



Analysis of MRI (Magnetic Resonance Imaging) Examination Service Rates: An Implementation of the Activity Based Costing (ABC) Method at UPT. Undata Regional Hospital, Central Sulawesi Province

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ABSTRACT

The JKN program enables government hospitals partnering with BPJS Health to experience an increase in patient numbers. This condition leads to higher hospital revenue; however, in some services at the UPT.RSUD Undata, there is a significant gap between the hospital's general rates and the rates set by BPJS through INA-CBG's (Indonesian Case-Based Groups), especially for high-tech services such as Magnetic Resonance Imaging (MRI). This study aims to calculate MRI service rates using the ABC method, and to compare the results of the ABC method calculation with general rates and INA-CBG's rates. This research uses a quantitative method with secondary data. Data were collected by determining all the activities involved in MRI examination services and then classifying them into Fixed Costs, Variable Costs, and personnel salaries. The study found that the unit cost for a single MRI examination service is 4,419,627 IDR. In detail, the comparison shows that the rate for general patients is set at 4,000,000 IDR, resulting in a difference of 419,627 IDR per procedure, while for BPJS patients through INA-CBG's, it is only 2,832,000 IDR, meaning there is a shortfall of 1,587,627 IDR. However, as a government-owned hospital, UPT

INTRODUCTION

In 2024, the allocation of the State Budget (APBN) for the Indonesian Ministry of Health reached IDR 186.4 trillion, equivalent to 5.6% of the total APBN. This figure represents an increase of 8.1% or IDR 13.9 trillion compared to the 2023 budget. Overall, the healthcare sector budget has shown an increasing trend over the past five years: from IDR 119.9 trillion in 2020, rising to IDR 124.4 trillion in 2021, IDR 134.8 trillion in 2022, IDR 172.5 trillion in 2023, IDR 186.4 trillion in 2024, up to IDR 218.5 trillion in 2025.

According to Article 170 of Law Number 36 of 2009 on Health, the local government health budget for provinces, regencies, and cities must be at least 10% (ten percent) of the regional revenue and expenditure budget, including salaries. The budget for the Central Sulawesi Provincial Health Office was allocated through the Provincial APBD, State Budget (APBN), and Foreign Loans and Grants (PHLN) in 2020 amounting to IDR 320.5 billion (Strategic Plan of the Central Sulawesi Provincial Health Office 2023, 2023).

UPT. RSUD Undata is a Class B hospital under the Central Sulawesi Provincial Government in the city of Palu and serves as the highest referral center for specialized health services (Pandey et al., 2019). Through its Quality Management Model, UPT. RSUD Undata consistently strives to enhance and develop the quality of services across all hospital units. This improvement and development of service quality are achieved thanks to the commitment, encouragement, and support from all levels of the Local Government. This, of course, also impacts health facilities, enabling them to grow and develop effectively in providing comprehensive health services to the community (Ahmed et al., 2022; Pratama et al., 2021).

Based on the Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2016 concerning Technical Requirements for Hospital Buildings and Facilities, type A hospitals are required to have advanced medical equipment, including MRI, as part of diagnostic support facilities. This aligns with the function of type A hospitals as the highest referral center providing extensive specialist and subspecialist medical services. Since the implementation of BPJS Health as the executor of JKN, various parties have expressed concerns about the rates applied, referring to INA-CBGs (Indonesia Case Base Groups), a payment model used by BPJS Health to reimburse claims billed by hospitals. INA-CBGs is a payment system using a "package" method, based on the patient's diagnosed disease. Hospitals will receive payment based on the INA-CBGs rates, which represent the average cost incurred for a specific diagnosis group.

Through INA-CBGs, it is expected that the quality and efficiency of hospitals can be improved. The benefits of implementing INA-CBGs in JKN are that the rates are intended to be in the form of packages that cover all hospital cost components. The system is based on costing data and disease coding referring to the International Classification of Diseases (ICD) compiled by the WHO (Ramadhan et al., 2022). The JKN program allows government hospitals and private hospitals partnering with BPJS Health to experience an increase in patient numbers. This condition leads to higher hospital revenue; however, in some services at UPT.RSUD Undata, there is a significant gap between the

general hospital rates and the rates set by the government through the INA-CBGs (Indonesian Case-Based Groups) system, especially for high-tech services such as Magnetic Resonance Imaging (MRI). For example, for non-contrast MRI examinations, the service rate can reach Rp 4,000,000, Meanwhile, the claim from BPJS through INA-CBG's is only Rp2,832,000.

