JURNAL FARMASI SAINS DAN KOMUNITAS
Journal of Pharmaceutical Sciences & Community

p-ISSN 1693-5683; e-ISSN 2527-7146

Vol. 22, No. 2, November 2025, pp. 265-270 Research Article

Cost Analysis of Inpatient Heart Failure Treatment at PKU Muhammadiyah Hospital of Yogyakarta Based on INA-CBG's Tariffs in 2023

Ingenida Hadning[1*], Lidya Prames Wari[1], Nina Dwi Lestari[2]

[1]School of Pharmacy, Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta
[2]School of Nursing, Faculty of Medicine and Health Science, Universitas Muhammadiyah Yogyakarta

https://doi.org/10.24071/jpsc.008765 J. Pharm. Sci. Community, 2025, 22(2), 265-270

Article Info

Received: 2024-06-01
Revised: 2024-08-23
Accepted: 2024-08-30

***Corresponding author:**
Ingenida Hadning

email:
ingenida.hadning@umy.ac.id

Keywords:
Actual cost; Cost analysis; Heart failure; INA-CBG's tariff 2023

ABSTRACT

The prevalence of heart failure in Indonesia has reached 1.5% of the entire population. Catastrophic heart failure requires long treatment, thus necessitating large costs. The Indonesian government regulates payments to advanced health facilities through INA-CBG tariffs. This study evaluated the INA-CBG tariffs based on the Ministry of Health Regulation No. 3 of 2023 for the treatment of inpatient heart failure. This study aims to determine the difference in the average actual costs of heart failure patients compared to the INA-CBG tariffs based on the Ministry of Health Regulation No. 3 of 2023. This research was conducted as an observational study with a cross-sectional design at PKU Muhammadiyah Hospital of Yogyakarta. Data on heart failure inpatients were gathered using a retrospective method from January to September 2023. Data were analyzed using descriptive analysis and a one sample t-test. The analysis found some average actual costs were higher than INA-CBG tariffs, with an insignificant difference. Real costs that the Social Security Agency (BPJS) on Health could not cover caused the hospital to suffer losses.

INTRODUCTION

Data released by the World Health Organization (WHO) in 2020 reported around 6.7 million cases of heart failure in developing countries. In this regard, Southeast Asia ranks first with the highest mortality rate due to heart failure (Tazkirah *et al*., 2023). Frequent heart failure occurs in various parts of the world, causes death rates and high disability, and has a budgetary impact, especially on the elderly population (Prihatiningsih and Sudyasih, 2018). Catastrophic heart failure is a disease requiring long-term treatment, thereby adding to the high costs (Lakoan *et al*., 2019).

The Indonesian government efforts to overcome the issue include launching the National Health Insurance (JKN) program run by the Social Security Agency (BPJS) on Health. In implementing the program, payments to the advanced health facilities are determined through Indonesian-Case Base Groups (INA-CBGs), which are viewed from patients' diagnosis, and diagnosis-related group (DRG) called coding (Permenkes, 2023).

INA-CBGs have been updated four times: Ministry of Health Regulation No. 69 of 2013, Ministry of Health Regulation No. 59 of 2014, Ministry of Health Regulation No. 52 of 2016, and Ministry of Health Regulation No. 3 of 2023. The regular updating of adjustments to INA-CBGs aims to prevent deficiencies in funds, considering the inflation rate to adjust to price changes, while ensuring that service provision improves quality for the better (Badan Perencanaan Pembangunan Nasional, 2014). The implementation of INA-CBGs in hospitals aims to save costs and prevent losses.

Previous research by Cahyaningrum (2017) using the INA-CBG tariffs based on the Ministry of Health Regulation No. 59 of 2014 discovered that a hospital could suffer significant losses. Hence, it is necessary to conduct research using the INA-CBGs tariffs in 2023 to identify the improvement in health services that PKU Muhammadiyah Hospital of Yogyakarta has

carried out with the new tariffs. This study aims to determine the difference between the average actual costs of heart failure inpatients at PKU Muhammadiyah Hospital of Yogyakarta and INA-CBG tariffs based on Ministry of Health Regulation No. 3 of 2023.

