



Analysis of Actual Costs and INA-CBG Rates for Breast Cancer Care in Indonesian Hospitals: A Narrative Review

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Abstract

Breast cancer is a global health challenge and a significant economic burden in Indonesia, given its high prevalence among women. This study aims to evaluate the gap between actual medical costs and INA-CBGs rates in breast cancer management to formulate policy recommendations for the sustainability of oncology services. The research was conducted through a narrative review of literature published in 2022–2026 from the Scopus, ProQuest, and Dimensions databases. The review of three selected articles confirmed the existence of a substantial disparity in costs, characterized by a consistent negative difference between actual hospital costs and JKN claim rates. The findings show that the largest cost component comes from cytostatic drugs at 62–69%, while radiotherapy services are reimbursed at only about 59–87% of actual costs. This discrepancy is further exacerbated by medical inflation and the increasing complexity of managing advanced cases. In conclusion, structural cost discrepancies threaten the financial stability of hospitals, necessitating a periodic revision of rates based on activity-based costing and the implementation of a carve-out policy for high-value oncology drugs to ensure sustainable service accessibility.

INTRODUCTION

Breast cancer is a significant global health burden with substantial economic implications for the health care system (Phyu et al., 2025). In Indonesia, breast cancer dominates the epidemiological profile as the type of cancer with the highest number of cases in women (Osborne et al., 2025). Based on GLOBOCAN 2022 data, the incidence rate of breast cancer in Indonesia reached 41.8 per 100,000 population with a mortality rate of 14.4 per 100,000 population. National Health Insurance (JKN) patient data in 2022 shows that breast cancer accounts for 51% of all cancer cases in female participants, with a prevalence of 16.3 per 100,000 population. This condition is compounded by the fact that about 70% of patients in Indonesia are diagnosed only at an advanced stage, which has a direct impact on the low national survival rate of 56.8%, far below the standards of developed countries. In addition to the impact on quality of life, breast cancer also places a huge financial burden on countries and individuals (Ehsan *et al.* 2023; Alzehr 2025; Ayub dan Khan 2025). The estimated lifetime cost per patient in stage IV reached USD 62,108, which is much higher than treatment in stage I at USD 29,724. In response to this challenge, the government through the Ministry of Health has designated breast cancer as one of the five national priority cancers in the National Cancer Plan 2024–2034 (GLOBOCAN, 2022; Ministry of Health of the Republic of Indonesia, 2024).

In the National Health Insurance scheme, the INA-CBGs tariff serves as a prospective payment method that provides reimbursement based on the diagnosis package for hospitals. Nonetheless, clinical implementation for breast cancer treatment shows a marked discrepancy between the actual cost of the hospital and the available rates. Variability in treatment protocols and high costs of cytostatic agents often cause cost burdens to exceed the specified tariff ceiling (Kurniawan et al., 2026; Yuliasuti et al., 2023). This gap indicates the inability of the current tariff package structure to cover the operational costs of complex oncology treatments, thereby increasing the potential risk of financial loss to referral health facilities (Kurniawan et al., 2026; Ratri et al., 2024).

The significant disparity between real medical costs in hospitals and INA-CBGs rates for breast cancer treatment demands the formulation of comprehensive policies to ensure the sustainability of oncology services in referral institutions (Icanervilia, 2024; Salsabila et al., 2025). Standard management of breast cancer, in addition to chemotherapy protocols, includes surgical and radiotherapy modalities (Guo et al., 2023). Research by Andika and Febriyanti at Dr. M. Djamil Padang Hospital identified that the delay in breast cancer diagnosis was more influenced by personal factors such as education level, anxiety, and the use of alternative therapies rather than accessibility. As a result, in addition to lowering life expectancy, this delay also burdens JKN financing, considering that cancer treatment has spent BPJS funds of around 7.6 trillion rupiah in the 2019–2020 period (Andika & Febriyanti, 2024). Regarding cost management, Soraya and Yuliasuti at Yogyakarta City Hospital concluded that the five-drug combination chemotherapy regimen is the most cost-efficient option with an Average Cost Effectiveness Ratio of IDR 12,863,249 (Soraya & Yuliasuti, 2024).

