The Usage Of Government Formulary For BPJS Inpatients With Ischemic Stroke In Indonesia

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Abstract.

Introduction: *Ischemic stroke patients tend to use some medicine. In National Health Security (JKN), the government has created a government formulary as quality control and cost control. The study aims to determine the percentage of government formulary in Hospitals and the affected factors.* ***Method:*** *It was cross sectional quantitative research. It used retrospective data from medical record and prescription of ischemic stroke inpatients from January to June 2019. The data collected include hospital characteristics, patient characteristics, supporting characteristics and treatment costs.* ***Result:*** *The data cames from 17 hospitals. Based on the inclusion and exclusion criteria, 257 medical records were analyzed. The average percentage of drug use was 73.22%. Its was influenced by the hospital class, the number of supporting examinations, the number of drug items. Type B and C hospitals used non government formulary. There were citicolin, mecobalamin, piracetam, neurotropic multivitamin, flunarizine.* ***Conclusion:*** *The average percentage of drug use was still less than 100%. There were still non government formulary drugs used for the therapy of inpatient ischemic stroke. The use of non government formulary drugs was influenced by the hospital class, the number of supporting examinations, the number of drug items.*

Keywords: *National health guarantee, hospitalization, hospital and ischemic stroke.*

I. INTRODUCTION

Ischemic stroke was defined as an episode of neurological dysfunction caused by cerebral, spinal, or retinal infarction by the American Heart Association in 2013.[1] The classification of ischemic stroke subtypes often used in research was the classification of Trial of ORG 10172 in Acute Stroke Treatment (TOAST), namely the atherosclerosis of large blood vessels, cardioembolics, lakunars, other causes, and unknown causes.[2,3] Complexity of clinical symptoms of stroke and drug use, varied patient response can increase the appearance of drug-related problems.[4,5,6]In the era of National Health Security (JKN), treatment of ischemic stroke is covered by BPJS (Social Security Agency). According to Minister of Health of the Republic of Indonesia Decree No. 129 of 2008, all prescriptions should adhere to the formulary with a standard of 100%.

Deviation from the formulary can impact the quality of hospital services, particularly within the Pharmaceutical Installation of Hospitals.Based on the Decision of the Director General Pharmacy and Medical Devices No. 1346 of 2014 concerning the Guidelines for the Implementation of the Government Formulary, it was stated that formulary was a selected list of drugs required and available in healthcare facilities as a reference for the implementation of JKN. The formulary serves as a reference for prescription writers, optimizes service to patients, facilitates planning and provision of drugs in healthcare facilities. Therefore, this article aims to determine the percentage of Government formulary drug utilization, factors influencing government formulary drug utilization, and non-government formulary drugs used in the treatment of inpatients with stroke in hospitals, as well as an analysis of the regulations regarding the use of government formulary drugs for BPJS patients.

II. METHODS

This study was a cross sectional quantitative research. The subjects of this research were inpatients with a primary diagnosis of non-hemorrhagic stroke (ICD 10 code: I63). Medical record data and prescriptions were collected retrospectively from patients who had completed treatment in January – June

2019. The subjects of this study were inpatients who have received treatment and were discharged in a healed condition. The collected data undergoes completeness and quality checks before further processing. During the research period, the collected data will be re-examined for completeness and accuracy. The complete data were consists of 257 medical records from 17 hospitals.

The hospitals were selected based on the regionalization of INA CBGs tariffs. Sampling of provinces was done by random sampling, with 2 provinces selected from each region. The selected sampling results were as follows:

- Regional 1: Banten, West Java
- Regional 2: Riau, Bali
- Regional 3: Aceh, South Sulawesi
- Regional 4: South Kalimantan, Central Kalimantan
- Regional 5: East Nusa Tenggara (NTT)

The characteristics of the selected hospitals were described in Table 1. The classes of hospitals were Class B and C hospitals. It is based on Minister of Health Regulation No. 56 of 2014 regarding the Classification and Licensing of Hospitals.

