Original Article

Analysis Of Chemotherapy Costs In Breast Cancer Patients Participating Bpjs At Dharmais Cancer Hospital Jakarta

Piter[1], Rangki Astiani[1], Kristin Monica Sari Pakpahan[1], Yuri Permatasar[2]*

[1]Fakultas Farmasi, Universitas 17 Agustus 1945 Jakarta, Kota DKI Jakarta, Indonesia

[2] Dharmais Cancer Hospital, DKI Jakarta, Indonesia

** Email korespondensi: piter@uta45jakarta.ac.id*

Diterima: 5 Oktober 2025 Direvisi: 28 Oktober 2025 Disetujui: 29 Desember 2025

Abstract

This study aims to find out how much chemotherapy costs for inpatient breast cancer chemotherapy patients participating in BPJS and whether there is a difference in real hospital costs compared to INA-CBGs rates. This research is a descriptive, observational study taken from secondary data, in the form of medical record data, laboratory data, INA-CBGs e-claim data and financial data on patient medical costs in accordance with the inclusion and exclusion criteria totaling 100 patient data. Data analysis uses One Sample T-test to see whether there is a significant difference between real costs and INA-CBGs rates. Based on the results of the One Sample T-test, it shows that there is a significant difference. According to the statistical results, a significance of p<0.005 was obtained in class 3 and there was no significant difference in class 1 or class 2. The average cost that breast cancer patients have to pay for each procedure chemotherapy, severity level I Rp. 7,129,348, severity level II Rp. 9,323,275 and severity level III Rp. 9,037,426.

Keywords: Analysis of Chemotherapy Costs; Real Costs; INA-CBGs Package Rates

INTRODUCTION

The World Health Organization (WHO) states that the second biggest cause of death after cervical cancer is breast cancer. This is due to the increase in breast cancer sufferers which has increased quite significantly, namely 20% per year (Riadinata & Pratiwi F, 2016). Meanwhile, the prevalence of breast cancer in Indonesia ranks 2nd with a value of 11.6% with a death rate of 6.6%. The prevalence percentage of this disease in Asian women is 24.2%, while in Indonesia it is 30.9% with a mortality rate of 15.5% in women (Bray F et al., 2018). Meanwhile, the prevalence of breast cancer at Dharmais Cancer Hospital Jakarta ranks first with a value of 42.1% with a distribution rate based on age 20-34 years of 14.1%, at age 35-64 of 93.2% and at age 65 years and over amounting to 132.1% [1].

Cancer is a cell disease characterized by uncontrolled cell proliferation. Generally, cancer is often called a malignant tumor. The majority of breast cancer sufferers in Indonesia are women, even though the incidence rate is ranked second for breast cancer among Asian countries (Youlden

DR et al., 2014). There are three ways to handle and care for patients with breast cancer, including: 1) surgery; 2) radiation; and 3) chemotherapy. Chemotherapy is the most frequently used type of treatment compared to other types of cancer treatment (Sari S L et al., 2019). This is because the systemic circulation system can be reached by chemotherapy methods so that it can treat and prevent the spread of tumors and cancer cells (Dipiro, 2014). Each breast cancer patient receives different chemotherapy treatment depending on the stage of breast cancer the patient is suffering from [2].

Cancer is an economic burden for individuals, families and countries. In 2010, the Jamkesmas Program spent more than IDR 143 billion for inpatient care for cancer sufferers in class 3 in all hospitals in Indonesia. Meanwhile, PT Askes in 2010 showed that cancer treatment was in 4th place in terms of cost absorption. BPJS funding will increase due to increased public awareness of health. On the other hand, hospitals as health service providers participating in BPJS often complain that Jamkesmas claim costs are still lower than hospital rates, so hospitals feel they are "at a loss" with BPJS services [3].

Based on the research results of Aisyah et al., (2019), it shows a significant difference between real costs and INA-CBGs package rates at severity levels I, II and III. The average cost that breast cancer patients incur every time they undergo chemotherapy, severity level I Rp. 4,496,831 and severity level II Rp. 7,797,032. In Sari's (2014) research, the results of research on the comparison of real costs compared to INA-CBGs costs showed negative results, meaning the hospital experienced losses [4].

The aim of this study was to determine the cost of chemotherapy and the comparison between real costs and INA-CBGs package rates for breast cancer inpatients participating in BPJS at the Dharmais Cancer Hospital, Jakarta.

METHODS

This research was conducted in June-July 2023, carried out in the medical records installation and SIMRS installation. The population in this study is collection of medical record data from patients diagnosed with Stage I, II, III breast cancer on BPJS participants undergoing chemotherapy at the Dharmais Cancer Hospital Jakarta inpatient installation [5].

