Jurnal Ners Volume 10 Nomor 1 Tahun 2026 Halaman 1044 - 1050
JURNAL NERS
Research & Learning in Nursing Science
http://journal.universitaspahlawan.ac.id/index.php/ners

FACTORS AFFECTING THE NEGATIVE DIFFERENCE BETWEEN HOSPITAL RATES AND INA-CBGS RATES FOR ISCHEMIC STROKE PATIENTS AT DR. SOEBANDI GENERAL HOSPITAL IN JEMBER

Rachman Adji Prakoso[1*], Abu Khoiri[2], Viera Wardhani[3]
[1]Master of Public Health Graduate Program, University of Jember, Jember, Indonesia
[2] Faculty of Public Health, University of Jember, Jember, Indonesia
[3] Faculty of Medicine, University of Brawijaya, Malang, Indonesia
rachmanadji01@gmail.com

Abstrak

Sistem pembayaran berbasis *casemix* Jaminan Kesehatan Nasional melalui INA-CBGs sering menimbulkan ketidaksesuaian antara biaya riil dan tarif klaim, khususnya pada kasus stroke iskemik yang memiliki kompleksitas klinis tinggi. Penelitian ini bertujuan menganalisis faktor yang memengaruhi selisih negatif antara tarif rumah sakit dengan tarif INA-CBGs pada pasien stroke iskemik di RSD dr. Soebandi Jember tahun 2024. Penelitian menggunakan pendekatan kuantitatif dengan desain potong lintang dan analisis SEM-PLS. Sebanyak 81 pasien stroke iskemik JKN dipilih melalui *stratified proportional sampling* berdasarkan kelas perawatan. Hasil penelitian menunjukkan bahwa komorbiditas konkordan tidak berpengaruh signifikan terhadap tingkat keparahan (β = 0,159; p = 0,11), sedangkan komorbiditas diskordan memberikan pengaruh positif dan signifikan (β = 0,730; p < 0,001). Tingkat keparahan berpengaruh positif signifikan terhadap LOS (β = 0,322; p < 0,001). Selain itu, LOS terbukti berpengaruh negatif dan signifikan terhadap selisih tarif (β = –0,724; p < 0,001). Sementara itu, kelas perawatan tidak menunjukkan pengaruh signifikan terhadap selisih tarif (β = 0,077; p = 0,29). Nilai R^2 selisih tarif sebesar 0,508 menjelaskan bahwa model mampu menerangkan 50,8% variasi selisih tarif. Temuan ini menegaskan bahwa kompleksitas komorbiditas dan lama perawatan merupakan determinan utama defisit biaya rumah sakit.

Kata Kunci: *Stroke Iskemik, INA-CBGs, Selisih Tarif, Lama rawat inap, Komorbiditas, SEM-PLS*

Abstract

The National Health Insurance casemix-based payment system through INA-CBGs often causes discrepancies between actual costs and claim rates, particularly in cases of ischemic stroke, which are clinically complex. This study aims to analyze the factors that influence the negative difference between hospital rates and INA-CBGs rates for ischemic stroke patients at Dr. Soebandi General Hospital in Jember in 2024. The study employs a quantitative approach with a cross-sectional design and SEM-PLS analysis. A total of 81 JKN ischemic stroke patients were selected through stratified proportional sampling based on treatment class. The results showed that concordant comorbidity did not have a significant effect on severity (β = 0.159; p = 0.11), while discordant comorbidity had a positive and significant effect (β = 0.730; p < 0.001). Severity had a significant positive effect on LOS (β = 0.322; p < 0.001). In addition, LOS was found to have a significant negative effect on the rate difference (β = –0.724; p < 0.001). Meanwhile, the treatment class did not show a significant effect on the rate difference (β = 0.077; p = 0.29). The R^2 value of the rate difference was 0.508, indicating that the model was able to explain 50.8% of the variation in the rate difference. These findings confirm that the complexity of comorbidity and length of stay are the main determinants of hospital cost deficits.

Keyword: *Ischemic Stroke, INA-CBGs, Tariff Gap, Length of Stay, Comorbidity, SEM-PLS*

* Corresponding author :
Rachman Adji Prakoso
Address : Universitas Jember
Email : rachmanadji01@gmail.com
Phone : 081227062958

INTRODUCTION

The National Health Insurance System (JKN) is part of the National Social Security System (SJSN), which aims to guarantee equitable and affordable access to health services for all Indonesians (PerPres, 2016). In its implementation, JKN uses a prospective case-mix payment system known as Indonesian Case-Based Groups (INA-CBGs), which is a payment mechanism with rates that are determined before services are provided (Kemenkes, 2016). This system is expected to improve efficiency, control costs, and maintain the quality of hospital services (Kemenkes, 2014a).

