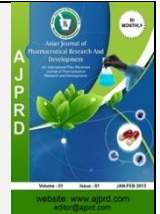


Available online on 15.04.2020 at <http://ajprd.com>

Asian Journal of Pharmaceutical Research and Development

Open Access to Pharmaceutical and Medical Research

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Research Article

Cost of Illness Analysis and Quality of Life in Ischemic Stroke Patients In USU Medan Hospital

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ABSTRACT

Objective: aims to evaluate the COI INA-CBG BPJS patients hospitalized for ischemic stroke BPJS (n = 33) at USU Medan Hospital in February 2019-August 2019 period.

Design: this study was conducted used a prospective cohort study method in patients with ischemic stroke (n = 33) in USU Hospital.

Interventions: the intervened variable were the cost of patient therapy and calculating the difference in claims of INA-CBGs with the cost of patient therapy.

Main outcome measures: the main measurement in this study was quality of life with European Quality of Life - 5 Dimensions Three Level (EQ5D3L).

Results: the results of this study indicate the total average cost of ischemic stroke inpatient therapy at the In patient Installation of USU Hospital in Medan obtained Rp 2,284,854 The average cost / rate incurred by the Hospital for ischemic stroke patients (n = 33) is still below the INA-CBGs claim rate. There was a relationship between the quality of life of ischemic stroke patients with diagnosis and comorbidities of patients (p = 0.004). The average quality of life (QoL) of ischemic stroke patients was obtained 0.7324 ± 0.2118.

Conclusion: it could be concluded that the quality of life of ischemic stroke patients is classified as good 32 patients (96.96%).

Keywords: *Cost of illness, INA-CBGs, EQ5D3L, Ischemic stroke.*

ARTICLE INFO: Received 28 Nov 2019; Review Completed 20 Jan 2020; Accepted 22 Jan. 2020; Available online 15 April. 2020



Cite this article as:

Darma E S, Azizah N, Khairunnisa K, Cost of Illness Analysis and Quality of Life in Ischemic Stroke Patients In Usu Medan Hospital, Asian Journal of Pharmaceutical Research and Development. 2020; 8(2):01-06.
DOI: <http://dx.doi.org/10.22270/ajprd.v8i1.652>

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INTRODUCTION

Stroke or pelo is a disease that is feared by the public. WHO data in 2015 show that stroke is the second leading cause of death after heart disease. In 2015, 6.24 million people worldwide died from stroke with a percentage of 53.34% of hemorrhagic strokes and ischemic strokes of 46.66%¹. The number of stroke sufferers in Indonesia in 2013 was based on a diagnosis of 1.2 million people with West Java the highest number of stroke patients was 533,895 people, while West Papua who was exposed to the number of stroke patients was 2,955 people².

Stroke is divided into two types, namely ischemic stroke and hemorrhagic stroke. Ischemic stroke is the most common type of stroke which is around 85% of the number of strokes. Ischemic stroke is a stroke caused by atherosclerosis. Atherosclerosis is a condition when a

buildup of fat and cholesterol or plaque can form a blockage. Stroke can result in death or disability which will reduce the health status and quality of life of stroke sufferers, in addition it will add to the burden of health costs borne by the family and country. Aneurysm or swelling of blood vessels is one of the common causes of hemorrhagic stroke sufferers. As we get older, there will be one or more parts of the walls of the weak blood vessels. Swelling occurs in the walls of blood vessels that are weak, can cause blood vessels to burst³.

The biggest cause of stroke is physical disability, emotions that affect quality of life for stroke sufferers. The quality of life of stroke sufferers is influenced by several factors, namely disorders or barriers due to physical disabilities, cognition, psychological and social disorders. According to Brown⁴ the concept of quality of

life is based on three areas of human life that are important dimensions in human experience, namely Being, Belonging and Becoming. The Being dimension emphasizes aspects of physical health, physical mobility and agility in carrying out individual activities. The belonging dimension is about what someone has in their physical environment such as home, workplace, neighbors and others, including what they feel when they are at home and their environment. The Becoming dimension focuses on one's activities to achieve goals, aspirations and expectations. Physical, emotional, and social life inability of stroke patients can affect their social role. This has an influence on the quality of life related to health in stroke patients.

Measurement of health-related quality of life in stroke patients is carried out with the aim of evaluating stroke patient care including the quality as well as the quantity of patient survival. The measurement usually includes functional, physical, psychological, and social elements. Handling a stroke requires a lot of sacrifice, both in moral and material aspects. If a stroke patient does not have income, access to health facilities will certainly be more difficult, as a result health status will not be optimal and will affect quality of life⁵.