Samples will be taken in a selected manner (purposive sampling), where the population taken as samples are breast cancer patients undergoing inpatient chemotherapy who meet the inclusion criteria at the Dharmais Cancer Hospital, Jakarta. The sample in this study was 100 medical records.

Inclusion criteria include inpatients diagnosed with breast cancer with the INA-CBGs grouping code C-4-13, primary diagnosis code Z-51-1 (Chemotherapy session of neoplasm), secondary diagnosis code C-50 (Malignant neoplasm of breast) , female patients over 18 years of age, patients with 1 treatment episode, stage I, II, II cancer patients who are BPJS class 1, class 2 and class 3 participants as well as patients with complete medical records and payment receipts. The exclusion criteria are patients who have other chronic diseases, breast cancer patients who do not continue therapy, forced to go home or go home of their own accord and patients who have died [6].

The types of data used are qualitative and quantitative, qualitative data is descriptive data obtained from medical record observations. Meanwhile, quantitative data is data related to figures obtained from observations of real costs and INA-CBGs costs. The data obtained was then

analyzed descriptively and analytically. Descriptive analysis includes presenting data in the form of a picture of the patient's real costs obtained from the patient billing cost details form and a description of the difference between the real costs and the INA-CBGs rates by subtracting the total INA-CBGs rates from the total patient real costs [7].

Data processing and analysis in this research uses SPSS, the data obtained will be tested for Normality, using a parametric test, namely the One Sample T-test. The aim is to see whether there is a significant difference between the real costs and the INA-CBGs rates.

RESULTS AND DISCUSSION

Based on medical record data for the period January - December 2022, the number of patients was 2902 and 100 patients met the inclusion criteria. Characteristic data based on age can be seen in Table 1.

Table 1. Data on Age Characteristics of Breast Cancer Patients at Dharmais Cancer Hospital for the Period January – December 2022

No	Age Range (years)	Number of patients	Percentage (%)
1	< 30 years	2	2
2	31 – 40 years	25	25
3	41 – 50 years	30	30
4	51 – 60 years	38	38
5	> 60 years	5	5
Total amount		100	100

This is in accordance with the 2018 Basic Health Research data that the prevalence of age groups suffering from cancer is quite high, ranging from 45 years of age from 124,652 patients (4.03%) and 55-64 years from 83,251 patients (4.62%). Meanwhile, research conducted by Aisyah et al., (2020) showed that the highest number of breast cancer patients were aged 41-50 years from 72 patients (40.90%) and 51-60 years from 46 patients (26.13%). Meanwhile, research conducted by Santoso et al., (2020) showed that the highest number of breast cancer patients were aged 41-50 years from 31 patients (20%) and 51-60 years from 100 patients (65%).

According to Hermawan & Djamaludin, (2016) the risk of breast cancer increases with age. Most often women over 40 years of age get breast cancer, although this does not mean that women under 40 years of age do not get breast cancer, but the incidence is lower than women over 40 years of age.The amount of inpatient costs incurred by the patient is determined based on the class of care.

The treatment classes at the Dharmais Cancer Hospital include class 1, class 2 and class 3. Table 2 shows that breast cancer patients undergoing chemotherapy at the inpatient installation at the Dharmais Cancer Hospital are mostly treated in class 1, namely 46 patients (46%) and class 3, namely 43 patients (43%).

Table 2. Percentage of Number of Chemotherapy Patients Based on Treatment Class

No	Class Room	Total patients	Percentage (%)
1	Class 1	46	46
2	Class II	11	11
3	Class III	43	43
Total amount		**100**	**100**

Based on the results of research conducted by Santoso et all, the results of statistical analysis show that the treatment class with real hospital costs obtained a significant value of <0.05, which means the difference is significant so that the more costs during patient treatment in hospital can be affect total patient costs. Therefore, it is important to choose the right type of chemotherapy to reduce the patient's hospital stay [8].

It can be seen that the distribution of the number of patients based on the stage of breast cancer patients from 100 patients (100%) of patients who had stage I breast cancer (early stage) was 11 patients (11%), patients who had stage II breast cancer (invasive stage) were 22 patients (22%) and 67 patients (67%) had stage III (advanced stage) breast cancer. Based on research conducted by Aisyah et al., (2019) that the stage of breast cancer patients can influence the high real costs, so that the higher the stage or level of severity, the costs that influence real hospital costs will also increase.