This significant difference in rates raises critical questions: Does the current rate reflect the actual costs incurred by the hospital? If not, the hospital risks experiencing overcosting or undercosting, which can impact the sustainability of services and service quality. Therefore, a study is needed to calculate and analyze MRI examination service rates using the ABC method at UPT RSUD Undata, Central Sulawesi Province. This research is important to address the discrepancy between the hospital's general rates and the current INA-CBG's rates and to provide data-based recommendations that can be used by hospital management in rate policy and cost control.

Problem Formulation

Based on this background, the research problem formulation in this study is as follows:

- 1) What are the results of calculating the MRI service tariffs at the UPT RSUD Undata, Central Sulawesi Province, based on the Activity-Based Costing (ABC) method?
- 2) To what extent is the difference between MRI service tariffs calculated using the ABC method and the currently applicable INA-CBG's claim tariffs and general tariffs?

Research Objective

To determine the condition of environmental sanitation in the working area of Pantoloan Health Center, Palu City, Central Sulawesi Province.

Specific Research Objectives

To identify the main activities in the MRI service process at UPT RSUD Undata.

- 1) To calculate MRI examination fees based on the ABC method.
- 2) To compare the results of the ABC method fee calculation with INA-CBG's rates and the hospital's general rates.
- 3) To analyze the differences that occur and the factors causing discrepancies in tariffs.
- 4) To provide recommendations for setting cost-based rates to support managerial decision-making.
 - a. To identify the relationship between the level of knowledge about environmental sanitation and community behavior in sanitation management in the working area of Pantoloan Health Center, Palu City, Central Sulawesi Province.
 - b. To identify the relationship between attitudes and community behavior in sanitation management in the working area of Pantoloan Health Center, Palu City, Central Sulawesi Province.
 - c. To determine strategies for community-based environmental sanitation management using SWOT analysis at Work area of Pantoloan Health Center, Palu City, Central Sulawesi Province

Theoretical Benefits

1. Providing information on actual MRI service costs to the management of UPT RSUD Undata, Central Sulawesi Province, to support more accurate decision-making regarding tariff determination.
2. Serving as a material for evaluating the effectiveness of the current tariff system, both in the context of INA-CBG's claims and general tariffs..

LITERATURE RIVIEW

Research by Widada et al. (2020) titled Determination of Priorities and Financial Feasibility in Magnetic Resonance Imaging (MRI) Investment. This study uses a mixed-method approach, which is a combination of qualitative and quantitative approaches. Primary data was obtained through Focus Group Discussions (FGD) with stakeholders as data sources. The secondary data of this study includes MRI prices and specifications from the LKPP e-catalog website, financial reports, the number of MRI examinations, and patient diagnosis data. The AHP analysis results explain that the priority order of MRI criteria is software, hardware, accessories, and price, while the priority of MRI alternatives is GE 16-CHANNEL, Philips 1.5T, Siemens 1.5T, and Canon 1.5T. An MRI investment with the GE brand is considered feasible because it has an IRR value above the applied discount factor (16%) and a positive NPV, The Payback Period value is less than 6 years, the Benefit-Cost ratio is greater than 1, and the PV of proceeds / Net investment is above 1. A study by Dwi Purnama et al. (2020) entitled 'Unit Cost Analysis of Elective Percutaneous Coronary Intervention (PCI) Cardiac Catheterization Services Using the TDABC Method: An Empirical Study at UPT RSUD Undata, Central Sulawesi Province' used a Mixed Method design. At the beginning of the study, a Concurrent Triangulation design was applied during the preparation of the Unit Cost Estimation (Unit Cost) for elective PCI cardiac catheterization services at UPT RSUD Undata, Central Sulawesi Province, which amounted to Rp. 34,926,396 with components including estimated personnel costs of Rp. 8,335,954, estimated drug and medical consumable costs of Rp. 23,227,725, estimated accommodation service costs of Rp. 2,890,257, and estimated indirect costs of Rp. 472,436. The component with the greatest impact on the service was drugs and AMHP

INA CBG's Rates

BPJS Kesehatan was formerly known as Askes (Health Insurance), managed by PT Askes Indonesia (Persero). However, in accordance with Law No. 24 of 2011 regarding BPJS, PT Askes Indonesia changed to BPJS Kesehatan as of January 1, 2014, through the Indonesia Case Based Group (INA_CBGs) mechanism in accordance with Presidential Regulation Number 12 of 2013 concerning Health Insurance, as amended by Presidential Regulation Number 111 of 2013. For the rates applicable on January 1, 2014, adjustments had been made from the INA_CBGs Jamkesmas rates and were stipulated in the Ministry of Health Regulation Number 69 of 2013 concerning Standard Rates for Health Services at Primary and Advanced Health Facilities in the implementation of Health Insurance (Aminda & Rahayu, 2020).

