Jurnal Farmasi dan Ilmu Kefarmasian Indonesia
Pharmacy and Pharmaceutical Sciences Journal
Published by Faculty of Pharmacy Universitas Airlangga
OPEN ACCESS
E-ISSN 2580-8303
P-ISSN 2406-9388

Jurnal Farmasi dan Ilmu Kefarmasian Indonesia Vol. 10 No. 2 August 2023, 217-223
DOI: 10.20473/jfiki.v10i22023.217-223
Available online at https://e-journal.unair.ac.id/JFIKI/

Comparative Analysis of Real Costs and INA CBG's Rates in BPJS Kesehatan Patients with Schizophrenia

Oktarina Mahanggi[1], Abdul Rahem[2]*, Yunita Nita[2]
[1]Master Program of Pharmaceutical Science, Faculty of Pharmacy, Universitas Airlangga, Surabaya, Indonesia
[2]Department of Pharmacy Practice, Faculty of Pharmacy, Universitas Airlangga, Surabaya, Indonesia

*Corresponding author: abdulrahem@ff.unair.ac.id

Submitted: 28 April 2023
Revised: 13 July 2023
Accepted: 20 July 2023

Abstract

Background*: Schizophrenia is the most severe mental disorder because its risk of death is to 2-3 times higher.* ***Objective****: To determine the average real costs, the difference between real costs and INA-CBG rates of inpatients with schizophrenia, and the factors that affect real costs.* ***Methods****: The study was conducted retrospectively from the hospital perspective using the total sampling method from January 2020-December to 2021. The study sample included inpatients patients and the real costs of the hospital. The data obtained were analyzed using the Mann-Whitney U-test and multiple linear regression tests.* ***Results****: About 112 patients met the inclusion criteria. The average real cost of inpatients with schizophrenia at Tombulilato General Hospital from January 2020 to December 2021 is Rp. 9,895,102 and the average INA-CBG rate of inpatients with schizophrenia was Rp. 14,820,778. There was a difference between the real costs and INA-CBG rates (p = 0.002), with the highest average hospital real cost component in the inpatient room (Rp. 3,397,723 (34.34%). The factor that affected the real costs of inpatients with schizophrenia patients is the length of stay (p = 0.000).* ***Conclusion****: The real costs of the hospital were lower (p = 0.002) than those of the INA-CBG. The highest real cost of the hospital was the inpatient room (34.34%), and the factor that affected the real costs was the length of stay (p = 0.000).*

Keywords*: cost analysis, hospital real costs, INA-CBG's rates, schizophrenia*

How to cite this article:
Mahanggi, O., Rahem, A. & Nita, Y. (2023). Comparative Analysis of Real Costs and INA CBG's Rates in BPJS Kesehatan Patients with Schizophrenia. *Jurnal Farmasi dan Ilmu Kefarmasian Indonesia*, 10(2), 217-223 http://doi.org/10.20473/jfiki.v10i22023.217-223

INTRODUCTION

Mental disorder is a syndrome of individual behavioral patterns associated with a symptom of suffering (*distress*) or *impairment (impairment*) in one or more essential functions of humans, namely psychological, behavioral, biological, and other disorders that affect their relationship with society (Widodo *et al.*, 2022). According to the *World Health Organization* (WHO) 2016, mental disorders worldwide have become a severe problem. An estimated 264 million people are affected by depression, 45 million people are affected by bipolar disorder, 20 million by schizophrenia, and 50 million by dementia (James *et al.*, 2018). Indonesia is one of the countries with significant mental health problems. Based on the calculation of disease burden in 2017, Indonesia has experienced several types of mental disorders, including depression, anxiety, schizophrenia, bipolar disorder, behavioral disorders, autism, eating behavior disorder, intellectual disability, and *Attention Deficit Hyperactivity Disorder* (ADHD) (Tulandi, 2021).