The distribution of breast cancer patients undergoing chemotherapy at the Dharmais Cancer Hospital inpatient installation for the period January – December 2022 is grouped based on length of stay (LOS), this is intended to determine the distribution of patients undergoing chemotherapy based on length of stay at home. Dharmais Cancer Hospital.

It was found that the average Length Of Stay (LOS) was 3 days. The Length of Stay (LOS) value is obtained from the total Length of Stay (LOS) divided by the total number of patients. The longer the average length of stay (LOS), the worse the hospital performance because patients need more time to recover. Apart from that, the longer the Length of Stay (LOS) will also result in higher medical costs that must be borne by the patient. The optimal and efficient Length of Stay (LOS) for hospitals is around 3-12 days (Santoso et al., 2020). Therefore, Dharmais Cancer Hospital manages patient therapy effectively through its inpatient services [9].

The components and amounts of real hospital rates in this study for breast cancer patients undergoing chemotherapy at the Dharmais Cancer Hospital inpatient installation for the period January – December 2022 consist of chemotherapy drug costs, laboratory fees, supporting examination fees, doctor consultation fees, room accommodation fees , costs of other medications and costs of non-surgical procedures. So the real costs for Dharmais Cancer Hospital are based on treatment class and severity level.

The largest cost components are non-surgical procedure costs, room accommodation costs and chemotherapy drug costs. The cost components for non-surgical procedures at the Dharmais Cancer Hospital include the costs of a WSD (Water Seal Drainage) examination, Pleural Effusion examination, Intrathecal examination, Colonoscopy examination, Gastrocopy examination, and others. Cost components for Stage I treatment class 1, the average cost of non-surgical procedures is IDR. 3,020,000 (37.48%), the average cost of room accommodation is Rp. 2,344,419 (29.09%) and the average cost of chemotherapy drugs is Rp. 494,591 (6.14%). The cost component for Stage II treatment class 1, the average cost of non-surgical procedures is IDR. 3,147,273 (28.93%), the average cost of room accommodation is Rp. 2,999,294 (27.57%) and the average cost of chemotherapy drugs is Rp. 2,581,373 (23.73%). Cost components for Stage III treatment class 1, the average cost of non-surgical procedures is IDR. 3,328,000 (35.43%), the average cost of room accommodation is Rp.2,639,596 (28.10%) and the average cost of chemotherapy drugs is Rp. 1,561,965 (16.67%). The cost component for Stage I class 2 treatment, the average cost of non-surgical procedures is IDR. 2,800,000 (39.97%), the average cost of room accommodation is Rp. 1,714,119 (24.47%) and the average cost of chemotherapy drugs is Rp.647,250 (9.24%). The cost component for Stage II treatment class 2, the average cost of non-surgical procedures is IDR. 3,000,000 (38.69%), the average cost of room accommodation is Rp. 2,735,556 (35.28%) and the average cost of chemotherapy drugs is Rp. 674,151 (8.69%). Cost component for Stage III treatment class 2, the average cost of non-surgical procedures is IDR. 3,187,500 (41.09%), the average cost of room accommodation is Rp. 1,673,165 (21.57%) and the average cost of chemotherapy drugs is Rp. 1,445,310 (18.63%). Cost components for Stage I treatment class 3, the average cost of non-surgical procedures is IDR. 2,800,000 (46.43%), the average cost of room accommodation is Rp. 1,107,500 (18.37%) and the average cost of chemotherapy drugs is Rp. 559,437 (9.28%). The cost component for Stage II treatment class 3 is the average cost of non-surgical procedures is IDR. 3,150.00 (40.55%), fees the average room accommodation is Rp. 1,690,000 (21.75%) and the average cost of chemotherapy drugs is Rp. 749,447 (9.65%).

The results of this study are in line with the results of research conducted by Aisyah et al., (2019) that the percentage of costs that absorb the most costs is the cost of chemotherapy drugs at 37.53%, room accommodation costs at 12.84%, costs for non-operative procedures at 21.74% at all levels of severity. Based on the results of research by Musnelina et al., (2019), results are similar to the results of this study, namely that the percentage of costs that absorb the most costs is the cost of chemotherapy drugs at 22.85%, room accommodation costs at 19.87%, costs for non-operative procedures at 22.85%. 16.47%. Meanwhile, the results of research conducted by Wulandari et al., (2019) showed that the cost of chemotherapy drugs was 63.02%, the cost of room accommodation was 3.81% and the cost of non-operative procedures was 8.43%. This is due to the high price of chemotherapy drugs and the high price of non-operative examination procedures [10].

