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COST OF ILLNESS FOR CHRONIC KIDNEY DISEASE TREATMENT WITH HEMODIALYSIS IN YOGYAKARTA

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Abstract:

The increase in the number of chronic kidney disease (CKD) sufferers and the expensive financing of this disease, the economic burden borne will certainly increase. This study aimed to determine the cost of illness of CKD patients undergoing hemodialysis, as well as to find out the comparison of real costs with INA-CBG's rates. This was a pharmacoeconomic research, used the cost of illness method according to a societal perspective. The study was conducted in a type B government hospitals in Yogyakarta from January to March 2020. The population in this study were all CKD patients undergoing hemodialysis in need to mention the hospital at first. The research instruments were medical records, hospital financial data, and patient interviews. The complete data were analyzed statistically with the descriptive method and the Mann Whitney test. The number of samples was 65 patients. The results revealed the average cost of illness was 6,224,277.00 IDR for one month of treatment. The cost component that dominates was hemodialysis rate. The average real cost was 836,686 IDR for one procedure. It can be concluded that the average real cost of CKD patients with hemodialysis in the type B government hospital were significantly smaller than the INA-CBG's rate.

Keywords: Chronic Kidney Disease; Hemodialysis; Cost Of Illness; INA-CBG's Rate

Introduction

Chronic kidney disease is a clinical condition of decreased kidney function induced by various causes and pathophysiological processes.[1] In Indonesia, chronic kidney disease is a disease that has a large number of sufferers. PT Askes insurance released data stating that the number of CKD patients in 2010 was 17,507 people and increased to 23,261 people in 2011 while in 2013 the number increased to 24,141. The increasing number of patients with chronic kidney disease certainly affects the number of patients who require hemodialysis therapy.[2] Based on the results of a systematic review and meta-analysis by Hill et al. (2016), the global chronic kidney failure population was 13.4%.[3] The prevalence of chronic kidney disease in Indonesia based on doctor's diagnosis in the population aged 15 years has increased from 2‰ in 2013 to 3.8‰. While the ratio of patients with chronic kidney disease aged 15 years who have or are currently undergoing dialysis is 19.3%.[4]

Hemodialysis has a cost burden especially from the perspective of the payer as well as the patient. The existence of direct medical costs in the form of drug costs, consumable medical materials, labs, and other costs that are not low cost, increases the burden of dependents. Since 2014 Indonesia health insurance (JKN) was already available for patients in class C hospitals, with the INA CBG's (Indonesia Case Base Groups) rate for hemodialysis which was paid by BPJS (Indonesia health and social security insurance institution) was 893.300 IDR. But patients with JKN were still required to pay expenses that weren't covered by BPJS among others, for vitamins, other medicines that are not included as CKD/HD drugs, or drugs requested by the patient's own wishes. Not to mention that patients might have to bear the burden of indirect medical costs ranging from transportation costs to lost income while the patient is undergoing hemodialysis, the amount of which cannot be underestimated.[5]

Several studies had been conducted related to the burden of costs that must be borne by patients who undergo hemodialys.[6] The high prevalence and high cost of hemodialysis therapy were the reasons that made researchers interested in assessing how much the patient had to bear. Some other reasons were that there was still little research on the cost of illness from the patient's point of view to determine the burden of the disease. Moreover, due to previous research showing that the hospital suffered losses, the researcher wanted to examine this by comparing it with the latest INA CBG's rates. This study was conducted in a government and a private hospitals in Yogyakarta to provide a broader picture of the burden of hemodialysis costs in patients with chronic kidney disease.

Through those considerations, the purpose of this study was to determine the cost of illness of chronic kidney failure patients undergoing hemodialysis and to compare the real costs of hemodialysis in patients with chronic kidney disease to the INA-CBG's rates.