Given the increasing prevalence and complexity of clinical management involving different stages of therapy, in-depth analysis of the optimization of financial resources is becoming increasingly urgent amid the escalation of dynamic economic pressures. This narrative review research aims to comprehensively examine the disparity between real costs and rates of INA-CBGs and evaluate the pharmacoeconomic efficiency in breast cancer management in Indonesia.

METHOD

This study uses a narrative review method to identify and analyze the literature related to the comparison of real costs and rates of INA-CBGs in breast cancer services in Indonesian hospitals. Literature searches were carried out systematically on several electronic databases, namely Scopus, ProQuest, and Dimensions with a publication year range of 2022–2026. Keywords used in the literature search included "breast cancer", "breast neoplasm", "INA-CBGs", "BPJS", "DRG", "case-based payment", "actual cost", "hospital cost", and "reimbursement". The combination of keywords is used with Boolean operators AND and OR to obtain relevant articles related to breast cancer service costs, INA-CBGs rates, and reimbursement systems in Indonesian hospitals.

The inclusion criteria in this study include primary research articles that discuss the cost of breast cancer services in hospitals, INA-CBGs rates, reimbursement systems, and real health service costs. The selected article is a research in the context of the national health financing system or hospitals in Indonesia, available in full text, and published in English. The exclusion criteria include articles that are not relevant to the topic of breast cancer service costs, articles

that only discuss clinical aspects without financing analysis, brief proceedings, and articles that are not available in full text form.

The literature selection procedure is carried out through several stages, including keyword identification, title and abstract filtering, and assessment of the relevance of the content to the research objectives. Articles that met the criteria were then analyzed in depth to identify patterns of differences between real costs and rates of INA-CBGs in the National Health Insurance ecosystem. Through a series of selection processes, three articles were selected that became the main references in this narrative review.

RESULTS AND DISCUSSION

The following table presents a summary of articles that meet the inclusion criteria in this study, including the characteristics of the study, study design, and key findings related to the comparison of real costs and rates of INA-CBGs in breast cancer services in hospitals. A summary of the characteristics and results of the study is presented in **Table 1**.

Table 1. Breast Cancer Service Cost Analysis Study

No.	Title, Name, and Research Year	Study Design	Research Results
1.	The Suitability of Direct Medical Costs with INA-CBG's Claims of Outpatient Breast Cancer in Class A and B Hospitals. (Nugraheni et al., 2024)	Observational analysis with a <i>cross-sectional</i> approach and data collection retrospectively in 2021.	- The real cost is greater than the INA-CBG rate (negative difference). - Class A Hospital: The average real cost is Rp.3.39 - Rp3.43 million. The total difference was minus IDR 88,041,600 (PBI) and minus IDR 91,386,300 (Non-PBI). - Class B Hospital: The average real cost is Rp. 2.61 million. The total difference was found to be minus Rp.164,113,635. The largest cost component came from medicines (62-69%).
2.	Cost Disparities Between Hospital Expenditures and Reimbursement Schemes in Indonesia: A Study on Chemotherapy for Breast Cancer. (Kurniawan et al.,2026)	A <i>cross-sectional retrospective</i> study at Surabaya Tertiary Hospital used data from 2021.	- Significant gap between hospital fees and JKN reimbursement. - Code C-3-13-0: Median real cost of Rp3,657,290 vs tariff of Rp.1,161,000 (Difference minus Rp. 2,496,290 per episode). - Code C-4-13-I: Median real cost of Rp. 3,964,189 vs tariff of Rp2,151,900 (Difference minus Rp. 1,812,289 per episode). - The main cost factors are chemotherapy administration (57.93%) and nursing care (14.04%).
3.	Costs Analysis of Radiotherapy for Breast Cancer in Indonesia: A Comparison Between Reimbursement Tariffs and Actual Costs. (Suryanegara et al., 2025)	Retrospective cohort study at National Public Referral Hospitals (Class A) and Private Hospitals (Class C) for the 2017–2022 period.	- The INA-CBG rate does not adequately cover the real cost of radiotherapy (Code C-3-10-0). - Public Hospital A: The rate to cost ratio is only 86.85%. Total financial losses reached USD 2,502,796.17. - Private Hospital C: The ratio of rates to fees is only 59.07%. Total financial losses reached USD 2,161,132.34.

