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Disparities in hospital cost and INA-CBGs tariff with unit cost analysis of inpatient services

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***Abstract*—** The National Health Insurance Program, a form of health insurance that has been implemented since 2014, which uses the Indonesian Case Based Groups (INA-CBGs) system. The implementation of this system ensures that patients get good service and hospitals get standard tariff. The intended tariff is in the form of a package which includes all components of hospital costs. This study aims to determine the relationship between the unit cost of all health service cost components and the INA-CBGs tariff and how the gap is. The research sample was taken from the INA-CBGs claim document in the second quarter of 2020 as many as 4,833. Data were analyzed using linear regression to find a relationship between hospital health service costs and the INA-CBGs tariff. Hospital service costs are calculated based on unit cost analysis. The average unit cost of laboratory was IDR 853,500 (7.91%), radiology IDR 366,198 (3.39%), treatment IDR 2,031,850 (18.82%), Examination IDR 4,205,745 (38.95%), Consumables IDR 345,092 (3.17%), and Drugs IDR 3,022,694 (27.76%). The results of the analysis showed Laboratory (b = 1.639; 95% CI = 1.177 to 2.100; p <0.001), Treatment (b = 0.915; 95% CI = 0.852 to 0.978; p <0.001), Examination and Accommodation (b = 1.211; 95% CI = 1.138 to 1.285; p <0.001), and Drug (b = 0.015; 95% CI = 0.007 to 0.024; p <0.001) had a significant relationship with the INA-CBGs tariff. Other variables such as Radiology (b = -0.141; 95% CI = -0.629 to 0.347; p <0.001) and Consumable Costs (b = -0.343; 95% CI = -696 to 0.009; p <0.001) had no significant relationship with INA-CBGs Tariff. However, all cost components have a significant effect (p <0.001) of 42.7% on the INA-CBG tariff with a strong influence category (R = 0.654). Hospitals must be wiser in managing finances with the INA-CBGs pattern, because the tariff may look small because there are some treatment that are not cost effective or there are still unnecessary treatment for patients taking a large portion of the cost of the package.

Keywords—INA-CBGs, tariff, hospital, unit, cost

I. INTRODUCTION

Health services with good quality and affordable costs are a hope for the entire community. For this reason, the hospital which is the main health service provider is also required to control costs and quality control, so the government imposes a tariff as it is known as the INA CBGs system. The point is to change the tariff that previously used the fee for service system (FFS) to become a prospective payment system.

The National Health Insurance Program (NHI), a form of health insurance that has been implemented since 2014, which uses the Indonesian Case Based Groups (INA-CBGs) system. INA-CBGs is a disease grouping system based on the same clinical features and resources used in medicine. This grouping is intended for health financing in the provision of health insurance as a prospective payment pattern. The implementation of this system ensures that patients get good service and hospitals get standard tariff. The intended tariff is in the form of a package which includes all components of hospital costs. Based on costing data and disease coding referring to the International Classification of Diseases (ICD) compiled by WHO. Using ICD-10 to diagnose 14,500 codes and ICD-9 Clinical Modifications which include 7,500 codes [1].

The change in financing from FFS to INA-CBGs brought the hospital to face conditions that could become threats or opportunities. There is an opportunity if the hospital can make good use of the JKN program so that the difference in claims is positive because it is able to adjust to the INA-CBGs tariff and there is a negative one because it has not been able to provide effective and efficient services so that it becomes a threat to hospital financial management [2]. Hospitals must be wiser in managing finances with the INA-CBGs pattern, because the tariff may look small because there are some actions that are not cost effective or there are still unnecessary actions taken on patients taking a large portion of the cost of the package. Therefore, every hospital must implement clinical pathways, which is an approach that can be used in cost rationalization without reducing the quality of health services [3].

The determination of the INA-CBG Tariff requires a long process, starting with the UC calculation carried out by the Ministry of Health's Tariff Team. Analysis of basic data and hospital costing data were carried out from a number of selected hospitals. INA-CBGs tariff are the average cost required for a detailed diagnosis group for 5 regional, hospital classes, hospital ownership (public or private). The development of standardized hospital services with financing or payment will be able to provide many benefits for patients. health service providers and funders [1].

