

Analysis Of Actual Treatment Costs For Child Bronchopneumonia Inpatients Compared To INA-CBG'S Rates At Rumah Sakit Bhakti Wira Tamtama Semarang

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Abstract

Bronchopneumonia is one of the most common respiratory tract infections in children and may impose a substantial burden on healthcare costs. This study aimed to determine the components of the actual treatment costs, analyze the conformity between actual costs and INA-CBG's tariffs, and identify factors affecting the actual costs of hospitalized pediatric bronchopneumonia patients at Bhakti Wira Tamtama Hospital. This study employed a retrospective cross-sectional descriptive analytic design. The sampling technique used was purposive sampling based on inclusion and exclusion criteria. Data were obtained from medical records, hospital financial data, and INA-CBG's claim data of pediatric bronchopneumonia patients covered by the National Health Insurance (JKN) during the March–December 2025 period. The results showed that the average total actual treatment cost for pediatric bronchopneumonia patients was IDR 4.358.977. The largest cost component was accommodation costs amounting to IDR 2.076.064 (23,81%), followed by nursing costs of IDR 728.128 (8,35%), while the lowest cost component was medical device costs amounting to IDR 17.021 (0.20%). There was a negative difference of IDR 6.643 and a significant difference ($p=0.001$) between the actual treatment costs and INA-CBG's tariffs. Factors influencing the magnitude of actual costs included length of stay and inpatient class, whereas severity level and comorbidities did not show a significant effect.

Key words: Actual Cost, Bronchopneumonia, Children, INA-CBG's, JKN

Introduction

Bronchopneumonia is a respiratory tract infection that remains a significant health issue among children, particularly in developing countries. This condition results from an infection in the lung tissue that causes inflammation of the bronchi and alveoli. Bronchopneumonia is typically caused by the bacteria *Streptococcus pneumoniae* and *Haemophilus influenzae*, although viral and fungal infections can also be responsible. Children are more susceptible to bronchopneumonia because their immune systems are not yet fully developed, making them more prone to infection and complications (Hts & Amalia, 2023). Pneumonia remains the leading cause of child mortality worldwide. The World Health Organization reports that in 2019, pneumonia caused approximately 740,180 deaths among children under five, accounting for about 14% of all under-five deaths globally (World Health Organization, 2022). UNICEF also notes that Indonesia is among the countries with persistently high rates of child mortality due to pneumonia (UNICEF, 2019). In Indonesia, approximately 10% of childhood infectious disease cases are caused by pneumonia (Kementerian Kesehatan RI, 2023). In Central Java Province, the number of pneumonia cases among children under five in 2023 reached 134,708 cases, while the city of Semarang recorded a pneumonia detection rate of 40.1% among children under five, which remains below the government target (Dinas Kesehatan Provinsi Jawa Tengah, 2023).

The high incidence of pneumonia not only impacts public health but also increases the financial burden of healthcare services. Under the National Health Insurance program, the healthcare payment system uses the Indonesian Case-Based Groups (INA CBG's) method. This system determines payment amounts based on diagnostic groups, procedures, and the severity of the patient condition (Permenkes, 2023). However, in practice, there remains a discrepancy between INA CBG's rates and actual hospital costs, particularly for conditions with high treatment costs such as bronchopneumonia. This situation could affect the effectiveness of hospital financing as well as the sustainability of the National Health Insurance program if periodic evaluations are not conducted. Several previous studies have shown a discrepancy between actual costs and INA CBG's rates for pediatric pneumonia patients. A study by Marhenta et al. (2022) revealed a negative difference between actual costs and INA CBG's rates for hospitalized pediatric pneumonia patients, particularly in care class III. Another study conducted by Khoirunnisya & Suryani (2024) stated that Length of Stay significantly influences the total treatment costs for patients. The longer a patient is hospitalized, the higher the treatment costs incurred by the hospital. The results of this study indicate that the evaluation of treatment costs for pediatric bronchopneumonia patients still needs to be developed, particularly in hospitals with different characteristics.