However, the implementation of the INA-CBGs system often causes discrepancies between hospital rates and INA-CBGs rates, namely that INA-CBGs rates do not cover all hospital service costs, resulting in a negative difference between hospital rates and INA-CBGs rates (Sofan and Syamsudin, 2021). This condition indicates that hospital service rates exceed the rates set in INA-CBGs, forcing hospitals to bear financial deficits. This phenomenon impacts the operational sustainability of hospitals, particularly regional hospitals that serve as referral facilities for JKN participants (Munawaroh et al., 2019).

Ischemic stroke cases require intensive care with long hospital stays and high use of medical resources, which can potentially cause differences between hospital rates and INA-CBG rates (Chetrine et al., 2022). Several studies have mentioned that negative differences are influenced by various factors such as severity, class of care, length of stay (LOS), and the number and type of patient comorbidities (Munawaroh et al., 2019; Aminda et al., 2020; Purbaningsih et al., 2020).

Research in China shows that comorbidity has a significant effect on the variation in stroke patient treatment costs. Comorbidity is divided into two categories, namely concordant comorbidity (diseases directly related to stroke such as hypertension and heart disease) and discordant comorbidity (diseases not directly related such as diabetes mellitus and chronic kidney disease) (Feng et al., 2024). The more comorbidities a patient has, the higher the severity and cost of care required (Utami and Fanny, 2021).

dr. Soebandi Regional Hospital in Jember, as a type B teaching hospital, faces similar problems. Based on 2024 data, out of 420 patients, a negative difference was found between hospital rates and INA-CBGs rates for ischemic stroke patients, particularly at severity levels II and III in care class 3, with a value of –Rp13,166,320. This condition indicates that comorbidity, severity level, length of stay, and care class have the potential to affect the magnitude of the service rate difference at this hospital.

Therefore, this study was conducted to analyze the factors that influence the negative difference between hospital rates and INA-CBG rates for ischemic stroke patients at Dr. Soebandi General Hospital in Jember. The results of this study are expected to provide a scientific basis for hospitals in planning rates, controlling costs, and developing service efficiency strategies in the era of JKN prospective financing.

METHODS

This study used a quantitative approach with a cross-sectional design. The analysis was conducted from the hospital's perspective using secondary data from medical records and the billing system of ischemic stroke patients participating in the JKN program at Dr. Soebandi General Hospital in Jember. The study was conducted from September to October 2025. This study has obtained research ethics approval with ethics approval number 3265/UN25.8/KEPK/DL/2025 issued by the Ethics Committee of the Faculty of Dentistry, University of Jember.

Population and Sample

The study population consisted of all JKN participants hospitalized with ischemic stroke between January and December 2024, totaling 420 patients. Sampling was performed using stratified proportional sampling based on care class with inclusion criteria of patients with complete medical records, having at least one comorbidity, and experiencing a negative difference between hospital rates and INA-CBGs rates. Exclusion criteria included patients who died, were discharged against medical advice, or were referred to another hospital. The study sample was determined using the Slovin formula:

$$n = \frac{N}{1 + N \,.\, (e)^2}$$

Explanation:
n = minimum sample size
N = total number of population members
e = specified error rate, percentage of sampling error tolerance, e = 0.1
Calculation:

$$n = \frac{420}{1 + 420 \,.\, (0{,}1)^2}$$
$$n = 80{,}769$$

From the above calculation, the result is 81, and this study involved 81 samples.

The dependent variable in this study was the negative difference between hospital rates and INA-CBG rates, while the independent variables included concordant comorbidities, discordant comorbidities, severity, length of stay (LOS), and class of care. Concordant and discordant comorbidities were identified based on secondary

diagnoses using ICD-10 codes as classified by Feng et al. (2024).

Research Tools/Instrument

Data were collected through a documentation study using a checklist to record variables from medical records and hospital financial systems. Data analysis was conducted in two stages: (1) normality testing using the Kolmogorov–Smirnov and Shapiro–Wilk tests to ensure data distribution, and (2) analysis of the relationship between variables using the Structural Equation Modeling–Partial Least Squares (SEM-PLS) method with SmartPLS version 4 software.

