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Discrepancies in Hospital Cost and Indonesia's Case-based Groups: A Literature Review

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ABSTRACT

Background: Indonesia started establishing national health insurance in 2014. Implementation of Indonesian national health insurance has frequent gaps between health expenditures based on hospital tariffs and the INA-CBG tariff

Objectives: This review was aimed to compare the hospital tariff of healthcare to the INA-CBGs tariff and to identify the factors contributing to the actual cost.

Methods: Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology followed in this research. The keywords "Real Cost and INA CBG'S" were used in Google Scholar, and the keywords "INA CBG'S AND REAL COST" on PubMed, ScienceDirect, and Scopus between 2014 and 2022.

Results: A total of 634 records were found through database searching of Google Scholar (594), PubMed (1), ScienceDirect (36), and Scopus (3). After the screening process, 24 articles were included in the review. It was found that 13 articles (54.16%) showed a lower hospital tariff than INA CBG's tariff, while 11 articles (45.84%) showed a higher hospital tariff than INA CBG's tariff. The main factors affecting the gaps of hospital tariff versus INA CBGs tariff mentioned in the articles were LOS, severity, and hospitality class.

Conclusion: The literature of this review found hospital rates are higher with rates of INA-CBGs in many hospitals, so it requires a review of rates and an efficient strategy of hospitals.

Keywords: Cost Containment; Discrepancies; Hospital Tariff; INA-CBG'S

INTRODUCTION

The case-mix system is a grouping of assessments and procedures based on similar or same clinical characteristics and use of resources or cost of treatment. In developed countries, the case-mix system is widely used in health payment systems and is currently being implemented in developing nations.[1] The Diagnosis-related Groups (DRGs) was the inaugural grouping system established under the case-mix system, allowing hospitals to correlate the types of patients they treat with the associated costs they incur. In health system management, DRGs serve as a potent instrument for hospital administrators. Hospital administrators use DRGS to assess both hospital expenses and hospital performance.[2] DRGS are widely used in the healthcare industry to address cost, effectiveness, and quality of care.[3] DRGS may encourage hospitals to implement quality control, cost control, and efficient patient care.[4]

The case mix system was developed for the first time in 2006 in Indonesia under the name INA-DRGS; Indonesian Diagnosis-related Group was renamed Indonesia Clinical Behavioral Group (on September 31, 2010).[1] National Health Insurance (NHI) team established the Indonesia Case Based Group (INA-CBGs) tariff rates for the healthcare payment system, which is a prospective payment mechanism at the hospital level. The INA-CBGs were designed with the assistance of health professional groups and the Association of Hospitals and a detailed

assessment of treatment standards and compensation in various situations.[5] INA-CBGs application is utilized by Health Service Providers, including Hospitals, Health Centers, and Medical Centers, to submit service claims. The INA-CBG tariff is the benchmark for Indonesia's Social and Health Insurance Agency, known as Badan Penyelenggara Jaminan Kesehatan (BPJS). Health financing is based on the disease diagnosis. Disease classification is critical since payment varies depending on the kind of exposure.[1] There is no ideal financial system; each financing method has advantages and disadvantages.[1] One of the issues involves tariff, where there are frequent disparities between health expenditures based on real costs and the rates of INA-CBGs.[6,7]The hospital was dissatisfied with INA CBG's fees[8] because the INA-CBG tariff were insufficient to cover the actual service cost (actual cost).[9] Income from inpatients participating in BPJS Kesehatan has not been fully able to cover the operational costs of inpatients participating in BPJS Kesehatan.[9]In an exemplary implementation, hospital tariff conditions are less than INA CBG.'s, and if a positive difference is obtained for the hospital, it represents a profit for the hospital in managing and providing therapy to patients effectively and efficiently.[10] Meng[11] has conducted a systematic review and meta-analysis evaluating the effects of Diagnosis-Related Group (DRGS)-based and cost-based reimbursements on inpatient health usage in six countries, specifically on length of stay (LOS).[12] In Indonesia, many researchers have conducted research comparing hospital tariffs and INA CBG's tariffs, but there are no reviews about these topics.

The research aimed to compare the cost of healthcare to the INA-CBGs tariff and to evaluate the factors that influence the hospital tariff in Indonesia. This study may provide insights that lead to the need to cost containment strategy in Indonesia.

METHODS

Study design

This study is a literature review that evaluates hospital tariff versus the Indonesia Case Base Groups (INA-CBGs) tariff Discrepancies.

Search strategy

The data collection process consisted of three primary phases: first, we identified and selected relevant studies on our topic. Second, we evaluate the retrieved research that satisfied all eligibility criteria. Then, we conducted a review and data extraction for each study. The literature review was conducted by entering the keywords "Real Cost and INA CBG'S" on Google Scholar and "INA CBG'S AND REAL COST" on PubMed, ScienceDirect, and Scopus between 2014 and 2022.

Eligibility criteria

Inclusion criteria for this review include a publication detailing the differences between hospital tariff and INA-CBG's from hospitals serving BPJS both in English and Indonesian. The exclusion criterion is articles before the specific date, thesis, articles in the conference, and articles before the implementation of the NHI.

Data Extraction

Diagrams from PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guided the selection of studies. It was shown in Figure 1. The first author extracted data from articles which the others reviewed articles. The data extraction form included detailed type of study, hospital type, hospital Class, disease, region of NHI and Difference.

RESULTS AND DISCUSSION

The literature evaluation, concentrating on discrepancies in hospital charges with INA-CBG's, was derived from research articles published between 2014 and 2022. It was discovered at 634. After eliminating duplicates, the total number of articles decreases to 631. A total of 36 articles satisfy the inclusion criteria. We screened 24 full-text papers for eligibility, of which 13 (54.16%) exhibited lower hospital costs than INA-CBG's tariff, whereas 11 (45.84%) showed higher hospital tariffs than INA-CBG's tariff. The clear difference between hospital costs and INA CBG's tariff can be seen in Table I. This table presents studies, hospital type based on ownership, hospital class, type of disease, BPJS regional, and differences. The hospital tariff gap with INA-CBG's tariff is based on a surplus or deficit difference. The surplus gap meant that the hospital tariff was lower than the INA-CBG's tariff; on the other hand, the deficit gap meant that the hospital tariff was higher than the INA-CBG'S tariff.