Tabel 1. Hospital Characteristic

No	Sample Characteristic	Sub Characteristic	Total	%
1	Hospital Type	B	10	58,82
		C	7	41,18
2	Hospital Ownership	Government	9	52,94
		Private	8	47,06

The independent variables in this research were hospital class, hospital ownership, gender, age, length of stay, number of medication items, number of diagnostic examinations, treatment costs and pharmacy costs. The dependent variable in this research was the percentage of utilization of national formulary drugs during hospitalization. The treatment costs in this study were direct medical costs calculated using a bottom-up approach, which include components such as administrative costs, accommodation costs, medical procedure costs, medical service costs, medical support costs, and drug and medical device costs. Descriptive analysis was used to describe the characteristics of hospitals (hospital class, hospital ownership), characteristics of inpatients (gender, age, length of stay), and supportive services (number of medication items, number of diagnostic examinations). Bivariate analysis was used to examine the differences in the percentage of national formulary drug utilization among inpatient stroke patients based on the characteristics of hospitals, inpatient patient characteristics, supportive services, treatment costs, and pharmacy costs. Complete data will be further analyzed. Statistical analysis will use bivariate analysis because we want to understand the relationship between two observed variables, such as the relationship between the percentage of national formulary drug utilization and hospital characteristics, among others. Due to the non-normal distribution of the data, non-parametric statistical analysis would be used.

III. RESULT AND DISCUSSION

After all the data has been collected, a completeness and suitability check of the data is carried out. The data that used as observations in the article came from 257 patients whose main diagnosis was ischemic stroke. The average percentage of government formulary drug use is 73.22%. More detailed data is presented in table 2.

Table 2. Precentage of Essential Drug

No	Sample Charateristics	Sub Charateristic	Total	% Esssential Drug		p Value	Metod
				Mean	SD		
Number of Patients Admitted to the Hospital							
1	Hospital type	B	200	74,58	± 12,03	**0,049**	**Mann Witney-Test**
		C	57	68,47	± 15,81		
2	Ownership	Government	172	74,81	± 11,86	**0,08**	
		Private	85	70	± 15,08		

Patient Characteristics							
3	Gender	Man	142	73,32	± 13,03	**0,32**	**Mann Witney-Test**
		Woman	115	73,1	± 13,41		
4	Age (mean : 60,14 years)	< 45 years	26	72,18	± 13,42	**0,554**	**Kruskal Wallis Test**
		45 – 60 years	114	73,95	± 13,28		
		> 60 years	117	72,74	± 13,1		
5	Length of Stay (mean : 6,24 days)	< 6 days	106	71,16	± 14,06	**0,25**	
		6 - 7 days	93	75,43	± 11,51		
		> 7 days	58	73,45	± 13,64		
Supporting Charateristics							
6	Number of Supporting Examinations (Mean: 1.80)	≤ 1	126	69,89	± 14,71	**0,008**	**Mann Witney Test**
		> 1	131	76,43	± 10,63		
7	Number of Medication Items (Mean 9.12)	< 7	48	66,81	± 18,06	**0,012**	**Kruskal Wallis Test**
		‘7 – 8	63	71,7	± 11,33		
		‘9 – 10	78	74,22	± 12,4		
		> 10	68	78,02	± 9,13		
Financing Charateristics							
8	Treatment Cost (mean : Rp. 4.854.305,45)	< Rp. 4.000.000,-	108	72,4137	± 14,23	0,971	**Kruskal Wallis Test**
		Rp. 4.000.000,- - Rp. 5.999.999,-	81	74,0897	± 12,73		
		≥ Rp. 6.000.000,-	68	73,4712	± 12,03		
9	Farmacy Cost (mean : Rp. 910.156,26)	< Rp. 500.000,-	94	71,7301	± 14,33	0,064	
		Rp. 500.000,- - Rp. 1.000.000,-	99	75,4074	± 11,93		
		≥ Rp. 1.000.000,-	64	72,0316	± 13,01		