METHODS

The research was conducted after the ethical clearance letter from PKU Muhammadiyah Hospital of Yogyakarta was issued with the number i927/Pl.24.2/IX/2023. This study was conducted as observational research with a cross-sectional design. Data were collected using a retrospective method. Total sampling was applied to collect samples from heart failure inpatients of classes I, II, and III at PKU Muhammadiyah Hospital of Yogyakarta from January to September 2023. This study adopted several inclusion criteria: patients were enrolled in BPJS on Health, heart failure inpatients of classes I, II, and III with diagnoses according to INA-CBG codes of I-4-12-I, I-4-12-II, and I-4-12-III at PKU Muhammadiyah Hospital, heart failure inpatients without procedures, heart failure in patients with complete medical data, and making full payments. Conversely, the exclusion criteria were heart failure in patients who died during hospitalization, inpatients who were forced to go home and change classes, and inpatients who began treatment from 1 to 22 January 2023.

The data encompassed medical records and medical costs of heart failure in patients with or without comorbidities in classes I, II, and III at PKU Muhammadiyah Hospital of Yogyakarta, as well as INA-CBG logbook and tariffs based on Ministry of Health Regulation No. 3 of 2023. The data were processed and analyzed using several methods. Descriptive analysis was employed to determine the highest cost component of heart failure inpatients based on the average actual costs. The comparison of the real costs of heart failure inpatients and INA-CBG tariffs also utilized descriptive analysis. A one sample t-test was applied to normally distributed data, while Wilcoxon was adopted for data not normally distributed.

RESULTS AND DISCUSSION

Characteristics of Heart Failure Patients at PKU Muhammadiyah Hospital of Yogyakarta

This research was conducted from September to October 2023 at PKU Muhammadiyah Hospital of Yogyakarta. A total of 62 heart failure patients who met the inclusion and exclusion criteria were included. Table 1 lists the characteristics of heart failure patients participating in this study.

The results disclosed that the prevalence of heart failure was higher in men. This tendency can be attributed to risk factors such as a history of smoking and drinking alcohol (Wannamethee *et al*., 2015). Furthermore, the study also discovered that patients experiencing heart failure were aged above 65 years. This discovery has proven that age is a risk factor for heart failure; generally, the older a person is, the higher the risk of heart failure (Sagala, 2016).

Comorbidities frequently accompany heart failure, serving as the triggering factor for the main diagnosis. These comorbidities refer to additional medical diseases that exist alongside the primary diagnosis, such as trigger factors and complications. These conditions must be addressed and treated to prevent the exacerbation of heart failure (Sulistiyowatiningsih *et al*., 2016).

Table 1. Patient Characteristics

Characteristics	N=62	%
Sex		
Male	35	56.45%
Female	27	43.55%
Age		
<45 years	5	8.06%
45-55 years	15	24.19%
55-64 years	18	29.03%
>65 years	24	38.71%