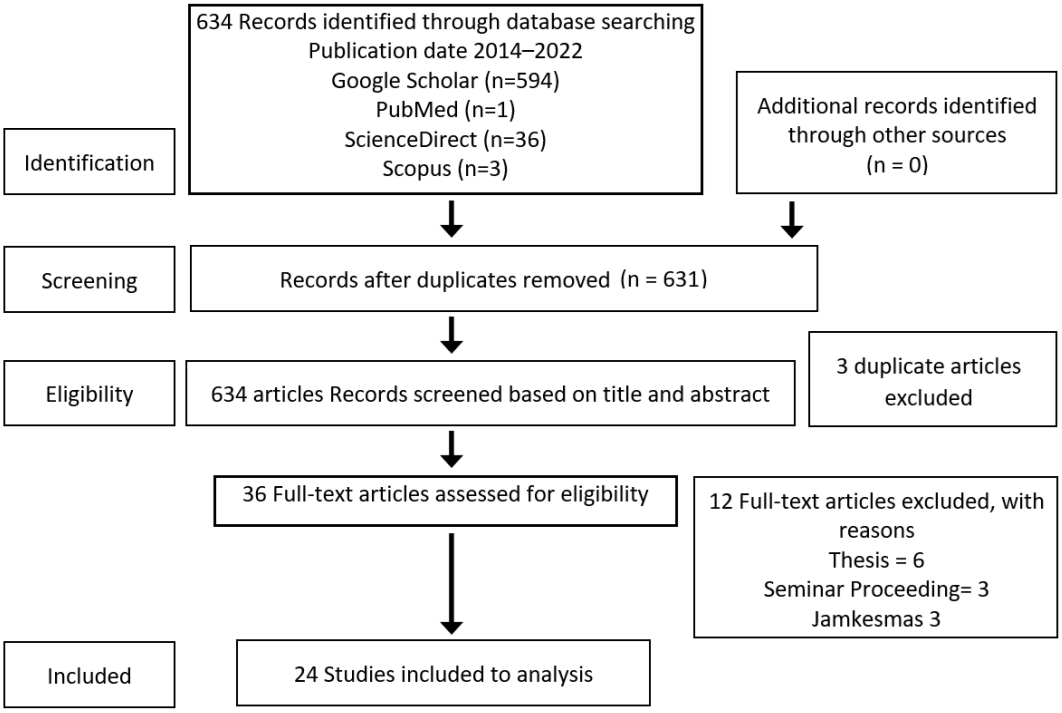

Figure I. Prisma Flow Diagram

Table I. Literature Review Comparison of hospital tariff and INA CBG'S

Study	Hospital Type	Hospital Class	Regional*	Difference**
Agustina et.al. (2020)[13]	Private	C	Regional 3	Surplus
Astuti et al. (2021)[14]	Private	C	Regional 1	Deficit
Aisyah et al. (2019) [15]	Public	A	Regional 3	Surplus
Cahyani et.al. (2018)[16]	Public	B	Regional 3	Surplus Code I64 Deficit Code 163.9
Chetrine et al. (2022) [17]	Public	B	Regional 1	Surplus
Damara (2022)[18]	Public	C	Regional 2	Deficit
Dewi and Andayani. (2021)[19]	Public	A	Regional 1	Deficit
Dwidayati et.al. (2016)[10]	Public	B	Regional 1	Surplus
Hayul et al. (2020)[20]	Public	B	Regional 1	Deficit
Lakoan et al. (2019)[21]	Public	B	Regional 1	Surplus
Oktadiana (2019)[22]	Public	B	Regional 1	Surplus
Manawan et.al. (2019)[23]	Public	A	Regional 3	Deficit
Negara et al. (2021)[24]	Public	B	Regional 1	Surplus
Nisa and Raharjo (2021)[25]	Public	B	Regional 1	Deficit
Rahmani (2022)[26]	Public	A	Regional 1	Surplus
Santoso et.al. (2020)[27]	Private	B	Regional 1	Deficit
Satibi et al. (2019)[28]	Public	A	Regional 2	Surplus
Siwi et al. (2016)[29]	Public	B	Regional 1	Surplus
Sofan and Syamsudin. (2021)[30]	Public	B	Regional 1	Surplus
Sulistyaningrum et.al. (2021)[31]	Private	B	Regional 1	Deficit
Tusshaleha (2018)[32]	Public	A	Regional 2	Surplus
Kusuma and Ariawati. (2018)[33]	Public	A	Regional 2	Surplus
Wirastuti et.al. (2019)[34]	Private	B	Regional 1	Deficit
Wirantari et.al. (2020)[35]	Public	A	Regional 2	Deficit

Note: * Regional grouping is based on area grouping of the NHI; **The total difference of all hospitalization costs for all classes and severity level

Table II. Hospital Tariff Gap with INA-CBG's tariff Based on The Disease and Severity