Stroke including catastrophic disease, namely catastrophic disease including chronic and degenerative diseases. Catastrophic disease is a disease whose treatment requires special expertise, uses sophisticated medical devices and requires lifelong health services. The cost of catastrophic diseases absorbs about 30% or around Rp 16.9 trillion from the National Health Insurance (JKN) budget. Catastrophic disease that is contained consists of heart disease (13%), chronic kidney failure (7%), cancer (5%), stroke (2%), thalassemia (1%), haemophilia (0.2%) and leukemia (0, 3%)⁶. Limited health and drug budgets, the health institutions and hospitals are required to provide the best service, therefore the need for cost control in all aspects of health services in an effort to balance budget and resource limitations to achieve optimal results. Control of health costs can be done using pharmacoeconomic analysis studies⁷.

Pharmacoeconomy is identification, measurement, comparing costs, risks, therapies and determining alternatives in providing the best health output for the resources used. Pharmacoeconomy also evaluates clinical aspects, health economics, behavior or well-being of individuals, the use of medicinal products, services and programs, which are focused on the total cost (input) and expenditure (out come). Several types of economic analysis studies, the Cost of Illness (COI) study is an appropriate study in evaluating CBG groups, especially inpatients at USU Medan Hospital. COI analysis is the earliest form of economic evaluation in the health service sector. COI studies are conducted based on epidemiological data, which are approaches based on prevalence or incidence. COI prevalence refers to the total number of cases in a certain time period (usually within one year), while the incidence refers to the number of new cases that arise within a certain time period. Analysis of COI based on prevalence is very helpful in giving an idea to decision makers to re-evaluate claims that are not in accordance with the cost of patient therapy⁸.

The COI study aims to determine the total economic impact (cost) of a sick or healthy condition on society through the identification, measurement and application of the value of all direct and indirect costs. The form of COI studies focuses on costs and is not related to treatment efficiency. COI studies can increase cost awareness for policy makers⁹. Considering that health funding includes limited medicines and services and ischemic stroke can affect the quality of life in stroke patients, this study focuses on the analysis of COI and quality of life in ischemic stroke inpatients at the University of North Sumatra (USU) Hospital in Medan in the February 2019 - August 2019 period.

MATERIALS AND METHODS

Research Design

This study used a prospective descriptive cohort study method in the February-August 2019 period by accessing data on the patient's medical record status in the Inpatient Installation at USU Hospital, Medan. This research was conducted by approach, observation or data collection at a time. The study was conducted prospectively, a longitudinal study by following the course of the disease in the order of time¹⁰ and assessing the quality of life of ischemic stroke patients using the EQ-5D-3L instrument. The perspective of this research is the health insurance provider insurance that is the Health BPJS as a guarantor for the cost of treating ischemic stroke patients. The cost calculation is reviewed from the direct medical costs (direct medical costs), namely the cost of medicine, additional drug costs, the cost of medical equipment, laboratory examination costs and indirect medical costs (indirect medical costs), namely the cost of accommodation.

Research Location

This research was conducted at the University of North Sumatra Hospital (RS) on Jl. Dr. Mansyur No. 66 Medan. The location was chosen with consideration of USU Hospital as a teaching hospital and in collaboration with BPJS Health. When the study was conducted in February 2019 - August 2019.

Population

The target population in this study were all inpatients diagnosed with ischemic stroke from February 2019 - August 2019 at the University Hospital of North Sumatra, Medan. The target population that meets the inclusion criteria and does not meet the exclusion criteria is made the study population, so that the entire study population is made as the subject. The target population in the form of medical record status of patients in the February 2019 - August 2019 period was 39 patients, from the target population who met the inclusion criteria and did not meet the exclusion criteria as many as 33 patients as the study population (subjects).

Research subject

The subjects of this study must meet the following criteria:

a. inclusion criteria of this study are:

- i. inpatients who use health insurance services from BPJS Health for the February 2019 - August 2019 period

- ii. hospitalized patients with ischemic stroke accompanied by complications of concomitant diseases
- iii. patients treated for at least 1 day (1x24 hours)
- iv. Willing to fill out information consent and questionnaire research sheet EQ-5D-3L

b. exclusion criteria of this study are:

- i. incomplete patient status data
- ii. general pathway patients diagnosed with ischemic stroke
- iii. hospitalized patients with hemorrhagic stroke and recurrent stroke

In calculating the sample size the following formula is used, with the condition that the population must be less than 10,000 (Notoatmojo, 2010).

$$n = \frac{N}{1+N(d^2)} = \frac{39}{1+39(0.1^2)} = 28 \text{ (minimum quantity)}$$