Table 2. Components of the Actual Costs

Cost Variable (IDR)	Average Cost													
	Class 1				Class 2				Class 3					
	Mean (IDR)	%	Mean (IDR)	%	Mean (IDR)	%	Mean (IDR)	%	Mean (IDR)	%	Mean (IDR)	%	Mean (IDR)	%
	I-4-12-I	n (5)	I-4-12-II	n (4)	I-4-12-I	n (4)	I-4-12-II	n (3)	I-4-12-I	n (22)	I-4-12-II	n (15)	I-4-12-III	n (9)
Room	1,040,000	22.0	1,820,000	27.3	742,500	20.2	1,000,000	20.6	723,636	19.4	922,000	14.7	852,222	15.3
Nursing	448,900	9.5	830,625	12.4	236,375	6.4	291,000	6.0	288,545	7.8	468,533	7.5	372,166	6
Laboratory	584,860	12.4	384,550	5.8	634,000	17.2	555,000	11.5	486,027	13.1	1,036,400	16.5	749,311	13.4
Radiology	535,092	11.3	465,617	7.0	451,867	12.3	452,993	9.3	451,948	12.1	560,458	8.9	638,826	11.5
Drug	500,393	10.6	510,955	7.7	336,375	9.1	604,300	12.5	559,763	15.0	1,031,146	16.4	737,377	13.2
BMHP	509,700	10.8	700,000	10.5	375,600	10.2	406,000	8.4	394,363	10.6	461,966	7.4	612,611	11.0
Visit	604,600	12.8	773,750	11.6	595,000	16.2	380,000	7.8	378,490	10.2	594,000	9.5	688,333	12.3
Nutrition	7,000	0.1	4,375	0.1	9,375	0.3	8,333	0.2	5,113	0.1	5,833	0.1	5,555	0.1
Support medicine	64,800	1.4	35,250	0.5	57,500	1.6	92,000	1.9	58,945	1.6	42,933	0.7	40,888	0.7
Nonsurgical procedure	183,800	3.9	761,250	11.4	137,500	3.7	676,666	14.0	156,818	4.2	482,666	7.7	470,444	8.4
Blood service	-	-	-	-	-	-	207,166	4.3	-	-	443,392	7.1	112,111	2.0
Rehabilitation	24,000	0.5	45,000	0.7	-	-	-	-	-	-	34,285	0.5	106,666	1.9
Rent tools	120,000	2.5	236,875	3.5	28,875	0.8	93,500	1.9	156,340	4.2	162,533	2.6	125,444	2.2
Administration	103,900	2.2	106,000	1.6	73,000	2.0	78,333	1.6	62,590	1.7	63,966	10	63,611	1.1
Total cost	4,727,045	100	6,674,242	100	3,677,967	100	4,845,293	100	3,722,511	100	6,278,272	100	5,576,126	100

This study unveiled that hypertension was the most prevalent comorbidity associated with heart failure. Hypertension boosts the cardiac workload, leading to stiffness and thickening of the heart muscle. Hardened heart muscle is an abnormal sign caused by the inability of the heart to work properly, elevating the risk of stroke, kidney failure, heart attack, and congestive heart failure (Sumara *et al*., 2021). The presence of various comorbidities in heart failure patients necessitates medical procedures, examinations, and treatment, which in turn affect the rates charged by hospitals (Utami and Fanny, 2021).

Treatment Cost Analysis

The average costs for each class were obtained based on the severity of heart failure inpatients at PKU Muhammadiyah Hospital of Yogyakarta in 2023. The data were grouped based on INA-CBG codes. Table 2 summarizes the average cost components for heart failure care.

The research findings are observable by examining each class and its level of severity. The predominant cost components were room, laboratory, consultation, and drug costs. Previous research conducted by Cahyaningrum (2017) discovered that, on average, the most significant cost components were room, visit, drug and medical equipment, and laboratory costs. This finding indicates that PKU Muhammadiyah Hospital of Yogyakarta has yet to conduct an assessment to adjust the most significant cost components in hospital rates.

Room costs were identified as the most significant component in hospital rates. The amount of room costs is influenced by the class of treatment and the patient's severity (Astuti *et al*., 2021). Basically, the higher the inpatient class and level of severity, the greater the room costs incurred. The laboratory component in this study incurred significant costs in relation to hospital rates. The patient's severity influences the size of the laboratory cost component because patients require more supporting examinations (Nurfadhillah, 2017). The costs of a doctor's consultation or visits emerged as a relatively high component. The length of a patient's hospitalization directly impacts the consultation

fees due to the increased number of doctor visits. In addition, consulting service fees also affect the size of the consulting fee component. According to Clevery in Astuti *et al*. (2021), reducing the price paid for services can be one way of controlling hospital costs. Moreover, the drug components are expensive. It might be attributed to the patient's comorbidities, leading to a high consumption of medicine (Nurfadhillah, 2017). Drug costs are influenced by the treatment the patient receives. The more comorbidities a patient experiences, the more drugs they consume, resulting in a larger portion of drug costs (Giusman and Nurwahyuni, 2022).

