Research of Service Administration Health and Sains Healthys
Vol. 6 No. 2 Desember 2025
*p-ISSN:*2830-4748 e-ISSN: 2830-4772
DOI: *10.58258/rehat.v6i2.9392/ http://ejournal.mandalanursa.org/index.php/Rehat*

Calculation of Unit Cost in Cardiac Echocardiography Using the Activity-Based Costing (ABC) Method Based on INA-CBG's Rates at dr. Oetojo Naval Hospital, Sorong

Rhegy Seno Pratama[1], Purwadhi[2], Rinawati[3]
Universitas Adhirajasa Reswara Sanjaya

Article Info
Article history:
Accepted: 25 Agustus 2025
Publish: 1 December 2025

Keywords:
Activity-Based Costing;
Unit cost;
Echocardiography;
INA-CBG's;
Cost efficiency.

Abstract
This study aims to calculate the unit cost of echocardiography services at RSAL dr. Oetojo Sorong, West Papua, using the Activity-Based Costing (ABC) method and compare it with the applied INA-CBG's tariff. The research method employed is a quantitative descriptive approach focusing on direct cost analysis, overhead costs, and cost allocation based on activities. The data used includes primary data obtained from direct observation and interviews, as well as secondary data such as financial reports and hospital medical records. The results show that the unit cost of echocardiography services calculated using the ABC method is higher than the INA-CBG's tariff, indicating a disparity between the standard tariff and actual costs. The application of the ABC method provides significant benefits to RSAL dr. Oetojo Sorong, such as identifying cost-intensive activities, improving operational efficiency, and providing transparency in cost management. This study also recommends that hospital management evaluate service tariffs and that BPJS Kesehatan review the alignment of INA-CBG's tariffs with the actual costs of healthcare services.

Corresponding Author:
Rhegy Seno Pratama
Universitas Adhirajasa Reswara Sanjaya
Email: rhegyseno@gmail.com

1. INTRODUCTION

In the era of the National Health Insurance (JKN) managed by BPJS Kesehatan, the healthcare payment system in hospitals has undergone a significant transformation with the implementation of the INA-CBG (Indonesian Case-Based Groups) system. This system implements payment based on diagnosis and treatment packages, where hospitals receive a fixed rate for each medical procedure, regardless of the actual costs incurred. Although this system aims to increase efficiency and transparency, many hospitals, especially those located in 3T (Frontier, Outermost, and Disadvantaged) areas, experience financial pressure because the rates received are often insufficient to cover actual operational costs. This condition is exacerbated by limited access to experts, expensive logistics, and high depreciation of medical equipment, which are a particular burden for healthcare institutions in border areas such as Sorong, Southwest Papua.

Dr. Oetojo Naval Hospital Sorong, as a hospital owned by the Indonesian Navy, plays a strategic role in providing quality healthcare services to military personnel, civil servants, and the general public in the region. One of the hospital's mainstay specialty services is cardiac echocardiography, a non-invasive diagnostic examination that is crucial for assessing the structure and function of the heart. This examination requires significant investment, including sophisticated echocardiography equipment, trained medical personnel such as cardiologists and technicians, and consumables that must be replaced

regularly. However, INA-CBG rates for cardiac echocardiography procedures often do not reflect the complexity and actual costs incurred by hospitals, potentially leading to ongoing operational deficits.

Traditional costing methods often used by hospitals, such as traditional costing, have limitations because they tend to allocate overhead costs proportionally based on volume, rather than based on the actual resource-consuming activities. This results in cross-subsidization between services, where labor-intensive services are subsidized by material-intensive services, resulting in inaccurate cost calculations. To address this limitation, Activity-Based Costing (ABC) was introduced as a more precise costing tool. ABC identifies cost-driver activities and allocates costs proportionally based on the resource consumption of each activity, providing a more accurate picture of the true cost of a service.