Table 2. Comparison of Real Costs vs Claims of INA-CBGs Breast Cancer Chemotherapy

Patient Group	Code	Average Real Cost	INA-CBGs claim	Negative Difference
PBI Class A Hospital 50 patients	C-3-13-0	IDR 3,397,073	IDR 1,674,900	-IDR 88,041,600
Non-PBI Class A Hospital 53 patients	C-3-13-0	IDR 3,439,253	IDR 1,674,900	-IDR 91,386,300
Class B Hospital 110 patients	C-3-13-0	IDR 2,619,355	IDR 1,161,000	-Rp164,113,635

Note: Difference per episode visit. The total difference between Class A and Class B hospitals was calculated on all patient samples during the study period. Source: Nugraheni et al. (2024)

Table 3. Comparison of Real Costs vs Reimburse JKN Tertiary Hospital Surabaya

INA-CBG Code	Case Percentage (%)	Median Real Cost (IDR)	Median Reimburse JKN (IDR)	Median Difference/Deficiency (IDR)
C-3-13-0	93,75%	3.657.290	1.161.000	(2.496.290)
C-4-13-I	6,25%	3.964.189	2.151.900	(1.812.289)

Note: Code C-3-13-0 (Outpatient) and C-4-13-I (Inpatient) Surabaya Tertiary Hospital.

Source: Kurniawan et al. (2026)

Breast cancer is a malignant neoplasm disease with a huge financial burden on the Indonesian health system. In the National Health Insurance (JKN) scheme, financing for cancer services is regulated through prospective INA-CBGs tariffs. However, all the studies analyzed in this narrative review consistently show that these rates are not enough to cover the real costs actually incurred by hospitals, both for chemotherapy and radiotherapy services. These findings confirm the existence of structural discrepancies that threaten the sustainability of oncology services in Indonesia (Nugraheni et al., 2024; Kurniawan et al., 2026; Suryanegara et al., 2025).

Consistency of the Negative Difference between Real Costs and INA-CBGs Rates

All articles analyzed in this narrative review consistently found a negative difference between the real cost of breast cancer services and the applicable INA-CBGs rates. This condition indicates that hospitals bear financial losses due to rates that do not reflect the actual cost of services. Research by Nugraheni et al. (2024) in **Table 2.** reported that the average real cost of outpatients in Class A hospitals reached IDR 3,397,073 for PBI patients and IDR 3,439,253 for non-PBI patients, both far exceeding the average INA-CBGs claims of IDR 1,674,900. More worrying conditions were found in Class B hospitals, where the average real cost of IDR 2,619,355 was far compared to the claims of only IDR 1,161,000. As a result, Class A hospitals recorded a total loss of minus IDR 88,041,600 for PBI patients and minus IDR 91,386,300 for patients non-PBI, while Class B Hospital suffered a total loss of minus Rp. 164,113,635 during the 2021 research period.