Utilization Based on Characteristic

Source: Data on Rational Drug Use Research in 2019

Hospital Characteristics Vs National Formulary Drug Utilization

Our research found that the percentage of the utilization of essential drugs (government formulary) is significantly influenced by the type of hospital. Type B hospitals utilize essential drugs more extensively. This may be due to the fact that all samples of Type B hospitals are government hospitals. Based on our investigation, there have been no studies directly linking the percentage of essential drug utilization to hospital types. Another study found that costs tend to be higher in third level hospitals located in provinces. This may be an indication of an increased likelihood of severe and complex patients being managed in larger tertiary referral hospitals, and higher cost of human resources and infrastructure costs for hospitals in larger provinces.

However, educational hospitals have significantly lower costs, which may reflect educational activities and awareness to promote best practices, evidence-based guidelines, and clinical care pathways.[7] Another study stated that age, type of hospital, and the region where the hospital is located are associated with hospital costs. The results of regression analysis indicate a significant relationship between hospital costs and the type of hospital and the region where the hospital is located.[8] Another study states that although both hospitals offer the same level of service, differences in hospital characteristics affect costs.[9] The use of essential drugs (government formulary) is a form of quality control in hospital services.

Patient Characteristics Vs. Essential Drug Utilization

The majority of stroke patients in the research sample were male, with an average age of 60.14 years and an average length of stay of 6.24 days. Another study also stated that 53.5% of the patients were male and had an age range of 45 to 65 years.[4] Several previous studies also indicate that strokes most commonly occur in individuals aged over 50 years.[4,5,6] Our research found that the percentage of essential drug (government formulary) utilization is not influenced by gender, age, or length of stay. There hasn't been any specific study yet that directly associates the percentage of essential drug (government formulary) utilization in stroke patients with patient characteristics. The study on the use of non-essential drugs (non-government formulary) conducted by Zulfa et al. in 2019 stated that the utilization of non-government formulary drugs is very high, with the highest number of patients being treated in class 3 and an average Length of Stay (LOS) of 6.8 days.[10]

Supporting Characteristics Vs. Essential Drug Utilization

The Number of Supporting Examinations

Supporting examinations included EKG, ultrasound (USG), echocardiogram (Echo), MRI, CT scan, X-ray (Rontgent), and transcranial Doppler. The number of supporting examinations correlate significantly with the percentage of essential drug (government formulary) utilization. This might be due to the fact that the results of supporting examinations add to the number of essential drug (government formulary) items that need to be used. Another study correlates the number of supporting examinations with treatment costs.[11,12]

The Number of Medication Items

Our research found that the percentage of essential drug (government formulary) utilization is influenced by the number of medication items used by inpatient ischemic stroke patients. The more patients use medication, the more essential drugs (government formulary) are used. This may be due to the clinical condition of the patients and the number of diagnoses. The average number of drugs used during treatment is 9.12 items. The average percentage of essential drug (government formulary) utilization is 73.22%. This percentage is still below the total percentage of essential drug utilization, which is 94.23%.[13] and 91.7%[14]. Non-compliance with the formulary will affect the quality of hospital services, especially the quality of services in the Hospital Pharmacy Installation.[15]

Financing Characteristics Vs. Essential Drug Utilization

The treatment cost for ischemic stroke patients is Rp. 4,854,305.45, or equivalent to 323.62 USD (assuming the exchange rate: 1 USD = Rp. 15,000). The pharmaceutical cost (drug cost) for ischemic stroke patients is Rp. 910,156.26, or equivalent to 60.67 USD. These treatment costs are still much lower compared to other studies[16-17] The treatment cost and pharmaceutical cost do not significantly affect the percentage of essential drug (government formulary) utilization. This may because the percentage of government formulary usage is relatively high.The study conducted by Orathai et al. stated that stroke costs were influenced by patient characteristics, pathology, treatment, and phases of care, which should be considered in reimbursement system policies.[18] Another study states that treatment costs were not correlated with age or gender, but costs were higher for patients with poor clinical conditions upon admission who require intensive care.[16] The significant predictive factors for costs were Length of Stay (LOS), smoking, and medications for secondary prevention.