Bhakti Wira Tamtama Hospital in Semarang is a type C hospital that collaborates with BPJS Kesehatan and treats inpatients with pediatric bronchopneumonia who are JKN participants. An analysis of actual treatment costs at this hospital is essential to determine the alignment of service costs with INA CBG's rates and to identify factors influencing the magnitude of treatment costs. This study aims to identify the components of actual treatment costs for inpatients with pediatric bronchopneumonia, analyze the alignment of actual costs with INA CBG's rates, and identify factors influencing the actual treatment costs for inpatients with pediatric bronchopneumonia at Bhakti Wira Tamtama Hospital in Semarang.

Methods

This study employed a descriptive-analytical method with a retrospective cross-sectional design to analyze a comparison of the actual treatment costs for hospitalized pediatric bronchopneumonia patients against the INA CBG's rates at Bhakti Wira Tamtama Hospital in Semarang. Research data were obtained from medical records, INA CBG's claim data, and hospital financial data for pediatric bronchopneumonia patients enrolled in the JKN program from March to December 2025. The study population included all pediatric bronchopneumonia inpatients enrolled in the JKN program who had submitted INA CBG's claims. Sampling was conducted using purposive sampling based on inclusion and exclusion criteria, resulting in a sample size of 94. The variables analyzed included length of stay, inpatient class, severity level, comorbidities, actual cost components, INA CBG's rates, and cost differences. Statistical analysis was performed using IBM SPSS Statistics. Data normality was tested using the Kolmogorov-Smirnov test. The comparison of actual costs and INA CBG's rates was analyzed using the Paired t-test if the data were normally distributed and the Wilcoxon test if the data were not normally distributed. Analysis of the factors influencing real costs was conducted using the independent t-test or the Mann-Whitney U test for two unpaired data groups, one-way ANOVA or the Kruskal-Wallis test for more than two data groups. The significance level was set at $p < 0.05$.

Result and Discussion

A study conducted at Bhakti Wira Tamtama Hospital in Semarang from March to December 2025 showed that bronchopneumonia remains one of the most common respiratory tract infections among pediatric inpatients enrolled in the JKN program. According to hospital data, there were 279 pediatric inpatients with bronchopneumonia during the study period. After selection based on inclusion and exclusion criteria, 94 patients were identified as meeting the criteria for the study sample. The selection process considered the completeness of medical records, healthcare cost data, JKN enrollment status, and the completeness of patients' INA-CBG's claims. Patient characteristics were analyzed based on gender, age, length of stay, inpatient class, disease severity, and comorbidities. Analyzing patient characteristics is important to provide an overview of the clinical condition of pediatric bronchopneumonia patients undergoing inpatient care, while also helping to understand factors that may influence the magnitude of treatment costs during their hospital stay.

Table 1. Characteristics of Pediatric Bronchopneumonia Patients Hospitalized at Bhakti Wira Tamtama Hospital in Semarang

Characteristic	Total (n=94)	Percentage (%)
Gender		
Man	49	52,13
Woman	45	47,87
Age		
Toddler (12–59 months)	48	51,06
Preschooler (60–72 months)	9	9,57
School aged children (>6–<18 years)	37	38,36
Length of Stay (Day)		

Characteristic	Total (n=94)	Percentage (%)
≤5	81	86,17
>5	13	13,83
Inpatient Class		
Class I	11	11,70
Class II	39	41,49
Class III	44	46,81
Severity Level		
Light	91	96,81
Medium	3	3,19
Comorbid		
Without comorbid	91	96,81
With comorbid	3	3,19

Table 1 shows that pediatric bronchopneumonia is more common among male patients, accounting for 52,13% of cases. These findings are consistent with the study by Saatirah et al. (2025), which indicated that the majority of pediatric bronchopneumonia patients are male. The study by Khoirunnisya & Suryani (2024) also showed similar results, indicating that the incidence of pediatric pneumonia is more common in boys than in girls. The high incidence of bronchopneumonia in boys may be influenced by anatomical factors of the respiratory tract and differences in the body immune response compared to girls. The diameter of the airways in boys is relatively smaller, making them more susceptible to complications when inflammation and excessive secretion production occur in the respiratory tract (Radjivshah et al., 2024). Additionally, the immune response in boys is known to be lower against respiratory tract infections due to hormonal influences that can affect the activity of the body immune system.