A similar disparity was reported by Kurniawan et al. (2026) in a chemotherapy study at a tertiary referral hospital in Surabaya. Researchers took secondary data from January to December 2021 on 80 patients. In **Table 3.** patients with the INA-CBG code C-3-13-0 (outpatient), the median real cost reached IDR 3,657,290 while the rate paid by JKN was only

IDR 1,161,000, resulting in a median difference of minus IDR 2,496,290 per visit episode which is statistically significant ($p < 0.001$). For the C-4-13-I code (hospitalization), the median difference reached minus Rp1,812,289 ($p = 0.031$). A similar pattern was found in radiotherapy services by Suryanegara et al. (2025), who reported a cumulative loss of USD 2,502,796 in Class A Public Hospitals and USD 2,161,132 in Class C Private Hospitals during the 2017–2022 period.

Radiotherapy services also face similar financial challenges, given that rates for code C-3-10-0 have not seen a corresponding increase since 2016.

Table 4. Comparison of rates of INA-CBGs radiotherapy (code C-3-10-0)
Permenkes No. 52 of 2016 vs Permenkes No. 3 of 2023

Health Facilities	Minister of Health Regulation 52/2016	Minister of Health Regulation 3/2023	Tariff Difference
Type A Public Hospital (Class A Hospital - Government)	Rp1.144.000	Rp1.144.000	IDR 0
Type C Private Hospital (Class C Hospital - Private, Regional 1)	Rp769.000	Rp769.100	Rp. 100

Table 5. Real costs vs INA-CBGs claims (2017–2022) Suryanegara et al., 2025

Health Facilities	Total Real Cost (USD)	Total INA-CBGs Claims (USD)	Coverage Ratio
Type A Public Hospital (2,893 patients)	USD 19.028.791	USD 16.525.995	86.85%
Type C Private Hospital (997 patients)	USD 5.279.981	USD 3.118.848	59.07%

Based on **Table 4**. PERMENKES No. 52 of 2016, the radiotherapy tariff for outpatient Type C Private Hospitals in region 1 is Rp769,000, while according to PERMENKES No. 3 of 2023 the amount of the tariff is Rp769,100, showing a difference of at least Rp 100 in the Standard Health Service Tariff in the Implementation of the JKN Program. The research of Suryanegara et al. was conducted on two different types of facilities, namely Type A Public Hospital and Type C Private Hospital. INA-CBG rate per visit for radiotherapy is set at Rp1,144,000 in Type A Public Hospital and Rp769,000 in Type C Private Hospital, which remains the same even though operational costs continue to increase. **Table 5**. The real cost analysis shows a huge burden on both facilities, with the total real cost at Type A Public Hospital reaching USD 19,028,791.17 while the total claims received are only USD 16,525,990. Meanwhile, Private Hospital Type C incurred a total real cost of USD 5,279,980.74 with only covered claims of USD 3,118,850. This resulted in an alarming rate coverage ratio, which was only 86.85% in public hospitals and slumped to 59.07% in private hospitals, with the majority of costs allocated to the radiotherapy procedure itself.

Influence of Hospital Class and Type of Ownership on the Cost Gap

Hospital class has been shown to significantly affect the amount of real costs, but the relationship to the rate gap is not linear. Nugraheni et al. (2024) show that the average direct cost per patient in Class A hospitals is higher than in Class B hospitals, (**Table 2**) due to the complexity of different services. However, Class B hospitals actually experienced a larger total negative difference (minus IDR 164,113,635) compared to Class A hospitals, partly due to the lower claim value of INA-CBGs (IDR 1,161,000 per visit vs IDR 1,674,900). Thus, lower rates in lower facility classes are not directly proportional to the ability to cover the actual real costs.

A similar pattern was found in the hospital ownership dimension. Suryanegara et al. (2025) reported that class C private hospitals experienced a rate coverage ratio of only 59.07%, much worse than class A public hospitals which reached 86.85% even though both used similar radiotherapy machine resources. This reflects that the calculation of national average rates has not adequately considered variations in operating costs between facilities and types of ownership. Private hospitals generally bear higher operating costs without subsidies from the government, while the rates of INA-CBGs received are lower due to their facility class classification. This condition is in line with the findings of Satibi et al. (2019) which concluded that both public and private hospitals consistently experience financing deficits due to the mismatch of INA-CBGs tariffs with the real cost for high-incidence cancers.