Study	Hospital tariff gap with INA-CBG's tariff				
	Positive (IDR)*	Negative (IDR)*	%	Disease	Severity/Class/Code/Treatment
Agustina et al., (2020)[12]		210,000	112	Typhoid	Mild Severity
	150,387	-	82		Severe Severity
Astuti et al., (2021)[13]	-	6,642,79	106,42	Hearth Failure	Severity I
	-	17,467,36	118,21		Severity II
	-	16,048,27	136,86		Severity III
	-	29,508,207	135,28		Class 1
	-	6,609,172	109,51		Class 2
	-	4,041,051	104,50		Class 3
	25,895,316	-	70,19		Treatment ≥ 1
	-	66,053,746	142,32		Treatment < 1
	-	4,284,743	105,56		Code diag. I
	-	35,873,687	121,63		Except kode I
	29,574,300	-	80,14		LOS≤ 5 days
	-	69,732,730	174,16		LOS > 5 days
Aisyah et al., (2019)[14]	1,353,827	-	70,84	Breast Cancer	Class 1 Severity I
	1,070,276	-	67,72		Class 1 Severity 3
	5,095,179	-	41,68		Class 2 Severity I
	3,900,808	-	47,91		Class 2 Severity 2
	3,376,292	-	45,90		Class 2 Severity 3
	7,860,147	-	33,54		Class 3 Severity1
	5,953,000	-	33,54		Class 3 Severity 3
Cahyani et al., (2019)[15]	17,173,346		92	Stroke	Code I64
	-	53,086,479	100,7		Code 163,9
Chetrine. et al., (2022)[16]	23,288,466	-	57	Stroke	Class 1 Severity I
	126,321,966	-	59		Class 1 Severity II
	459,868	-	98		Class 2 Severity I
	29,841,707	-	71		Class 2 Severity II
	13,534,612	-	85		Class 3 Severity I
	143,777,706	-	34		Class 2 Severity II
	-	2,403,235	105		Class 1Severity III
Damara, (2022)[17]	-	1,584,160,835	119	Top 10 diseases	The difference in total costs
Dewi & Andayani, (2021)[18]	-	62,187,362	-	Breast Cancer	Severity 1
	6,159,896	-	-		Severity 2
	64,042,570	-	-		Severity 3
Dwidayati et al., (2016)[10]	23,455,157	-	79,33	Stroke	Severity 1 Class 1
	4,601,088	-	82,66		Severity 1 Class 2
	43,762,584	-	74,73		Severity 1 Class 3
	-	5,818,145	115,59		Severity 2 Class 1
	4,753,172	-	80,19		Severity 2 Class 2
	22,047,172	-	63,24		Severity 3 Class 3
	8,476,948	-	27,33		Severity 3 Class 1
	-	1,119,484	111,20		Severity 3 Class 2
	4,835,948	-	70,98		Severity 3 Class 3

Table II. Hospital Tariff Gap with INA-CBG's tariff Based on The Disease and Severity (Continue)

Study	Hospital tariff gap with INA-CBG's tariff				
	Positive (IDR)*	Negative (IDR)*	%	Disease	Severity/Class/Code/ Treatment
Hayul et al., (2020)[19]	1,435,183	-	82,59	Diabetes	N-4-15-I Severity 1
	971,749	-	86,86		N-4-15-I Severity 2
	6,776,313		74,31		N-4-15-I Severity 3
	330,419		98,43		N-4-15-II Severity 1
	549,967		95,92		N-4-15-II Severity 2
	2,031,930		92,26		N-4-15-II Severity 3
		476,422	100,50		N-4-15-III Severity 1
		220,910	100,86		N-4-15-III Severity 2
		23,286,250	154,44		N-4-15-III Severity 3
Lakoan et al., (2019)[20]	2,069,515	-	61,57	Congestive heart failure	Severity 1 Class1
	1,503,250	-	67,43		Severity 1 Class2
	2,465,322	-	45,06		Severity 1 Class3
	5,035,596	-	45,42		Severity 2 Class1
	4,228,526	-	45		Severity 2 Class 3
	6,252,992	-	43,73		Severity 3 Class1
	5,584,14	-	41,37		Severity 3 Class2
	5,619,582	-	39,32		Severity 3 Class3
Oktadiana, (2019)[21]	320,531	-	81,77	Hypertension	Severity 1 Class1
	611,617	-	71,02		Severity 1 Class2
	461,315	-	81,26		Severity 1 Class3
	507,166	-	75,23		Severity 2 Class1
	1,047,210	-	63,46		Severity 2 Class 3
	870,183	-	78,37		Severity 3 Class1
	385,312	-	88,8		Severity 3 Class3
Manawan et al., (2019)[22]	-	168,479,055	205,10	Breast Cancer	C-4-13-1
	-	82,388,376	159,61		C-4-13-11
	-	143,642,276	139,38		C-4-13-III
	-	309,052,477	118,79		L- 1-50-1
	-	242,343,118	138,16		L- 1-50-II
	-	5,488,229	109,99		L-1-50-Il
	-	79,638,211	128,79		L-4-11-1
	-	500,721,446	157,10		L-4-11-11
	214,887,977		80,40		L-4-11-Ill
Negara et al., (2021)[23]	29,785,499	-	64,38	Diabetes	E-4-10-I Class 1
	76,359,738	-	66,44		E-4-10-II Class 1
	75,474,249	-	60,47		E-4-10-III Class 1
	46,850,430	-	63,41		E-4-10-II
	34,637,570	-	67,38		E-4-10-I Class 1
	54,640,600	-	62,64		E-4-10-I Class 1I
	60,761,040		59,63		E-4-10-I Class 1II
Nisa and Raharjo, (2021)[24]	-	33,336,673	105,21	Coronary heart disease	The difference in total costs
Rahmani et al., (2022)[25]	71,830		28,17	Kidney	The difference in total costs

Table II. Hospital Tariff Gap with INA-CBG's tariff Based on The Disease and Severity (Continue)