This study aims to calculate the unit cost of cardiac echocardiography services at Dr. Oetojo Naval Hospital in Sorong using the ABC method, and to analyze the gap between actual costs and INA-CBG rates. Practically, the results of this study are expected to provide a basis for hospital management in negotiating rates with BPJS, preparing more realistic budgets, and designing operational efficiency strategies. Academically, this study contributes to the literature on health management accounting in Indonesia, particularly in the context of military hospitals and remote areas that face unique logistical and financial challenges. Thus, this study not only answers the question of "what is the true cost of a service," but also opens up discussion about tariff fairness, service sustainability, and the need for more inclusive and contextual health policies.

The literature review in this research focuses on three main pillars: logistics management concepts, *Activity-Based Costing* (ABC) method, and the INA-CBG's tariff system and its implications for hospital cost efficiency. Logistics management, according to Bastian (2008), encompasses the planning, implementation, and control of the flow of goods, services, and information from the point of origin to the end consumer. In the hospital context, effective logistics management is crucial to ensure the timely availability of consumables and medical devices, which directly impact operational costs and service quality.

Activity-Based Costing ABC method is a revolutionary approach to management accounting developed to address the weaknesses of traditional methods. As explained by Baviga (2021) and Susanti (2021), ABC focuses on identifying resource-consuming activities and then allocating costs based on this cost driver relevant. The main components of ABC include identifying activities, determining cost *driver*, grouping direct and indirect costs, and allocating costs to products or services based on activity consumption. ABC's advantage lies in its ability to provide more accurate cost data, which is crucial for strategic decision-making such as pricing, efficiency evaluation, and budget planning.

The application of ABC in the healthcare sector has been extensively researched. A study by Budiarto & Sugiharto (2013) demonstrated a discrepancy between actual costs and INA-CBG claim costs for catastrophic illnesses, supporting the need for more accurate costing methods. Similar studies by Wita (2010) on appendectomy surgery and Siregar (2004) on hospital pharmacy management also confirmed that ABC can uncover hidden costs and provide a solid basis for managerial decision-making. In Indonesia, a study by Amrin (2020) at Sumantri Hospital found that hospital rates were lower than those calculated using the ABC method, a finding highly relevant to the context of this study.

INA-CBG's tariff system, which is based on the principal case-based *payment*, has major implications for hospital cost management. As Cleverley (1997) outlined, cost efficiency is not simply about cutting expenses, but about optimizing the use of resources to achieve desired outcomes. In the INA-CBG system, hospitals that are unable to control costs will experience deficits, while efficient hospitals will generate surpluses. However,

established rates often do not take into account geographic variables, case complexity, or high logistics costs in remote areas, which pose a significant challenge for hospitals like Dr. Oetojo Naval Hospital in Sorong.

Based on the literature review, the method proposed in this research is *Activity-Based Costing* (ABC) as an accurate unit cost calculation tool. This approach was chosen because it can specifically identify which activities consume the most resources, allowing management to make more informed decisions regarding efficiency. The research conceptual framework describes the relationship between activities in the echocardiography process of *cost driver* that drives costs, and the allocation of costs to the final service units. Thus, the ABC method is not only a calculation tool, but also a diagnostic tool for identifying areas for improvement in the healthcare value chain.

2. RESEARCH METHOD

This study uses a quantitative approach with a case study design, which focuses in depth on one service unit at RSAL Dr. Oetojo Sorong, namely the cardiac echocardiography service. The choice of a case study design is considered appropriate because this study aims to understand a complex phenomenon in a specific context, namely the calculation of health service costs in a hospital located in a unique geographic area. The research location was chosen because RSAL Dr. Oetojo Sorong represents the typical challenges of hospitals in the 3T area in managing complex health services with limited resources, difficult logistical access, and high operational burdens.