In addition to biological factors, environmental and behavioral factors can also influence the high incidence of bronchopneumonia in boys. Boys are generally more active in outdoor activities, so they are more frequently exposed to air pollution, dust, and weather changes that can increase the risk of respiratory tract infections (Rezeki et al., 2025). Exposure to secondhand smoke in the home environment is also a significant risk factor that can worsen children respiratory health and increase the risk of pneumonia and bronchopneumonia (Citra et al., 2026). These findings indicate that the incidence of bronchopneumonia in children is influenced not only by medical factors but also by environmental conditions and child-rearing practices.

The largest age group in this study was toddlers aged 12 to 59 months, accounting for 51,06% of the sample. These results indicate that toddlers are the age group most vulnerable to developing bronchopneumonia. This finding aligns with studies by Hidayat & Fortuna (2025) and Rizone et al. (2025), which noted that the majority of pediatric pneumonia patients fall within the toddler age group. The high incidence of broncho-pneumonia in toddlers is related to their immune systems, which are not yet fully developed, so the body ability to fight infections is still limited. At this age, children also begin to actively interact with their surroundings, increasing the risk of exposure to bacteria and viruses that cause infections.

Nutritional factors also contribute to the high incidence of broncho-pneumonia among infants. Children who are not exclusively breastfed are known to have a higher risk of developing respiratory tract infections compared to those who are optimally exclusively breastfed (Damayanti et al., 2021). Breast milk contains various immunological components such as Secretory

Immunoglobulin A and Immunoglobulin G, which help protect the respiratory tract mucosa against infection. Additionally, malnutrition in infants can weaken the immune system, making children more susceptible to recurrent infections and prolonging the recovery process.

Based on the length of hospital stay, it was found that the majority of patients were hospitalized for ≤ 5 days, accounting for 86,17%. Length of Stay is a key indicator in healthcare services as it relates to the patient clinical condition, the effectiveness of treatment, and the total cost of care incurred during the patient hospitalization. The results of this study align with the research by Sartika & Amalia (2023), which states that the majority of pediatric bronchopneumonia patients are hospitalized for less than seven days. The length of stay for bronchopneumonia patients is influenced by the severity of the disease, the body response to antibiotic therapy, the presence of comorbidities, and the patient general condition upon initial admission to the hospital.

Patients with more severe clinical conditions tend to require longer observation and treatment, resulting in a longer length of stay (Marhenta et al., 2022). An extended length of stay also contributes to increased treatment costs for patients, particularly in terms of accommodation, nursing care, and other support services. Additionally, intravenous antibiotic administration for patients with bronchopneumonia is generally recommended for a minimum of five days to ensure bacterial infections are optimally resolved and to reduce the risk of complications and disease recurrence (Simbolon et al., 2023). Therefore, the duration of antibiotic therapy is one of the factors influencing the length of hospital stay for pediatric broncho-pneumonia patients.

The study results also indicate that the majority of patients were hospitalized in class III wards, accounting for 46,81%. This study aligns with research by Tuti & Nurwahyuni (2024), which states that toddlers with pneumonia were more frequently treated in class III (67,34%), class II (19,85%), and class I (12,80%). The high utilization of class III wards indicates that the majority of patients come from lower-middle-income groups and access healthcare services through the BPJS Health program. This situation is related to the fact that class III BPJS premiums are relatively more affordable than those of other classes. In addition, some BPJS participants also fall under the Premium Assistance Recipient (PBI) category, which automatically entitles them to class III care. Although room facilities in class III are more basic than those in class I and II, essential medical services are still provided in accordance with hospital service standards.