Note:

n = Large population

n = Minimum amount

d = desired level of confidence/accuracy 10% (0.1)

Data analysis

The steps in analyzing research data are:

a. patient characteristics

Analysis of patient characteristics was carried out to obtain a picture of the proportion of sex, age, education level and type of work of the patient. The data obtained were then analyzed statistically using Chi-square (SPSS) version 20.

b. treatment profile of ischemic stroke patients

Analysis of the treatment profile was carried out to determine the therapeutic model and the amount of drug use in each treatment group. Data on drug use includes type, dosage, route and time regimen of administration.

c. direct medical costs

The implementation of direct medical cost research is reviewed from the perspective of the health care provider namely BPJS Health, the costs included in the analysis are only direct medical costs. Medical direct costs include

accommodation costs, drug costs, laboratory examination costs, medical equipment costs. The cost is calculated by multiplying the cost per unit by the number of units used in each group, then adding up all the costs of the resources used in each group.

RESULT AND DISCUSSION

Demographics of Research Subjects

The results of research conducted at the Hospital Inpatient Installation (RS) of the University of North Sumatra (USU) Medan in the February 2019 - August 2019 period were obtained by 39 patients with ischemic stroke inpatients. The study population was made as the subject of the study that met the inclusion criteria of 33 patients (84.61%) and the exclusion criteria of 6 patients (15.39%).

Evaluation of Ischemic Stroke Cost of Illness

Ischemic stroke patients are grouped into 6 groups based on the diagnosis of concomitant diseases, namely the Congestive Heart Failure (CHF) group of 5 patients, Diabetic Nephropathy (DN) by 4 patients, Diabetic Nephropathy and Pneumonia (DN + PN) by 4 patients, Hyper Cholesterol (HK) as many as 5 patients, Hypertension (HN) as many as 11 patients, and as many as 4 patients Hypertension and Diabetic Nephropathy (HN + DN).

Direct medical costs were costs incurred by the insurer, in this case the Health BPJS, related to accommodation costs, laboratory examinations, platelet antiaggregation drugs, other non-platelet antiaggregation drugs used to support the treatment of ischemic strokes and Medical Consumables. Patients who are suspected of being diagnosed with ischemic stroke should have a laboratory examination. Examination parameters include blood glucose levels, electrolytes, blood gas analysis, complete hematology, urea levels, creatinine levels, cardiac enzymes, PT + INR, APTT, blood fat, CT-Scan and chest radiograph. Details of costs and total laboratory examination costs can be seen in Table 1

Table 1: Total Cost of Drugs and Medical Devices and Laboratory Examinations in Ischemic Stroke Patients

No.	Diagnosis	Drug+Medical Devices (Rp)	Laboratory+Accommodation (Rp)	Total (Rp)	Each patient (Rp)
1.	CHF (5)	1.148.745	9.975.800	11.124.545	2.224.909
2.	DN (4)	1.488.788	10.793.800	12.282.588	3.070.647
3.	DN+PN (4)	987.244	8.869.500	9.856.744	2.464.186
4.	HK (4)	621.510	8.111.800	8.733.310	2.183.328
5.	HN (11)	1.871.668	28.989.400	30.861.068	2.805.552
6.	HN+DN (5)	3.137.218	10.267.700	13.404.918	2.680.984

Note:

CHF: Congestive Heart Failure

DN: Diabetic Nephropathy

DN+PN: Diabetic Nephropathy and Pneumonia

HK: Hyper Cholesterol

HN: Hypertension

HN+DN: Hypertension and Diabetic Nephropathy

Regionalization in INA-CBG tariffs was intended to accommodate differences in the distribution costs of drugs and medical devices in Indonesia. The basis for determining regionalization was to use the Consumer Price Index (CPI) from the Central Statistics Agency (BPS). The division of regionalization was grouped into 5 regions. The agreement on regional division was implemented by BPJS Health with the Association of Indonesian Hospitals

(PERSI) with the results of the province of North Sumatra in Reginonal III. Rates of INA-CBG claims for ischemic stroke according to regionalization are divided into 3 classes namely class I of Rp 5.274.300; Class II amounting to Rp 4.520.800; class III amounting to Rp 3.767.300. The results of the calculation of the average cost of ischemic stroke patients obtained as much as Rp 2.284.854. Costs / rates incurred by hospitals for ischemic stroke patients (n = 33) were still below the INA-CBGs claim rates.

Total Direct and Indirect Medical Costs

The total of medical direct costs calculated in this study were the cost of accommodation, the cost of laboratory examinations, the cost of platelet antiaggregation drugs, the cost of other drugs (non-platelet anti-aggregation). Total direct and indirect medical costs could be seen in Table 2.

