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Analysis of Claims for Acute Ischemic Stroke Patients with National Health Insurance (JKN) Financing at the Universitas Indonesia Hospitalin 2024

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ABSTRACT

Acute ischemic stroke is a leading cause of mortality and disability in Indonesia, with thrombolysis therapy using alteplase being a high-cost treatment. The gap between the INA-CBGs tariff and actual hospital costs, particularly for ischemic stroke, poses a significant challenge to health financing efficiency. This study aims to analyze the disparity between INA-CBGs rates and actual costs for treating acute ischemic stroke at the Universitas Indonesia Hospital (RSUI). Using a retrospective descriptive design, the study examines JKN claim data from January to December 2024, with a sample of 340 claims of ischemic stroke patients (ICD-10 code I63.9) in the INA-CBGs G-4-14 group. The analysis includes patient characteristics, treatment class, severity level, and cost components. Results show that the majority of patients were male (57.4%) and aged 60–74 years (46.5%). Most patients (90.3%) did not receive thrombolysis, with moderate severity being the most common case (66.8%). A significant discrepancy was found between the INA-CBGs tariff (IDR 2,716,782,600) and actual hospital costs (IDR 3,468,927,095), with a negative difference of 27.7%. The main cost components were medicines (22.5%), followed by room accommodation, radiology, and laboratories. The study highlights the need for policy evaluation to address the financing gap in stroke services to ensure equitable and sustainable health financing.

Keywords: JKN Claim Analysis, Ischemic Stroke, Cost Component, INA-CBGs Tariff

INTRODUCTION

In 2019, stroke was the second leading cause of death in the world and the leading cause of disability. Stroke has a high incidence and prevalence in Indonesia, in 2019 the national stroke incidence rate was 293.3 per 100,000 people and the national stroke prevalence rate was 2,097.2 per 100,000 people (Widyasari et al., 2022). According to WHO, stroke is the second leading cause of death in Indonesia in 2021 (WHO, 2021). Based on the results of the Indonesian Health Survey in 2023, it was found that the prevalence of stroke in Indonesia reached 8.3 per 1,000 population (Kristanti et al., 2023). Stroke is also one of the chronic diseases with the third highest financing after heart disease and cancer, reaching 5.2 trillion rupiah in 2023 (National Social Security Board, 2023).

Acute ischemic stroke is a medical condition characterized by the sudden onset of focal neurological deficits due to blockage of blood flow to certain areas of the brain. Ischemic stroke is caused by a thrombotic event or embolism that causes disruption of blood flow to an area of the brain. In thrombotic events, blood flow to the brain is blocked in the blood vessels due to thrombus (clots) in the blood vessels themselves. It usually occurs due to atherosclerosis, arterial dissection, fibromuscular dysplasia, or inflammatory conditions. In the event of an embolism, blood clots are carried by blood flow from other parts of the body such as the heart or large blood vessels and then move to the brain, causing blood flow to the brain to be disrupted

(Hui et al., 2024). One of the procedures for acute ischemic stroke that has been shown to be effective is intravenous thrombolysis with alteplase within 4.5 hours after the onset of stroke. Timely administration of alteplase has been shown to significantly improve clinical outcomes in acute ischemic stroke patients (Hasan et al., 2018).

The National Health Insurance Program (JKN) in Indonesia aims to provide financial protection guarantees to the Indonesian population in meeting their basic health needs. JKN provides comprehensive coverage of health benefits for the entire community, including financing for the treatment of acute ischemic stroke (BKPK of the Ministry of Health of the Republic of Indonesia, n.d.). The Universitas Indonesia Hospital (RSUI) is a class A state university hospital in Depok City. As a teaching hospital, RSUI also collaborates with JKN in providing services to the community, including in the treatment of acute ischemic stroke with alteplase. The management of acute ischemic stroke with alteplase still faces various challenges such as high drug costs and strict administrative governance of JKN claims. Therefore, the analysis of JKN claims in acute ischemic stroke patients with alteplase therapy in hospitals is important to identify problems and opportunities for improvement in health financing management.