Based on disease severity, it was found that the majority of patients fell into the mild category, accounting for 96,81%, while moderate severity accounted for 3,19%. No patients with severe severity were found in this study. This finding indicates that the majority of pediatric bronchopneumonia patients treated at Bhakti Wira Tamtama Hospital in Semarang remain in a clinical condition that can be effectively managed at a type C hospital. Patients with more severe conditions are generally referred to hospitals with more comprehensive healthcare facilities. The severity of the disease is crucial to consider as it is directly related to therapeutic needs, length of hospital stay, and the cost of patient treatment. The more severe the patient condition, the more complex the healthcare services provided, resulting in higher costs.

This study identified three patients with a comorbid condition of urinary tract infection. The presence of comorbidities indicates that the patients' clinical condition was influenced not only by bronchopneumonia as the primary diagnosis but also by other conditions that could exacerbate their condition. Comorbidities can increase the risk of complications, prolong the length of hospital stay, and increase the need for therapy and supportive examinations while the patient is undergoing treatment. Therefore, the presence of comorbidities is a factor that must be considered in evaluating the treatment costs for pediatric patients with bronchopneumonia.

Table 2. Distribution of Antibiotic Use in Hospitalized Pediatric Patients with Bronchopneumonia

Antibiotic Class	Drug Type	Dosage Form	Total	Percentage (%)
Third generation cephalosporins	Ceftriaxone	Injection	89	58,94
Aminoglycoside	Gentamicin	Injection	56	37,09
Penicillin	Ampicillin	Injection	4	2,65
	Sulbactam			
Imidazole	Metronidazole	IV	1	0,66
Combination of penicillin + aminoglycoside	Ampicillin + gentamicin	Injection	1	0,66
Total			151	100,00

The use of antibiotics in pediatric patients with bronchopneumonia in this study was dominated by third generation cephalosporins, specifically ceftriaxone, accounting for 58,94% of cases. The high prevalence of ceftriaxone use indicates that this antibiotic remains the primary choice for empirical therapy of pediatric bronchopneumonia in hospitals. Ceftriaxone has a broad spectrum of activity against both Gram positive and Gram negative bacteria, making it effective for treating lower respiratory tract infections (Damayanti et al., 2022). Additionally, this antibiotic has good clinical efficacy and a more practical dosing schedule, which is why it is frequently used in hospitalized pediatric patients.

The use of gentamicin was also quite high in this study, at 37,09%. Gentamicin is an aminoglycoside antibiotic that works by inhibiting bacterial protein synthesis through binding to the 30S ribosomal subunit (Oviani et al., 2026). The combination of ceftriaxone and gentamicin in some patients indicates therapeutic adjustment based on the patient clinical condition and the suspected causative bacteria. The use of antibiotic combinations is generally performed in patients with more complex infections to enhance therapeutic efficacy while reducing the risk of bacterial resistance (Bognar et al., 2024). Based on the results of this study, the use of a two-antibiotic combination in pediatric patients with bronchopneumonia was ampicillin and gentamicin, with a percentage of 0,66%. This result aligns with the study by Damayanti et al. (2022), which noted that the combination of ampicillin and gentamicin (38,18%) was the most commonly prescribed antibiotic combination for pediatric patients with pneumonia at Dr. Saiful Anwar General Hospital in Malang.

The predominance of antibiotic use in injectable form indicates that most patients receive therapy via the intravenous route. Intravenous administration of antibiotics is chosen because the clinical condition of pediatric patients often precludes the use of oral medications, such as the presence of shortness of breath, decreased consciousness, vomiting, or difficulty swallowing medication. In addition to having a faster onset of action, intravenous therapy also provides more reliable drug delivery, making it more effective for use during the acute phase of bronchopneumonia (Simbolon et al., 2023).

In addition to antibiotic administration during hospitalization, patients with bronchopneumonia also receive follow-up therapy in the form of antibiotics as take home medication to continue treatment at home. The administration of this follow-up therapy aims to ensure optimal resolution of the bacterial infection and to prevent recurrence of the disease or complications after

the patient is discharged. The use of antibiotics as a take home regimen is expected to help accelerate the healing process and improve overall treatment success, as presented in Table 3.