Study	Hospital tariff gap with INA-CBG's tariff				
	Positive (IDR)*	Negative (IDR)*	%	Disease	Severity/Class/Code/ Treatment
Santoso et al., (2020)[26]	-	9,861,600	103,85	Breast Cancer	L-1-50-I Class 1
	-	30,643,000	109,76		L-1-50-I Class 2
	-	146,724,100	100,00		L-1-50-I Class 3
Siwi et al., (2016)[28]	7,115,785,21	-	56,99	Fracture radius ulna	Severity 1
Sofan and Syamsudin, (2021)[29]	589,918	-	83,99	Ischemic Stroke	Class 3 Severity 1
	3,322,631	-	50,14		Class 3 Severity 2
	4,964,746	-	44,22		Class 3 Severity 3
	554,848	-	87,45		Class 2 Severity 1
	2,977,941	-	62,76		Class 2 Severity 2
	4,930,264	-	50,69		Class 2 Severity 3
	791,892	-	84,65		Class 1 Severity 1
	4,177,674	-	55,22		Class 1 Severity 2
	11,665,300	-	41,44		Class 1 Severity 3
Santoso et.al., (2020)[26]	-	1,289,449	129,37	Chronic kidney disease	Class 1 Severity 1
	-	2,202,157	131,70		Class 2 Severity 1
	-	3,436,358	146,71		Class 3 Severity 1
	-	3,227,659	119,19		Class 1 Severity 2
	-	1,825,339	11,99		Class 2 Severity 2
	-	1,141,970	145,47		Class 3 Severity 2
	-	1,595,390	204,61		Class 2 Severity 3
Satibi(2019)[27]	4,099,765		78,7	Breast cancer	Class 1
	3,667,672		70,89	Cervical cancer	Class 1
	3,628,786		69,66	Nasopharyngeal cancer	
	3,711,557		83,12	Breast cancer	Class 2
	3,720,427		84,61	Cervical cancer	Class 2
	3,721,347		83,34	Nasopharyngeal cancer	Class 2
	3,190,815		85,75	Breast cancer	Class 3
	3,185,545		84,74	Cervical cancer	Class 3
	2,822,905		75,87	Nasopharyngeal cancer	Class 3
	8,270,338		84,36	Breast cancer	Class 1
	7,366,833		80,92	Cervical cancer	Class 1
	7,476,608		88,97	Breast cancer	Class 2
	7,364,655		89,5	Cervical cancer	Class 2
	6,408,885		91,52	Breast cancer	Class 3
	6,306,591		90,06	Cervical cancer	Class 3
	6,048,605		86,37	Nasopharyngeal cancer	Class 3
	10,592,704		78,25	Breast cancer	Class 1
	10,451,749		90,08	Cervical cancer	Class 1
	11,478,010		84,79	Nasopharyngeal cancer	Class 1
	11,038,109		95,13	Breast cancer	Class 2
	9,795,986		92,1	Cervical cancer	Class 2

Table II. Hospital Tariff Gap with INA-CBG's tariff Based on The Disease and Severity (Continue)

Study	Hospital tariff gap with INA-CBG's tariff				
	Positive (IDR)*		Positive (IDR)*		Positive (IDR)*
	6,781,437		58,45	Nasopharyngeal cancer	Class 2
	7,673,560		79,36	Breast cancer	Class 3
	9,058,463		93,69	Cervical cancer	Class 3
	6,470,961		66,93	Nasopharyngeal cancer	Class 3
Tusshaleha (2018)[31]	3,716,554	-	71,45	Rectum Cancer	Severity 1 Class1
	2,930,222	-	65,32		Severity 1 Class 2
	3,009,750	-	81,26		Severity 1 Class3
	7,680,392	-	78,26		Severity 2 Class1
	6,351,268	-	90,97		Severity 2 Class 3
	10,179,575	-	75,08		Severity 3 Class1
	10,031,690	-	83,99		Severity 3 Class3
Kusuma and Ariawati, (2018)[32]	534,784,590	-	97,82	Thalassemia	The difference in total costs
Wirastuti et al., (2019)[33]	2,106,600	-	89,99	Stroke	Class I Kode G-4-14-I
	-	8,752,500	120,78		Class II Kode G-4-14-I
	-	5,538,600	111,52		Class III Kode G-4-14-I
	-	1,949,300	121,26		Outpatient Class III Code Q-5-44-O
Wirantari et al.,(2020)[34]	-	6,580,263	207	Congenital heart disease	Severity 1 Class 3
	-	7,577,037	202		Severity 1 Class 2
	-	5,133,184	148		Severity 1 Class 1
	-	5,133,184	166		Severity 2 Class 3

Note: *Indonesia Currency

Table III. Number of Studies with differences in hospital tariffs and INA-CBGs based on the type of hospital

Hospital Types	Hospital Classes						Total
	A		B		C		
	Surplus	Deficit	Surplus	Deficit	Surplus	Deficit	
Public	4	3	8	4		1	20
Private				3	1	1	5

Note * in a hospital two different result (surplus Code I64 dan deficit Code 163.9).

In Table II, the most prominent negative difference between the hospital tariff and the INA-CBGs tariff is Congenital heart disease in Severity 1 class 3 in Wirantari et al. ;[35] the percentage of difference is 2017%. In second place with 205,1% is the journal Manawan et al. [23], the disease is breast cancer in code c-4-13-1. In the journal, Sulistyaningrum et al.[31] chronic kidney disease follows with 204,61% in Class 2 Severity 3. On the other hand, the most significant positive difference is a journal [10] in Severity 3 Class 1, followed by [26] in The difference in total costs and [15] in Severity 3 Class 3. We can see in Table 2, in conditions of worsening severity and classes moving up to a higher class, the difference between the hospital tariff and the INA-CBGs rate increase,[14,19,20,22,27,29,31,33-34] even in two journals, the difference in severity 3 becomes negative .[17,20] Interestingly the difference becomes positive in code L-4-11-III.[23]

In this literature review, it was determined that there is a difference between the INA-CBGs tariff. Details on the results of the literature review for tariff difference data with the INA-CBGs based on the type of hospital can be seen in Table III.