Research Method

This research was a pharmacoeconomic research from a social perspective and a provider perspective. Research according to the social perspective was carried out to determine

the cost of illness, while the provider perspective was carried out to determine the comparison of real costs to INA-CBG's rates. Data were collected by non-experimental observation using a cross sectional research design.

This research was carried out in a type B government hospital in Yogyakarta from January to March 2020. The instruments used included medical records and patient financial data. The cost of illness questionnaire was used to measure direct non-medical costs and indirect costs.

The population in this study was all CKD patients undergoing hemodialysis in a type B government hospital in Yogyakarta. The research sample had to meet the inclusion and exclusion criteria of the study. The inclusion criteria in this study were chronic kidney disease patients undergoing hemodialysis at a type B government hospital in Yogyakarta, at least 18 years of age, male and female, able to communicate well and willing to be a respondent. Exclusion criteria for this study were respondents who didn't fill out the questionnaire completely, or had incomplete medical and financial record data.

Data analysis for the cost of illness was carried out with univariate descriptive analysis and calculated the average cost of illness including direct medical costs, direct non-medical costs, and indirect costs. The analysis to compare the real costs of CKD patients undergoing hemodialysis to INA CBG's rates was a descriptive analysis to find out the average direct medical cost. The results were then analyzed bivariate with the Independent t-Test if the data were normally distributed and Mann Whitney if the data were not normally distributed. From this test, a significant value of the correlation between the average direct medical cost and INA CBG's rates will be obtained. The significance value criteria can be seen from the sig value. If the value of sig. value> 0.005, then the two variables do not have a significant correlation. If the value of sig. value <0.005, then the two variables have a significant correlation.

Results and Discussion

Patient characteristics can be seen in Table 1.

Table 1. Patient Characteristics

Characteristic	Number of Patient (n =65)	Percentage (%)
Gender		
Males	39	60
Females	26	40
Age (year)		
20-30	2	3%
31-40	9	14%
41-50	17	26%
51-60	19	29%
>60	18	28%
HD Frequency		
Once a week	10	15
Twice a week	55	85

Table 3. Direct Medical Cost Component

DMC Component	n	Average (1x a week)	%	n	Average (2x a week)	%
HD Treatment	4	2.820.000 ± 0	83,2%	8	5.640.000 ± 0	83,7%
Laboratory	1	25.000 ± 0	0,7%	1	2.5000 ± 0	0,4%
Medicines	1	349.282 ± 213.885,51	10,3%	1	672.009 ± 424.223,08	10,0%
Medical Consumables	1	165.658 ± 1.646,49	4,9%	1	328.745 ± 1.820,78	4,9%
Service fees	4	26.800 ± 5.672,54	0,8%	8	47.273 ± 6.758,96	0,7%
Outside Insurance cost	1	200 ± 632,5	0,0%	1	27.129 ± 83.875,9	0,4%
Total		3.386.940 ± 219.690	100%		6.740.156 ± 449.541	100%

The total cost of illness can be seen in Table 2. The cost of illness or disease costs includes 3 types of costs, there are direct medical costs, direct non-medical costs, and indirect costs. Direct medical costs are the costs that are directly related to the patient's medical needs including hemodialysis rates, laboratory examination fees, drug costs, medical consumables, and surgical services. Meanwhile, direct non-medical costs are costs that are not directly related to medical needs such as food costs and transportation costs. Indirect costs are the costs resulting from lost productivity due to medical care such as salary deductions or reduced income.[11]

Table 2. Total Cost of Illness

Frequency	n	Total DMC (IDR)	Total DnMC (IDR)	Total IC (IDR)	Total COI (IDR)
1x	10	33.869.404	881.866	0	34.751.270
2x	55	370.708.591	14.294.666	0	385.003.257
3x	-	-	-	-	-
Total cost of illness	65	404.577.995	15.176.532	0	419.754.527
Average		6.224.277 ± 1.289.919,25	233.485 ± 269.039,43	0 ± 0	6.457.762

Previous study indicated that at the Type B hospital, the total cost of illness for patients with chronic kidney disease for 76 patients in one month was 467,345,660.00 IDR with an average of IDR 6,149,295.00 IDR for each patient. The highest cost component was direct medical costs with an average of 5,215,331 IDR, followed by direct non-medical costs with an average of 566,260.00 IDR and indirect costs with an average of 165,530.00 IDR. Direct medical costs are the largest cost component because there are various components in the direct medical costs calculated, including the costs for the hemodialysis procedure itself.[5]

The direct medical cost components are shown in Table 3.