[19] Six variables that correlate with total medical costs were the total number of days stayed, disturbed consciousness, hypoalbuminemia in the acute ward, fever in the rehabilitation ward, hypokalemia in the rehabilitation ward, and hyponatremia in the rehabilitation ward, which significantly correlate with total medical costs. The total number of length of stay could significantly predict total medical costs.[20]. The patients analyzed had a primary diagnosis of ischemic stroke. The research data originated from medical records of patients in 17 hospitals. Based on the inclusion and exclusion criteria, 257 medical records were analyzed. The majority of patients are male. The average age was 60.14 years with an average length of hospital stay of 6.24 days. The average number of supporting examinations is 1.8, and the average number of medications used is 9.12 items. The average treatment cost is Rp. 4,854,305.45. The average drug cost is Rp. 910,156.26. The average percentage of essential drug (government formulary) utilization is 73.22%. The

percentage of essential drug (government formulary) utilization was influenced by hospital class, the number of supporting examinations, and the number of medication items.

Table 3. Non-Essential Drug Utilization and its Percentage in Hospitals Top of Form

No	Non-Essential Drug Names	Percentage	
		Hospital type B	Hispital type C
1	Citicoline	42,20	37,04
2	Mecobalamin	16,74	20,00
3	Piracetam	13,53	12,59
4	Neurotropic Multivitamin	13,30	3,70
5	Flunarizin	2,29	4,44
6	Other	11,93	22,22

Source: Rational Drug Use Research Data 2019

Hospitals of type B and C utilized non-essential drugs. There were similarities in the top five non-essential drug items used, namely citicoline, mecobalamin, piracetam, neurotropic multivitamin, and flunarizine. Citicoline was the most frequently used drug in both type B and C hospitals.

Use Of Non-Government Formulary Drugs In Hospital

The average percentage of national essential drug utilization in hospitalized ischemic stroke patients was 73.22%. The utilization of non-national essential drugs was 26.78%. Non-national essential drugs used include neuroprotectors (Piracetam and Citicoline), peripheral neuropathy (Mecobalamin), neurotropic vitamins (combination of Vitamin B1, B6, B12), migraine and vertigo (Flunarizine). In the national formulary (Government formulary), there are items for vitamin B1, B6, and B12 but in separate preparations. Other studies also indicate that the use of citicoline and piracetam as neuroprotectors remains quite high.[11,21,22] Other studies also indicate that the highest expenditure on neurotropic drugs (neuro-protectors) is Rp87,100,204 (78.52%).[10] Several studies in Indonesia mention that the use of Nootropics and Neurotropics such as Piracetam and Citicoline is considered quite effective in restoring neurological function in stroke patients.[23,24] However, in the guidelines issued by the American Heart Association (AHA)/ American Stroke Association (ASA) in 2011, there is no recommendation for the use of neuroprotectants in stroke patient therapy.[25] The use of drugs in hospitals, particularly non-evidence-based therapies such as neuroprotectants (e.g., edaravone, gang-liosides, etc.) and traditional Chinese medicine (TCM), can also contribute to the healthcare cost burden in China, with previous studies and national estimates revealing that more than half of the average inpatient costs consist of treatment expenses for ischemic stroke and intracerebral hemorrhage (ICH)..[26.27]

Medications that are not listed in the national formulary will be provided by the hospital pharmacy installation but with the approval of the hospital. If a prescribed medication is not listed in the national formulary, then it is beyond the responsibility of BPJS. Patients must incur additional costs to obtain medications that match the recommended dosage and duration of therapy. This will burden patients under the National Health Insurance (JKN) scheme because they have already paid their monthly premiums.[28] The implementation of clinical practice guidelines can help in standard care, thus reducing the use of non-evidence-based therapies and minimizing variation in Length of Stay (LOS) in acute stroke.[29] The formulary refers to a number of essential medications approved by medical expert staff. If used correctly, this can lead to better healthcare, improved drug management, and lower healthcare costs for most patients with the same disease.[30] The use of non-formulary drugs indicates that the national formulary (Government formulary) has not yet become the sole reference in prescribing by healthcare providers.