Analysis of real hospital cost data based on INA-CBGs rates, namely to determine the correspondence between the real costs of breast cancer patients undergoing chemotherapy at the Dharmais Cancer Hospital inpatient installation for the January period– December 2022 with INA-CBGs rates. The suitability of real hospital costs with INA-CBGs rates can be seen from whether there is a difference between real costs and INA-CBGs rates. To determine the suitability of real hospital costs with the INA-CBGs package rates, the one sample T-test was used. The characteristics of the cost difference can be seen in the table as follows:

Table 3. Comparison between average real costs and INA-CBGs rates

Severity Level	Class	Real Cost	Average Real Cost	INA-fare CBGs	Cost Diferences	*P*
I (n=5)	1 (n=46)	40.291.927	8.058.385	4.304.900	-3.753.485	0,596
II (n=11)		119.666.889	10.878.808	8.101.900	-2.776.908	
III (n=30)		281.750.383	9.391.679	10.967.300	1.575.421	
I (n=2)		14.009.186	7.004.593	3.690.000	-3.314.593	
II (n=1)		7.754.097	7.754.097	6.944.500	-809.597	
III (n=8)		62.061.518	7.757.815	9.400.500	1.642.685	
I (n=4)		24.121.680	6.030.420	3.075.000	-2.955.420	
II (n=10)		77.690.997	7.769.100	5.787.100	-1.982.000	
III (n=29)		245.245.050	8.456.726	7.833.800	-622.926	

The research results in Table 3 show that there is a negative difference between the INA-CBGs tariff costs and the real costs in treatment class 1 with severity levels (stages) I and II, treatment class 2 with severity levels (stages) I and II and treatment class 3 with severity levels (stages) I, II and III. Negative results indicate that the rates charged by the hospital are higher than the INA-CBGs rates. Based on the data in Table 3, it can be concluded that the INA-CBGs fees imposed by hospitals are not sufficient to cover the costs of treating breast cancer patients who are hospitalized. The results of statistical analysis using the parametric one sample t-test on the average real costs and average costs of INA-CBGs on the overall level of severity showed significance with $p<0.05$ in patients participating in BPJS class 3 with severity levels I, II and III, indicating a significant difference in cost differences. The difference in this cost reaches Rp. 3,753,485 for severity level I class 1, Rp. 2,776,908 for severity level II class 1, Rp. 3,314,593 for severity level

I class 2, Rp.809,597 for severity level II class 2, and Rp. 2,955,420 for severity level I class 3, Rp. 1,982,000 for severity level II class 3, Rp. 622,926 for severity level III class 3. This shows that the INA-CBGs tariff is lower compared to the real costs incurred.

However, what is interesting is that the research results in Table 6 show a positive difference at severity level III with treatment classes 1 and 2, where this result is different from the difference at severity levels I and II which produces negative values. According to Abdullah's research results (2019), the payment value in the INA-CBGs system is not necessarily the same as the actual costs incurred by the hospital in treating each patient, sometimes it is higher but sometimes lower than the real costs that have been incurred, resulting in fraudulent acts in an effort to obtain profits can occur. Fraudulent acts that have the potential to occur include coding claims that do not comply with the rules for multiple conditions which usually occur in patients undergoing treatment in inpatient installations, then coding a diagnosis that is not accompanied by supporting examinations, exchanging the main diagnosis for a secondary diagnosis or errors in coding the diagnosis [11][12].

Analysis of real hospital costs based on INA-CBG rates is needed to see a picture of the prices charged to JKN (National Health Insurance) patients based on the grouping system and the real costs of Dharmais Cancer Hospital as a health service provider for inpatient chemotherapy treatment for breast cancer patients. Research conducted by Santoso et al., (2020), found that the difference between the total real hospital costs and the total INA-CBGs rates for breast cancer inpatients was that the total real costs were higher than the total INA-CBGs rates, where the statistical results obtained a significance value. $p<0.05$, which means there is a significant difference with a difference of Rp. 187,228,700. In contrast to research by Aisyah et al., (2020), statistically there is no significant difference between real costs and INA-CBGs tariffs. There is a positive difference between the average real cost and the INA-CBGs tariff, meaning that the INA-CBGs tariff can cover the costs per patient for each episode of chemotherapy treatment in breast cancer patients [13]. The significant difference in cost rates between real hospital rates and INA-CBGs rates is probably due to the standardization of medical or administrative services in inpatient breast cancer patient services, which has an impact on the difference between real hospital rates and INA-CBGs rates and the treatment provided by each -Each doctor is different, but controlled effectively and efficiently. According to the research results of Wahyuni et al, the factors causing differences in rates are determined by standard rates, length of treatment, accuracy of coding [14].