Table 3. The Use of Antibiotics as Take Home Medication or Follow Up Therapy

Antibiotic Class	Drug Type	Dosage Form	Total	Percentage (%)
Third generation cephalosporins	Cefixime	Oral	84	97,67
First generation cephalosporins	Cefadroxile	Oral	2	2,33
Total			86	100,00

Based on the study results, the most commonly used antibiotic for follow up therapy in pediatric patients with bronchopneumonia was cefixime, a third-generation cephalosporin, at a rate of 97,67%. These results are consistent with the study by Zaini et al. (2019) at Dr. H. M. Ansari Saleh General Hospital in Banjarmasin, which reported that cefixime is the most commonly prescribed oral antibiotic for pediatric pneumonia patients (80%). Pharmacologically, cefixime works by inhibiting bacterial cell wall synthesis through binding to Penicillin Binding Proteins (PBPs) (Zaini et al., 2019). The high use of cefixime is influenced by its oral administration, particularly in patients whose clinical condition has improved, allowing intravenous therapy to be switched to oral therapy.

The total average expenditure for all real cost components of pediatric inpatients with bronchopneumonia at Bhakti Wira Tamtama Hospital in Semarang was IDR 4.358.977. These cost components include accommodation costs, nursing costs, laboratory costs, ancillary costs, other medication costs, radiology costs, administrative costs, medical equipment costs, physician service costs, equipment rental costs, antibiotic costs, and rehabilitation costs. The average real cost components for inpatients with pediatric bronchopneumonia are presented in Table 4.

Table 4. Average Actual Cost Components for Inpatient Pediatric Bronchopneumonia Patients at Bhakti Wira Tamtama Hospital in Semarang

Cost Components	Price Range (IDR)	Average (IDR)	Percentage (%)
Accommodation Cost	1.200.000 – 3.000.000	2.076.064	23,81
Nursing Costs	535.000 – 960.000	728.128	8,35
Medications and Medical Equipment Cost	181.700 – 837.500	295.532	5,08
- Other Medication Cost	95.408 – 600.124	298.819	3,43
- Medical Equipment Cost	34.385 – 212.774	88.438	1,01
- Antibiotic Cost	15.000 – 176.000	56.102	0,64
Laboratory Cost	149.000 – 1.681.000	367.000	4,21
Support Services Cost	0 – 630.000	295.532	3,39
Radiology Cost	0 – 229.000	183.766	2,11
Administrative Cost	110.000	110.000	1,26
Doctor Service Cost	75.000	75.000	0,86
Equipment Rental Cost	0 – 500.000	63.106	0,72
Rehabilitation Cost	0 – 240.000	17.021	0,20
Total	2.139.793 – 8.413.898	4.358.977	100,00

Accommodation costs are the largest cost component for hospitalized pediatric patients with bronchopneumonia, accounting for IDR 2.076.064 of the total cost. The high cost of accommodation is influenced by the length of hospitalization and the patient care class during treatment at the hospital. The longer a patient is hospitalized, the higher the accommodation costs incurred by the hospital. These findings align with the study by Yamananda et al. (2019), which stated that accommodation costs are one of the largest components of hospitalization costs for pediatric pneumonia patients.

The alignment between actual costs and INA-CBG's rates can be determined by the presence or absence of a difference between these two cost components, as well as based on the results of statistical tests conducted. This comparative analysis also provides insight into the efficiency of the healthcare services provided by the hospital in managing pediatric bronchopneumonia patients. If actual costs are lower than INA-CBG's rates, the hospital has the potential to generate a profit. Conversely, if the actual costs are higher than the INA-CBG's rates, the hospital may incur a loss. A comparison of the average actual costs with the INA-CBG's rates for pediatric bronchopneumonia patients is presented in Table 4.