Based on the results of the 2018 Basic Health Research (Riskesdas), there has been an increase in the prevalence of People with Mental Disorders (ODGJ) in Indonesia. The majority of households with schizophrenic mental illness, according to residents, showed that 7 $^{0}/_{00}$ in rural areas experienced more schizophrenic mental disorders than in urban areas, which is 6.4 $^{0}/_{00}$. The data show that the highest prevalence value is in the province of Bali (11.1$^{0}/_{00,}$ while in Gorontalo, the prevalence value was 6.6$^{0}/_{00}$ (Ministry of Health, 2019).

One of the most severe mental disorders is schizophrenia because the risk of death is two to three times higher; therefore, it requires relatively expensive treatment costs that trigger a high economic impact on patients, families, and health financing institutions if schizophrenic patients experience a recurrence in the hospital (Pratiwi *et al.*, 2017). A study using BPJS Kesehatan (Healthcare and Social Security Agency) sample data from 2015 to 2016 examining the financing of patients with schizophrenia in Indonesia showed that the average claim costs per patient were Rp. 427,806 for outpatients and Rp. There are 10,500,000 patients (Sangadah, 2021). Another study showed a negative difference in Rp. 136,096,659 for inpatients with schizophrenia, and 267 samples with the code F-4-10-I (Sari, 2015). A study of schizophrenia in the US from to 2005-2014 showed a significant hospitalization rate of 55.4%, with costs ranging from $10,000- $49,999 (57.1%) (Chen *et al.*, 2021). An Italian study conducted in 2009-2016, obtained the results of 15,000 social security beneficiaries showing an average annual expenditure of €160.1 million with an average cost per patient of €10,675 (Mennini *et al.*, 2021).

The high number of mental health problems in the community indicates that it is necessary to improve health services in quality medical services efficiently. Implementation of the INA-CBG programme is expected to enhance the success of health services for people who are already unhealthy (Rahem *et al.*, 2021). Increasing health financing affects health insurance costs and health quality. If the INA-CBG's claim cost is greater than the actual costs, then the hospital does not experience losses, but if the real costs are greater than the INA-CBG's rates, then the loss is shared by the hospital (Agiwahyuanto *et al.*, 2020). Several research cases, such as ischemic stroke (Muslimah *et al.*, 2017) and hypertension (Nilansari *et al.*, 2021) showed that the actual costs incurred were greater than those incurred by INA-CBG. However, studies on diabetic gangrene disease (Kinanti *et al.*, 2021) and thalassemia (Wijaya & Ariawati, 2018) have shown a positive difference between hospital real costs and INA-CBG rates. This study aimed to determine the average real costs, explore the difference between real costs and INA-CBG rates, and identify factors that affect real costs.

MATERIALS AND METHODS

Ethical considerations

The Toto Kabila Regional General Hospital issued a certificate of ethical eligibility (800/RSUD TK/1224). a/XII/2022). Permit for conducting research was issued by the Investment and Integrated One-Stop Services Agency of Bone Bolango Regency (503/DPMPTSP-BB/IPM/0338/IX/2022).

Methods

The study was conducted from October to December 2022 at Tombulilato General Hospital, using *retrospective* data from the hospital's perspective. The sampling was performed using the *total sampling* technique. The study population included 112 inpatients with schizophrenia between January 2020 and December 2021. The inclusion criteria of the sample in this study were 1) patients with a diagnosis of schizophrenia based on medical records, e-claim applications, and BPJS claims data for the January 2020-December 2021 period; 2) inpatients with schizophrenia of BPJS class 1,2,3 with the codes F-4-10-I, F-4-10-II, F-4-10-III, and 3) patients who had complete medical records. The exclusion criteria were patients who left the hospital at their request (forced return) and those who

P-ISSN: 2406-9388
E-ISSN: 2580-8303

died. The study participants met the inclusion criteria for 112 patients.

The cost component of this study was the real costs of the hospital (laboratory costs, blood transfusion costs, nutrition installation costs, emergency department installation costs, nursing care costs, general practitioner and specialist mental health service costs, medicines and medical consumable costs, inpatient room costs, and inpatient administration) and INA-CBG rates.

This study used descriptive analysis of patient demographic data and cost components. Mann-Whitney and multiple linear regression tests were used to examine the factors affecting the hospital's real costs to see the difference between the real costs and the cost of INA-CBG inpatient schizophrenia.