The population of this study comprised all processes, resources, and costs involved in providing cardiac echocardiography services at Dr. Oetojo Naval Hospital in Sorong from January to December 2024. Given the comprehensive nature of this case study, no sampling was required, as all activities and associated costs were fully identified and analyzed. Data collection was conducted through two primary sources: primary and secondary data. Primary data were obtained through structured questionnaires and in-depth interviews with medical personnel directly involved in the service, including cardiologists, nurses, and echocardiography technicians, as well as finance and logistics staff. The questionnaire was designed to identify key activities in the echocardiography process, the time required, and the use of resources such as labor, equipment, and consumables. Interviews were used to gain a deeper understanding of operational dynamics and challenges encountered in the field.

Secondary data were collected from internal hospital documents, including financial records (general ledgers, cost reports), medical staff work schedules, details of equipment and consumables usage, and BPJS Kesehatan claims data based on INA-CBGs. This data was used to verify and supplement information from the primary data. Data analysis was conducted using the Activity-Based Costing (ABC) method through a series of systematic steps. First, the main activities in the echocardiography process were identified, including patient registration, room and equipment preparation, echocardiography examination, interpretation of results by a specialist, printing and submitting reports, and equipment maintenance. Second, all costs were classified into direct costs (such as medical staff salaries and consumables) and indirect or overhead costs (such as electricity, water, equipment depreciation, administrative costs, and facility maintenance). Third, cost drivers were determined for each activity, for example, working hours for medical staff, number of procedures for consumables, and equipment usage hours for depreciation allocation. Fourth, costs were allocated to each activity based on the predetermined cost drivers. Fifth, all costs allocated to a single echocardiography procedure were summed to obtain the actual unit cost. Finally, a comparative analysis was performed between the actual unit cost and the INA-CBG rates to identify gaps and analyze their causes.

To ensure data validity and reliability, the questionnaire instrument was tested for validity using Pearson correlation and for reliability using Cronbach's Alpha on trial respondents. The data was then analyzed using SPSS version 25 software to assist with the calculation and descriptive statistical analysis. The analysis process was conducted in parallel with data collection to ensure the accuracy and completeness of the information.

3. RESEARCH RESULTS AND DISCUSSION

The calculation results using the Activity-Based Costing (ABC) method show that the actual unit cost of cardiac echocardiography services at Dr. Oetojo Naval Hospital in Sorong is IDR 1,250,000 per procedure. The breakdown of these cost components includes labor (HR) costs of IDR 550,000 (44% of the total cost), which is the largest component and reflects the high reliance on trained medical personnel such as cardiologists and echocardiography technicians. This cost is calculated based on basic salary, allowances, and working time spent directly in the examination process. The second component is the cost of consumables of IDR 300,000 (24%), which includes ultrasound conductor gel, gloves, tissues, electrodes, and other sterilization equipment. The questionnaire results indicate a tendency for the use of consumables to be less than fully efficient, with some respondents admitting to overuse, while others experienced shortages due to suboptimal logistics management. This confirms the findings of Ramadhan and Nasution (2019) that inefficient management of consumables can significantly increase hospital costs.

The third component is the depreciation cost of the echocardiography equipment, amounting to Rp250,000 (20%), calculated based on the initial investment value of the equipment and its 10-year useful life using the straight-line method. Echocardiography equipment is an expensive strategic asset, and its depreciation costs represent a significant fixed burden for the hospital. The final component is overhead costs, including electricity, water, administration, and facility maintenance, amounting to Rp150,000 (12%). These costs are allocated based on the hours the room and equipment are used, as well as the proportion of the workforce involved. The ABC method is much more accurate than traditional methods because it can specifically identify which activities consume the most resources, allowing management to make more informed decisions regarding efficiency.

A comparison between the actual unit cost and the INA-CBG's rates reveals a significant discrepancy. The hospital's rate from BPJS Kesehatan for cardiac echocardiography based on the INA-CBG's is Rp950,000, meaning a deficit of Rp300,000 per procedure. If this deficit persists, it will significantly impact the hospital's financial sustainability, especially consider the increasing volume of services and increase public awareness of the importance of early detection of heart disease. The hospital will be forced to cover this deficit from surpluses from other services or use operational funds that should be allocated for equipment upgrades, workforce training, or the development of new services.

