.56 ± 16.448 years. According to Table 1, the average length of stay (LOS) for ICU patients was 6.78 days, with an average duration in the ICU of 3.18 days, while non-ICU patients had a shorter average LOS of 4.98 days. The mortality rate for ICU patients was recorded at 20%, whereas for non-ICU patients was 2.33%. However, it is important to note that the ICU mortality rate in this study does not reflect the final status of patients referred to other facilities, as they were still counted as "alive." With 8 ICU patients being referred, this mortality rate may not accurately represent the actual outcome, as we could not account for mortality at the referral hospital.

Table 1. Descriptive analysis between ICU vs non-ICU patients

	ICU	non-ICU	*p-value*
Hospital Cost	(IDR)27,789,488.42	(IDR)14,055,083.4	0.000024*
INA-CBGClaim	(IDR)15,881,409.88	(IDR)5,887,816.98	0.00031*
Claim to cost ratio	0.57	0.41	0.388*
Length of Stay	6.78	4.97	0.005*
Alive vs Death	40 vs 10	42 vs 1	0.021**

**using t-test* ***using chi-square*

In terms of financing, the coverage of the INA-CBG claim for ICU patients averages only 57.15% of the actual hospital costs, while for non-ICU patients, the coverage is even lower at 41.89%. Figures 1 and 2 show that the number of comorbidities did not significantly affect the gap between the INA-CBG claim and the hospital's actual costs.

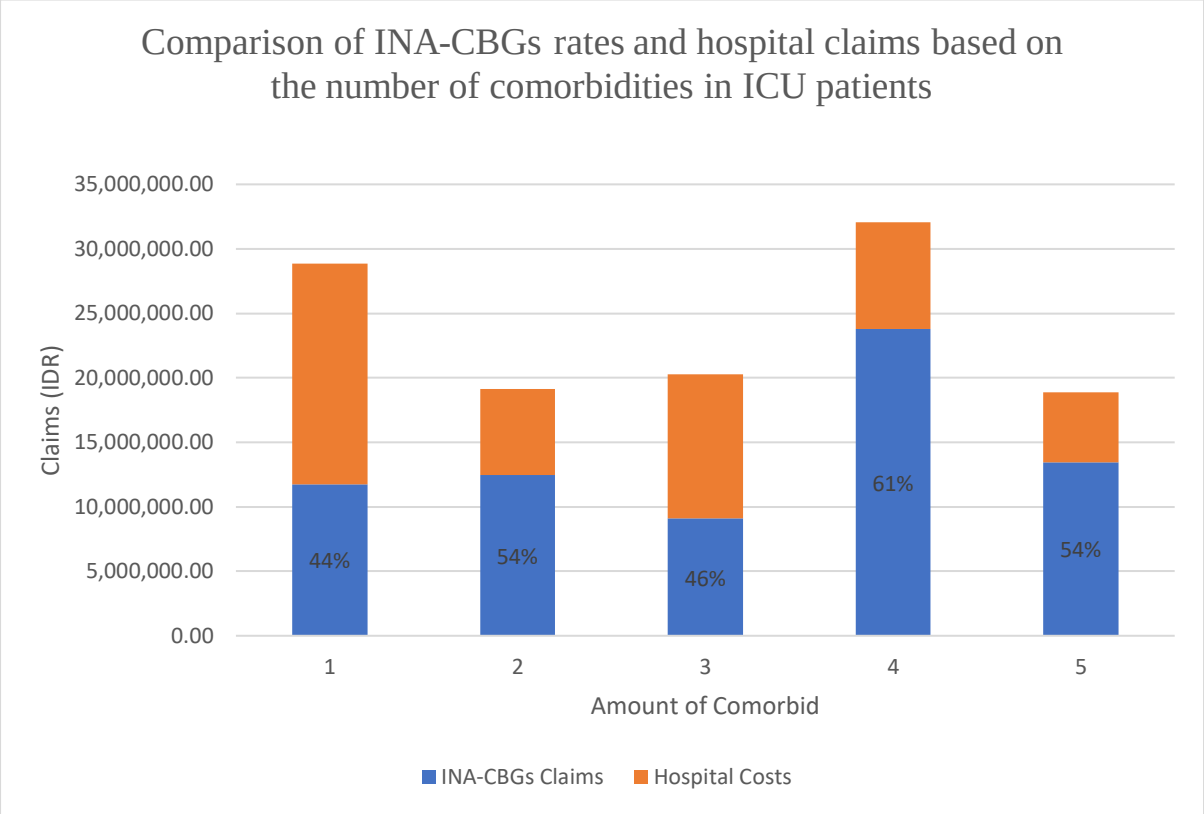

Figure 1. Comparison of INA-CBGs rates and hospital claims based on the number of comorbidities in ICU patients.

