

Factors Affecting the Variation in Billing Ischemic Stroke Hospitalization in Indonesia

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Abstract— Background: Stroke is a disease with the highest mortality rate and high treatment billing disease in Indonesia. The prevalence of ischemic stroke (IS) is the greatest among all types of stroke where the incidence is 85% of the total stroke [9]. In general, the purpose of this study was to understand the variation in billing in ischemic stroke inpatient services based on the determinant factors that influence it. **Methods:** The study design was a Non-Experimental Research Design with retrospective data from October to December 2019 and the unit of analysis was ischemic stroke patients who were treated at the National Brain Center Hospital (RS PON) Prof. Dr. dr. Mahar Mardjono Jakarta. Analysis is used to see the determinant factors that influence the variation in billing strokes. **Results:** The results of the study are expected to get an overview of billing variations influenced by the determinant factors observed, namely age, length of treatment (days), NIHSS score, comorbid (hypertension, tryglicerid and LDL), give positive contribution. While gender, speed of getting treatment after attack (hours), comorbid (diabetes, total cholesterol, HDL) are giving negative contribution. **Conclusion:** After descriptive analysis shows that hypertension, fasting glucose, LDL, length of stay and NIHSS score have an influence on total billing. However, after regression analysis showed that length of stay and NIHSS score were the variables that most influenced the variation in total ischemic stroke billing.

Keywords: stroke, ischemic stroke, total billing

Introduction

Stroke is a disease that highest rank causes of death in the world, as well as in Indonesia, this is supported by data from the Institute for Health Metrics and Evaluation (IHME) where in Indonesia it shows that it is a disease that disease of causes the highest death and growth in the number of deaths due to stroke from 2009 to 2019 was 25.9% [12]. Stroke is a non-communicable disease with an ever-increasing prevalence, as well as based on Riskesdas (Basic Health Research) data stroke in Indonesia showing an increasing prevalence where in 2013 the prevalence of stroke was 7‰, while in 2018 the prevalence was 10.9‰. [20]. In China there are around 7 million people suffering from stroke, and of which 2 million are newly detected sufferers, and those who are detected as dead are 20% of the total mortality index in China. [23]. It is estimated that the worldwide prevalence of stroke is 0.2% of the world population. Of the people who suffer from a stroke, 30% die, 30% are left functionally disabled and 40% have a successful recovery with minor to no disabilities [28].

Stroke is a disease with high medical costs in Indonesia and stroke is 3rd ranked for a disease that spends the most health budget in the National Health Insurance (JKN) program, and has increased significantly in the last 3 years [15]. Meanwhile, for out-of-pocket financing, the amount of costs incurred in Indonesia is not known. Stroke is one of the diseases with a high cost of these three things in Indonesia which is borne by BPJS Health where in 3 years the

increase in costs borne by BPJS Health is very high 2016 the total cost due to stroke is US \$ 0,1 billion, 2017 US \$ 0,16 billion and 2018 US \$ 0,19 billion [15]. Stroke is a disease with high and increasing costs, this is as noted from various countries such as America in 2008, the direct cost of stroke treatment is estimated at US \$ 18.8 billion, with an estimated average cost for ischemic stroke is US \$ 18,963 – US \$ 21,454/patient [26]. In China in 2003 the government spent RMB 1.17 billion in hospital treatment of stroke, while in 2009 it was RMB 8.19 billion (CAGR+117%) and 2011 it was RMB 40 billion (10x increase) [16]

There are two main types of strokes that contribute to the greatest incidence of stroke, namely: ischemic stroke, which accounts for 85%, and is caused by impaired blood supply due to narrowing. or blockage of the circulatory system to the brain, and hemorrhagic stroke, which accounts for about 15% of strokes and due to blood loss in the brain due to arteriolar hypertension resulting in neurological damage [9]. Whereas in Indonesia, based on BPJS Kesehatan sample data, ischemic stroke has the highest treated compared to other types of strokes, ischemic stroke is handled by 93.5%, while hemorrhagic stroke is 4.3% and Transient Ischemic Attack (TIA) is 2.1%. [7]