The difference in actual expenses with INA-CBGs occurs because each hospital sets its rates based on its mission. Hospital charges are often based on a retrospective cost calculation, meaning payments are charged after the service has been rendered. Consequently, it does not motivate the team of health service professionals to be efficient. [36] INA-CBGs rates are determined using the prospective method. In the future, hospital rates will no longer be calculated using retrospective cost data. Another explanation is that the disparity is attributable to the hospital not implementing Clinical Pathways (CP) in inpatient services, affecting patient care procedures. Clinical Governance and CP implementation are interdependent to maintain and increase service quality at a cost that can be predicted and afforded.[9]

Clinical Pathways, considered a factor in cost analysis, are not always equivalent to medical service standards. The Clinical Pathway is not utilized for rate estimation but rather for maintenance cost weight (directly related to standardization of LOS). The application of clinical pathways in the provision of inpatient services will be of great assistance in establishing a diagnosis because the objectives of the Clinical Pathway include reducing the variety of services so that costs are more predictable, standardizing services, improving service quality (Quality of Care), improving costing procedures, and improving the quality of information [9]. The clinical pathway aims to enhance outcomes by enhancing care coordination mechanisms, which will save costs and benefit the quality of health services.

Because it is a standard protocol for disease treatment, implementing clinical pathways in health services is an essential requirement [37]. In this literature review, negative differences in private hospitals are higher (80%) than in government hospitals; this is similar to the research Tynkkynen and Vrangbæk [38] on 5500 hospitals around Europe, which indicated that public hospitals are more often reported to have the best economic performance when compared to private not-for-profit (PNFP) and private for-profit (PFP) hospitals. Private ownership is not necessarily correlated with greater efficiency than public ownership [39]. There were considerable differences between private and public hospitals in capacity, the volume of activity, and case mix; however, after adjusting for case mix, there were no variations in the usage of expensive pharmaceuticals between private and public hospitals [40]. The results of this literature review regarding disease and the negative difference between the INA-CBGs tariff and the actual cost are presented in Table IV.

Table IV. Difference Of Hospital Tariffs Versus INA-CBG'S Based On The Disease

Disease	Number of Studies	
	Surplus	Deficit
Cancer	3	4
Hearth Disease	2	3
Hypertension	1	
Typhus	1	
Stroke	2	1
Multiple diseases		1
Diabetes	1	1
Kidney	1	1
Fracture	1	

Catastrophic diseases like cancer and heart disease have a greater negative difference because their treatment requires specialized skills, sophisticated medical devices, and lifelong health care [40-41]. In another study, it was revealed that the cost of inpatient claims for INA-CBGs for Class A catastrophic diseases was higher compared to all hospitals [43].

The results of this review of the literature regarding the factor that can cause the difference between the INA-CBGs tariff and the actual cost are presented in Table V.

LOS (Length of Stay) is the main factor of differences between hospital tariff and INA-CBGs tariff. In Table 5, this factor is found in 16 journals. Length of stay is one aspect of assessing efficient or inefficient hospitals [42]. LOS is related to the cost of care incurred by the patient. LOS is an important indicator for determining the success of therapy for diabetes mellitus patients. Hospital services are more effective and efficient the shorter the

patient's hospitalization[44]. The major impact of Length of stay on total healthcare expenses. Reducing the Length of stay by one day could cut the entire cost of therapy by around 3% [45]. The correlation between Length of stay and hospitalization rates is statistically significant and demonstrates a strong positive correlation [46]. According to research [15], prolonged treatment contributes significantly to the rise in hospitalization rates. Length of stay has consequences for rising hospital costs because more health services are rendered, some of which may be wasted. LOS also creates inefficient resource allocation and utilization [47].

Table V. The Driving Factor Of The Difference In Hospital Tariffs With INA-CBG'S

Factor	Number of Studies	References
LOS	16	10,13,14,19–25,27,28,30–32,34
Severity	14	10,14–17,19–25,30,33
Class of hospitality	12	10,14,15,20,21,23,27,28,30–32,34
Secondary diagnostic	5	13,14,21,22,33
Number of procedure	4	14,28
Procedure	2	21,25,28,32
Standard differences in tariff determination	2	18,33
Diagnostic Coding Accuracy	1	33
Age	2	31,34

Severity is the second rank factor affecting the differences between hospital and INA-CBGs tariffs. It was found in 16 journals. The severity and complications of disease affect the provision of health services, where the impact will be felt in providing more service measures [23]. Complications and comorbidities influence the severity. Level I (mild) is a diagnosis without comorbidities and complications, level II (medium) is a diagnosis with minor complications and comorbidities, and level III (severe) is a diagnosis with considerable complications and comorbidities [48]. Age and the disease's severity determine the days required for treatment and Length of stay impacts rising hospital expenses [47].

Class of hospitality determined in 12 journals. Class of hospitality and severity level is also associated with financing health care, with catastrophic diseases accounting for 32% of the overall cost of health services [6]. According to activity-based costing, treatment class rates are more expensive the higher the Class [49]. The more the Class of treatment, the greater the patient's expenses will be. Because the facilities each patient receives in each treatment class are different, the varying rates for each treatment class will result in varied expenses [50]. Generally, the first kind of hospitalized room was higher than the hospital tariffs for all severity levels for the second and third types of hospitalized rooms. This is due to the increased cost of the first type of inpatient room [51].

