JMPF Vol. 10 No. 2 : 137-144
ISSN-p : 2088-8139
ISSN-e : 2443-2946

Cost Analysis of Indonesia Case Based Groups (INA-CBGs) Tariff for Stroke Patients

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Submitted: 18-06-2019 *Revised: 13-10-2019* *Accepted: 17-06-2020*
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ABSTRACT

The INA-CBG's (Indonesia Case Based Groups) package rate implementation for National Health Insurance Program member since 1st January 2014 suffering from stroke has forced all hospitals in Indonesia to do a quality control and efficient service cost. Stroke, one of the catastrophic diseases often accompanied with some of its comorbid factors, requires high treatment cost. Thus, a cost analysis study is needed to prevent hospital loss. This study was aimed at determining the suitability of cost between the real cost of stroke therapy and the Indonesian Case-Based Groups (INA-CBG) rate according to the Ministry of Health Decree number 69 of 2013. This study was an observational study with a cross-sectional design. Data collection was done retrospectively. Study subjects were all that hospitalized strokes of patients who were members of the National Health Insurance and also met the inclusion and exclusion criteria registered between January to June 2014. The study data were in real direct medical costs analyzed for its suitability with the INA-CBG's rate. Descriptive statistical tests and t-tests were used to analyze the data. The results showed that the average real cost of the first-class hospitalization was higher than INA-CBG's rate for cerebral infarction and for unspecified stroke, with insignificant discrepancies. The average real cost of second class hospitalization was lower than INA-CBG's rate for cerebral infarction, otherwise the average cost was higher than INA-CBG's rate for unspecified stroke, with insignificant discrepancies. The average real cost of third class hospitalization was lower than INA-CBG's rate for cerebral infarction and for unspecified stroke, with significant discrepancies. Most of the average costs were higher than the INA-CBG rate. Thus, the hospital is not capable of managing a stroke of cost-based treatment on INA-CBGs. The hospital has suffered losses. INA-CBG's rate of stroke treatment needs to be evaluated.
Keywords: stroke; cost analysis; INA-CBG's

INTRODUCTION

Based on the data from WHO, there are 15 million populations getting stroke every year in the whole world, and the most death occurrences with age between 55 – 85 years old. In Indonesia, the death rate from stroke reaches 138,268 people or 9.70% of the total deaths that occurred. In 2013, there was an increase in the prevalence of stroke in Indonesia to 12.1 per 1,000 population.[1-3]

Stroke was the expensive disease as the patient often needs further treatment and long-term rehabilitation. This because a stroke generally causes physical and mental disability due to neurological damage as a result of cerebral blood flow due to occlusion or hemorrhage.[4-6]

One of the efforts that have been done by the Indonesian government in health budgeting is implementing national health insurance program through Jaminan Kesehatan Nasional (National Health Insurance) in 2014 based on Government Law number 40 of 2004 about the National Social Insurance System. The implementation of National Health insurance increase people's health dan productivity. However, the insurance challenge the hospitals in managing their budget).[7]

According to[8], the system of an implication of INA-CBG's in service system can push the hospitals to do quality control and cost control as well as efficient service to patients. INA-CBG's is the cost of health service paid by Badan Penyelenggara Jaminan Sosial (BPJS) Kesehatan as the one that manage National Health Insurance. The cost is not measured based on the variation or the amount of the service, but based on the group of diagnosis that has been determined. Therefore, there should be an analysis of

pharmacoeconomy to determine and decide the intervention of therapy that becomes the most appropriate one if it is considered from the aspect of economy, clinical, and humanity.

Existing evidence related to the real cost of ischemic stroke in Indonesia is still inconsistent. The previous research was done by comparing the amount of real cost of stroke a public hospital in Yogyakarta with the rate of INA-CBG's showing that real cost of the hospitals was bigger the rate of insurance claim of INA-CBG's.[9] On the other hand, the other research done in a central public hospital in Yogyakarta showed that the real cost of ischemic stroke patients was uitable to the rate of INA-DRG's (Indonesia Diagnostic Related Groups).[10]

The objectives of the study were to determine the difference cost between the real cost of stroke therapy and the health cost based on INA-CBGs rate according to the Ministry of Health Decree number 69 of 2013. This study will potentially contribute to evaluating the application of INA-CBG's rate in Indonesia.