Table 1. Number of visited/treated stroke based on ICD 10 code

ICD 10 Identified for Stroke	Classified	# Treated	% Proportion
G45 Transient cerebral ischaemic attacks and related syndromes	Transient Ischemic Attack (TIA)	816	2,1%
I60 Subarachnoid haemorrhage	Hemorrhagic Stroke	248	0,6%
I61 Intracerebral haemorrhage	Hemorrhagic Stroke	1.369	3,5%
I62 Other nontraumatic intracranial haemorrhage	Hemorrhagic Stroke	88	0,2%
I63 Cerebral infarction	Ischemic Stroke	13.158	34,0%
I64 Stroke, not specified as haemorrhage	Ischemic Stroke	23.045	59,5%
Total Stroke		38.724	100,0%

Source : Data Sample BPJS Kesehatan 2015-2020

Several factors are thought to be the cause of variations in stroke treatment costs including gender, age, speed of treatment after an attack, comorbidities in this case mostly with hypertension, dyslipidemia and diabetes, length of stay in hospital, level of severity, and CV risk. [30,13] Knowing the influencing factors will be able to help the government determine public health programs to reduce/minimize the risk of disability and mortality.

Material and methods

1.1. Material

This study conducted an analysis based on a database from the National Brain Center Hospital in Jakarta with data collection in October-December 2019, with a total sample of 105 inpatients with a diagnosis of ischemic stroke. The consideration for data collection in the Q4 2019 period was to exclude the influence of the Covid 19 case. Data sample from National Brain Centre Hospital was putting randomly and put 105 sample based on Slovin sample formula. The sample was patient with membership of National Health Insurance or Jaminan Kesehatan Nasional (JKN). In addition, to carry out a comparative analysis using the 2015-2020 BPJS Kesehatan sample data with a sample of 7,110 ischemic stroke patients from a total sample of 2,200,960 patients with complaints of all diseases. Data sample BPJS Kesehatan was stratified random sampling based on municipalities and smallest unit is individua in family group.

1.2. Methods

The study design was a Non-Experimental Research Design with retrospective data from October to December 2019 and the unit of analysis was ischemic stroke patients who were treated at the National Brain Center Hospital (RS PON) Prof. Dr. dr. Mahar Mardjono Jakarta after applying the inclusion and exclusion criteria. The research method is a quantitative cross sectional study design and statistical data analysis of descriptive analysis and regression analysis. The data sample taken from National Brain Centre database. The descriptive analysis to get clear picture of data that we have. While for regression analysis to see relationship among dependent variable which is total billing with other determinant variable such as gender, age, comorbid, the length of treatment after the attack and NIHSS score.

Discussion

Stroke is a non-communicable disease as one of the diseases that causes the highest mortality in the world and Indonesia. In this study, we will look at the factors that are suspected as the cause of variations in the magnitude of the billing of treating various strokes, including gender, age, class of national health insurance, speed of treatment after an attack, co-morbid in this case mostly cases hypertension, dyslipidemia, and diabetes, the severity in this case is seen from the NIHSS score (National Institute of Health Stroke Scale), length of stay in hospital.

Table 2. Determinant Factors Impacted to Cost of Treatment

Age Group	# of Patients				Average Billing(US\$)		
	Male	Female	Total	%	Male	Female	Total
Total	70	35	105	100,0%	1.012,5	923,7	982,9
<=40 years old	4		4	3,8%	692,8	-	692,8
41-50 years old	14	7	21	20,0%	934,7	997,6	955,7
51-60 years old	28	11	39	37,1%	872,2	811,5	855,0
61-70 years old	15	11	26	24,8%	1.466,5	919,0	1.234,9