A secondary diagnosis can prolong hospitalized patients' LOS and cause rates to vary in each case-mix main group (CMG) [48]. The number of therapy procedures also extends the stay and raises the costs; this factor has been found in 4 journals. Clinical pathways appeared to be associated with shorter lengths of stay [52]. The clinical path must be followed as a guideline in therapy to optimize treatment procedures and increase the effectiveness of healthcare services. A clinical pathway is a detailed and structured treatment plan that includes essential steps in a patient's care for a specific clinical problem [53]. The number of secondary diagnoses has a significant relationship with mortality risk [54]. This illness requires excellent treatment; hence, treatment expenditures, including non-chemotherapy expenses, will increase by [51]. In addition to being determined by the coder and the verifier, the diagnosis and procedures listed on the patient's resume also influence the coding accuracy. The cost of medicines and consumable medical devices accounts for the most significant proportion of total hospital expenses [33]. Age influences the actual costs because the older the patient is, the greater the likelihood of problems and comorbidities. Age will impact the administration of medications and physiotherapy to accommodate cost overruns. [50]

In this research, they didn't include data during the pandemic because of a lack of data from articles that were included in this review; meanwhile, before the COVID-19 epidemic, major cost escalations for these medications were nearly ubiquitous, with a median increase of 76% from January 2012 to December 2017, with almost all pharmaceuticals (48 [98%]) displaying. [55]In March 2020, a substantial increase in drug purchases was observed following the WHO's declaration of COVID-19 as a pandemic. A considerable disparity was noted among

countries, with developed nations exhibiting a greater increase in drug purchases compared to developing nations. [56] During the COVID-19 pandemic, the escalation of drug prices presents a potential health catastrophe much exceeding that of the virus itself since it hampers the ability to maintain treatment for chronic illnesses and other medical disorders. The effects are evident in pharmacy drug prices for consumers while also influencing the expenses of the health system (SUS), which is already strained by the epidemic and further compromised by recent austerity measures.[57] After the pandemic in the United States, Between January 2022 and January 2023, almost 4,200 pharmaceutical goods experienced price hikes, with 46 percent exceeding the inflation rate. The mean increase in drug prices was 15.2 percent, equivalent to $590 per drug product. [58]

CONCLUSION

We concluded that the hospital tariff is still higher than INA-CBGs tariffs The primary factor in this study is LOS., Severity, and hospitality class. This study indicates the importance of assessing the rates of the INA-CBGs in order to address healthcare expenses from a hospital standpoint. It is essential for hospitals to conduct an assessment of quality control in order to maximize the treatment of patients within the financial limitations set by the payer (BPJS).. The possibilities for future research could encompass studies conducted within hospital settings, specifically focusing on the implementation of cost-containment strategies within the framework of quality control and cost control measures.

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STATEMENT OF ETHICS

This research has received ethical approval from The Medical and Health Ethics Research (MHERC) UGM with the number KE/FK/1026/E.C./2023.

REFERENCES

1. Kemenkes. Regulation of The minister of health of Indonesia number 27 of 2014 technical instructions for the INA-CBG system. Published online 2014.
2. Zafirah SA, Nur AM, Ezat S, Puteh W, Aljunid SM. Potential loss of revenue due to errors in clinical coding during the implementation of the Malaysia diagnosis related group (MY-DRG ®) Casemix system in a teaching hospital in Malaysia. Published online 2018:1-11. doi:10.1186/s12913-018-2843-1
3. Vozikis A, Xesfingi S, Moustaferi E, Balbouzis T, Rigatos T. The DRG-based hospital prospective payment system in Greece: an assessment of the reimbursement rates using clinical severity classification. *Mod Econ*. 2016;07(13):1584-1600. doi:10.4236/me.2016.713141
4. Hadning I, Fathurrohmah F. Stroke Treatment Cost Analysis for Consideration on Health Cost Determination Using INA-CBG'S (Indonesia Case Based Groups) in Indonesia National Health Insurance Programme 2014. *Value Heal*. 2016;19(7):A866. doi:10.1016/j.jval.2016.08.390
5. Mboi N. Indonesia: on the way to universal health care. *Heal Syst Reform*. 2015;1(2)::91-97. doi:10.1080/23288604.2015.1020642
6. Ambarriani AS. Hospital financial performance in the Indonesian national health insurance era. *Rev Integr Bus Econ Res*. 2014;4(1):121-133.
7. Putra RSP, Indar, Jafar N. Ability to pay and catastrophic payment for self paying participants BPJS kesehatan Makassar City. *JST Kesehat*. 2014;4(3):283-290.
8. Sinaga ES, Ginting IR, Kusumaratna RK, Marthias T. Evaluation of national health insurance program implementation in Jakarta Province, Indonesia. *J Kebijak Kesehat Indones JKKI*. 2021;10(03):1-9.
9. Handayani L, Suharmiati, Pratiwi NL. Hospital unit cost and INA-CBGs tariff : is the hospital health services paid fair? *Bul Penelit Sist Kesehat*. 2019;21(4):219-227.
10. Dwidayati A, Andayani TM, Wiedyaningsih C. Conformitu analysis of real cost to INA-CBG'S Tariff in non hemorrhagic stroke treatment Of hospitalized JKN patients at Dr. Soehadi Prijonegoro Hospital Sragen 2015. *J Farm Indones*. 2016;13(2):139-149. http://farmasiindonesia.setiabudi.ac.id/
11. Meng Z, Hui W, Cai Y, Liu J, Wu H. The effects of DRGs-based payment compared with cost-based payment on inpatient healthcare utilization: A systematic review and meta-analysis. *Health Policy (New York)*. 2020;124(4):359-367. doi:10.1016/j.healthpol.2020.01.007