The difference between the actual costs and INA-CBG tariffs was determined from the average actual costs required by patients during their hospital stay. Then, the actual costs were compared with INACBG tariffs, which were set based on class and severity. With a significance level of more than 0.05, the table of three patients coded I-4-12-I from classes 1, 2, and 3 indicates that the actual cost average is less than the INA-CBG tariffs. It implies that the actual cost average is smaller than the INA-CBG tariffs, with an insignificant difference.

Additionally, patients coded I-4-12-II from class 1 possessed a higher actual cost average than the INA-CBG tariffs, with a significance higher than 0.05. It illustrates that the actual cost average is greater than the cost rate, with an insignificant difference. Patients coded I-4-12-II from class 2 demonstrated a smaller actual cost average than the INA-CBG tariffs, with a significance of greater than 0.05. It signifies that the actual cost average is smaller than the cost rate, with an insignificant difference. Patients coded I-4-12-II from class 3 exhibited a greater actual cost average than the INA-CBG tariffs, with a significance of less than 0.05, implying that the actual cost average is greater than the INA-CBG tariffs, with a significant difference.

Moreover, patients with a code of I-4-12-III from class 3 had a smaller actual cost average compared to the INA-CBG tariffs, with a significance below 0.05. In short, the actual cost average is greater than the INA-CBG tariffs, with a significant difference. The difference between the real total costs and total INA-CBG tariffs was identified to unveil whether the hospital experienced a surplus or a minus.

Table 3. Differences in the Actual Costs Compared to the INA-CBG's Tariff in 2023

INA-CBG's Code	Class	n	Total Cost		Average Cost		Sig (normality)	*P* (2-tailed)
			Actual Cost (IDR)	INA-CBG's Tariff (IDR)	Actual Cost (IDR)	INA-CBG's Tariff (IDR)		
I-4-12-I	1	5	23,635,225	25,030,000	4,727,045 ±1,038,735	5,006,000	0.651	0.581
	2	4	14,711,870	17,539,600	3,677,967 ± 681,832	4,384,900	0.942	0.130
	3	22	81,895,260	82,805,800	3,722,511 ± 1,681,532	3,763,900	0.005	0.426
I-4-12-II	1	4	26,696,968	23,212,800	6,674,242 ± 2,252,940	5,803,200	0.061	0.496
	2	3	14,535,880	15,249,900	4,845,293 ± 1,954,032	5,083,300	0.381	0.852
	3	15	94,174,080	65,451,000	6,278,272 ± 3,042,317	4,363,400	0.684	0.029
I-4-12-III	1	0	-	-	-	-	-	-
	2	0	-	-	-	-	-	-
	3	9	50,185,140	52,506,000	5,576,126 ± 1,507,648	5,834,000	0.740	0000
Total Cost			305,834,423	281,795,100				
Difference (+/-)			-24,039,323					

As exhibited in Table 3, the overall actual cost for heart failure inpatients at PKU Muhammadiyah Hospital of Yogyakarta in 2023 reached IDR 305,834,423. Meanwhile, the INA-CBG's total expenses amounted to IDR 281,795,100. The analysis revealed a difference of IDR 24,039,323, indicating that the hospital incurred a financial loss in providing treatment for heart failure patients in 2023. This loss occurred because BPJS on Health could not cover the total actual costs.