>70 years old	9	6	15	14,3%	955,3	1.051,9	993,9
Length of Stay (days)							
1-3 days	7	1	8	7,6%	707,4	624,0	697,0
4-5 days	32	17	49	46,7%	735,0	868,4	781,3
7-9 days	28	13	41	39,0%	1.103,9	970,1	1.061,4
>=10 days	3	4	7	6,7%	3.830,6	1.082,9	2.260,5
The length of treatment after the attack							
<3 hours	9	5	14	13,3%	1.621,9	942,7	1.379,3
3-4.5 hours	12	8	20	19,0%	1.375,3	951,1	1.205,6
4.5-6 hours	8	5	13	12,4%	674,1	1.151,3	857,6
6-10 hours	7	2	9	8,6%	1.066,0	735,2	992,5
>10 hours	34	15	49	46,7%	791,7	852,1	810,2
Hypertension (mmHg)							
Normal (Sys <120 and Dias <80)	6	1	7	6,7%	709,4	744,1	714,4
Pre-Hypertension (Sys : 120-139 or Dias : 80-89)	17	6	23	21,9%	1.023,9	801,2	965,8
Hypertension Level 1 (Sys : 140-159 or Dias : 90-99)	22	17	39	37,1%	1.069,8	894,8	993,5
Hypertension Level 2 (Sys >160 or Dias >100)	24	11	35	33,3%	1.051,6	1.051,5	1.051,6
Isolated Systolic Hypertension (Sys >140 and Dias <90)	1		1	1,0%	434,9	-	434,9
Rapid Glucose							
Normal (<140 mg/dL)	32	21	53	50,5%	968,2	967,1	967,8
Pre-diabetes (140-199 mg/dL)	17	6	23	21,9%	1.180,4	997,3	1.132,6
Diabetes (>200 mg/dL)	21	8	29	27,6%	944,0	754,7	891,7
Fasting Glucose							
Normal (<100 mg/dL)	13	11	24	22,9%	675,4	947,5	800,1
Pre-diabetes (100-125 mg/dL)	25	10	35	33,3%	1.023,7	931,1	997,2
Diabetes (≥126 mg/dL)	32	14	46	43,8%	1.140,6	899,8	1.067,3
Total Cholesterol							
Optimal (<200 mg/dL)	35	16	51	48,6%	1.075,3	891,8	1.017,7
Desirable (200-239 mg/dL)	19	9	28	26,7%	994,5	1.024,4	1.004,1
High (≥240 mg/dL)	16	10	26	24,8%	896,2	884,3	891,6
LDL Score							
Optimal (<100 mg/dL)	5	4	9	8,6%	760,1	1.024,0	877,4
Near Optimal (100-129 mg/dL)	17	10	27	25,7%	904,8	918,9	910,0
Desirable (130-159 mg/dL)	23	9	32	30,5%	1.124,4	997,8	1.088,8
High (160-189 mg/dL)	14	6	20	19,0%	1.113,5	841,9	1.032,0
Very High (≥190 mg/dL)	11	6	17	16,2%	930,9	835,5	897,2
HDL Score							
Low (<40 mg/dL)	39	11	50	47,6%	1.006,8	933,7	990,7
Optimal (40-59 mg/dL)	28	21	49	46,7%	1.064,2	890,6	989,8
High (≥60 mg/dL)	3	3	6	5,7%	603,0	1.119,3	861,2
Tryglicerid							
Optimal (<150 mg/dL)	48	23	71	67,6%	1.046,2	939,3	1.011,6
Desirable (150-199 mg/dL)	8	5	13	12,4%	832,4	1.169,8	962,1

High (200-499 mg/dL)	12	7	19	18,1%	946,9	697,0	854,8
Very High (≥ 500 mg/dL)	2		2	1,9%	1.316,0	-	1.316,0
NIHSS Score							
Mild (0-6)	50	20	70	66,7%	870,6	777,5	844,0
Moderate (7-15)	10	7	17	16,2%	826,7	1.075,3	929,1
Severe (>16)	10	8	18	17,1%	1.907,5	1.156,5	1.573,7

Source :National Brain Centre Hospital data Q4 2019. US\$ exchange rate is based average foreign exchange rate Bank of Indonesia (12 December 2022), which US\$ 1 = IDR 15.587.