Analysis Technique

The structural model was tested using path coefficient values, t-statistics, and p-values to measure the significance of the relationships between variables, as well as R-square (R^2) values to assess the proportion of variance explained by the model (Hair et al., 2021). Effect size (f^2) and cross-validated redundancy (Q^2) values were also used to test the strength and predictive relevance of the research mode.

RESULTS AND DISCUSSION

Patient Characteristics Based on Age

Age	Number of Patients	Percentage(%)	Total Rate Difference(-)
≤ 44 years	2	2.5	19.448.653
45-54 years	15	18.5	55.157.485
55-64 years	33	40.7	95.235.827
65-74 years	21	25.9	89.589.257
75-84 years	10	12.4	47.264.146
Total	**81**	**100**	**306.695.368**

Table 1. Distribution of Patient Numbers by Age

Based on Table 1, shows that of the 81 ischemic stroke patients, the 55–64 age group was the largest, with 33 patients (40.7%) and a total rate difference of –Rp 95,235,827, followed by the 65–74 age group with 21 patients (25.9%) and a difference of –Rp 89,589,257. The youngest age group (≤44 years) only had 2 patients (2.5%), while the 75–84 age group had 10 patients (12.4%). This distribution indicates that ischemic stroke cases are more common in pre-elderly to early elderly people, in line with the increasing trend of cerebrovascular risk with age. Overall, the total rate difference for the entire sample reached –Rp 306,695,368. This finding confirms that the middle age group (55–74 years) not only dominates the number of cases but also contributes the most to the hospital service cost deficit.

Characteristics of Factors Affecting Negative Tariff Differences

Table 2. Distribution of Concordant (K) – Discordant (D) Comorbidities, Severity Level, LOS, and Care Class in Relation to Tariff Differences for Ischemic Stroke Patients from January to December 2024

Variable	Number of Sample	Percentage (%)	Total Tariff Difference (-)	Average Tariff Difference (-)
Concordant (K) – Discordant (D)				
K.0 – D.1	11	13,6	33.719.005	3.065.364
K.0 – D.2	6	7,4	20.331.420	3.388.570
K.0 – D.3	1	1,2	3.960.933	3.960.933
K.0 – D.4	1	1,2	3.205.768	3.205.768
K.0 – D.5	2	2,5	43.237.724	21.618.862
K.1 – D.0	29	35,8	58.246.358	2.008.495
K.1 – D.1	11	13,6	29.680.565	2.698.233
K.1 – D.2	3	3,7	5.990.623	1.996.874
K.1 – D.6	2	2,5	21.413.931	10.706.965
K.2 – D.0	9	11,2	27.063.908	3.007.100
K.2 – D.1	2	2,5	41.377.637	20.688.818
K.2 – D.2	1	1,2	970.277	970.277
K.3 – D.0	3	3,6	17.497.219	5.832.406
Severity Level				
1	49	60,5	123.061.476	2.511.458
2	25	30,9	134.387.720	5.375.508
3	7	8,6	49.246.172	7.035.167
LOS				
≤ 5	20	25	38,336,937	1,916,847
6 - 10	49	60	143,424,815	2,927,037
≥ 10	12	15	124,933,616	10,411,135
Care Classes				
1	18	22,2	54.483.900	3.026.883
2	5	6,2	26.362.686	5.272.537
3	58	71,6	225.848.782	3.893.944

Concordant comorbidity (C); Discordant

comorbidity (D); C.1–D.1: patients have one concordant and one discordant comorbidity.

In the combination of concordant and discordant comorbidities, patients without concordant comorbidities but with five discordant comorbidities showed the highest average rate difference of -Rp21,618,862. A similar pattern was seen in patients with one concordant comorbidity and six discordant comorbidities, with an average of -Rp 10,706,965. Meanwhile, patients with two concordant comorbidities and one discordant comorbidity had an average difference of -Rp 20,688,818. These findings indicate that the greater the number of comorbidity, especially discordant ones, the greater the clinical complexity, resulting in a higher cost of care.

In terms of severity, the majority of patients were at severity level 1 (60.5%). Although the number of patients with severity level 1 was the highest, the average rate difference increased with increasing severity, reaching a peak at severity level 3 -Rp 7,035,167 at level 3. This indicates that the more severe the patient's condition, the higher the difference between the actual hospital costs and the INA-CBGs rates.