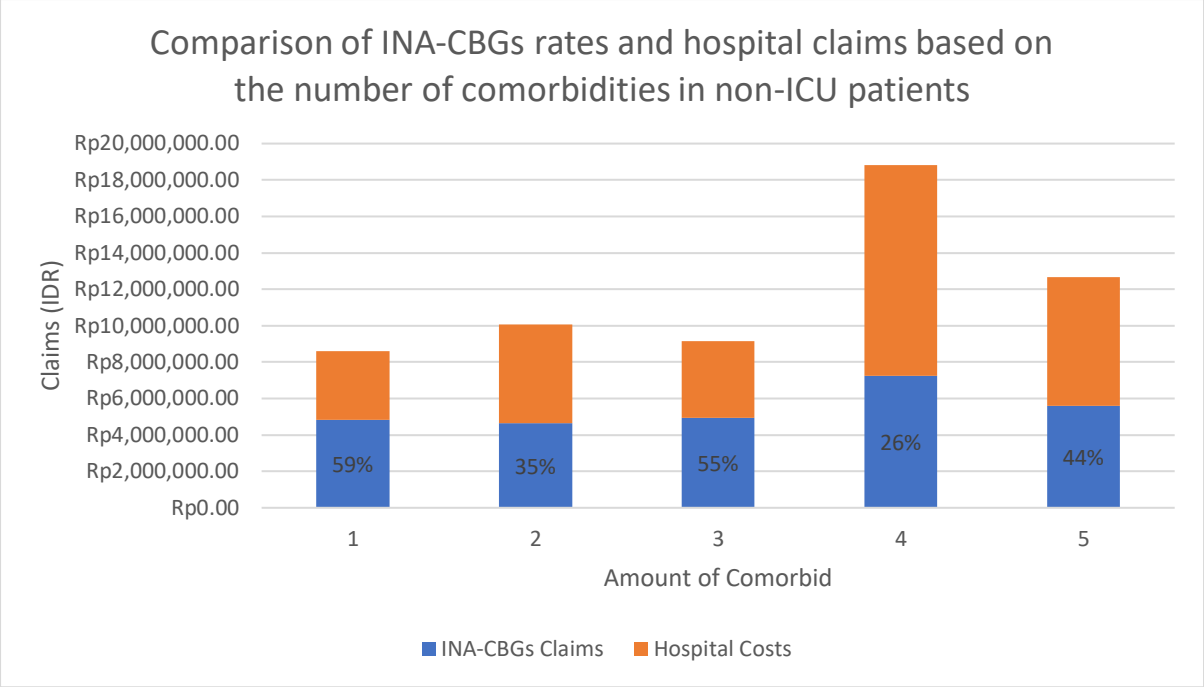

Figure 2. Comparison of INA-CBGs rates and hospital claims based on the number of comorbidities in non-ICU patients.

Table 2 shows that LOS in the ICU has a significant influence (sig. = 0.000) on INA-CBG claims compared to other variables such as comorbidities, LOS non-ICU, outcomes, and patient severity. LOS in the ICU also provides the largest contribution to the prediction of INA-CBG claims, with a coefficient beta value of 0.476. This indicates that the cost of care covered under INA-CBG is heavily influenced by LOS in the ICU, whereas other variables may indirectly affect the costs. Table 3 shows that LOS in the ICU and non-ICU have a significant influence compared to other variables. LOS in the ICU has the greatest impact, with a coefficient beta value of 0.527, on the increase in hospital costs. LOS in general wards (coefficient beta = 0.355) also contributes substantially but to a lesser extent than the ICU.

Table 2. Results of Linear Regression Analysis of Factors Affecting INA-CBG Rates

	INA-CBGS CLAIM			
	Unstandardized B	Standardized Coefficients Beta	Confidence Interval	Sig.
Comorbidities	675,678.491	0.065	-1,093,288.278; 2,444,645.260	0.450
LOS ICU	2,990,703.633	0.476	1,678,683.057; 4,302,724.209	0.000
LOS non- ICU	7,448,754.575	0.172	-112,262.122; 1,609771.272	0.087
Output (Alive vs Death)	5,399,749.095	0.124	-2,807,006.219; 13,606,504.41	0.194
Severity Level	1,808,323.340	0.096	-1,636,058.372; 5,252,705.052	0.300

**using linear regression*

Table 3. Results of Linear Regression Analysis of Factors Affecting Hospital Rates

	HOSPITAL CLAIM			
	Unstandardized B	Standardized Coefficients Beta	Confidence Interval	Sig.
Comorbidities	1,320,421.783	0.107	-522,808.920; 3,163,652.485	0.158
LOS ICU	3,902,663.504	0.527	2,535,562.295; 5,269,764.713	0.000
LOS non- ICU	1,827,934.180	0.355	930,770.684; 2,725,097.676	0.000
Output (Alive vs Death)	2,621,751.886	0.051	-5.929,535.582; 11,173,039.35	0.544
Severity Level	-1,445,533.673	-0.065	-5,034,515.803; 2,143,448.457	0.426