Table 5. Results of the Comparative Analysis of Average Actual Costs With INA-CBG's Rates

INA-CBG's Code	n (94)	Difference		Patient Total	INA-CBG's Rate (IDR)	Average Actual Cost (IDR)	Difference (IDR)	Sig.
J-14-6-I	1	+	-	11	4.666.100	5.024.873	-358.773	0,001
	2	4	7	38	4.106.142	4.424.121	-317.979	
	3	9	29	42	3.508.400	4.109.214	-600.814	
J-14-6-II	2	5	37	1	5.743.600	5.557.300	186.300	
	3	1	0	2	4.930.200	3.872.150	1.058.050	
Average				2	0	4.597.532	-6.643	

Table 5 shows that there are variations in actual hospital costs compared to INA-CBG's rates based on INA-CBG's codes and patient care classes. The results indicate a discrepancy between actual hospital costs and INA-CBG's rates for certain groups of inpatients with pediatric bronchopneumonia. A negative difference indicates that the actual cost of services is higher than the INA-CBG's rates, while a positive difference indicates that the INA CBG's rates are still sufficient to cover the costs of hospital services. Overall, an average negative difference of IDR 6.643 was obtained, indicating that the INA-CBG's rates are generally still sufficient to cover the actual costs of services for inpatients with pediatric bronchopneumonia.

The largest negative discrepancy between the INA-CBGs reimbursement rate and the hospital's actual costs was observed in the INA-CBG's group J-4-16-I, comprising 73 patients. All ward classes in this group demonstrated actual treatment costs exceeding the INA-CBG's reimbursement, with deficits of IDR 358,773 for class I, IDR 317,979 for class II, and IDR 600,814 for class III. The substantial deficit in class III was associated with the higher number of patients (37 patients) and the presence of one patient whose actual treatment cost exceeded the INA-CBG's reimbursement by more than IDR 1,000,000. These findings are consistent with those reported by Nisa and Raharjo (2021), who found that lower ward classes tend to experience greater cost discrepancies. This occurs because INA-CBG's applies a fixed case-based reimbursement system,

which often does not fully cover the actual costs incurred by hospitals (Alfiana et al., 2024; Yusran et al., 2025).

These findings are consistent with those of Marhenta et al. (2022), who reported that the actual treatment costs for pediatric pneumonia patients in the INA-CBG's group J-4-16-I exceeded the INA-CBG's reimbursement across all ward classes. The largest negative discrepancy was observed in class III (IDR 1,293,583), followed by class II (IDR 704,371) and class I (IDR 562,001), which was attributed to the higher number of class III patients. Similarly, Pradhana et al. (2025) reported that class III inpatient wards had the highest patient volume and the greatest reimbursement deficit, resulting in substantial financial pressure on the hospital. These findings suggest that lower ward classes are associated with a greater risk of financial losses due to discrepancies between INA-CBG's reimbursement and actual hospital costs.

Despite having fewer patients, classes I and II also experienced negative discrepancies, indicating that patient volume is not the only contributing factor. Other determinants, including Length of Stay (LoS), medical procedures, and ward class, also influence the magnitude of the discrepancy. Longer hospitalization and more intensive treatments increase actual hospital costs, thereby widening the gap between reimbursement and expenditures (Fathah & Safitri, 2024). In addition, although class I included only 11 patients, it still showed a negative discrepancy of IDR 358,773, likely due to higher service costs associated with better inpatient facilities, greater use of supporting resources, more intensive treatment, and more complex patient care (Putri et al., 2025).

Before conducting a comparative analysis of actual costs and INA-CBG's rates, a normality test was first performed to determine the distribution of the research data. The normality test on data from 94 patients showed that the actual cost data and INA-CBG rates were not normally distributed, with a Kolmogorov-Smirnov significance value (sig) of 0.001 ($p < 0.05$). These results align with the study by Widayati et al. (2022), which obtained a normality test significance value of 0.000, indicating that the data were also non-normal. Therefore, the cost difference analysis did not meet the assumptions of the parametric paired-sample t-test and proceeded using the non-parametric Wilcoxon test as an alternative. The results of the Wilcoxon test showed a significance value of 0.001 ($p < 0.05$), which means that there is a statistically significant difference between actual hospital costs and INA-CBG's rates.