Regarding LOS, most patients had a length of stay of 6–10 days (60%), followed by ≤5 days (25%) and ≥10 days (15%). The average rate difference increased significantly with longer LOS, from –Rp1,916,847 for LOS ≤5 days to –Rp2,927,037 for LOS 6–10 days and a maximum of –Rp10,411,135 for LOS ≥10 days. These results indicate that longer hospitalization duration correlates with increased clinical complexity, risk of complications, and the need for more intensive monitoring and follow-up therapy.

In the treatment class, most patients were treated in class 3 (71.6%), while classes 1 and 2 accounted for 22.2% and 6.2% of patients, respectively. The highest average rate difference was found in class 2 (–Rp5,272,537), followed by class 3 (–Rp3,893,944) and class 1 (–Rp 3,026,883). These results indicate that differences in treatment classes are not directly proportional to the size of the rate difference, as clinical factors such as comorbidity and severity have a greater influence on the formation of service costs than differences in facilities between classes.

Partial Least Square (PLS) Analysis Results

Table 3. Results of the Test of Relationships between Variables

Variable	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Concordant Comorbidity -> Severity Level	0.159	0.167	0.100	1.600	0.11
Discordant Comorbidity -> Severity Level	0.730	0.737	0.057	12.866	0.00
Severity Level -> Los	0.322	0.325	0.085	3.774	0.00
Los -> Tariff Difference	-0.724	-0.717	0.082	8.830	0.00
Severity Level -> Tariff Difference	0.077	0.086	0.073	1.047	0.29

Acceptance of the hypothesis test or relationship between variables is if T-Argument > 1.96 and P-Value < 0.05, then Ha is accepted and Ho is rejected. Based on the data in Table 8, concordant comorbidity does not affect the severity variable. From the analysis results, a regression coefficient value of 0.159 was obtained. The calculated T-Statistic value is 1.6, which is smaller than the T-Table value of 1.96, with a P-value of 0.11, which is greater than 0.05. Discordant comorbidity has a positive and significant effect on the severity variable. From the analysis results, a regression coefficient value of 0.730 was obtained. The calculated T-Statistic value was 12.866, greater than the T-Table value of 1.96, with a P-value of 0.00, which is less than 0.05. The severity level variable had a positive and significant effect on the LOS variable. From the analysis results, a regression coefficient value of 0.322 was obtained. The calculated T-statistic value is 3.774, which is greater than the T-table value of 1.96 with a P-value of 0.00, which is less than 0.05. The LOS variable has a positive and significant effect on the Tariff Difference variable. From the analysis results, the regression coefficient value is -0.724. The calculated T-Statistic value is 8.830, which is greater than the T-Table value of 1.96 with a P-value of 0.00, which is less than 0.05. The treatment class variable has no effect on the tariff difference variable. From the analysis results, a regression coefficient value of 0.077 is obtained. The calculated T-Statistic value is 1.047, which is smaller than the T-Table value of 1.96 with a P-value of 0.29, which is greater than 0.05.

Discussion

The results show that a negative difference between hospital rates and INA-CBG rates occurs in most ischemic stroke patients. This condition confirms that the actual service needs in hospitals exceed INA-CBG rates, reflecting the high clinical burden and resource requirements in the management of ischemic stroke. The 55–74

age group dominates the cases and contributes the most to the rate difference, which is in line with (Knisely et al., 2023; Cheng et al., 2025; Sari et al., 2022; Rosiyani et al., 2021), which state that the risk of stroke and the need for care increase in middle to old age due to degenerative factors, decreased vascular elasticity, and the complexity of comorbidities.

The results of this study indicate that clinical factors have a dominant influence on the negative difference between hospital rates and INA-CBG rates. Discordant comorbidity has been proven to have a significant effect on severity, in line with the study by Feng et al. (2024), which explains that comorbidities that are not directly related to the primary diagnosis (discordant comorbidity) can worsen the condition of stroke patients and add to the complexity of treatment. This condition leads to increased use of medical resources such as medications, supporting examinations, and nursing services, which results in higher hospital treatment costs. Patients with ≥5 discordant comorbidities were recorded to have the largest average rate difference, indicating that the mismatch of the INA-CBGs package increases as clinical complexity increases. Conversely, concordant comorbidities did not have a significant effect on severity. This may be due to the homogeneity of the patients' underlying conditions (e.g., controlled hypertension and diabetes), so that the variation in severity is not greatly influenced by these comorbidities, and this factor can be better controlled through the implementation of a structured stroke clinical pathway (Ariyani, 2021; Purnamasari et al., 2023). These findings are in line with research (Feng et al., 2024) stating that concordant comorbidities play a greater role as long-term risk factors rather than determinants of acute phase severity.