*****using linear regression*

Discussion

This study reveals the fundamental challenges within Indonesia's health financing system, specifically regarding the INA-CBG claim structure. While designed to control costs and improve efficiency, this system faces significant limitations in addressing the actual needs of patients with high severity, particularly in the ICU.[2,3] The gap between the INA-CBG reimbursement rates and the actual costs incurred by hospitals creates substantial financial strain, especially for private hospitals that do not receive government subsidies. Our study found that INA-CBG claims coverage reaches only 57.15% for ICU patients and 41.89% for non-ICU patients. Consequently, private hospitals are left to bear the remaining uncovered costs or seek additional funding to bridge this shortfall.[7,8]

A comparison with other Asian countries underscores the global context of these challenges. In developed countries like Japan, national insurance systems cover 70–100% of healthcare costs, while in developing nations like Malaysia, coverage is around 50%.[5] In contrast, less-developed countries still rely heavily on international aid, with coverage ranging from 20% to 60%, leaving hospitals to absorb the remainder of costs. In both developed and developing nations, financial shortfalls often become a shared responsibility between hospitals and patients, known as cost-sharing. In Indonesia, however, the government has not fully optimized its cost-sharing system, resulting in a significant financial burden on hospitals, particularly private institutions.

This study found that the ICU LOS significantly influences INA-CBG claims ($p = 0.000$) also strongly predicts the INA-CBG claims with other contributing variables. These results align with previous studies showing that LOS in the ICU is a major contributor to high hospital care costs due to the intensive use of resources, including ventilators, close monitoring, and complex therapies.[9,10] While clinically relevant. other variables, such as the number of comorbidities and patient severity, did not demonstrate statistical significance in influencing INA-CBG claims. This may be due to the nature of the INA-CBG payment system, which is bundled and does not fully reflect the complexity of individual cases but is instead based on the primary diagnosis.[2] As a result, the actual costs incurred by

hospitals are more heavily influenced by the duration of patient care in specific units, particularly the ICU.

LOS in the ICU and non-ICU significantly influenced the actual hospital costs. LOS in the ICU contributes the most indicating that the longer a patient stays in the ICU, the higher the hospital costs. These findings are consistent with the literature, which reports that ICUs account for 20–30% of total hospital costs, even though ICU patients represent only a small proportion of the total patient population.[11] Non-ICU LOS also contributes significantly with a slightly less pronounced impact than ICU LOS. This can be explained by the differences in care intensity and resource needs between these two units.

The persistent financial pressure exerted by these funding gaps can negatively impact the quality of healthcare services. Hospitals may be compelled to shorten the duration of patient care to reduce operational costs. The global average of ICU LOS is typically 5–7 days, with a mortality rate of approximately 30%. In contrast, the ICU LOS observed in this study was only 3.18 days, which may suggest the possibility of undertreatment. Undertreatment occurs when patients do not receive care that adequately addresses their clinical needs, leading to serious consequences, including an increased risk of complications, readmissions, and even mortality. Moreover, undertreatment can indirectly increase healthcare costs, as additional care is needed to address complications arising from insufficient treatment.[12,13] Parameters such as complications during treatment, adherence to clinical pathways, readmission rates, post-care quality of life, and patient and family satisfaction should be analyzed to assess the potential risk of undertreatment moving forward.[14,15] However, this study does not definitively prove undertreatment, and further analysis incorporating additional parameters is required to confirm this hypothesis.[4,12]

To manage this financial deficit, many private hospitals employ a cross-subsidization strategy, wherein the revenue generated from private or commercial insurance patients is used to offset the deficit from BPJS Kesehatan patients. While this approach allows hospitals to sustain operations, its long-term viability is in question, particularly as the proportion of BPJS patients increases or the profit margin from non-BPJS patients diminishes.[6,16]

A comprehensive reassessment of the INA-CBG tariff structure is crucial to address these ongoing challenges. This adjustment would better reflect the actual healthcare costs, especially for complex cases like ICU care. Additionally, sustainable funding mechanisms must be developed, integrating the role of private health insurance, a more effective cost-sharing system, and adjustments to BPJS Kesehatan premiums. These steps are vital for ensuring the long-term viability of healthcare services, preserving the quality of care, and safeguarding patient well-being.[17]

However, this study has several limitations, including the inability to track the final status of patients referred to other facilities, which could lead to bias in the mortality rates. Additionally, this research was conducted at a type C hospital in Bekasi, meaning the results may not be generalizable to all hospitals across Indonesia.

Conclusions

This study demonstrates the significant financial strain created by the discrepancy between the INA-CBG claims and the actual costs particularly for private hospitals handling patients with high severity. This financial gap poses a potential risk for undertreatment, negatively impacting both the quality of care and the well-being of healthcare providers. To mitigate these challenges, a recalibration of the INA-CBG tariff structure is imperative to more accurately reflect real-world costs. Additionally, the development of sustainable funding mechanisms like a cost-sharing system, alongside a comprehensive assessment of undertreatment parameters, is crucial. Implementing these measures will be pivotal in fostering a more sustainable and high-quality healthcare system in Indonesia.

Competing Interests

The authors declare no conflicts of interest that could influence the results and interpretation of this study. All research activities were conducted with complete independence, without any influence from parties with financial or professional ties to the topic discussed.

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