Review Of Regulation Regarding The Use Of National Formulary Drugs

In the framework of the national health insurance (JKN), the National Formulary is compiled, which is a list of selected drugs needed and must be available in healthcare facilities. This is in accordance with Minister of Health Regulation No. 523 of 2015. In accordance with Minister of Health Regulation No. 200 of 2020, the National Formulary (Government formulary) is a list of selected drugs used as a guideline in healthcare servicesThe main purpose of regulating drugs in the Government formulary is to improve the

quality of healthcare services by enhancing the effectiveness and efficiency of treatment, thus achieving rational drug useThere are several drugs used by inpatients but are not listed in the National Formulary because the doctors (hospital) base them on the Hospital Formulary. The compilation of the Hospital Formulary not only refers to the National Formulary but also refers to the Hospital Clinical Practice Guidelines and considers the results of drug utilization evaluations in the hospital. According to hospital accreditation standards, the Hospital Formulary refers to regulations and is based on the hospital's mission, patient needs, and the types of services provided.The use of drugs outside the national formulary requires patients to purchase these drugs because the administrative procedures for BPJS Health claims implementation use the INA-CBGs package system. This is in accordance with Minister of Health Regulation No. 76 of 2016, BPJS patients who are hospitalized are entitled to receive observation, care, diagnosis, treatment, rehabilitation, and/or other health services while occupying a bed.

Therefore, BPJS patients who are hospitalized are entitled to receive healthcare benefits at healthcare facilities that collaborate with BPJS Health; Ministry of Health of the Republic of Indonesia. Participant Service Guidelines for the National Health Insurance Card (JKN-KIS).The socialization of prescribing drugs from the national formulary has been conducted by the hospital to BPJS contract doctors, but some BPJS contract doctor teams, such as BPJS contract doctors, sometimes cannot attend the held socialization and seminars due to schedule incompatibility reasons. In the implementation stage of the guidelines and drug administration, there are still prescriptions that contain drugs outside the National Formulary (Government formulary). Furthermore, some doctors still issue two separate prescriptions, one containing Government formulary-listed drugs and another containing drugs not listed in the Government formulary, which must be purchased by the patients themselves.[31]The presence of non-Government formulary drugs serves as an indicator of non-compliance with the regulations established for prescribing BPJS patients with Government formulary drugs. Doctors, as prescription writers, often perceive that the National Formulary (Government formulary) hasn't covered all the drugs needed by patients. Consequently, they sometimes choose not to consult it and prefer products they are accustomed to using, even if they are not listed in the Government formulary. The strong promotion by medical representatives (medref) and bonuses given to doctors contribute to an increase in the number of non-PBI BPJS participants who purchase additional medications by paying for them.[31]

IV. CONCLUSION

The average percentage of Government formulary drug usage is 73.22%. The percentage of Government formulary drug usage is influenced by the hospital class, the number of supporting examinations, and the number of drug items. Type B and C hospitals use non-Government formulary drugs. There are similarities in the top five non-Government formulary drug items used, namely Citicoline, mecobalamin, piracetam, multivitamin neurotropic, flunarizine. Regulations regarding the use of Government formulary drugs for BPJS patients have been established, thus prescribing non-Government formulary drugs is a form of non-compliance. However, up to this point, there has been no sanction or enforcement of discipline against doctors as prescription writers.

V. SUGGESTION

The hospital needs to conduct periodic evaluations of BPJS contract doctors who prescribe medications. The hospital should create periodic reports on the results of these evaluations and submit them to the Supervisory Board, the Health Department, and the Ministry of Health. There should be regulations in place to impose strict sanctions if BPJS contract doctors continue to prescribe non-Government formulary medications.

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