RESULTS AND DISCUSSION

Patient characteristics

Between January 2020 and December 2021, 112 patients met the inclusion criteria. An overview of the characteristics of inpatients with schizophrenia is presented in Table 1.

In this study, the character data of inpatients with schizophrenia at Tombulilato Hospital showed that the number of male patients was higher than that of the 82 inpatients (73.21%). According to (Sadock *et al.*, 2014) and (Tus Ińs Ki & Lew-Starowicz, 2018), the number of patients with schizophrenia was higher in men than in women. This result is in accordance with the research conducted by (Trishna & Muhdi, 2020) that as many as 65.3% of men have schizophrenia compared to 34.7% of women. This is because sex differences in people with schizophrenia are related to reproductive hormones in men and women. Estrogen protects women against schizophrenia (Androvičová *et al.*, 2021).

Based on age, it can be seen that patients with schizophrenia experienced the highest in the early adulthood category, namely the age of 26-35 years as many as 40 patients (35.71%), which is the productive age (Badan Pusat Statistik, 2021). Early adulthood is the most vulnerable period of development to experiencing stress that impacts'individuals' well-being (Manita *et al.*, 2019).

Regarding male-dominated patients at a productive age, people with high school education appeared to have the highest education level in experiencing schizophrenia (39 patients, 34.82%) compared to other levels of education. Furthermore, 68 patients (48.21%) had a non-working status, and schizophrenic patients were influenced by intrinsic and extrinsic factors of patients, namely, people who do not work have a 6.2 times greater risk of developing schizophrenia than those who work (Zahnia & Wulan, 2016).

The prevalence of schizophrenia in this study, which is domiciled in rural areas, was 95 patients (84.82%) and 17 patients (15.18%) in urban areas. According to data from Kementrian Kesehatan RI (2019), the prevalence of schizophrenia in Indonesia based on residence is more significant in rural areas 7‰ than in urban areas 6.4‰. This contrasts with the population density theory, which states that schizophrenia is higher in areas with high population densities, such as cities. Population density is a factor that influences the occurrence of mental disorders, including psychosis (Sadock *et al.*, 2014). Based on Table 1, the highest class of treatment-experienced schizophrenia, namely class 3, with 91 patients (81.25%), showed that most patients with schizophrenia in Tombulilato Hospital came from middle to lower economic classes.

Table 1. Characteristics of Patients (n = 112)

Characteristics	Category	n =112 (%)
Gender	Male	82 (73.21)
	Female	30 (26.79)
Age (years)	12, 16	1 (0.89)
	17/25	32 (28.57)
	26-35	40 (35.71)
	36-45	26 (23.21)
	46-55	7 (6.25)
	56-55	5 (4.46)
	>65	1 (0.89)
Education	No school	1 (0.89)
	Elementary School	32 (28.57)
	Junior High School	27 (24,11)
	Senior High School	39 (34.82)
	Diploma	3 (2.68)
	Undergraduate (S1)	9 (8.04)
	Postgraduate (S2)	1 (0.89)
Occupation	Unemployed	68 (60.73)
	Students	3 (2.67)
	Working	41 (36.60)
Domicile	Village	95 (84.82)
	City	17 (15.18)
Treatment class	1	2 (1.79)
	2	19 (16.96)
	3	91 (81.25)

Compatibility of real costs and INA-CBG's rates for schizophrenic patients at Tombulilato Hospital

P-ISSN: 2406-9388
E-ISSN: 2580-8303

Patients with schizophrenia receiving inpatient health services at the hospital were paid for using INA-CBG rates per patient per episode. Table 2 shows that for each patient treated at Tombulilato Hospital, based on all treatment classes and the severity of schizophrenia using statistical analysis of the Mann-Whitney test, the *p*-value for the overall data was 0.002 ($p<0.05$). This indicates a statistical difference between the real costs of the hospital and the INA-CBG rates. The average value of the hospital's real cost was Rp. 9,895,102 and the average INA-CBG rate was Rp. 14,820,778. A comparison between the average real costs and INA-CBG rates yielded a positive difference value. This result is different from the results of research (Sari, 2015), which shows that the cost comparison has a negative difference value of Rp.136,096,659 between INA-CBG's rates and the real costs. Also, the most influential cost component is accommodation. The difference in costs that occur in hospitals depends on the pattern of hospital rates; in Tombulilato Hospital, the hospital still refers to the 2011 regional regulations on general service levies, which are still relatively small in hospital service rates. Thus, there is still a positive difference in hospitals in the calculation of medical costs, which is achieved by directly determining the INA-CBG's rate policy in PMK 52 of 2016.