1.3.Gender

Gender also indicates that male patients suffer more strokes, as seen in the incidence of stroke in Singapore showing 55.4% of sufferers are men [18]. Likewise in Spain it shows 56.7% of sufferers are men [3], and in Japan it shows 61% [29], while in Taiwan it shows 58% are men [17], as well as in Denmark it shows men suffer more strokes (60%) than women [24], in contrast to the UK where more women suffer strokes than men (52%) [11].

The prevalence of ischemic stroke is more common in male patients than female patients were out of 105 samples, the number of male patients is 70 ischemic stroke patients, while there are 35 female patients. However, it shows that there is no significant difference in the total cost of hospitalization between male and female patients, where the average cost for ischemic stroke treatment is average US\$ 982,9 for male and female US\$ 1.012,5 for male and US\$ 923,7 for female. It because the treatment for stroke ischemic between male and female are the same.

1.4.Ages

The EDISE study showed that 56% of stroke survivors in the Netherlands were aged 75 years and over [25]. This suggests that stroke generally strikes in old age with various comorbid chronic diseases.

The incidence of stroke increases with age, and we know that many researchers have conducted studies of the health and economic burden of this disease among people aged 65 years and over [26]. But another study in the United States showed that the average age of stroke survivors was 69.7 years [19]. Meanwhile, in Singapore, the average age of stroke sufferers is 65.8 years and 55.4% are men [18]. Whereas in Japan the average age is 70 years [29]. And in Taiwan the average age is 64.9 years [17]. In England, the average age of ischemic stroke patients is 73.2 years [11]. Research in Germany shows that age influences the risk of dependency on care that cannot be explained by disease burden. Thus, there must be underlying age-dependent factors that explain the remaining age effect [22].

In its development, stroke is not only experienced by old age, but it turns out that many young people have experienced it, this can be seen from 105 samples 3.8% (4) aged under 40 years have experienced it, especially male patients, while female patients have not experienced it. Approximately 39% of ischemic stroke patients are elderly patients (60 years and over). For male patients, ischemic stroke occurs evenly in all age groups, whereas in women it mostly occurs at an advanced age (48%).

Meanwhile, billing that occurs on average shows that younger age has lower billing, even so there is no significant difference in various age groups except at the age of 61-70 years for men showing bigger billing. It is possible that there are more co-morbidities and severe severity in elderly patients. In this case, gender does not differentiate billing in each age group. At a young age (<40 years) the average billing for ischemic stroke care is US\$ 692.8. Meanwhile, men aged 61-70 years showed the highest average billing of US\$ 1,466.5. Men aged 61-70 years experienced many comorbidities, especially hypertension, which causes a long length of stay. In the same age range for women, the average billing is US\$ 919. In this age range, the difference in billing is significantly different between men and women. Whereas the other age groups have the same average maintenance billing.

1.5.Length of Stay

In Australia the average length of ischemic stroke stay in hospital was 8 days with a Clinical Facilitator in 2011 [5], and decreased by 22% after using a Clinical Facilitator. Whereas in France, the average length of stay in ischemic stroke patients was 12.5 days with 8.5 days being treated in a stroke unit [21]. In the Netherlands, demonstrating higher pre-hospital costs for centralized systems is offset by reduced length of hospital stay and avoidance of institutional care after discharge due to improved patient health [8]. In contrast to America, it shows that younger patients stay in the hospital longer than older patients in 2002-2017 [23]. In Malaysia the average day of hospitalization was 9.8 days, and 3 months after an acute attack the average was treated twice by specialists in an outpatient clinic [2]. In Greece the average stroke patient was hospitalized for 12.3 days [14].

The length of stay in this study showed that 47% of patients were treated within 4-5 days, this is in accordance with the clinical pathway owned by the National Brain Center Hospital. Whereas 8% of patients can be treated faster from clinical pathways. But there are 7% of patients who need treatment for more than 10 days, causing a significant increase in billing. Data shows length of stay is not affected by gender differences.

While maintenance billing shows that, the longer it is treated, the greater the billing. In the length of stay of 1-3 days, the average billing required is US\$ 697; while the length of stay 4-5 days is US\$ 781.3; length of stay 7-9 days is US\$ 1,061.4 and billing for more than 10 days costs an average of US\$ 2,260.5. There are many factors that cause the length of treatment, for example the number of comorbidities and severity, severity, and so on.