Further analysis revealed several factors contributing to the discrepancy between actual costs and rates. Internally, a lack of efficiency in human resource utilization was the primary factor. Suboptimal work schedules led to high idle time, particularly while waiting for patients or during preparation. Furthermore, inefficient use of consumables, such as excessive use of ultrasound gel or wasted gloves, added to the cost burden. Externally, INA-CBG's rates were deemed impractical and failed to account for important variables such as geographic location, case complexity, rising material prices, and high logistics costs in remote areas. A uniform rate system across Indonesia ignores the reality that operational costs in Sorong are significantly higher than in major cities like Jakarta or Surabaya.

These findings align with research by Douglas et al. (2019) which emphasizes the importance of accurate cost calculations in economic decision-making in the healthcare

sector. Without valid cost data, hospitals cannot evaluate service efficiency, negotiate with insurance institutions, or plan sustainable development strategies. Therefore, the results of this study not only indicate a deficit but also provide a basis for hospitals to propose tariff revisions or special incentives for hospitals in 3T areas that provide specialist services. This section explains the research results and provides a comprehensive discussion. The results can be presented in the form of images, graphs, tables, and others to make it easier for readers to understand [2, 5]. The discussion can be conducted in several sub-chapters.

4. CONCLUSION

Based on the results of the calculations and analysis that have been carried out, it can be concluded that the *Activity-Based Costing* (ABC) method is a highly effective and accurate tool for calculating the unit cost of cardiac echocardiography services at Dr. Oetojo Naval Hospital, Sorong. The results clearly show a significant gap between the actual costs incurred by the hospital (Rp1,250,000) and the rates received from BPJS Kesehatan (Rp950,000), resulting in an operational deficit of Rp300,000 per procedure. This discrepancy is the result of internal factors, such as the lack of efficiency in the use of human resources and consumables, as well as external factors, namely the INA-CBG's tariff structure that does not consider the complexity and geographic context of the hospital. If not addressed, this ongoing deficit could threaten the sustainability of echocardiography services, which are crucial for the community in the Southwest Papua region. Therefore, it is highly recommended that the hospital use the results of this study as a basis for conducting operational audits, improving efficiency, and renegotiating tariffs with BPJS Kesehatan, in order to maintain service quality and the institution's financial sustainability.

5. BIBLIOGRAPHY

Alfian, M., & Wulandari, E. (2021). Analisis Responsiveness Pelayanan Kesehatan di Instalasi Rawat Inap RSND Semarang. Jurnal Administrasi Kesehatan Indonesia, 9(2), 89–97.

Andriani, T. Y., & Setiawan, D. (2022). How to Engage Patients in Achieving Patient Safety: A Qualitative Study from Healthcare Professionals' Perspective. BMC Medical Informatics and Decision Making, 22(1), 1–11. https://doi.org/10.1186/s12911-022-01876-5

Aryani, R. N., Suryani, S., & Widyasih, H. (2020). An Evaluation of Patient Satisfaction with Nursing Care: A Qualitative Study in an Indonesian Hospital. Journal of Nursing Practice, 4(1), 12–18. https://doi.org/10.30994/jnp.v4i1.76

Bastian, I. (2008). Akuntansi kesehatan. Jakarta: Erlangga.

Baviga, R. (2021). Penerapan metode activity-based costing.

Budiarto, W., & Sugiharto, M. (2013). Biaya klaim INA-CBGs dan biaya riil penyakit katastropik rawat inap peserta Jamkesmas di rumah sakit: Studi di 10 rumah sakit milik Kementerian Kesehatan Januari-Maret 2012. Buletin Penelitian Sistem Kesehatan, 16(1), 58-65.

Chairuddin, R. (2010). Pengantar ilmu bedah ortopedi (Edisi ketiga). Jakarta: Yarsif Watampore.