Overall, this study reveals a discrepancy between actual hospital costs and INA-CBG's rates, with the majority of patients facing a negative balance because service costs exceed claim rates. This situation can affect the financial stability of hospitals and the sustainability of healthcare services. In addition to impacting financial aspects, this discrepancy also has the potential to lower service quality because hospitals tend to implement operational efficiencies, such as limiting the procurement of medications, medical equipment, and healthcare personnel (Tama et al., 2025). Therefore, an evaluation of INA-CBG's rates needs to be conducted periodically to achieve a balance between cost efficiency and the quality of healthcare services.

Tabel 6. Results of the Analysis of Factors Influencing the Actual Costs of Inpatient Pediatric Bronchopneumonia Patients at Bhakti Wira Tamtama Hospital in Semarang

Patient Characteristic	<i>p-value</i>	Interpretation
Length of Stay	0,001	Significant
Inpatient Class	0,001	Significant
Severity Level	0,739	Not Significant
Comorbid	0,889	Not Significant

Table 6 shows that the factors significantly influencing the total actual costs for hospitalized pediatric patients with bronchopneumonia are Length of Stay and inpatient care class, with a p-value <0.05. These results indicate that the longer a patient is hospitalized, the higher the total costs incurred by the hospital. Length of stay is directly related to the use of hospital rooms, nursing interventions, drug therapy, laboratory tests, and other support services during the patient's treatment. These findings align with the research by Rahman et al. (2019) and Khoirunnisya & Suryani (2024), which state that Length of Stay is one of the primary factors influencing the magnitude of service costs for pneumonia patients.

The inpatient class also had a significant effect on patients total actual costs. Differences in facilities and service costs across each class resulted in variations in the total treatment costs incurred by the hospital. The higher the care class, the greater the costs incurred due to differences in facilities, accommodations, and support services. These results differ from the study by Rastiti et al. (2023) at Aisyiyah Bojonegoro Hospital, which found no significant differences in costs based on care class. Other studies by Ye et al. (2023) and Suheri (2022) indicate that care class significantly influences inpatient costs and the potential for hospital losses due to discrepancies in INA-CBG's rates. Theoretically, inpatient care class is linked to the use of hospital resources, making it a key factor influencing the magnitude of service costs alongside the length of hospital stay.

Meanwhile, severity level and comorbidities did not show a significant effect on the total real costs of hospitalized pediatric bronchopneumonia patients. The results of this study indicate that increases in hospital service costs are more influenced by the intensity of medical care and length of stay than by patient demographic characteristics. A study by Faizah & Mildawati (2021) also stated that age had no significant effect on the cost of care for pneumonia patients. However, these findings differ from those of Khoirunnisya & Suryani (2024), who showed that age significantly influenced the increase in healthcare costs. These differing results may be influenced by sample characteristics and variations in patients' clinical conditions across the respective studies.

Conclusion

This study shows that the average total actual cost of treatment for pediatric inpatients with bronchopneumonia at Bhakti Wira Tamtama Hospital in Semarang was IDR 4.358.977, with the largest cost components being accommodation and nursing fees. The analysis results indicate a negative variance with an average of IDR 6.643 as well as a significant difference between the actual treatment costs and the INA CBG's rates ($p=0.001$). These results indicate that, in general, the INA CBG's rates are still insufficient to cover the costs of inpatient care for children with bronchopneumonia. Factors significantly influencing the total actual treatment costs are Length of Stay and inpatient care class, while age, gender, severity level, and comorbidities did not show significant influence. This study contributes to the development of health financing system evaluations, particularly regarding care for pediatric bronchopneumonia patients enrolled in the JKN program, and can serve as a basis for hospitals to improve service efficiency and control healthcare costs without compromising the quality of patient care.

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