Table 2: Total Direct and Indirect Medical Costs of Ischemic Stroke Inpatients

No	Direct medical cost	Total cost (Rp)
1	Laboratory examinations	65.378.000
2	Anti-platelet drugs	150.865
3	Anti-platelet drugs and medical consumables	9.104.304
No	Indirect medical cost	Total cost (Rp)
1	Accomodation	25.545.000
Total direct and indirect medical costs (n=33)		100.178.169
Direct and indirect medical costs for patients		3.035.702
Direct and indirect medical costs for 100 patients		303.570.200

Based on Table 2, the highest total direct medical costs were found in laboratory examinations, amounting to Rp 40.600.000, non-platelet non-aggregate drug costs and medical consumable Rp 9.104.304, platelet antiaggregation drug costs Rp 150.865. Indirect medical costs are accommodation costs Rp. 25.545.000. This study uses primary and secondary clinical outcomes, so the total direct and indirect medical costs used must be calculated as direct and indirect medical costs per 100 patients for primary clinical outcomes and direct and indirect medical costs per patient for secondary clinical outcomes.

Quality Adjust Life Years (QALY)

Utilities assessment related to changes in the quality of life of ischemic stroke inpatients is performed using the EuroQol Five Dimension Three Level (EQ-5D-3L) questionnaire. The EQ-5D-3L instrument consists of 5 dimensions, namely mobility, self care, usual activities,

pain / discomfort, anxiety / depression, anxiety / depression . Each of these dimensions consists of levels 1-3, where level 1 shows no problems, level 2 shows there are few problems and level 3 shows there are severe problems in each dimension. The calculation of the EQ5D score is based on reducing the coefficients of each dimension in the EuroQol score formula. The EQ-5D-3L score illustrates perfect health conditions with a utility value of 1.0 and a score of 0 for deaths with a utility value of 0.0.

Utility value is used to get the QALY value, which is the outcome used in the cost utility analysis. Utility value or quality of life is divided into 2 categories namely good quality of life (score > 0.5) and poor quality of life (score ≤ 0.5), QALY is obtained from multiplying utility value by the number of years¹¹. Quality of life scores of ischemic stroke patients with a diagnosis of comorbidities before receiving treatment can be seen in Table 3.

Table 3: Quality of Life Assessment of Ischemic Stroke (QoL) Patients before Receiving Treatment in 5 Dimensions of Health Status

Dimension	Quality of Life Ischemic stroke patients						Total n=33
	Value 1 (no problem)		Value 2 (there was a problem)		Value 3 (pretty serious issues)		
	N	%	N	%	N	%	
Walk / move	0	0	30	91	3	9	100%
Self care	4	12,3	29	87,7	0	0	100%
Daily activity	0	0	14	42,42	19	57,58	100%
Pain / discomfort	12	36,36	19	57,6	2	6,04	100%
Anxiety / Depression Sad	20	60,61	12	36,36	1	3,03	100%

In the overall assessment of ischemic stroke patients experience problems in mobility (walking / moving) and usual activities (normal activities carried out). Quality of life assessment of ischemic stroke (QoL) scores well on 5

dimensions of health status before receiving treatment based on diagnosis of comorbidities, obtained in the CHF group of 4 patients (12.1%), in the DN group of 3 patients (9%), in the group DN + PN 1 patient (3%), in the HK

group 3 patients (9%), in the HN group 10 patients (30.1%) and in the HN + DN group 3 patients (9%). The quality of life of patients is affected by complications of comorbidities in ischemic stroke patients.

The quality of life category of ischemic stroke (QoL) patients before receiving treatment based on the diagnosis of comorbidities can be seen in Table 4.

Table 4: The quality of life category of ischemic stroke (QoL) patients before receiving treatment based on the diagnosis of comorbidities

No	Diagnosis	Quality of Life Ischemic stroke patients								
		very good			good			Bad		
		n	%	QoL	N	%	QoL	N	%	QoL
1	CHF	0	0	0	4	80	0.623	1	20	0.458
2	DN	0	0	0	3	75	0.546	1	25	0.103
3	DN+PN	0	0	0	1	23	0.71	3	75	0.436
4	HK	0	0	0	3	75	0.604	1	25	0.193
5	HN	0	0	0	10	90.9	0.642	1	9,1	0.174
6	HN+DN	0	0	0	3	60	0.548	2	49	0.24
(n ; %)		0	0	0	24	72.72		9	27.28	

The average quality of life of patients with ischemic stroke before receiving treatment obtained QoL of patients 0.73 ± 0.02 . Based on the percentage of achievement of quality of life (QoL) obtained good category obtained 32 patients

(96.6%) poor patient 1 patient (3.04%). Assessment of quality of life of ischemic stroke (QoL) in the 5 dimensions of health status after receiving treatment could be seen in Table 5.