1.6.Speed of Treatment After Attack

Stroke disease in the speed of stroke treatment after an attack is the main key to avoiding disability [4]. And the time interval for treatment determines the type of medical services that can be performed. In Taiwan, for ischemic stroke patients treated for less than 4.5 hours showed a low level of disability (mRS 0-2) [10].

The speed of stroke treatment after an attack in this study showed that 44.8% of patients could be treated under 6 hours after their stroke. With this speed, the severity that occurs can be minimized, so that the possibility of disability or mortality can be avoided. But what is concerning is that there are still 46.7% of patients who are treated more than 10 hours after

the attack, this is possible because of the lack of knowledge from the patient's family about the signs of stroke.

In this study the speed of handling does not affect the average amount of billing that occurs. However, in patients with a treatment speed of under 3 hours, male patients have a greater average billing that occurs and is significantly different from female patients. Where in male patients the average billing was US\$ 1,621.9 per patient and US\$ 942.7 for women. However, at a treatment speed of 4.5-6 hours, female patients have a larger average billing where for the classification of treatment speed after an attack of 4.5-6 hours for women is US\$ 1,151.3 and for men it is US\$ 674.1. Billing variations here are strongly influenced by other determinant factors.

1.7.Comorbid

Co-morbidities commonly experienced by stroke patients are chronic diseases including diabetes, hypertension, heart failure, pneumonia, kidney failure and other chronic diseases, and are generally suffered by elderly patients. In ischemic stroke patients, hyperglycemia in the acute phase may reflect stress, underlying impaired glucose tolerance, or unrecognized diabetes mellitus. Higher blood glucose levels on admission were consistently associated with poorer functional outcome and in acute ischemic stroke patients treated with or without IVT.

In America, in old stroke patients, hypertension and diabetes are the most common comorbidities experienced by ischemic stroke patients [13]. Meanwhile, in Taiwan, younger patients have a lower incidence of comorbidities than older patients [6]. Whereas in China the most common co-morbidities are coronary heart disease, hypertension, diabetes, Alzheimer's disease, Parkinson's disease, mental disorders, chronic kidney disease [30]. Likewise, in Europe, more and more comorbids indicate more costs [19]. In Denmark it was shown that hypertension (50%) and diabetes (11%) were the main co-morbidities in stroke [24]. In Cameroon showed, with aging, people tend to have a number of co-morbidities, visit more and stay longer in hospital which requires more use of health care with subsequent costs than younger people [1].

In this study the observed comorbidities were hypertension, dyslipidemia and diabetes based on data from measurements and observations from laboratory results. These comorbidities are those that are often experienced by ischemic stroke patients, although it does not rule out the occurrence of other comorbidities.

1.7.1. Hypertension

The classification of hypertension in this study uses the classification set out in the Joint National Committee (JNC) VII. This study shows that the higher the severity of hypertension, the greater the average billing issued, this happens to have the same pattern in both male and female patients. In this case, 71.4% of ischemic stroke patients have comorbid hypertension, while 21.9% of ischemic stroke patients are pre-hypertensive and 6.7% of them are patients with normal blood pressure. But in this case female patients experience hypertension more than male patients, where 80% of female patients have comorbid hypertension while male ischemic stroke patients who have comorbid hypertension are around 67%.

Whereas the average billing issued to patients with normal blood pressure (systolic <120 mmHg and diastolic <80 mmHg) was US\$ 714.4, where the billing for female patients was on average greater than male patients (US \$ 744.1 vs. US \$ 709.4). Whereas in patients with comorbid hypertension with the classification of pre-hypertension (systolic: 120-139 mmHg or dias: 80-89 mmHg) and hypertension level 1 (systolic: 140-159 mmHg or dias: 90-99 mmHg) male patients spend an average of larger average billing. Where the average billing comparison of male and female pre-hypertension patients is US\$ 1,023.9 vs US\$ 801.2. Meanwhile, in hypertension level 1 patients, the average billing ratio for men and women was US\$ 1,069.8 vs US\$ 894.8.