METHODS

Study design

This cross-sectional observational study used a retrospective sampling method. The subject was taken from the hospital medical record of all stroke patients at a type B private hospital in Yogyakarta. The patients were hospitalized on January-June 2014 and met with the inclusion criteria. The inclusion criteria of the study were diagnosed acute stroke patients, male or female, became the members of National Health Insurance with the following codes I619 for intra-cerebral haemorrhage, or I639 for cerebral infarction, or I64 for not specific strokes between haemorrhagic strokes and stroke infarction, and with clinical diagnosis of stroke caused neurologic deficits and classified in the same diagnosis. The exclusion criteria were return to discharge with deceased status or discharge with no physician consent. The subject thenwas classified using INA-CBGs. Patient's length of stay and direct medical costs were defined as a study variable.

Data collection

Demography characteristic was obtained from the hospital medical record. Additional demographic data that include a length of stay during hospitalization (date and time of admission and discharged), date and time of stroke onset, stroke risk factors, previous medication, nursing record, and laboratory results were recorded in case report form. Stroke treatment cost tracing was based on patient medical record. Cost of medications and medical types of equipment were traced from hospital pharmaceutical department, while medical procedure cost, nursing cost, additional examination cost (laboratory, physiotherapy, and nutrition), administration cost, and hospitalization cost were traced from finance and administration department.

Statistical analysis

Data collected from the patient medical record and from patient treatment cost tracing were analyzed. Treatment cost suitability analysis of INA-CBGs-based stroke treatment cost was conducted by comparing analytical treatment cost with regional 1 INA-CBGs tariff according to the Ministry of Health Decree number 69 of 2013.

Data analysis with t-test was done for the continuous variable that has been processed in descriptive analysis. This analysis will then used to seek significant cost discrepancy between real stroke treatment and INA-CBGs-based.

RESULT AND DISCUSSION

During January – June 2014 there were 49 stroke patients at a private hospital in Yogyakarta who fulfilled the inclusion criteria. There were 2 patients with code I619 (Intra-cerebral Hemorrhage = ICH), 20 patients with code I639 (Cerebral Infarction = CI), and 27 patients with code I64 (Unspecified Stroke = US). Stroke patient characteristic can be seen in table I as below.

Stroke patient characteristic on table I showed that most of the stroke patient with diagnosis ICH, CI, and US were aged above 55.

Table I. Stroke Patient Characteristic

Characteristics	ICH		CI		US	
	(n=2)	%	(n=20)	%	(n=27)	%
Sex						
Male	1	50	14	70	19	70
Female	1	50	6	30	8	30
Age						
≤ 55 years	0	0	7	35	9	33
> 55 years	2	100	13	65	18	67

Notes: ICH: Intra-cerebral Hemorrhage (with code I619); CI: Cerebral Infarction (with code I639); US: Unspecified Stroke (with code I64)

Table II. Correlation Between Real Cost and INA-CBGs's Rate

Class	Diagnostic Code	INA-CBG's Code	Real Cost (IDR)		INA-CBG's Rate (IDR)	Sig. (p<0,05)
			Mean	SD	Mean	
I	I639	G-4-14-I	6,175,260	3,641,107	5,158,795	0.566
	164	G-4-15-I	10,260,320	7,107,732	4,021,093	0.121
	164	G-4-15-II	7,692,475	2,339,329	4,799,193	0.090
	164	G-4-15-III	11,318,550	9,457,199	6,851,464	0.625
II	I639	G-4-14-II	5,770,350	1,308,501	7,996,295	0.180
	I64	G-4-15-II	6,095,950	3,114,451	4,113,594	0.655
	I619	G-4-13-I	4,074,000	-	2,705,047	-
III	I639	G-4-14-I	1,881,600	454,952	3,684,853	0.180
	I639	**G-4-14-II**	**1,593,262**	**666,908**	**6,663,579**	**0.000**
	I64	G-4-15-I	2,817,880	1,240,742	2,872,209	0.500
	I64	**G-4-15-II**	**2,211,500**	**1,223,001**	**3,427,995**	**0.026**

It might be due to the risk of stroke will increase 2 times after age 55.[11] At the elderly group, the risk of hypertension increases because the blood vessels become more rigid and less elastic.[12] whereas the hypertension is the most important risk factor of stroke.[13,14] This study showed that male has higher stroke prevalence than female (70% and 30%). The men have a higher risk to get a stroke compared to women in the same age.[4] It is caused by women's hormones that have protective roles toward the diseases related to blood artery.[15] Furthermore, men also have a higher potential to get a stroke because of their lifestyle like smoking, staying up to work, and a high rate of stress.[16]

The amount of INA-CBGs costs decided by the government varies for each INA-CBGs coding and is affected by the disease severity. While INA-CBGs code is determined by the primary diagnosis code, secondary diagnosis code, and medical procedures.[17-19] The correlation between real cost and rate INA-CBGs can be seen in Table II as below. One sample t-test was used for this study to find any significant discrepancy between real stroke treatment cost and the amount of INA-CBGs cost when data was distributed normally.