The analysis results in Table 3 show the difference between hospital real costs and INA-CBG rates, and most claims come from mild schizophrenia patients in treatment class 3 with the code INA-CBG's F-4-10-I. Treatment class 3 had the lowest premium. The treatment of mild schizophrenia (F-4-10-I) class 3 had the largest number of visits; that is, the average value of real costs was Rp. 9,854,982 and the average rate of INA-CBG was Rp. 15,722,630. Therefore, the difference in Rp was obtained. 5,867,648 with a value of $p = 0.001$ ($p<0.05$), whereas the lowest difference in schizophrenia treatment was in mild schizophrenia patients (F-4-10-I) with treatment class 1 was Rp. 288,850 ($p=1.00$). Statistically, there was no significant difference between the real costs incurred by hospitals and INA-CBG rates in mild schizophrenia patients in treatment class 1. This is because the number of patients in class 1 was only two. Overall, the difference in costs obtained based on the BPJS treatment class and severity of schizophrenia has a positive difference in value for hospitals. The results of the study indicated that the comparison of real costs and INA-CBG rates in hospitalized patients with hebephrenic schizophrenia showed positive results on the days of the acute and subchronic phases of hospitalization based on INA-CBG rates (Basirun *et al.*, 2013). Positive differences in real hospital costs with INA-CBG rates existed because the hospitals did not make cost adjustments based on standard disease management procedures with clinical pathways.

Table 2. Differences between actual costs and INA-CBG's rates of schizophrenic patients at Tombulilato General Hospital for the period of January 2020-December 2021 (n = 112)

Category	n	Average (Rp)	Total (Rp)	*P-value*
Real costs	112	9,895,102	1,108,251,500	<0.002
INA-CBG's		14,820,778	1,659,927,200	

Table 3. Compatibility of real costs with INA-CBG's rates schizophrenic patients at Tombulilato Hospital based on BPJS class and INA-CBG's code (n=112)

INA-CBG's Code		BPJS Class	n	Real Costs	INA-CBG's	Fee Difference	*P* Value
Code	Description			Average (Rp)	Average (Rp)	Average (Rp)	
F-4-10-I	Mild schizophrenia	Class 1	2	3,543,000	3,831,850	288,850	1.00
F-4-10-I	Mild schizophrenia	Class 2	19	10,780,184	12,392,531	1,612,347	0.826
F-4-10-I	Mild schizophrenia	Class 3	84	9,854,982	15,722,630	5,867,648	.001*
F-4-10-II	Moderate schizophrenia	Class 3	5	11,451,100	17,269,880	5,818,780	117
F-4-10-III	Severe schizophrenia	Class 3	2	3,998,500	4,877,550	879,050	0.439

Cost component

The real cost component of the Tombulilato Regional General Hospital includes laboratory,