Similar research conducted by Cahyaningrum (2017) regarding the analysis of medical costs for heart failure patients in 2015 adhered to Health Regulation No. 59 of 2014. It uncovered a total actual cost of IDR 325,227,380, while the INA-CBG's total cost reached IDR 497,718,400, with a surplus difference of IDR 169,491,020. This difference has evidenced that the hospital did not suffer a loss because BPJS on Health could bear the total actual costs.

Another study by Astuti *et al*. (2021) disclosed a tariff difference of minus IDR 40,158,430 caused by the higher real hospital costs compared to INA-CBG tariffs. Real hospital costs are influenced by comorbidities that worsen the patient's condition and the length of treatment days. It affects the increasing number of medical services and support provided (Rahayuningrum, 2017). Thus, it impacts the high actual costs paid by hospitals (Nisa and Raharjo, 2021).

Efficiency is a viable approach to overcome the cost difference, since it allows for the generation of balanced rates and ensures high service quality. Efficiency can be achieved by the utilization of drug efficiency, length of treatment, actions, and examinations (Nisa and Raharjo, 2021). Efficiency could be boosted by implementing clinical pathways as a hospital protocol in selecting therapy for patients (Dwidayati *et al*., 2016). The implementation of clinical pathways in heart failure cases has been proven effective in reducing length of stay and health costs by up to 20% (Moore, 2016). Hence, hospitals could adopt clinical pathways to effectively manage costs and provide high-quality care. A clinical pathway enables the appropriate execution of care and treatment (Agiwahyuanto *et al*., 2020).

Previous research conducted by Cahyaningrum (2017) using the INA-CBG tariffs based on the Ministry of Health Regulation No. 59 of 2014 exhibited a profit. Conversely, this research, conducted using the INA-CBG tariffs based on the Ministry of Health Regulation No. 3 of 2023, revealed a loss. It indicates that hospitals have been unable to adjust their real costs to the latest INA-CBG tariffs. Therefore, hospitals need to evaluate the cost components of rooms, medicines, visits, and laboratories.

CONCLUSIONS

The investigation found that the average actual cost of inpatient heart failure patients with the INA-CBG's codes I-4-12-II class I and III at PKU Muhammadiyah Hospital Yogyakarta exceeded the INA-CBG tariffs with an insignificant difference. In other words, BPJS on Health could not cover all actual costs, especially regarding the room, medicine, visit, and laboratory costs for heart failure inpatients, causing the hospital to experience losses. Therefore, the hospital must evaluate the tariffs to match the INA-CBG tariffs in 2023.

ACKNOWLEDGEMENTS

The authors would like to thank Universitas Muhammadiyah Yogyakarta for supporting this research.

REFERENCES

Agiwahyuanto, F., Widianawati, E., Wulan, W.R., Putri, R.B., 2020. Tarif rumah sakit dengan tarif Ina-Cbgs pasien rawat Inap. *Higeia,* 4(207), 520–532.

Astuti, N.D., Irmawati, I., Apifah, A., 2021. Analisis tarif rumah sakit dan tarif Ina CBGs kasus gagal jantung kongestif. *Jurnal Rekam Medis dan Informasi Kesehatan*, 4(1), 44–51.

Badan Perencanaan Pembangunan Nasional, 2014. Buku II Agenda Pembangunan Bidang. Rencana Pembangunan Jangka Menengah Nasional 2015-2019, 965.

Cahyaningrum, A., 2017. Analisis Biaya Pengobatan Pasien Gagal Jantung Rawat Inap Di Rumah Sakit PKU Muhammadiyah Yogyakarta Periode Tahun 2015. [Skripsi], UMY.

Dwidayati, A., Andayani, T.M., Wiedyaningsih, C., 2016. Analisis kesesuaian biaya riil terhadap tarif INA-CBGS pada pengobatan stroke non hemoragik pasien JKN Rawat Inap RSUD Dr. Soehadi Prijonegoro Sragen tahun 2015, *Jurnal Farmasi Indonesia,* 13(2), 139–149.