As seen on table II, the amount of real stroke treatment cost at a private hospital in Yogyakarta for diagnosis code of I639 and I64

Table III. Details of Direct Medical Cost Stroke Treatment for Unspecified Stroke (I64)

Cost Variable (IDR)	1st class hospitalization				2nd class hospitalization			
	≤ 7 Days*		>7 Days*		≤ 7 Days*		>7 Days*	
	Mean	%**	Mean	%**	Mean	%**	Mean	%**
Visit fee	614,000 ± 189,156	11.35	1,517,833 ± 1,517,833	11.73	607,500 ± 357,088	9.9	435,000	11.2
Electro medic & Radio diagnostic	409,540 ± 326,971	7.57	1,333,860 ± 1,137,581	10.31	714,800 ± 42,426	11.7	480,000	12.3
Laboratory analysis	763,660 ± 1,172,636	14.11	906,133 ± 1,059,161	7.00	628,500 ± 3,535	10.3	73,000	1.9
Rehabilitation medic	409,540 ± 81,309	1.38	223,666 ± 195,535	1.73	89,000 ± 12,727	1.5	0	0
Nursing	72,000 ± 18,096	1.33	117,166 ± 82,176	0.91	101,500 ± 19,091	1.7	68,000	1.7
Medicine, medical equipment	**2,119,520 ± 1,170,054**	**39.17**	**5,829,066 ± 2,916,314**	**45.04**	**2,575,750 ± 2,002,597**	**42**	**1,626,100**	**41.8**
Room	**1,272,400 ± 635,182**	**23.51**	**2,907,500 ± 1,378,324**	**22.47**	**1,332,500 ± 696,500**	**21.7**	**1,120,000**	**28.8**
Administration	85,640 ± 20,526	1.58	106,573 ± 22,847	0.82	78,050 ± 19,021	1.3	91,600	2.4
Total	5,411,560	100	12,941,797	100	6,127,600	100	3,893,700	100

Cost Variable (IDR)	3rd class hospitalization			
	≤ 5 Days*		>5 Days*	
	Mean	%**	Mean	%**
Visit fee	272,500 ± 96,393	19.8	702,833 ± 277929	24.0
Electro medic & Radio diagnostic	380,450 ± 189,628	27.7	437,044 ± 281,118	15.0
Laboratory analysis	153,000 ± 71,498	11.1	266,011 ± 173,553	9.1
Rehabilitation medic	10,000 ± 20,000	0.7	75,555 ± 67,659	2.6
Nursing	25,500 ± 16,114	1.9	70,277 ± 33,155	2.4
Medicine, medical equipment	**270,050 ± 222,917**	**19.6**	**859,333 ± 749,244**	**29.4**
Room	**187,500 ± 43,301**	**13.6**	**433,333 ± 97,628**	**14.8**
Administration	76,275 ± 1,517	5.5	75,644 ± 4,179	2.6
Total	1,375,275	100	2,920,030	100

Keterangan: *Average LOS; **The percentage of cost variable

Table IV. Stroke Comorbid Factors

Comorbid Factors	ICH		CI		US	
	(n=2)	%	(n=20)	%	(n= 27)	%
Hypertension	2	100	14	70	15	56
Diabetes Mellitus	0	0	4	20	6	22
Dyslipidemia	0	0	2	10	3	11
Others	0	0	0	0	3	11

in 1st class hospitalization were averagely higher than the amount of INA-CBGs cost for the same diagnosis code and the same class. In 2nd class hospitalization, the amount of real stroke treatment cost for diagnosis code of I639 were averagely lower than the amount of INA-CBGs cost, while it was higher for diagnosis code of I64 for real stroke treatment. In 3rd class hospitalization, the amount of real stroke treatment cost for diagnosis code of I619 were higher than the amount of INA-CBGs while it was lower for diagnosis code of I639 and I64 for real stroke treatment cost. Moreover, one sample t-test analysis for 1st class hospitalization with diagnose code I639 and I64 the p value was >0.05, 2nd class hospitalization with diagnose code I639 and I64 the p value was >0.05, and 3rd class hospitalization with diagnose code I639 (G-4-14-I) and I64 (G-4-15-I) the p value was >0.05. That meant there was an insignificant discrepancies between real stroke treatment cost and the corresponding INA-CBG's cost. In the other side one Sample t-test analysis for 3rd class hospitalization with diagnose code I639 (G-4-14-II) and I64 (G-4-15-II) the p value was < 0.05, that meant there was a significant discrepancies between real stroke treatment cost and the corresponding INA-CBG's cost. According to the aforementioned analysis it was concluded that the hospital was adequately capable of doing rate management determined by INA-CBGs. By doing so, the hospital did not have to bear too many cost deficits.[10]