The unit cost as the basis for calculating the INA-CBGs tariff as carried out by the Ministry of Health's Tariff Team is not just taken for granted but through a fairly complicated process. Several studies suggest that it is very important to determine the tariff based on unit cost because it determines the main day of inpatient or outpatient care. Research by Putri in 2014 uses the unit cost calculation method with the Activity Based Costing (ABC) method to set tariff, when compared to traditional methods, the ABC method gives greater results

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except for the VIP class which gives smaller results. It is important to know the unit cost calculation so that the hospital can sell services (tariff) without experiencing losses or taking excessive profits. The tariff is set based on the unit cost plus the profit margin with the amount depending on the hospital policy. Thus, the hospital can manage sufficient costs after calculating the unit cost [4]. There are many types of products produced by the hospital, resulting in many types of costs and activities occurring in the hospital. This situation demands the accuracy of charging overhead or full costs in determining product prices. These charges are used to calculate the unit cost of services [5].

Several hospital managements complained that INA-CBGs tariff were deemed insufficient to meet the actual cost of services (actual cost). The results of Edya's research in 2017 show that the Cost Recovery Tariff for inpatients of the National Health Insurance is 83.20%, which means that the income from inpatients who participate in the National Health Insurance has not been able to fully cover the operational costs of inpatients for the National Health Insurance participants [6]. Another study on outpatients in a hospital by Aulia et al in 2015 stated that the costs incurred by the hospital, both fixed and non-fixed costs, are covered by the income of patient services at the INA-CBGs tariff. By calculating the real income figure minus the total direct and indirect costs, the hospital's profit will be 9% [7]. Budiarto and Sugiarto's research in 2013 based on data from participants in hospitalized public health insurance in 10 hospitals owned by the Ministry of Health stated that the cost of INA-CBGs claims was 14.39% greater than the cost according to hospital tariff for both class A, B and specialized hospital [8]. Meanwhile, research by Maryati et al in 2020 states that special, class A and government-owned hospitals have a 1.926 times better INA-CBG tariff accuracy compared to public, class B and private hospitals although the relationship is not statistically significant (b = 1,926; 95% CI = 0.865 to 4,290; p = 0.158) [9]. Research by Maryati et al in 2019 shows that the total hospital tariff is IDR 582,373,996 compared to the total claim tariff in the INA-CBG system of IDR 526,431,595, resulting in a negative difference of IDR 55,942,371 (9.6% of the total hospital tariff) [10]. Based on these facts, the researcher conducted a study on disparities in hospital tariff and INA-CBGs tariff with unit cost analysis of inpatient services.

II. METHOD

This type of research is quantitative research with secondary data analysis and cross-sectional study design. The population in this study was a medical record document of hospitalized patients in the second trimester of 2020 at one of the referral hospitals in Surakarta, Indonesia. Samples to be taken must meet the inclusion criteria, namely: 1) 2020 National Health Insurance inpatient claim documents, 2) Complete and verified claim documents, 3) Claim documents that are not pending and dispute claims. The sample used in the study was 4833 claim documents. The variables in this study were laboratory costs, procedures costs, examinations costs, drugs costs, radiological costs and consumables costs and tariff of INA-CBGs. Data collection was carried out by observing the claim documents of inpatients of the National Health Insurance. The collected data were analyzed using Multiple Linear Regression in order to draw conclusions.

III. RESULT

From a total sample of 4833 data on the cost of inpatient health services, the smallest laboratory fee is IDR 54,188 while the highest laboratory fee is IDR 8,290,359. The smallest Radiology cost was 189.006 while the highest Radiology cost was 5,981,052. The smallest treatment fee is IDR 2,055,000, while the highest treatment fee is IDR 64,675,000. The smallest Examination and Accommodation fee is IDR 167,500 while the highest Examination and Accommodation fee is IDR 72,170,750. The smallest Consumable Costs are IDR 1,348 while the most Consumable Costs are IDR 15,176,450. The smallest drug cost was IDR 58,891 while the highest drug cost was IDR 2,080,951,431 (Table 1).

Table 1 Description of Research Variables

No	Kind of service	Mean	Min (IDR)	Max (IDR)
1	Laboratory	853,500	54,188	8,290,359
2	Radiology	366,198	189,006	5,981,052
3	Treatment	2,031,850	2,055,000	64,675,000
4	Examination &Accommodation	4,205,745	167,500	72,170,750
5	Consumable Costs	345,092	1,348	15,176,450
6	Drugs	3,022,694	58,891	2,080,951,431

Based on the data on the percentage of unit cost to the total cost of health services, the cost of examination and accommodation was in the first place as the highest cost, namely IDR 4,205,745 (38.95%). In second place, the cost of using medicines is IDR 3,022,694 (27.76%). Treatment costs rank second after drugs, namely IDR 2,031,850 (18.82%). In the next sequence there is a laboratory examination fee of IDR 853,500 (7.91%), a radiology examination fee of IDR 366,198 (3.39%) and the lowest cost is a consumable cost of IDR 345,092 (3.17%) (Table 2).