In the implementation of the National Health Insurance (JKN), the payment pattern to advanced health facilities has been regulated by *Indonesian Case Base Groups* (INA-CBGs) in accordance with Presidential Regulation Number 12 of 2013 concerning Health Insurance as amended by Presidential Regulation Number 111 of 2013. The INA-CBG tariff has 1,077 tariff groups consisting of 789 inpatient group codes and 288 outpatient group codes. Each group is denoted by a combination of alphabetic and numerical codes. In the INA CBG sub-group, one of them is *Severity Level* which is the resource intensity level, where it indicates the severity of cases affected by secondary diagnosis such as comorbidities or complications during the treatment period. The terms mild, moderate, and severe conditions in the INA-CBGS description do not describe the patient's clinical condition, but rather describe the severity affected by the secondary diagnosis (Ministry of Health of the Republic of Indonesia, 2014).

The application of INA-CBGs in ischemic stroke cases has its own challenges, including the gap between the INA-CBGs group package rates and the actual cost of medical services, especially in stroke cases that have special interventions such as alteplase, intensive care, and long-term rehabilitation.

Two previous studies on stroke and healthcare financing have highlighted the challenges faced by the Indonesian health system, particularly in relation to ischemic stroke treatment and the costs involved. Widyasari et al. (2022) explored the high incidence of stroke in Indonesia and emphasized the rising burden of stroke-related healthcare costs, while Kristanti et al. (2023) focused on the prevalence of stroke and its impact on the healthcare financing system. Both studies emphasize the economic burden of stroke treatment, yet they do not delve into the specific challenges posed by the INA-CBGs system and its alignment with real treatment costs. This research, however, addresses this gap by examining the discrepancy between INA-CBGs rates and actual hospital costs, focusing on acute ischemic stroke treatment with alteplase at RSUI. By analyzing JKN claims, patient demographics, and treatment costs, this study provides insights into the inefficiencies of the current healthcare financing system and offers recommendations for policy improvements.

This study aims to analyze JKN claims in acute ischemic stroke patients at RSUI. This analysis includes a review of the number of claims, costs, duration of treatment, and other factors that affect the effectiveness of the service. It is hoped that the results of this study can provide meaningful input for the improvement of JKN policies in supporting the treatment of acute ischemic stroke in Indonesia.

METHOD

This study is an observational study with retrospective descriptive analysis of JKN claim data of acute ischemic stroke patients at RSUI. The data used includes claims submitted by hospitals to the Health Social Security Administration Agency (BPJS) for the period January – December 2024. The population in this study is all acute ischemic stroke patients who are treated at RSUI with JKN financing for the period January – December 2024. The inclusion criteria in this study are all claims of hospitalization of acute ischemic stroke patients with the code I63.9 who use BPJS Kesehatan guarantee from January to December 2024, and are included in the INA-CBGs G-4-14 group (Brain Vascular Injury with Infarction).

The sample consisted of 340 claims that met the inclusion criteria, namely all claims with the Cerebral Vascular Injury with Infarction group. Data is collected from medical record data, claim reports, and treatment cost details. The variables analyzed included the number of claims, costs covered by JKN, hospital rates, and length of hospitalization. Data analysis was carried out using descriptive statistical methods to assess the average cost of claims, the difference between hospital rates and the cost rates covered by JKN in accordance with INA-CBGs.

Data for this study were collected from various sources, including medical record data, claim reports, and treatment cost details. The key variables collected include the number of claims, the costs covered by JKN, the hospital rates, and the length of hospitalization. This data is derived from the BPJS claim forms submitted by RSUI to the Health Social Security Administration. All data was thoroughly checked to ensure accuracy and compliance with the inclusion criteria.

The collected data were analyzed using descriptive statistical methods to assess the average cost of claims, as well as the difference between the hospital rates and the cost rates covered by JKN in accordance with the INA-CBGs tariff. The analysis aimed to identify any discrepancies between the actual hospital costs and the reimbursement rates under the JKN program, which could help evaluate the efficiency of health financing for acute ischemic stroke treatment.