P-ISSN: 2406-9388
E-ISSN: 2580-8303

radiology, blood transfusion, medicine, medical consumables, inpatient rooms, emergency department installations, general practitioner visits, specialist mental health services, nursing care, nutrition installation, and inpatient administration costs. The currency of the cost uses the Indonesian Rupiah (IDR) for 2020-2021. Based on Table 4, medical support costs such as laboratory costs, with an average value of Rp. 98,714 and the average radiology cost was Rp. 13,571, and the average blood transfusion cost was Rp.8,178, which was the smallest cost incurred by the hospital. In general, patients undergo laboratory examinations at the beginning of hospital admission to determine the presence or absence of other accompanying diseases, whereas radiology and blood transfusions are only performed on patients who experience secondary diagnostic complaints. The most significant component of the cost of medical personnel is a general practitioner, which has an average value of Rp.1,289,732, and the average cost of specialist mental health services is Rp. 180,535. This is because the frequency of specialist visits is only once a week; therefore, the general practitioner is fully responsible for the patient. The inpatient room is the first highest-cost component, with an average value of Rp. 3,397,723, these results were influenced by the duration of the patient's length of stay. Research (Cheng *et al.*, 2022) shows that unmarried status is a risk factor for patients to stay longer. This causes an increase in severity based on the calculation of special CMG rates. Schizophrenia is a disease with a top-up system in the INA-CBG's claims. If the length of stay increases, the ADL value in the who-DAS interviews will also affect financing. The average nutritional installation cost of Rp. 2,398,741, and an average medicine cost of Rp.1,748,950. The cost of medicines for schizophrenic patients at Tombulilato Hospital is managed through a prescription system based on the use of generic drugs that adhere to the national disease and formulary guidelines. However, several psychotic medicines are branded in patients' prescriptions and manufactured to meet the needs of patients and hospital budgets. An analysis of factors that affect the real costs of the hospital in this study using multiple linear regression tests on the length of the stay (p=0.000; β=0.975) and the severity of the disease (p=0.544; β=-0.018) revealed that severity had no significant effect on the real costs, whereas the length of stay did.

Overall, this study provides an overview of the cost burden of schizophrenic patients participating in BPJS Kesehatan in Indonesia, which is expected to be a consideration in the national health insurance scheme budget and hospital financing.

Table 4. Component Cost (n = 112)

Cost Component	Average±SD (Rp)
Laboratory	98,714.29±91,319.59
Radiology	13,571.43±35,744.52
Blood Transfusion	8,178.57±80,381.21
Pharmacy	
Medicine	1,748,950.89±965552.57
Medical Material Consumables	19,107.14±33,879.85
Inpatient Room	3,397,723.21±2,093,052.84
Emergency Installation	48,785.71±15,883.26
The cost of general practitioner visit	1,289,732.14±729,323.03
The cost of Psychiatry visit	180,535.71±103,190.88
Nursing care	661,294.64±395,962.06
Nutrition Installation	2,398,741.07±1,340,712.11
Inpatient Administration	25,000.00±0.00
Average total assets	9,895,325.80±5,924,611.92

The strength of this research is that it was first performed in Tombulilato Hospital on schizophrenic patients to determine the real costs of hospitals and compared to INA-CBG rates. Research limits result from real hospital costs, affecting the number of patients due to forced reentry, including 37 patients. Therefore, hospital INA-CBG claims at actual hospital costs differ from hospital discrepancies. This study can be used to conduct a cost analysis for the treatment of patients with schizophrenia.

CONCLUSION

The real cost of the hospital was lower at Rp. 9,895,102 (p = 0.002) for INA-CBG rates of Rp. 14,820,778. The highest real cost component of the hospital was an inpatient room (34.34%), and the factor that affected the real costs was the length of stay (p = 0.000). This study shows a positive difference in real costs and INA-CBG rates in inpatients with schizophrenia in BPJS Kesehatan at Tombulilato Hospital, so it is expected to be a picture of financing schizophrenia patients through a national health insurance scheme.

ACKNOWLEDGMENT

We thank the Ministry of Health of the Republic of Indonesia for the Implementation of Health Human Resources Learning Task Education 2021 for research funding 2022.

AUTHOR CONTRIBUTIONS

Conceptualization, O. M., A. R., Y. N.; Methodology, Y. N.; Software, A. R.; Validation, Y. N.; Formal Analysis, A. R.; Investigation, A. R.; Resources,

P-ISSN: 2406-9388
E-ISSN: 2580-8303

O. M.; Data Curation, O. M.; Writing - Original Draft, Y. N.; Writing - Review & Editing, Y. N.; Visualization, A. R.; Supervision, A. R.; Project Administration A. R.; Funding Acquisition, O. M.

FUNDING STATEMENT

This research did not receive any specific grant from funding agencies in the public, commercial, or not for profit sectors.

CONFLICT OF INTEREST

The authors declared no conflict of interest.

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P-ISSN: 2406-9388
E-ISSN: 2580-8303