Tariff Stagnation and Its Impact on the Financing Deficit

One of the main structural factors that exacerbates the gap is the stagnation of INA-CBGs tariffs that do not keep pace with medical inflation and rising drug prices. The current applicable chemotherapy (code C-3-13-0) and radiotherapy (code C-3-10-0) rates have been determined based on the Minister of Health Regulation (PMK) No. 52 of 2016 to PMK No. 3 of 2023 have been issued, the increase in radiotherapy rates for Type C Private Hospitals is only Rp100 (from Rp769,000 to Rp769,100), an increase that is neither clinically nor economically meaningful. Meanwhile, the radiotherapy tariff at Type A Public Hospital has not changed at all, namely Rp1,144,000 per visit (Suryanegara et al., 2025; Ministry of Health of the Republic of Indonesia, 2016; Ministry of Health of the Republic of Indonesia, 2023).

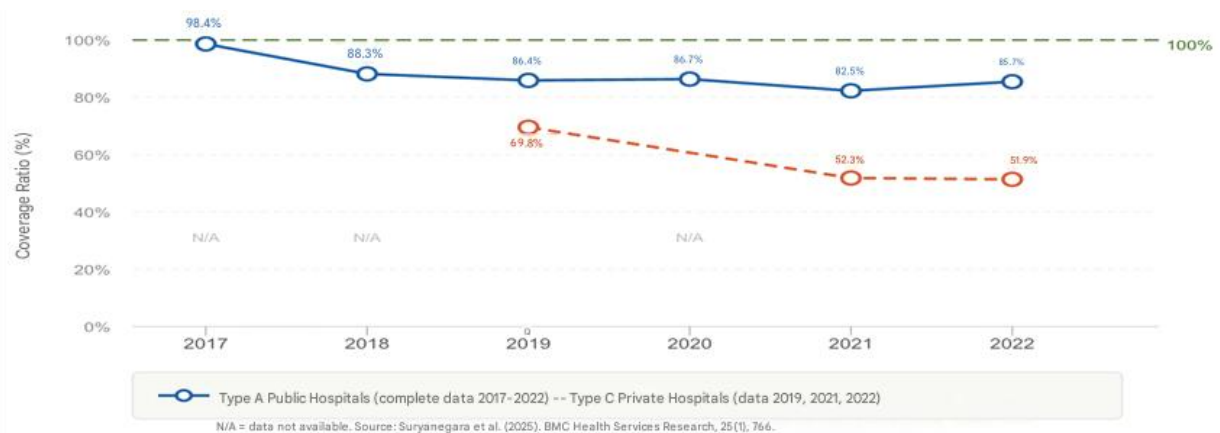


Figure 1. Ratio of INA-CBGs Tariff Coverage to Real Biya for Breast Cancer Radiotherapy (2017-2022)

The impact of this tariff stagnation is clearly seen in the longitudinal data of Suryanegara et al. (2025) covering the period 2017–2022 in **Figure 1**. The rate coverage ratio at Class A Public Hospitals has gradually decreased from 98.40% in 2017 to 85.70% in 2022, while at Class C Private Hospitals it has decreased drastically from 69.80% (2019) to 51.90% (2022). This downward trend shows that without periodic tariff revisions proportional to health care cost inflation, the deficit will continue to widen from year to year. The sensitivity analysis in the study revealed that to fully cover the real cost, rates need to be increased using the rate of inflation plus an additional increase of 25% per year in public hospitals and 95% in private hospitals, a figure that reflects how far current rates are from actual needs (Suryanegara et al., 2025).