RESULTS AND DISCUSSION

There were 15,684 claims for patient hospitalization with BPJS Kesehatan guarantees at RSUI from January to December 2024. Of the total claims, there were 340 claims (2.2%) that were included in the INA-CBGs G-4-14 group (Cerebral Vascular Injury with Infarction) with an average treatment time of 6.3 days. The average length of care is not differentiated based on intensive and non-intensive care rooms, which can affect the average value of the aggregate. This study is similar to another study at one of the Regional General Hospitals which showed a length of hospitalization between 5-7 days for cases of ischemic stroke without complications (Mazidah et al., 2019). Average length of stay (*Average length of stay*/ AVLOS) in ischemic stroke patients varies depending on clinical severity, availability of stroke unit services, and health financing system in each country. A study by Langhorne et al. (2020) that analyzed global data from 94 countries showed that the average ischemic stroke LOS ranges from 5 to 15 days, with lower-middle-income countries such as Indonesia tending to have longer LOS due to rehabilitation delays and limited access to post-acute services. The study also emphasizes the importance of efficient stroke service organization to optimize LOS and clinical outcomes (Langhorne and Ramachandra, 2020).

Based on the results of this study (Table 1), of the 340 claims included in the Cerebral Vascular Injury with Infarction group, the majority of stroke patients were male as much as 57.4%, while female patients were 42.6%. The age distribution showed that the most age group was in the range of 60-74 years, which was 158 patients (46.5%), followed by the age group of

45-59 years as many as 120 people (35.3%). In terms of management, most patients did not receive thrombolysis therapy (90.3%), while only 9.7% (33 patients) received thrombolysis. In terms of treatment rooms, most patients were hospitalized in a regular room without intensive care (93.2%), while only 6.8% of patients were admitted to the intensive care unit.

Table 1. Characteristics of Claims of Patients with Group G-4-14 (Cerebral Vascular Injury with Infarction) January – December 2024

Variable	Characteristic	Sum	Percentage
Gender	Man	195	57.4%
	Woman	145	42.6%
Age	< 45 years old	21	6.2%
	45 - 59 years old	120	35.3%
	60 - 74	158	46.5%
	≥ 75 years old	41	12.1%
Treatment Type	Thrombolysis	33	9.7%
	Not given Thrombolysis	307	90.3%
Ward Location	Inpatient Unit	317	93.2%
	Intensive Care Unit	23	6.8%
Patient Guarantor Class*	Class 1	132	38.8%
	Class 2	28	8.2%
	Class 3	180	52.9%
Severity Level*	Mild	62	18.2%
	Moderate	227	66.8%
	Severe	51	15.0%

*Based on BPJS Kesehatan

The distribution of patients based on treatment class in Table 1 also shows that the majority of patients treated are patients with BPJS Kesehatan Class 3 guarantee (52.9%). These findings are in line with the demographic profile of National Health Insurance (JKN) participants, where more than 60% of JKN participants come from the Contribution Assistance Recipient (PBI) group or participants with low premiums (BPJS Kesehatan, 2023). Grade 3 participants generally came from low socioeconomic groups, which suggests that ischemic stroke not only impacts the clinical aspect, but also becomes a significant economic burden for vulnerable groups. This condition has a direct impact on the hospital financing system. In the INA-CBGs tariff scheme, the class of treatment affects the amount of claim rates paid by BPJS. Class 3 has the lowest rates, even though clinical needs and treatment costs are often not significantly different from higher classes, especially in cases of stroke of moderate to severe severity. This has the potential to cause a larger cost deficit in class 3 patients, thus challenging the efficiency and sustainability of hospital services (Hadning et al., 2020).

In this study, it was found that the severity level of patients based on the grouping of INA-CBGs was dominated by moderate stroke cases as much as 66.8%, then mild stroke as much as 18.2%, and severe stroke as much as 15.0% (Table 1). This category refers to patient conditions that require moderate resources—typically including a combination of standard hospitalization, antithrombotic treatment, and one or more follow-up supportive examinations, without severe complications.