Table 2 Percentage of Average Unit Cost to Total Cost

No	Kind of service	Average Unit Cost (IDR)	Percentage (%)
1	Laboratory	853,500	7.91
2	Radiology	366,198	3.39
3	Treatment	2,031,850	18.82
4	Examination and Accommodation	4,205,745	38.95
5	Consumable Costs	345,092	3.17
6	Drug	3,022,694	27.76

The results of multiple correlation analysis showed that the R number was 0.654. This shows that the relationship between Laboratory, Radiology, Treatment, Examination and Accommodation, Consumable Costs, and Drug with the INA-CBG tariff is in the strong category (0.600 - 0.799). The R2 (R Square) number is 0.427 or (42.7%). This shows that the percentage contribution of the influence of Laboratory, Radiology, Treatment, Examination and Accommodation, Consumable Costs, and Drug to the INA-CBGs Tariff is 42.7% (Table 3).

Simultaneous regression coefficient analysis is carried out by using the F test through the following stages: (1) Formulating a hypothesis consisting of Ho: Laboratory, Radiology, Treatment, Examination and Accommodation, Consumable Costs, and Drug simultaneously does not have a significant effect on Tariff. INA-CBGs and Ha: Laboratory, Radiology, Treatment, Examination and Accommodation, Consumable Costs, and Drug simultaneously have a

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significant effect on the INA-CBGs Tariff; (2) Determine the level of significance, namely 5% (0.05); (3) Determining the F count from the results of the SPSS calculation, the value is 599.989; (4) Determine the F table using a significance level of 95%, a = 5%, then df 1 = k - 1 = 7 - 1 = 6, df 2 = 4833 - 7 = 4826 (n is the number of respondents and k is the number of variables), the results obtained for the F table are 0.270; (4) Determining the significance value of the results of the SPSS calculation, the p value is <0.001 (Table 4).

The calculated F value is 599.989 with p value <0.001. This shows that the calculated F value is greater than the F table 0.270 and the p value is less than 0.05. Thus, Ho was rejected, and Ha accepted. This means that Laboratory, Radiology, Treatment, Examination and Accommodation, Consumable Costs, and Drug simultaneously have a significant effect on the INA-CBGs Tariff (Table 4). The results of the partial regression coefficient test can be seen that Laboratory (b = 1.639; 95% CI = 1.177 to 2.100; p <0.001), Treatment (b = 0.915; 95% CI = 0.852 to 0.978; p <0.001), Examination and Accommodation (b = 1.211; 95% CI = 1.138 to 1.285; p <0.001), and Drug (b = 0.015; 95% CI = 0.007 to 0.024; p <0.001) had a significant relationship with the INA-CBGs tariff. Other variables such as Radiology (b = -0.141; 95% CI = -0.629 to 0.347; p <0.001) and Consumable Costs (b = -0.343; 95% CI = -696 to 0.009; p <0.001) had no significant relationship with INA-CBGs Tariff (Table 5).

Table 3 Multiple Correlation Analysis and Determination Test

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	,654[a]	,427	,427	9609970,33218	,427	599,989	6	4826	,000	1,829

a. Predictors: (Constant), Drug, Radiology, Consumable Costs, Treatment, Examination and Acomodation, Laboratory

b. Dependent Variable: INA-CBGs Tariff

Table 4 Simultaneous Regression Coefficient Analysis

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3324592577768 16260,000	6	5540987629613 6040,000	599,989	,000[b]
	Residual	4456884827438 76990,000	4826	9235152978530 3,980		
	Total	7781477405206 93250,000	4832			

a. Dependent Variable: INA-CBGs Tariff

b. Predictors: (Constant), Drug, Radiology, Consumable Costs, Treatment, Examination and Acomodation, Laboratory

Table 5 Partial Regression Coefficient Test

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2603880,232	218154,954		11,936	,000	2176197,116	3031563,347
	Laboratory	1,639	,235	,098	6,963	,000	1,177	2,100
	Radiology	-,141	,249	-,007	-,567	,571	-,629	,347
	Treatment	,915	,032	,338	28,576	,000	,852	,978
	Examination and Acomodation	1,211	,038	,449	32,299	,000	1,138	1,285
	Consumable Costs	-,343	,180	-,023	-1,908	,056	-,696	,009
	Drug	,015	,004	,039	3,560	,000	,007	,024

a. Dependent Variable: INA-CBGs Tariff

The results of unit cost calculations in this study are mostly lower than the 2016 INA-CBG tariff. It can be said that the 2016 INA-CBG tariff reflect the actual cost of services or are fair enough to be applied in hospitals as service providers for NHI participants. Tariff changes made by the government are in the context of providing fair payments to hospitals according to the services that have been provided. The amount of the tariff needs to be managed efficiently by the hospital in order to be able to pay for quality health services and to get benefits in order to provide adequate remuneration services for health providers or management staff. No matter how big the tariff, if there is waste by the provider, the unit cost that occurs will swell and of course have an impact on cost insufficiency.