Specific Cost Gap per Chemotherapy Regimen

Kurniawan et al. (2026) provide a more granular perspective by analyzing the cost gap at the level of individual drug regimens. From the Wilcoxon signed-rank test, it was found that a number of specific agents showed a statistically significant lack of reimbursement: Vinorelbine 10 mg ($p=0.039$) with a total difference of minus Rp2,639,552, Brexel 20 mg ($p<0.001$) with a difference of Rp328,023, and Cyclophosphamide 1g ($p=0.002$) with a difference of minus Rp56,100. On the other hand, commonly used agents such as paklitakcell, epirubicin, and goserelin did not show significant differences. which indicates that the pricing more accurately reflects the cost of conventional drugs than newer or more expensive agents.

These findings are important because they reveal that a uniform package tariff system is not able to accommodate cost variability between regimens. Hospitals that treat advanced patients with the need for more aggressive and expensive chemotherapy protocols as identified in the Kurniawan et al. study, where 64.1% of patients in stage IV experienced a much larger deficit than facilities with an early stage patient profile. This has implications for the risk that hospitals will be forced to avoid the use of expensive drugs in order to maintain financial balance, which in turn can worsen patients' accessibility to optimal therapies according to current clinical standards (Kurniawan et al., 2026).

Soraya and Yuliastuti (2024) complement the pharmacoeconomic perspective through an analysis of the cost-effectiveness of chemotherapy at the Yogyakarta City Hospital in 2017–2021. Using the Average Cost-Effectiveness Ratio (ACER) method, the study found that although the combination of fonkopac, paclitaxel, pamoxed, carboplatin, and epirubicin had the highest average cost (Rp819,388,966 during the study period), this regimen actually provided an ACER value of Rp12,863,249 with a clinical effectiveness of 63.7%, which showed significant results among all the regimens compared. This suggests that higher costs do not necessarily mean waste, but may reflect better clinical value when associated with patient outcomes. In the context of financing policy, these findings reinforce the argument that the revision of INA-CBGs rates needs to consider not only the cost structure, but also the clinical value of each regimen used. A value-based reimbursement approach that integrates clinical effectiveness into tariff setting is one of the relevant policy alternatives for the Indonesian context (Satibi et al., 2019; Ratri et al., 2024).

CONCLUSION

In general, various studies show that the INA-CBG tariff in the National Health Insurance (JKN) scheme is still not able to accommodate the real cost of breast cancer services, especially in chemotherapy and radiotherapy services. A significant difference between the direct medical costs incurred by hospitals and the value of claims paid by BPJS Kesehatan is found in both public and private hospitals. The high cost of services is mainly influenced by expenditure on chemotherapy drugs, the cost of administering the procedure, and the need to care for patients with advanced stages who require more intensive resources. The mismatch between the INA-CBG rate and the actual cost results in sustainable financial deficits for hospitals. In addition, the stagnation of radiotherapy tariffs further increases the financial burden of healthcare facilities because the increase in operational costs is not followed by a proportionate tariff adjustment. Thus, this condition indicates that the INA-CBG payment system in breast cancer management in Indonesia does not fully represent the actual cost of service needs; therefore, an evaluation and revision of tariff policies is needed to support the sustainability of financing and the quality of health services.

The government, through the Ministry of Health and BPJS Kesehatan, is recommended to immediately revise and adjust the INA-CBG tariff periodically to align it with medical inflation and fluctuations in the price of contemporary medicines. The application of the activity-based costing method in health facilities is highly recommended to obtain more precise cost estimates as the basis for determining national rates. In addition, a hybrid payment model or carve-out for innovative, high-cost oncology drugs needs to be considered to mitigate the risk of extreme financial deficits in hospitals. Internally, hospitals are advised to optimize the use of clinical pathways to improve the efficiency of resource allocation without sacrificing the quality of clinical services. Finally, cross-stakeholder collaboration needs to be strengthened to re-evaluate tariff structures that take into account variations in clinical stages and comorbidities, to ensure sustainable accessibility of oncology services for the entire community.

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