The results of this study showed that the difference between the rate of INA-CBGs and the hospital rate for acute ischemic stroke cases that were included in the group of Brain Vascular Injury with Infarction was -27.7%. This negative value shows that the INA-CBGs rate paid by BPJS Kesehatan is 27.7% lower than the actual cost incurred by the hospital. This is in line with several studies showing that the rate of INA-CBGs is often insufficient to cover the real cost of acute ischemic stroke treatment. (Hadning et al., 2020) found that the average real

cost of hospitalization of stroke patients was much higher than the established INA-CBG package, so most hospitals suffered losses in the management of stroke patients. Similar findings were reported by Munawaroh et al. (2019), who recorded a total negative difference of around IDR 116.4 million in 110 ischemic stroke (JKN) patients at one government hospital (Rachmad and others, 2019). Likewise, (Chetrine et al., 2022), confirming that there is a significant difference between the real cost and the rate of INA-CBGs in ischemic stroke patients. The cost difference between the INA-CBGs rate and the hospital rate, for example, around 27.7% in this study may raise concerns about the continuity of financing ischemic stroke services by JKN, because hospitals are facing financial pressure. If rates are not adjusted, the sustainability of thrombolysis provision and stroke care may be compromised.

From the results of the analysis of the hospital tariff component (Figure 1), it was found that the largest percentage was allocated for drug costs (22.5%), followed by accommodation room costs (21.8%), radiology (13.4%), and laboratories (12.7%).

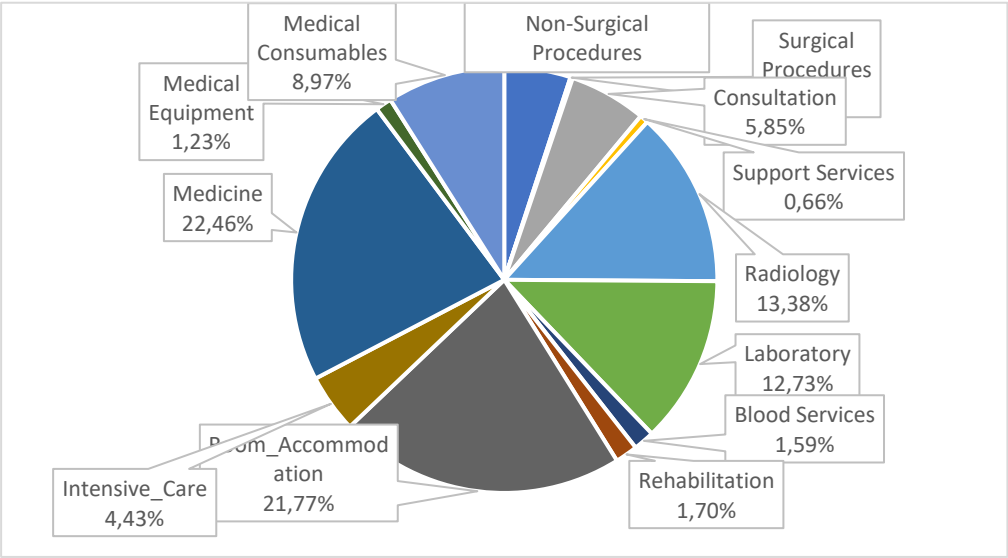

Figure 1. Component Graph of Hospitalization Rates of Acute Ischemic Stroke Patients with Brain Vessel Injury Group with Infarction

Analysis of the cost component shows that the cost of drugs is the largest contributor to the treatment of ischemic stroke. Mazidah et al. (2021) reported that the cost of drugs and consumables medical materials (BMHP) reached 27.21% of the total cost of stroke treatment (Mazidah et al., 2019). A large part of it is the cost of alteplase, a thrombolytic drug that is included in the *High-Cost Drug*. Globally, Kleindorfer et al. (2017) revealed that the price of one vial of 100 mg alteplase in the US more than doubled (to ≈US$6,400 in 2014), while the increase in hospital reimbursement rates (DRG) was only 8%. As a result, the portion of the cost used for alteplase increased from 27% to 53% of the total stroke payout in that time span (Kleindorfer et al., 2017). This confirms that alteplase includes *High-Cost Drug*, which is a very high price, so it is the dominant component of the cost of acute stroke treatment even though in this study the number of patients who received alteplase was relatively small (9.7%).