1.7.2. Diabetes

In this study, the classification criteria for the diagnosis of comorbid diabetes were based on the Perkeni Consensus 2015 (Indonesian Endocrinology Association). Where the classification is:

- a. Diabetes: fasting glucose ≥ 126 mg/dL; rapid glucose ≥ 200 mg/dL
- b. Pre-Diabetes: fasting glucose 100-125 mg/dL; rapid glucose 140-199 mg/dL
- c. Normal: fasting glucose <100 mg/dL; rapid glucose <140 mg/dL

Based on rapid glucose, 50.5% of patients were patients with normal classification, where 60% of female patients were included in the normal rapid glucose classification, while 45.7% were men. And there are 21.9% of patients with pre-diabetes classification for rapid glucose. Patients with diabetes based on rapid glucose show that men experience it more (30%), while women only 22.9%.

Based on rapid glucose, it cannot be concluded that patients with diabetes severity spend an average of more billing treatments. Where normal patients with rapid glucose considerations show an average treatment billing of US\$ 967.8, pre-diabetic patients US\$ 1,132.6 and diabetic patients is US\$ 891.7.

Meanwhile, based on fasting glucose, there were 22.9% of patients with normal blood sugar levels, of which 31.4% for women and 18.6% for men. In ischemic stroke patients, 33.3% of patients were classified as pre-diabetic and 43.8% were diabetic patients based on fasting glucose.

The average billing in diabetic patients based on the classification of fasting glucose showed that patients with blood sugar classification with normal fasting glucose had a lower average billing than diabetic patients of US\$ 800.1, whereas in pre-diabetic patients it was US\$ 997. 2 and diabetic patients US\$ 1,067.3.

1.7.3. Dislipidemia

In this study dyslipidemia for the classification of total cholesterol, LDL cholesterol, HDL cholesterol and triglycerides according to NCEP ATP III 2001, where the classification is as follows:

Table 3. Classification of Dyslipidemia Variable

Total Cholesterol

Optimal (<200 mg/dL)
Desirable (200-239 mg/dL)
High (≥ 240 mg/dL)

LDL Score

Optimal (<100 mg/dL)
Near Optimal (100-129 mg/dL)
Desirable (130-159 mg/dL)
High (160-189 mg/dL)
Very High (≥ 190 mg/dL)

HDL Score

Low (<40 mg/dL)
Optimal (40-59 mg/dL)
High (≥ 60 mg/dL)

Tryglicerid

Optimal (<150 mg/dL)
Desirable (150-199 mg/dL)
High (200-499 mg/dL)
Very High (≥ 500 mg/dL)

In this study, total cholesterol showed that 24.8% of patients were classified as high cholesterol. However, the average billing for treatment of ischemic stroke patients with high total cholesterol classification does not show higher billing than normal patients. In patients with high total cholesterol classification, the average billing was US\$ 891.6, while patients with optimal total cholesterol classification were US\$ 1,017.7, as well as in patients with desirable total cholesterol classification, US\$ 1,004.1.

In patients with a classification based on LDL levels, it showed that 35.2% of patients were in the high and very high categories. At this LDL level, male and female patients have a tendency to suffer in the same proportion. If you look at the average billing that occurs, it shows that the higher the LDL level, the higher the maintenance bill, but the very high classification shows the opposite. Where the average billing range for optimal to high LDL levels is US\$ 877.4 – US\$ 1,032. But in patients with very high classification, the billing was lower, namely US \$ 987.2.

Patients with HDL levels showed no relationship between HDL levels and total billing average ischemic stroke. Where the number of patients with high HDL levels was only 5.7% of the total ischemic stroke patients with an average billing of US\$ 861.2; however, patients with low and optimal HDL levels had higher average billings of US\$ 990.7 and US\$ 989.8.

Likewise, triglyceride levels have no relationship with total billing average ischemic stroke. Data shows that 20% of patients have high and very high triglyceride levels with an average billing of US\$ 854.8 and US\$ 1,316. But in the optimal and desirable categories, there were more patients, namely 67.6% and 12.4%, and higher billing, namely US\$ 1,011.6 and US\$ 962.1.