Direct medical costs are costs incurred to obtain medical services. In this study, direct medical cost component obtained was hemodialysis costs along with laboratory costs, including costs for medical tests such as hemoglobin checks, serum creatinine and so on. Moreover, there was also medicine costs that mostly given to the patient once a month. This direct medical cost was considered based on the hemodialysis frequency of patients per week: once a week; twice a week; and 3 times a week, after that, the costs were calculated for one month.

The table 3 above showed the total amount of each component in the direct medical cost which consists of the tariff for hemodialysis, laboratory costs, and drug costs. Each costs is distinguished based on the frequency of patients undergoing hemodialysis so that it can be seen which cost component is the largest and the smallest.

Hemodialysis tariff is a tariff that is charged for one treatment, which is 731,000 IDR in the type C private hospital and 705,000.00 IDR in the type B government hospital. In both hospitals, the hemodialysis rate contribute to the largest component of the total direct medical cost for all patients with different hemodialysis frequency: once, twice or 3 times a week. This result was correspondence with the previous research conducted by Fauziah (2015) and Tania and Thabrany (2017) that the largest component in direct medical costs for chronic kidney disease is hemodialysis rates.[5,12]

Laboratory costs are costs that charged for special medical tests, including blood, urine and so forth. Drug costs are costs that charged to obtain medicines, both routine hemodialysis drugs and other drugs prescribed by doctors. The use of drugs in each patient is different, depending on the physiological condition of each patient based on routine blood tests carried out at the beginning of each month. Consumable medical materials are medical materials that can only be used once (disposable) such as syringes and infusion sets. Action services are costs incurred for each action given to the patient during the hemodialysis procedure. The amount of service for each patient can be different, depending on the needs of the patient such as the use of drugs and taking blood samples. Non-insurance costs are costs incurred using the patient's personal funds without being covered by health insurance. These costs include drug costs, doctor consultations, treatments, and others. However, not all patients incur costs outside of this insurance because of different levels of need.

Direct non-medical costs are shown in Table 4.

Table 4. Direct Non-medical Costs Component

Frequency	Number of Patient	Average Transportation Costs	%	Average Meal Costs	%	Total
1x	4	25.387 ± 14.414,66	28.8%	62.800 ± 120.606,61	71.2%	88.187 ± 132.756,1
2x	8	128.776 ± 221.776,48	49.5%	131.127 ± 142.118,76	50.5%	259.903 ± 279.693,7

Direct non-medical costs measure costs that are not directly related to health services, such as round-trip transportation to a health care facility and meal expenses for family or patients. In this study, there are two direct non-medical costs, that are transportation costs and meal costs.

The cost of transportation for each patient was different because of the different modes of transportation used and the different distance between the patient's residence and the hospital. Most of the distance between the patient's residence and the hospital was not too far so that expenses for transportation such as purchasing fuel could be reduced. Meal expenses for each patient were different due to several factors such as differences in lifestyle. Most of the patients and their families bought meal to eat while they were in the hospital for receiving medical treatment or waiting, but some patients and their families brought food from home.

The data obtained in this study indicated that the cost for meal was higher than the cost for transportation. This finding was different from previous research conducted by Tania and Thabrany (2017) that stated that at Type B Hospitals, the average value of transportation costs was 302,120.00 IDR, higher than the average amount spent for food that was 264,130 IDR. Several factors affected this cost comparison, such as different lifestyles and distances from residence to the hospitals.[5]

Indirect costs are costs that had to be borne by the patient indirectly because hemodialysis causes loss of work productivity. The component that was calculated in this indirect cost was the income reduction experienced by patients during hemodialysis which was calculated monthly.