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Tariff control is essential for health service providers to maintain financial viability in economic competition. Apart from tariff, improving the quality of health services is also something that must be considered by health service providers and policy makers [11]. If the claim is too low, then it cannot pay for the treatment costs that have been incurred, so that health service providers will try to reduce expenses by reducing quality. If the claim is too high, health service providers do not have efforts to make efficiency and of course this will waste existing resources [12]. It has been shown in various studies that tariff and quality of health services are interrelated [13], although often policy makers consider that tariff and quality of health services are two separate things [14]. There are many problems related to tariff and quality of health services, because it is difficult to achieve the goal simultaneously between adequate tariff and optimal quality of health services [15]. Good quality health services can increase hospital profits through prospective payment methods, so efficiency is the best balance between tariff and quality of health services [16]. Determinants that indicate hospital efficiency include competition, average bed use, number of doctors, number of nurses, use of technology, family structure, length of days of treatment, and health policy [15].

Hospital management must conduct an evaluation in order to be able to manage health services efficiently. Re-evaluating the calculation of medical service costs will support the achievement of high cost efficiency without neglecting quality. In accordance with the demands of the NHI, the hospital needs to improve the quality of service both in terms of health workers in service or management according to the accreditation indicators. The quality of hospital services will be achieved if the hospital evaluates the strategy for managing costs from the INA-CBGs tariff by conducting management audits, quality management and clinical costs, improving Clinical Quality, Electronic Data Interchange / EDI, Revenue Management, conducting Team coordination Clinical staff (Management Information Systems, Financial Management, Professional Staff, Health Financing). In addition, the hospital management must compile a Strategic Planning and Financial Management to identify and implement cost reduction strategies, and increase productivity through the revenue cycle, as well as take advantage of investment in information technology systems as a support. Tariff that reflect the actual cost of services will encourage the hospital to meet the medical needs needed by patients and provide rewards to hospitals that have provided services with satisfactory outcomes [17].

Clinical Pathway is an integrated service planning concept that summarizes every step given to patients based on evidence-based medical service standards and nursing care with measurable results and within a certain period while in the hospital. This clinical pathway is one of the components of the casemix system which consists of disease coding and action procedures (ICD-10 and ICD 9-CM) and cost calculations (either top down or activity-based costing or a combination of both). The implementation of the Clinical Pathway is closely related to Clinical Governance in terms of maintaining and improving the quality of services at an estimated and affordable cost. This method is a health service management model that has been widely applied by hospitals in various parts of the world. In 2003 it was reported that as many as 80% of hospitals in the United States had applied clinical pathways [3].

The implementation of the Clinical Pathway is closely related and related to Clinical Governance in order to maintain and improve the quality of service at an estimated and affordable cost [18]. Medical service standards are not necessarily the same as Clinical Pathways which can be used as a component of Cost analysis. Clinical Pathway is not used to estimate tariff but for maintenance cost weight (directly related to Length of Stay standardization). The application of clinical pathways in providing inpatient services will greatly assist diagnosis because the objectives of the Clinical Pathway include reducing service variations so that costs are more predictable, services are more standardized, improve quality of service (Quality of Care), improve costing procedures, improve the quality of information which has been collected as well as a counter-check, especially in cases of high cost, high volume [19].

IV. CONCLUSION

The unit cost of the results of this study is mostly lower than the INA-CBGs tariff, so it can be concluded that the INA-CBGs tariff reflect the actual cost of services or are fair enough to be applied in hospitals as service providers for NHI participants. Tariff control is essential for health service providers to maintain financial sustainability. Clinical pathway concept for is currently a concept most appropriate for use by the hospital, in serving NHI patients with the INA-CBGs package tariff. Activity based costing (ABC) method can be used by the hospital, as a basis for determining service tariff health for BPJS patients and non BPJS patients. ABC method too can show the level of efficiency service from each unit activity, by looking at the activity service by the number of services that are can and costs incurred for the service. Hospital management must evaluate in order to be able to manage health services efficiently without neglecting the quality of services provided to patients.

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