Severity level has a positive correlation with length of stay (LOS). The finding that severity has a significant effect on LOS is in line with the results of studies by Munawaroh et al. (2019) and Purbaningsih et al. (2020), which state that the more severe the patient's clinical condition, the longer the treatment period required to achieve clinical stability. Patients with severity level 3 had the highest average rate difference, reinforcing the finding that treatment complexity and duration of care are dominant cost components. These results are in line with previous studies stating that severity is a major determinant of LOS due to the need for intensive intervention, invasive procedures, continuous monitoring, and greater risk of complications (Lin et al., 2022; Yang et al., 2023).

LOS was found to have a significant negative effect on the tariff difference, reinforcing previous findings by Satibi et al. (2018) and Utami (2021), that the longer a patient is hospitalized, the greater the likelihood that the actual hospital costs will exceed the INA-CBGs claim tariff. This indicates that the prospective tariff system does not fully represent the variation in medical service needs that arise due to differences in patients' clinical conditions. At LOS ≥10 days, the average tariff difference increases sharply because the INA-CBGs system is a fixed rate, so hospital revenue does not change even if the duration of treatment increases. The accumulation of costs for medication, supporting examinations, follow-up therapy, and nursing services during hospitalization is not fully accommodated in the INA-CBGs tariff (Andrew et al., 2021). These findings are consistent with the literature, which confirms that length of stay is one of the biggest factors causing cost deficits in hospitals that use a package-based payment system (Yuliastuti et al., 2023; Rochmah et al., 2020; Zhang et al., 2024).

The care class had no significant effect on the rate difference, indicating that the differences in facilities between classes 1, 2, and 3 were not a major factor in determining hospital rates. Although the care classes differed in terms of room facilities, the accommodation cost component only accounted for a small proportion of the total cost of ischemic stroke care. The difference in rates is more influenced by clinical factors such as severity, comorbidity, use of intensive care units, and other specific therapies (Fathi and Junadi, 2025). Therefore, cost control strategies should not only focus on adjusting care classes but also on improving length of stay (LOS) efficiency, optimizing clinical pathways, and rational resource utilization (Chetrine et al., 2023; Pertiwi et al., 2025).

Overall, this study confirms that the inconsistency of INA-CBGs rates for ischemic stroke is mainly influenced by clinical factors, rather than care class factors. These findings imply the need to strengthen LOS management, update rates based on clinical complexity, and implement a financing model that better reflects the actual cost burden of hospitals. These efforts are important to maintain the financial sustainability of hospitals while maintaining the quality of ischemic stroke services.

CONCLUSIONS

This study shows that the negative difference between hospital rates and INA-CBG rates for ischemic stroke patients is mainly influenced by clinical factors. Discordant comorbidities have a significant effect on increasing severity, while concordant comorbidities do not show a significant effect. Severity is positively related to length of stay, and LOS is proven to be the most decisive factor in the rate difference. The class of care does not significantly affect the rate difference, indicating

that differences in accommodation facilities are not a dominant component of cost formation. Overall, high clinical complexity and long duration of care are the main causes of the discrepancy between actual hospital costs and INA-CBGs rates.

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to all those who have contributed to the completion of this study. Special thanks go to my supervisors, Dr. Abu Khoiri and Dr. dr. Viera Wardhani, for their invaluable guidance and support throughout the research process. I would also like to thank Dr. Soebandi Hospital in Jember for their participation and willingness to share their insights.

REFERENCES

Andrew, H. H., D. Horrocks, C. Leung, M. B. Richardson, A. M. Sheehy, dan C. F. S. Locke. 2021. The increasing impact of length of stay “outliers” on length of stay at an urban academic hospital. BMC Health Services Research. 21(1):1–7.

Chetrine, H., D. A. Nugraheni, N. D. Rugiarti, dan A. Tetuko. 2022. Perbandingan tarif indonesian-case based groups pada penyakit stroke iskemik rawat inap di rs pemerintah. Jurnal Farmasi Medica/Pharmacy Medical Journal (PMJ). 5(1):1.