12. Meng Z, Hui W, Cai Y, Liu J, Wu H. The effects of DRGs-based payment compared with cost-based payment on inpatient healthcare utilization : A systematic review and. *Health Policy (New York)*. 2020;124(4):359-367. doi:10.1016/j.healthpol.2020.01.007
13. Agustina, Palu B, Muchlis N. Analysis of real costs and INA-CBG'S tariff at The Bahagia General Hospital in Makassar City. *J Muslim Community Heal*. 2020;1(2):13-25.
14. Astuti ND, Irmawati I, Apifah A. Analysis of hospital inpatient costs and INA-CBGs tariffs for congestive heart failure. *J Rekam Medis dan Inf Kesehat*. 2021;4(1):44-51. doi:10.31983/jrmik.v4i1.6788
15. Aisyah N, Aryzki S, Wahyuni A, Andayani TM, Puspandari DA. Factors affecting the real cost Of chemotherapy for patients with breast cancer of JKN participants in RSUD Ulin Banjarmasin. *J Curr Pharm Sci*. 2019;2(2):2598-2095.
16. Cahyani DP, Yuswar MA, Nurmainah. Analysis the conformity of real costs against INA-CBGs tariffs in ischemic stroke treatment of JKN patients inpatient at Sultan Syarif Mohamad Alkadrie Hospital Pontianak in 2018. *J Mhs Farm Fak Kedokt UNTAN*. 2019;4(1).
17. Chetrine. H, Nugraheni. DA, Rugiarti. ND, Tetuko. A. Comparison of Indonesian-Case Based Groups tariffs on inpatient ischemic stroke in government hospital. 2022;5(1):1-6.
18. Damara AY. The difference between hospital rates and INA-CBG'S rates at Ryacudu Hospital Kotabumi in 2020. *E-Indonesian J Heal Med*. 2022;2(3):322-332. http://ijohm.rcipublisher.org/index.php/ijohm
19. Dewi BA, Andayani TM. Cost Compliance Analysis of real therapy and INA- CBG ' s of chemotherapy breast cancer inpatient At 2017 Dr . Moewardi Surakarta Hospital. *Str J Ilm Kesehat*. 2021;10(1):1234-1241. doi:10.30994/sjik.v10i1.543
20. Hayul H, Andayani TM, Oetari. Analysis of conformity real costs for determining INA-CBG'S tariffs for inpatient diabetic nephropathy at Ir.Soekarno Sukoharjo Hospital in 2018. *J Farm Sains Indones*. 2020;3(1):26-36.
21. Lakoan MR, Andayani TM, Chairun W. Analysis of Conformity of Real Costs Against INA-CBG'S Tariff in the Treatment of Congestive Heart Failure for Inpatients at Hospital Dr. Soehadi Prijonegoro Sragen 2015. *J Farm Sains Indones*. 2019;2(2):1-8.
22. Oktadiana I. Conformitu of Real Cost to INA-CBG'S Cost in Hypertension Treatment at Pandan Arang Hospital Boyolali 2017. *J Farm Indones*. 2019;16(2):106-117. jfi.setiabudi.ac.id
23. Manawan F, Widodo G, Andayani TM. Cost of illness in breast cancer patients at The National General Hospital Prof. Dr. R.D Kandou Manado. *J Farm Medica/Pharmacy Med J*. 2019;2(2):86. doi:10.35799/pmj.2.2.2019.26532
24. Negara SBSMK, Octavia DR, Utami PR. The comparison of the actual cost to case-mix of Type 2 diabetes mellitus inpatient in Pandan Arang Boyolali Hospital. *Pharm Educ*. 2021;21(2):269-274. doi:10.46542/pe.2021.212.269274
25. Nisa BI, Raharjo BB. Determinants of difference in real costs and INA-CBG'S tariff in coronary heart patients. *Higeia J Public Heal Res Dev*. 2021;1(3):84-94. https://journal.unnes.ac.id/sju/index.php/higeia/article/view/37998
26. Rahmani N, Sarnianto P, Ramadaniati HU. Analysis of treatment profile, hospital cost perspective and HROQoL in outpatient hemodialysis patients at Fatmawati General Hospital, Jakarta. *Nusant J Ilmu Pengetah Sos*. 2022;7(2):408-420.
27. Santoso A, Sulistyaningrum IH, Rosyid A, et al. Comparative of real cost against the price of INA CBG breast cancer and its affecting factors in JKN Program era. *Farm Sains dan Prakt*. 2020;6(1):60-66.
28. Satibi S, Andayani TM, Endarti D, Suwantara IPT, Wintariani NP, Agustini NPD. Comparison of real cost versus The Indonesian Case Base Groups (INA-CBGs) tariff rates among patients of high- incidence cancers under the national health insurance scheme. *Asian Pacific J Cancer Prev*. 2019;20(1):117-122. doi:10.31557/APJCP.2019.20.1.117
29. Siwi MAA, Andayani TM, Herowati R. Factors affecting the cost of therapy for radius ulna fracture patients by ORIF surgery And the suitability with INA-CBG'S tariff in RSUD Sukoharjo Regency. 2016;13(2):117-125.
30. Sofan A, Syamsudin. Analysis of treatment costs for inpatient ischemic stroke patients at RSUD Dr.Drajat Prawira Negara Serang. *J Ilm Indones*. 2021;6(3).
31. Sulistyaningrum IH, Santoso A, Binarti. Analysis of Differences in real costs with INA-CBG'S tariffs and factors affecting for chronic kidney disease in the era of National Health Insurance. *Indones J Med Pharm Sci*. 2021;1(1):6-12. doi:10.30659/ijmps.v1i1.2
32. Tusshaleha LA. Analysis of real cost Conformity of rectal cancer chemotherapy patients with INA-CBGs