Data collection at the government hospitals of this research did not find any indirect cost component, because most of the patients did not work. For patients who had retired, they still get a pension every month. Patients who worked as entrepreneurs, informal workers and farmers also did not experience income reduction because their work could still be controlled with the help of their families, although some patients had clash working hours with the hemodialysis schedule. Meanwhile, patients who worked as civil servants who were still working get working policies relief so that there were no salary deductions.

Previous study conducted by Tania and Thabrany (2017) showed that 69% of the patients undergoing hemodialysis, did not work. Most patients find it difficult to have time flexibility for formal work and some chose to stop working. Some patients were also dismissed from their jobs due to physical incapacity or many leave permits were applied because of the hemodialysis schedule. Only a small proportion of patients have formal jobs such as civil servants or the private sector as much as 11%, while some others had independent or informal work.[5]

Comparative analysis of real costs and INA-CBG's rates was shown in Table 5. INA-CBG’s rates is the rate for claims

payment by BPJS Kesehatan (Indonesia Health Insurance) to the advanced level of Health Facilities for service packages based on disease diagnosis groupings. Based on the Indonesia Ministry of Health Regulation Number 64 of 2016, the INA CBG's rate for hemodialysis patients in type B government hospitals is 879,100 IDR with ICD-10 code was N-3-15-0.

Table 5. Real Costs and INA-CBG's Rates Comparison

Kode INA CBG's	Number of Patient	Average of Real Costs (IDR)	INA CBG's Rates (IDR)	*p* value
N-3-15-0	65	836.686	879.100	0,000

The results of the study at type B government hospitals showed that the average real cost of chronic kidney disease patients undergoing hemodialysis was 836,686 IDR, which was lower than the INA-CBG's rates which had been set at 879,100.00 IDR. The result of the p-value is 0.000 (p<0.005) which indicated that real costs had a significant difference with INA CBG's rates. This cost difference can be seen in the INA-CBG's tariff for 65 CKD patients of the type B government hospital, which had a total value of 421,968,000.00 IDR in a month, which was greater than the total real cost for 65 patients which was only 401,458,876.00 IDR in one month. Therefore, there was about 20,509,124.00 IDR retrenchment in the type B government hospital. This result is in accordance with previous research conducted at a type B Hospital, Jakarta, which showed that the average real cost for hemodialysis was 740.875.00 IDR, which is lower than the INA-CBG's rates according to Indonesia Ministry of Health Regulation Number 59 of 2014 which was 982.600.00 IDR.[5]

The result of the p-value is 0.000 (p<0.005) which indicates that real costs have a significant difference with INA CBG's rates. Some factors that are considered influential are the cost of medicines that differ from one patient to another and also laboratory checks that are adjusted to the patient's comorbid disease. These results are also in accordance with research conducted by Azalea et al (2016) which explains that several groups of chronic kidney disease patients with hemodialysis have significant differences in terms of the comparison of real hospital costs and INA CBG's rates which are influenced by the amount of treatment costs and also the frequency of hemodialysis.[13]

In the hospital, the hemodialysis rate contribute to the largest component of the total direct medical cost for all patients. This result was correspondence with the previous research conducted by Fauziah (2015) and Tania and Thabrany (2017) that the largest component in direct medical costs for chronic kidney disease is hemodialysis rate.[5,12]

Conclusions

The average cost of illness for CKD patients with hemodialysis for a month treatment in the type B government

hospitals was 6,224,277.00 IDR. The average real cost of CKD patients with hemodialysis for one procedure in the type B government hospitals was 836,686 IDR which was significantly lower than the INA-CBG's rates.

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