Cheng, Q., R. A. Fattah, D. Susilo, A. Satrya, M. Haemmerli, S. Kosen, D. Novitasari, G. C. Puteri, E. Adawiyah, A. Hayen, A. Mills, V. Tangcharoensathien, S. Jan, H. Thabrany, A. Asante, dan V. Wiseman. 2025. Determinants of healthcare utilization under the indonesian national health insurance system – a cross-sectional study. BMC Health Services Research. 25(1)

Fathi, G. C. dan P. Junadi. 2025. Analysis of claims for acute ischemic stroke patients with national health insurance (jkn) financing at the university of indonesia hospital in 2024. Journal of Social Research. 4(7):1516–1523.

Feng, H., J. Zhang, Z. Qin, Y. Zhu, X. Zhu, L. Chen, Z. Lu, dan Y. Huang. 2024. Analysis of readmission and hospitalization expenditures of patients with ischemic stroke suffering from different comorbidities. Heliyon. 10(17):e36462.

Knisely, K., C. Edrissi, C. Rathfoot, C. B. Sanders, S. I. Nathaniel, dan T. I. Nathaniel. 2023. Stroke severity among ischemic stroke patients with elevated diastolic blood pressure. Future Neurology. 18(2)

Lin, K. H., H. J. Lin, dan P. S. Yeh. 2022. Determinants of prolonged length of hospital stay in patients with severe acute ischemic stroke. Journal of Clinical Medicine. 11(12):0–7.

Munawaroh, S., W. Sulistiadi, dan Rachmad. 2019. Perbedaan tarif ina–cbg’s dengan tarif riil rumah sakit pada pasien bpjs kasus stroke iskemik rawat inap kelas i di rs pon tahun 2018. Jurnal Manajemen Dan Administrasi Rumah Sakit Indonesia (MARSI). 3(2):155–165.

Purbaningsih, S., J. Wahyono, dan E. Suparniati. 2020. Cost of illness pasien stroke. Manajemen Dan Pelayanan Farmasi

Purnamasari, T., R. T. Pinzon, A. C. Adisasmita, M. K. Sudaryo, Trihono, dan A. T. Endarti. 2023. Proceedings of the 1st International Conference for Health Research – BRIN (ICHR 2022). Atlantis Press International BV. Proceedings of the 1st International Conference for Health Research – BRIN (ICHR 2022).

Pertiwi, Y. H., K. Kosasih, T. Nugroho, V. Paramartha, F. Yuliaty, dan E. S. M. Asnar. 2025. The effect of clinical pathway compliance in stroke management on patient health outcomes and its implications for hospital costs (a study at rspal dr. ramelan surabaya). Journal Transnational Universal Studies. 3(7):89–100.

Rochmah, T. N., A. E. Sutikno, M. Dahlui, M. B. Qomaruddin, dan Ernawaty. 2020. Cost variance of health services at phc hospital, surabaya, indonesia: operational audit. Utopia y Praxis Latinoamericana. 25(Extra 2):13–23.

Rosiyani, E. A., E. Witcahyo, Y. T. Herawati, F. Kesehatan, dan U. Jember. 2021. Perhitungan cost of illness (coi) pasien hipertensi di pelayanan rawat inap rsd balung kabupaten jember cost of illness of hypertension inpatients in rsd balung kabupaten jember. Jurnal Ilmu Kesehatan Masyarakat Berkala. 3(2):117–122.

Sari, M. D. W., T. M. Andayani, dan D. Endarti. 2024. PERBANDINGAN biaya rill rumah sakit dengan tarif ina-cbgs pada pasien rawat inap malaria. Jurnal Kesehatan Masyarakat. 8(3):6245–6256.

Utami, Y. T. dan N. Fanny. 2021. Faktor penyebab perbedaan selisih klaim negatif tarif ina-cbgs dengan tarif riil di rsud dr. moewardi. Jurnal Sains Dan Kesehatan. 3(3):492–499.

Yang, C. C., O. A. Bamodu, L. Chan, J. H. Chen, C. T. Hong, Y. T. Huang, dan C. C. Chung. 2023. Risk factor identification and prediction models for prolonged length of stay in hospital after acute ischemic stroke using artificial neural networks. Frontiers in Neurology. 14

Yuliastuti, F., T. M. Andayani, D. Endarti, dan S. A. Kristina. 2023. Breast, cervical, and lung cancer: a comparison of real healthcare costs

and ina-cbgs rates in the era of national health insurance. Pharmacy Practice. 21(1):1–7.

Zhang, X., M. Qian, S. Tang, J. Yan, R. Wang, D. Lyu, dan X. Ying. 2024. The impact of a new case-based payment system on quality of care: a difference-in-differences analysis in china. Risk Management and Healthcare Policy. 17(December):3113–3124.