Details of the average treatment cost of stroke patients consisted of direct medical costs as seen in Table III. The greatest components of stroke treatment cost from all the diagnostic codes and all class for direct medical cost were medicine and medical equipment cost (IDR 859,333 to 5,829,066) and room cost (IDR 150,000 to 2,907,500). The costs of medicine, medical equipment and room were affected by the accuracy of diagnosis, treatment selection, and stroke comorbidities factors. Those factors then will directly affect the patient's length of stay and treatment cost.[9,20-22] Another studies have concluded that the length of stay for ischemic stroke patient in a Central Hospital in Yogyakarta was affected by stroke severity.[9] The difference in length of stay of general disease was affected by the disease severity and comorbid factors such as myocardial infarction and congestive heart failure.[21,23-25] Some factors that might length the hospitalization of acute ischemic stroke patients were diabetes mellitus, atrial fibrillation, type of stroke, stroke treatment, and stroke relapse.[20]

The stroke therapy costs for all diagnose codes at a private hospital in Yogyakarta are not only affected by the type and number of drugs used but also affected by other additional medications to treat the stroke comorbid factors. The more type of drugs used for stroke treatment the higher the treatment cost should be. Moreover, the more comorbid factors the higher the treatment cost should be as well.[9,20-22] Stroke comorbid factors at a private hospital in Yogyakarta can be seen on the table IV as below.

As seen on table IV, the most common comorbid factor in stroke, in diagnosis ICH, CI, and US was hypertension (100%, 70%, and 56%). It was consistent with the theory stating hypertension were the most common comorbid factors in ischemic stroke as well as

Table V. The Difference Between Total Real Cost and INA-CBG's Rate

Class Hospitalization	Total Real Cost (IDR)	Total INA-CBG's Rate (IDR)	Losses/Profits (IDR)
1st	158,898,100	99,793,458	(-) 59,104,642
2nd	39,473,500	36,590,723	(-) 2,882,777
3rd	52,364,700	105,168,390	(+) 52,803,690
	Total Losses		**(-) 9,183,729**

in hemorrhagic stroke.[4,9,24,26]

Hypertension might cause intracranial vessel rupture or become the stenotic. The ruptured vessel will cause intracranial hemorrhage, but when the vessels become the stenotic it might disturb intracranial blood flow and, eventually, brain cellular death. Moreover, the rise in blood pressure might faster the plaque formation process, endothelial layer damage, and finally, the plaque would be prone to rupture and causes thrombus. Thrombus then will occlude blood vessel locally, or become embolic in the bloodstream into cerebrovascular system.[12]

As seen on table V there are some losses need to be covered by a private hospital in Yogyakarta during 6 months of the study (January 2014 – June 2014) for all stroke diagnosis code and severity for 1st and 2nd class hospitalization as much as IDR 59,104,642 and IDR 2,882,777. Otherwise, there are some profits for 3rd class hospitalization.

Table V showed hospital losses. The losses were anticipated if they were known and solutions were known before. One of the possible causes of being branded medicine prescribing that might be substituted with generic medicine even though some of the prescribing already used generic medicine.[9] The determined of INA-CBGs code is very depended with the diagnosis code reported by hospital coding officers. Thus diagnosis writing accuracy and medical procedure writing completeness became the primary factors due to the discrepancy of INA-CBGs code.[9,17,19,27] This rate difference became the main problem in the coding process. Hospital management has to socialize to doctors regarding the coding process and the correct and detailed diagnosis of writing that might cause inaccurate rate deciding. Thus, solving this problem is a step to prevent hospital losses.

Based on the above discussion, there are some important factors National Health Insurance rates effective: the accuracy of diagnosis, treatment decisions and nursing care for the stroke treatment and also its comorbid factors. They are also important issues to avoid the hospital's financial loss. Hospital management is expected to be important issues for their medical staff and paramedics to reach the same level of understanding and commitment in the medical team.

It is important to note the limitation of our study. Our sample size was relatively small and the data was based on a type B private hospital in Yogyakarta that use INA-CBGs tariff for regional 1. Further studies should be conducted using the larger sample, involved many type private and public hospitals in other regional that might represent Indonesia's data.

CONCLUSION

Most of the average real costs were higher than INA-CBG's rate. Thus, the hospital was not capable of managing stroke treatment cost based on INA-CBGs. The hospital has suffered losses. INA-CBG's rate of stroke treatment needs to be evaluated.

ACKNOWLEDGMENT

This research is supported by Universitas Muhammadiyah Yogyakarta.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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