Healthcare services for hospitals in the JKN era, one of which is through the Indonesian Case Based Groups (INA CBGs) payment system, refers to the claim payment amount by BPJS Kesehatan to hospitals for service packages based on the grouping of disease diagnoses and procedures (Leonard et al., 2021). The INA-CBGs system is a payment model used by BPJS Kesehatan to reimburse claims billed by hospitals using a package system based on the results of the patient's disease diagnosis. The use of the INA-CBGs system can help in calculating service rates more objectively based on actual costs. Socialization of the use of the INA-CBGs system is highly expected to improve the quality and efficiency of hospitals (Payu, 2022; Sutopo Sutopo, 2022).

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Traditional Cost Accounting Method

In accounting systems, there are two approaches to calculating unit costs, namely the Traditional Costing System (TCS) and Activity-Based Costing (ABC). The ABC method was developed as a solution to the limitations of TCS, aiming to allocate cost drivers more accurately to each activity and to calculate costs based on those activities. TCS tends to allocate costs incurred in certain departments using a number of cost drivers. In contrast, ABC assigns the costs of resources directly to cost objects such as products, services, or customers based on the activities performed. The ABC method is also known as a two-stage process, where costs are first allocated to activities, and then from activities to services (Ross, 2004).

Activity-Based Costing Method

The ABC method is a costing method that focuses on identifying activities and utilizing various cost drivers. This approach allows for more accurate measurement of resource usage by products, thereby helping management make higher-quality decisions (Haryanti et al., 2022).

The ABC method is an approach to determining product costs aimed at providing accurate information to management through the measurement of resource usage (Lamrisma & Lilianti, 2019; Musfira et al., 2024). Based on various expert opinions, it can be concluded that an activity-based costing system calculates all costs based on each activity with more specific allocation methods. Therefore, trading companies are advised to implement the ABC system in determining production costs to support more precise decision-making (Ofiyana et al., 2021).

Research Conceptual Framework

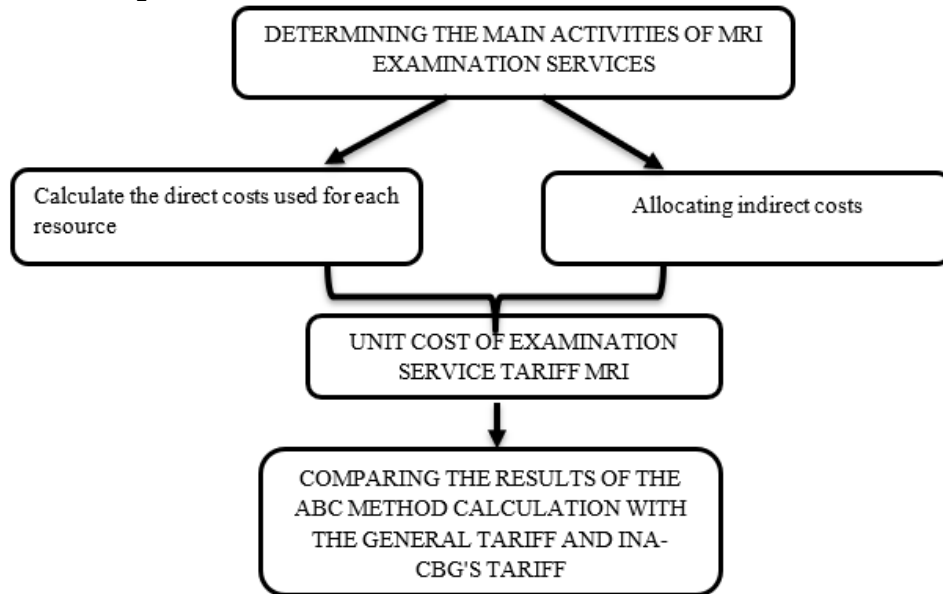


Figure 2. Conceptual Framework

METHODOLOGY

Type of Research

The type of research used in this study is descriptive quantitative research to calculate the MRI examination service rates using the ABC method at UPT. RSUD Undata, Central Sulawesi Province. Then, after the analysis of the MRI service rates has been completed, it will be compared with the general hospital rates and INA-CBGs rates, followed by interviews to obtain stakeholders' perceptions regarding these findings.

Research Location and Time

This research was conducted at UPT. RSUD Undata, Central Sulawesi Province. The research time was carried out once the research approval letter had been issued. The study will be conducted from August to October 2025.

Research Instruments

In this material on calculating MRI service rates using the ABC method, it begins with collecting secondary data from the hospital's financial reports, medical records data, and other data related to all costs incurred in MRI examination services. Then, for primary data collection in this study, the methods used are interviews, documentation, and triangulation.