1.8. Severity Level

The severity of stroke is measured based on The National Institutes of Health Stroke Scale (NIHSS). The NIHSS is a tool for systematic assessment of the neurologic deficits most seen in acute stroke. There are 15 questions to detect stroke severity including level of consciousness, eye gaze, sight/sense of sight, facial paralysis, arm movements, leg movements, limb movements, sensors, speech senses, articulation, focus of attention.

The NIHSS score in this study showed that 66.7% of patients were classified as mild, while moderate was 16.2% and severe was 17.1%. The severity indicated by the NIHSS score illustrates that the more severe or the higher the NIHSS score, the higher billing will be spent. Where in the NIHSS classification the score for mild shows an average billing of US\$ 844, for moderate it is US\$ 929.1 while for severe it shows a very high billing of US\$ 1,573.7.

1.9. Correlation among Determinant Factors

In this study, the determinant factors observed were gender, age, length of stay (days), speed of getting treatment after attack (hours), comorbidities (hypertension, diabetes and dyslipidemia), NIHSS score. The regression analysis shows that the model formed is a fairly precise model, where R = 0.637 and R² = 0.406.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.637 ^a	0,406	0,327	9947125,849

a. Predictors: (Constant), NIHSS Score, Age, Total Cholesterol, Tryglicerid, HDL, LDL, Duration after Attack, Hipertension, Sex, Glukosa Rapid, Length of Stay, Fasting Glucose

And ANOVA shows

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	6,1488E+15	12	5,124E+14	5,179	.000 ^b
Residual	9,00402E+15	91	9,89453E+13		
Total	1,51528E+16	103			

a. Dependent Variable: Total Billing

b. Predictors: (Constant), NIHSS Score, Age, Total Cholesterol, Tryglicerid, HDL, LDL, Duration after Attack, Hipertension, Sex, Glukosa Rapid, Length of Stay, Fasting Glucose

Meanwhile, based on the coefficients, it shows that the length of stay and NIHSS score are variables that greatly influence total billing.

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	-2.661.766	8.962.252		-0,297	0,767
Sex	-	2.179.474	-0,131	-1,552	0,124

	3.381.469				
Age	128.240	100.660	0,111	1,274	0,206
Length of Stay	2.507.919	525.195	0,419	4,775	0
Speed of getting treatment	-9.897	33.875	-0,025	-0,292	0,771
Hipertension	569.064	1.125.244	0,043	0,506	0,614
Rapid glucose	-1.521	20.843	-0,011	-0,073	0,942
Fasting glucose	-1.298	27.453	-0,007	-0,047	0,962
Tryglicerid	12.693	9.511	0,133	1,335	0,185
Total Cholesterol	-55.607	51.667	-0,189	-1,076	0,285
LDL	39.606	53.933	0,123	0,734	0,465
HDL	-2.022	65.510	-0,003	-0,031	0,975
NIHSS Score	424.705	107.406	0,341	3,954	0

a. Dependent Variable: Total Billing

Conclusion

There are many determinant factors that influence cost variations in the initial hypothesis, namely gender, age, length of stay (days), speed of getting treatment after attack (hours), comorbid (hypertension, diabetes and dyslipidemia), NIHSS score. Ischemic stroke has started in young patients (≤ 40 years), and mostly occurs in men. From all the variables observed based on the descriptive analysis showed that hypertension, fasting glucose, LDL, length of stay and NIHSS score had an influence on total billing. For these determinant factors were showing that increasing value/severity it will increase the total billing charged. Most of stroke ischemic patients have comorbid hypertension, its possible because of lifestyle which less exercise. Indonesian cuisine is one of the most diverse, vibrant, and colorful in the world, full of intense flavor and most of that can trigger hypertension.

However, after regression analysis showed that length of stay and NIHSS score were the variables that most influenced the variation in total ischemic stroke billing. Length of stay impacted to billing of room, services, diagnosed, medical device and drug, and human resources billing. While higher NIHSS score will impacted to severity of the patients and the treatment type that need to get for medication.

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