CONCLUSIONS

Based on the results of the One Sample T-test, it shows that there is a significant difference, according to the statistical results, the significance is $p<0.005$ in class 3 and there is no significant difference in class 1 or class 2. The average costs that breast cancer patients have to pay each undergoing chemotherapy, severity level I Rp. 7,129,348, severity level II Rp. 9,323,275 and severity level III Rp. 9,037,426.

ACKNOWLEDGEMENTS

Thank you to all parties who have directly or indirectly provided assistance and motivation during the preparation of this research journal.

REFERENCES

[1] Abdullah, A. S. (2019). Analysis of Factors Causing Fraud Incidents Resulting from Upcoding Health Service Costs to BPJS Health Ambon Branch. Yamasi Makassar Health Journal, 3(1), 1–5.

[2] Aisyah, N., Aryzki, S., Wahyuni, A., Andayani, T. M., & Puspandari, D. A. (2019). Factors that influence the real costs of breast cancer chemotherapy patients participating in JKN at Ulin Hospital, Banjarmasin. Journal Of Current Pharmaceutical Sciences, 2(2), 154–159.

[3] Aisyah, N., Syarifuddin, A., Amami, P., & Mardiana, M. (2020). ANALYSIS OF CHEMOTHERAPY COSTS FOR BREAST CANCER AND CERVICAL CANCER PATIENTS AT ULIN HOSPITAL BANJARMASIN. Indonesian Pharmaceutical Human Journal, 3(1), 19– 28. https://doi.org/10.36387/jifi.v3i1.500

[4] Bray F, Ferlay J, Soerjomatram I, Siegel RL, Torre LA, & Jemal A. (2018). GLOBOCAN Estimates of Worldwide Incidence and Mortality for 36 Cancers in 185 Countries. Global Cacer Statistics, 394–424.

[5] Dipiro, J. T. (2014). Pharmacotherapy: A Pathophysiologic Approach (9th ed., Vol.2). McGrawHill Education.

[6] Hermawan, D., & Djamaludin, D. (2016). The incidence of breast cancer is seen from the factors of age, early menstruation and use of contraception. Holistic Health (The Journal of Holistic Healthcare), 10(2), 45–53.

[7] Musnelina, L., Pontoan, J., & Martin, C. J. (2019). Analysis Of The Cost Effectiveness Of Chemotherapy In Breast Cancer Patients At Gatot Soebroto Rspad, Jakarta. Scientific Manuntung, 5(1), 65–72.

[8] Riadinata, & Pratiwi F. (2016). Analysis of Mother's Knowledge Level about Breast Cancer with Awareness Behavior in Housewives. Journal of Obstetrics, 153–161.

[9] Santoso, A., Sulistyaningrum, I. H., Rosyid, A., Cahyono, E. B., Wirastuti, K., & Riyanto, B. (2020). Comparison of Real Costs with INA-CBGs Rates for Breast Cancer in the Era of National Health Insurance. Journal of Scientific and Practical Pharmacy (JFSP), 6(1), 60–66.

[10] Sari, R. P. (2014). Comparison of Real Costs with INA-CBGs Package Rates and Analysis of Factors Affecting Real Costs in Jamkesmas Inpatient Diabetes Mellitus Patients at Dr. Sardjito General Hospital, Yogyakarta. Spread Journal, 4(1), 61–70.

[11] Sari S L, Indra R L, & Lestari R F. (2019). 'Correlation of Perceptions About the Side Effects of Chemotherapy with the Quality of Life of Breast Cancer Patients Shanti Lesmana Sari, Rani Lisa Indra, Raja Fitriana Lestari.' Jurnal Cakrawala Promkes, 1(2), 40–47.

[12] Wahyuni, S., Saputra, I., & Hanum, F. (2019). Comparison of Real Hospital Costs with INA-CBGs Rates for Thalassemia Sufferers at the Zainoel Abidin Agency Aceh General Hospital in 2018. Nanggroe Medika Medical Journal, 2(3), 8–16.

[13] Wulandari, A., Monalisa, S., & Zaini, J. (2019). Cost Analysis of First Line Chemotherapy for Lung Cancer Patients at Persahabatan Hospital, East Jakarta for the 2016 Period. Sainstech Farma, 12(2), 85–92.

[14] Youlden DR, Cramb SM, Yip CH, & Baade PD. (2014). Incidence and Mortality of Female Breast Cancer in the Asia-Pacific Region. . Cancer Biol Med, 101–115.