Giusman, R., Nurwahyuni, A., 2022. Biaya pengobatan pasien rawat Inap COVID-19 di Rumah Sakit X tahun 2021. *Jurnal Ekonomi Kesehatan Indonesia*, 7(2), 96.

Indriyati Oktaviano Rahayuningrum, Didik Gunawan Tamtomo, A.S., 2017. Analisis tarif rumah sakit dibandingkan dengan tarif Indonesian Case Based Groups pada pasien rawat INAP peserta Jaminan Kesehatan Nasional di rumah sakit. Prosiding Seminar Nasional dan Internasional Universitas Muhammadiyah Semarang, 214–223.

Lakoan, M.R., Andayani, T.M., Chairun, W., 2019. Analisis kesesuaian biaya rill terhadap tarif Ina-Cbgs pada pengobatan gagal jantung kongestif pasien JKN rawat Inap Rsud Dr. Soehadi Prijonegoro Sragen Tahun 2015. *Jurnal Farmasi & Sains Indonesia,* 2(2), 1–8.

Moore, J.A.M., 2016. Evaluation of the efficacy of a nurse practitioner-led home-based congestive heart failure clinical pathway. *Home Health Care Services Quarterly*, 35(1), 39–51.

Nisa, B.I., Raharjo, B.B., 2021. Determinan selisih biaya riil dan tarif INA CBG'spada pasien jantung koroner. *Higeia Journal of Public Health Research and Development*, 1(3), 13–23.

Nurfadhillah, A., 2017. Analisis biaya dan kesesuaian biaya riil dengan tarif INA-CBGs pada pasien PPOK peserta JKN rawat Inap di BBKPM Surakarta. Universitas Gadjah Mada.

Permenkes, 2023. Peraturan Menteri Kesehatan Republik Indonesia No. 3 Tahun 2023 Tentang Standar Tarif Pelayanan Kesehatan Dalam Penyelenggaraan Program Jaminan Kesehatan. Menteri Kesehatan RI, 1–721.

Prihatiningsih, D., Sudyasih, T., 2018. Perawatan diri pada pasien gagal jantung. *Jurnal Pendidikan Keperawatan Indonesia*, 4(2).

Sagala, R., 2016. Karakteristik penderita gagal jantung yang dirawat inap di Rumah Sakit Santa Elisabeth Medan tahun 2015-2016, Repositori Institusi Universitas Sumatera Utara.

Sulistiyowatiningsih, E., Nurul Hidayati, S., Febrianti, Y., 2016. Kajian interaksi obat pada pasien gagal jantung dengan gangguan fungsi ginjal di instalasi rawat Inap RSUP Dr. Sardjito Yogyakarta periode 2009-2013. *Jurnal Ilmiah Farmasi,* 12(1), 35–43.

Sumara, R., Saputra, S.H., Mukarommah, N., Wibowo, N.A., Yumni, F.L., Supriyanto, S., 2021. Identifkasi Faktor Risiko Kejadian Penyakit Jantung Koroner di Rumah Sakit Umum Haj Surabaya, *Jurnal Keperawatan Muhammadiyah*, 6(1), 242-247.

Tazkirah, R., Kamal, A., Safuni, N., 2023. Asuhan keperawatan pada pasien acute decompensated heart failure (ADHF): Suatu studi kasus*. JIM FKep* 7(1) .

Utami, Y.T., Fanny, N., 2021. Faktor penyebab perbedaan selisih klaim negatif tarif Ina-Cbgs dengan tarif Riil di RSUD Dr. Moewardi. *Jurnal Sains dan Kesehatan,* 3(3), 492–499.

Wannamethee, S.G., Whincup, P.H., Lennon, L., Papacosta, O., Shaper, A.G., 2015. Alcohol consumption and risk of incident heart failure in older men: a prospective cohort study. *Open Heart*, 2(1), e00026