Tariff for the implementation of National Health Insurance at Sanglah General Hospital Denpasar in 2014. *J Ilm Mandala Educ*. 2018;4(1):156. doi:10.36312/jime.v4i1.337
33. Kusuma AAMW, Ariawati K. The Discrepancy between hospital and INA-CBG'S tariff of thalassemia disease at pediatric ward Sanglah Bali Hospital in 2017. *J Penelit dan Pengemb Pelayanan Kesehat*. 2018;2(2):95-101.
34. Wirastuti K, Sulistyaningrum IH, Cahyono EB, et al. Comparison of real costs with INA-CBG'S tariff of stroke in the era of national health insurance at Sultan Agung Islamic Hospital. *J Ilm Ibnu Sina Ilmu Farm dan Kesehat*. 2019;4(1):117-126. doi:10.36387/jiis.v4i1.244
35. Wirantari NP, Gunawijaya E, Yantie NPVK. Cost analysis of congenital heart diseasepatients who underwent diagnostic catheterization. *Paediatr Indones Indones*. 2020;60(5):244-252. doi:10.14238/pi60.5.2020.244-52
36. Thabrany H. Comparison of catastrophic disease claims for National Health Insurance participants in DKI Jakarta and East Nusa Tenggara Provinces in 2014. *Pelatih RSPAD*. Published online 1998:2-6.
37. Panella M, Marchisio S, Di Stanislao F. Reducing clinical variations with clinical pathways: Do pathways work? *Int J Qual Heal Care*. 2003;15(6):509-521. doi:10.1093/intqhc/mzg057
38. Tynkkynen LK, Vrangbæk K. Comparing public and private providers: A scoping review of hospital services in Europe. *BMC Health Serv Res*. 2018;18(1):1-14. doi:10.1186/s12913-018-2953-9
39. Tiemann O, Schreyögg J, Busse R. Hospital ownership and efficiency: A review of studies with particular focus on Germany. *Health Policy (New York)*. 2012;104(2):163-171. doi:10.1016/j.healthpol.2011.11.010
40. Bonastre J, Chevalier J, Van der Laan C, Delibes M, De Pouvourville G. Access to innovation: Is there a difference in the use of expensive anticancer drugs between French hospitals? *Health Policy (New York)*. 2014;116(2-3):162-169. doi:10.1016/j.healthpol.2013.11.006
41. Heniwati, Thabrany H. Comparison of catastrophic disease claims for National Health Insurance participants in DKI Jakarta and East Nusa Tenggara Provinces in 2014. *J Ekon Kesehat Indones*. 2017;1(2):18-27. doi:10.7454/eki.v1i2.1771
42. Cook K, Dranove D, Sfekas A. Does major illness cause financial catastrophe? *Health Serv Res*. 2010;45(2):418-436. doi:10.1111/j.1475-6773.2009.01049.x
43. Aulia S, Supriadi, Sari D, Mutiha A. Cost recovery rate of the BPJS National Health Insurance Program. *Akuntabilitas*. 2015;8(2):111-120.
44. Salim MF, Lubis IK, Sugeng S. Differences in length of stay (LOS) in diabetes mellitus patients based on complications at Dr. Sardjito Yogyakarta. *J Manaj Inf Kesehat Indones*. 2019;7(1):17. doi:10.33560/jmiki.v7i1.216
45. Taheri PA, Butz DA, Greenfield LJ. Length of stay has minimal impact on the cost of hospital admission. *J Am Coll Surg*. 2000;191(2):123-130. doi:10.1016/S1072-7515(00)00352-5
46. Puspandari DA, Mukti AG, Kusnanto H, Kebijakan P, Asuransi M. Determinant factors of drug cost for breast cancer patient in Indonesia. *J Kebijak Kesehat Indones JKKI*. 2015;04(03):104-108.
47. Agboado G, Peters J, Donkin L. Factors influencing the length of hospital stay among patients resident in Blackpool admitted with COPD: A cross-sectional study. *BMJ Open*. 2012;2(5). doi:10.1136/bmjopen-2012-000869
48. Puspitorini S, Kusumadewi S, Rosita L. Prediction of disease case severity level to determine INA- CBGs rate. In: *IOP Conference Series: Materials Science and Engineering*. Vol 185. ; 2017. doi:10.1088/1742-6596/755/1/011001
49. Kula JI. Hospitalization fee determination method on BLU RSUP Prof. Dr. R. D. Kandou Manado. *J EMBA*. 2013;Vol 1 No 3(3):793-803.
50. Muslimah., Tri M.A., Rizaldy, P., Dwi E. Comparison of real costs againts the price of INA-CBG'S Ischemic store in Bethesda hospital Yogyakarta. *J Manaj dan Pelayanan Farm*. 2017;7(2):105-114.
51. Satibi S, Daulay EH, Oviani GA, Erlianti K, Fudholi A, Puspandari DA. Performance analysis of pharmacist and influencing factors in the era of National Health Insurance at Puskesmas. *J Manag Pharm Pract*. 2018;8(1):32. doi:10.22146/jmpf.34441
52. Trimarchi L, Caruso R, Magon G, Odone A, Arrigoni C. Clinical pathways and patient-related outcomes in hospital-based settings: A systematic review and meta-analysis of randomized controlled trials. *Acta Biomed*. 2021;92(1):1-13. doi:10.23750/abm.v92i1.10639
53. Rotter T, Kinsman L, James E, et al. Clinical pathways: effects on professional practice, patient outcomes, length of stay and hospital costs. *Cochrane database Syst Rev*. 2010;(3):CD006632. doi:10.1002/14651858.CD006632.pub2

54. Kuderer NM, Dale DC, Crawford J, Cosler LE, Lyman GH. Mortality, morbidity, and cost associated with febrile neutropenia in adult cancer patients. *Cancer*. 2006;106(10):2258-2266. doi:10.1002/cncr.21847
55. Wineinger NE, Zhang Y, Topol EJ. Trends in Prices of Popular Brand-Name Prescription Drugs in the United States. 2019;2(5):1-9. doi:10.1001/jamanetworkopen.2019.4791
56. Suda KJ, Kim KC, Hernandez I, et al. The global impact of COVID-19 on drug purchases: A cross-sectional time series analysis. *J Am Pharm Assoc*. 2022;62(January):766-774.
57. Pontes MA, Robeiro AA, Raijche M, Rover M, Leite SN. Rising drug prices in Brazil during COVID-19 pandemic : another threat to people ' s health. *Brazilian J Pharm Sci*. 2022;58(3):1-4. doi:https://doi.org/10.1590/s2175-97902022e20863
58. Bosworth A, Sheingold S, Finegold K, Sayed BA, Lew N De, Sommers BD. Changes in the List Prices of Prescription Drugs ,. 2023;(October):2017-2023.