According to the *Keputusan Menteri Kesehatan Nomor HK.01.07/MENKES/1905/2023*, the claim value of one vial of alteplase 50 mg is IDR 4,500,545. The accumulated costs of a small percentage of patients can result in a spike in the total cost of the drug as a whole. This reflects the concept of "*outlier impact*" in hospital cost analysis, where certain cases contribute a disproportionate proportion of costs to their frequency. In addition to thrombolysis with alteplase, almost all stroke patients require additional medications such as Antiplatelets (aspirin, clopidogrel), Anticoagulants (heparin,

warfarin), Anti-hypertension, statins, *Proton Pump Inhibitors,* analgesics and others. These drugs are given routinely to all patients, whether they have thrombolysis or not. When combined, the cumulative cost of all patients to these drugs becomes significant. Therefore, the cost of the drug is the highest cost contribution, not only because of alteplase, but also because of other thorough and continuous pharmacological needs during treatment.

In an effort to respond to the large cost of thrombolysis, the Indonesian Ministry of Health has adjusted the JKN financing regulations. *Permenkes No. 3 Tahun 2023* affirms the division of service rates at Advanced Referral Health Facilities into INA-CBGs and non-INA-CBGs tariffs (Ministry of Health of the Republic of Indonesia, 2023). In the non-INA-CBGs scheme, special medicines such as alteplase and ancillary services can be claimed separately outside the INA-CBG package. Furthermore, the *Keputusan Menteri Kesehatan Nomor HK.01.07/MENKES/1905/2023* stipulates the value of drug price claims, including alteplase, as a reference for the payment of JKN claims. The attachment to the *Keputusan Menteri Kesehatan* states the claim value of alteplase 50 mg of IDR 4,500,545 per ampoule. This policy allows hospitals to be able to apply for alteplase separately, thereby reducing the deficit burden on the INA-CBG package. However, its effective implementation requires socialization and readiness of administration and human resources, so that the collection of these drugs can be realized without obstacles.

In addition to the cost of medicines, the percentage of the cost of supporting examinations such as laboratories and radiology in stroke cases is also quite large. Patients with acute ischemic stroke usually undergo *Computed Tomography Scan* (CT scan) or *Magnetic Resonance Imaging* (MRI) of the brain to distinguish the classification of hemorrhagic or ischemic stroke, as well as a series of laboratory tests to assess stroke risk factors. Laboratory tests that are usually carried out are lipid profile examinations, blood glucose, kidney function. Each of these services can add significant costs. To illustrate, in the United States it is reported that roughly half of hospital payments for acute stroke are used to cover the cost of the drug (alteplase), while the rest goes to other treatments including diagnostic checkups and daily care (Broderick et al., 2016).

Although CT scans, MRIs, and labs are also quite expensive, they have a more limited repetition cycle (generally done once or twice during acute care). Instead, the patient's medications are administered repeatedly every day, with wide doses and variations, as well as use that is highly dependent on the patient's comorbid condition and complications.

CONCLUSION

This study shows that in the management of acute ischemic stroke patients with National Health Insurance (JKN) financing, there is a negative difference of 27.7% between the rate of INA-CBGs and the actual cost of services in hospitals. This indicates that the rates of INA-CBGs do not fully reflect the real needs of resources, particularly in cases with specialized interventions such as thrombolysis therapy. Although only 9.7% of patients received alteplase therapy, drug costs were the largest component (22.5%) in the cost structure. Supporting examinations such as CT-scans, MRIs, and vascular risk laboratories also add to the cost burden despite their limited frequency. The results of this study confirm the need for continuous evaluation of the INA-CBGs tariff scheme and the strengthening of non-INA-CBGs regulations in the financing of stroke services. Reform of the financing system based on clinical needs and patient economic risks is urgently needed to ensure the sustainability of services, especially in teaching and referral hospitals that bear the burden of higher case complexity.

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