Table 5: Quality of Life Assessment of Ischemic Stroke (QoL) Patients After Receiving Treatment in 5 Dimensions of Health Status.

Dimension	Quality of Life Ischemic stroke patients						Total n=33
	Value 1 (no problem)		Value 2 (there was a problem)		Value 3 (pretty serious issues)		
	N	%	N	%	N	%	
Walk / move	16	48,49	17	51,51	0	0	100%
Self care	12	36,37	21	63,63	0	0	100%
Daily activity	2	6,09	27	81,81	4	12,1	100%
Pain / discomfort	26	78,79	7	21,21	0	0	100%
Anxiety / Depression Sad	26	78,79	7	21,21	0	0	100%

Assessment of walking / moving dimensions in ischemic stroke patients after receiving treatment obtained 16 patients (48.49%) no problems and 17 patients (51.51%) with no problems. An assessment of the dimensions of self-care obtained 12 patients (36.37%) no problems and (63.63%) there were problems. Assessment of the usual dimensions of activities obtained by 27 patients (81.81%) had problems; 4 patients (12.1%) had serious problems and 2 patients (6.09%) had no problems. Pain / discomfort assessment was obtained by 26 patients (78.79%) there were no problems and 7 patients (21.21%) there were problems. Assessment of anxiety / sad depression obtained by 26 patients (78.79%) had no problems and 7 patients (21.21%) had problems. In the overall assessment of ischemic stroke patients after receiving care the quality of life of patients tends to improve, but the percentage of

problems in mobility (walking / moving), self care (self care) and usual activities (normal activities carried out) is still quite high and reduced compared to before receiving treatment .

Quality of life assessment of ischemic stroke (QoL) score good on 5 dimensions of health status after receiving treatment based on diagnosis of comorbidities, obtained in the CHF group of 5 patients (15.15%), in the DN group of 3 patients (9.09%), in the DN + PN group 4 patients (12.12%), in the HK group 4 patients (12.12%), in the HN group 11 patients (33.33%) and in the HN + DN group 5 patients (15.15%). The quality of life category of ischemic stroke (QoL) scores well on the 5 dimensions of health status after receiving treatment based on the diagnosis of comorbidities can be seen in Table 6.

Table 6: Categories of Quality of Life of Ischemic Stroke (QoL) Patients After Receiving Treatment Based on Diagnosis of Accompanying Diseases

No	Diagnosis	Quality of Life Ischemic stroke patients								
		very good			good			Bad		
		n	%	QoL	n	%	QoL	n	%	QoL
1	CHF	0	0	0	5	100	010.77	0	0	0
2	DN	0	0	0	3	75	0.79	1	25	0.458
3	DN+PN	0	0	0	4	100	0.71	0	0	0
4	HK	0	0	0	4	100	0.71	0	0	0
5	HN	0	0	0	11	100	0.79	0	0	0
6	HN+DN	0	0	0	5	100	0.66	0	0	0
(n ; %)		0	0	0	32	96.96		1	3.04	

The quality of life of ischemic stroke patients is better influenced by the care received at USU Medan Hospital. Quality of life assessment of ischemic stroke (QoL) patients before and after receiving treatment based on 5 dimensions of health status. Based on the results of statistical tests between QoL values and patient diagnoses, there was a relationship between the quality of life of patients with patient diagnoses, where in the diagnosis group and accompanying diseases have a significant relationship p value = 0.004. The average quality of life (QoL) of ischemic stroke patients was obtained 0.7324 ± 0.2118 . The quality of life of ischemic stroke patients was classified as good 32 patients (96.96%)

CONCLUSION

Based on the analysis of patient data from the research results it can be concluded that the total average cost of ischemic stroke inpatient therapy in the Inpatient Installation of USU Hospital Medan was Rp. 2.284.854. The average cost / rate incurred by the Hospital for ischemic stroke patients (n = 33) is still below the INA-CBGs claim rate. There was a relationship between the quality of life of ischemic stroke patients with diagnosis and accompanying disease patients (p = 0.004). The average quality of life (QoL) of ischemic stroke patients was obtained 0.7324 ± 0.2118 . The quality of life of ischemic stroke patients is classified as good 32 patients (96.96%)

CONFLICT OF INTERESTS

All author have no to declare.

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