Cleverley, W. O. (1997). Essentials of health care finance (4th ed.). Gaithersburg, MD: Aspen.

Donabedian, A. (1988). The quality of care: How can it be assessed? JAMA, 260(12), 1743–1748. https://doi.org/10.1001/jama.1988.0341012008903

Gerteis, M., Edgman-Levitan, S., Daley, J., & Delbanco, T. L. (Eds.). (1993). Through the Patient's Eyes: Understanding and Promoting Patient-Centered Care. San Francisco: Jossey-Bass Publishers.

Hansen, D. R., & Mowen, M. M. (2004). Akuntansi manajemen (Edisi 7). Jakarta: Salemba Empat.

Horngren, C. T., Harrison, W. T., & Oliver, M. S. (2008). Accounting (8th ed.). Harlow: Prentice Hall.

Kaplan, R. S., & Anderson, S. R. (2004). Time-driven activity-based costing. Harvard Business School Press.

Kartadinata, A. (2000). Akuntansi dan analisa biaya: Suatu pendekatan terhadap tingkah laku biaya. Jakarta: Rieneka Cipta.

Kepmenkes RI. (2012). Nomor 440/MENKES/SK/XII/2012 tentang tarif rumah sakit berdasarkan Indonesia Case-Based Group (INA-CBG).

Marlina, L., et al. (2020). Komunikasi Berpusat pada Pasien dan Dampaknya terhadap Kepuasan. Jurnal Keperawatan Indonesia.

Masyhudi. (2008). Analisis biaya dengan metode activity-based costing Kepaniteraan Klinik Mahasiswa Fakultas Kedokteran Unissula di Rumah Sakit Islam Sultan Agung (Tesis S2). Semarang: Magister Ilmu Kesehatan Masyarakat Universitas Diponegoro.

Moleong, L. J. (2006). Metodologi Penelitian Kualitatif (Edisi Revisi). PT Remaja Rosdakarya.

Mulyadi. (2003). Activity-based cost system: Sistem informasi biaya untuk pengurangan biaya. Yogyakarta: UPP AMP YKPN.

Mulyadi. (2007). Activity-based cost system. Yogyakarta: UPP AMP YKPN.

Otto, C. M., & Pearlman, A. S. (2020). Textbook of clinical echocardiography. Elsevier.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. Journal of Retailing, 64(1), 12–40.

Permenkes No. 1045/MENKES/PER/XI/2006. (2006). Tentang rumah sakit.

Purwadhi, P. (2023). Pengaruh kebijakan manajemen strategis terhadap daya saing rumah sakit di era JKN. Jurnal Ekoma, 12(2), 85–94. https://journal-nusantara.id/index.php/EKOMA/article/view/5312

Siregar, C. J. P. (2004). Farmasi rumah sakit. Jakarta: ECG.

Sugiyono. (2012). Metode penelitian kuantitatif, kualitatif, dan R&D. Bandung: Alfabeta.

Supriyono, R. A. (1999). Akuntansi biaya buku I: Pengumpulan biaya dan penentuan harga pokok (Edisi 2, Cetakan ke-12). Yogyakarta: BPFE.

Susanti, R. (2021). Implementasi metode ABC dalam layanan diagnostik rumah sakit. Jurnal Manajemen Kesehatan Indonesia.

Widjaja, Y. R. (2022). Pengaruh budaya organisasi terhadap kualitas pelayanan kesehatan. Jurnal Gemilang, 10(4), 78–86. https://jurnal-stiepari.ac.id/index.php/gemilang/article/view/21

Widjaja, Y. R. (2022). Telemedika sebagai strategi pelayanan kesehatan di masa pandemi: Tinjauan literatur. Jurnal Ilmu Riset Kesehatan, 6(2), 102–110. https://bajangjournal.com/index.php/JIRK/article/view/8531

Wita, V. (2010). Perhitungan biaya satuan tindakan bedah appendiktomi akut di kamar operasi Rumah Sakit X (Tesis).