- a. Interviews The primary data collection in this study uses the in-depth interview method or semi-structured interviews with open-ended questions within the limits of certain themes and conversation flow. In this study, interviews were conducted to obtain complete information regarding the activities carried out by each unit and the practical capacity of each related personnel.
- b. Documentation In this study, documentation consists of financial data and medical records data from 2021-2025.

Data Analysis

The analytical steps in this study are:

- Identifying activities.
- Classifying costs based on activities into various activities.
- Identifying cost drivers.

Determining the rate per cost driver unit to calculate the unit rate using the formula:

$$\text{"Rate per cost driver unit"} = \frac{\text{Number of Activities}}{\text{Cost Drivers}}$$

1. Allocating costs to products using cost drivers and activity measures. The allocation of overhead costs for each service is calculated using the formula: Allocated OHP = Cost per unit rate × Selected cost driver.
2. The calculation of the rate for each service using the activity-based costing system method can be calculated using the following formula: Service rate = Cost of each service × Expected profit.
3. Activity-based costing system (ABC) analysis using Microsoft Excel.

Data analysis, calculation of service rates starts with identifying activities performed in the MRI examination process, then separating between direct and indirect expenditures for services, then identifying cost drivers, followed by calculating service rates using the ABC method (Harmana, 2020; Lamrisma & Lilianti, 2019).

The stage of in-depth stakeholder interviews addressing the results of MRI service tariff calculations has been completed, followed by conducting in-depth interviews with relevant stakeholders regarding the findings of MRI service tariff calculations using the ABC method. These findings were then compared with the hospital's general tariffs and INA-CBGs tariffs, and recorded using a digital voice recorder. These in-depth interviews were conducted with the head of the finance department (Yusran Bachtiar, Deasy Soraya A. Aminartha Putri, 2019; Zifi et al., 2020).

RESULT AND DISCUSSION

Calculating MRI Examination Tariffs Using the Activity Based Costing (ABC) Method

1. Identifying the Total Cost of Each Cost Pool

After identifying the resource groups, the next step is to identify the total cost for each resource group (cost pool). The total cost of each resource represents the actual cost incurred for each activity of this MRI examination service. Depreciation costs of buildings, medical and non-medical equipment, and electricity for MRI examination services based on electricity requirements.

Table 1. Depreciation Costs of Buildings, Medical Equipment, and Electricity

No	Activity	Acquisition Value (Rp)
1	Building	29.301.541
2	Medical and Non-medical equipment	2.448.678.000
3	Electricity	268.350.589
	Total	2.746.330.130

Source: Secondary Data, 2025

To obtain the total estimated depreciation cost of buildings related to MRI examination services, the data is derived from the acquisition value of the buildings (using values based on the Palu Mayor's decision number 600/1473/PU/2021 concerning the standard maximum unit prices of state buildings in Palu in 2022), which is divided by the building's useful life of 50 years (according to Ministry of Home Affairs Regulation 64 of 2013). For example, the depreciation of the Radiology room building is obtained from the acquisition value of the Radiology building, which is IDR 8,531,799,114. The Radiology room has a floor area of 1,200 m², while the MRI room has a floor area of 128 m². Therefore, the way to obtain the building depreciation value for the MRI room is $128 \div 1,200 \times 100 = 10.6$. Then, it is multiplied by the building acquisition value of 8,531,799,114 = IDR 90,437,070,608. Next, by dividing by the building's depreciation period of 50 years, a value of IDR 18,201,171 is obtained for the MRI room building. Then, to obtain the total estimated depreciation value of medical and non-medical equipment related to MRI examination services, it is obtained by summing all the estimated acquisition values of medical and non-medical equipment in each room (in accordance with the available data on medical and non-medical equipment in assets) based on e-catalog prices or according to the acquisition contract value, divided by the useful life or usage period of the equipment (according to Minister of Home Affairs Regulation No. 64 of 2013). Consequently, the total estimated depreciation value of medical and non-medical equipment related to MRI examination services is IDR 2,487,750,000 per year.

Main Activities in the MRI Examination Service Process

MRI is one of the advanced modern medical technologies used to detect disorders in internal organs by utilizing magnetic fields without involving X-ray exposure. Compared to other radiology tools, MRI is a sophisticated medical device that combines computer technology, high magnetic fields (0.064 – 7.0 Tesla), and radio waves to produce cross-sectional images of the human body (Pratama et al., 2021). Some of its advantages include:

1. Ability to produce clearer images that can be viewed from various angles without needing to reposition the patient.
2. Relatively safer to use for vital organs such as the brain and heart.
3. Capable of displaying anatomical structures of the body in greater detail.
4. Image results can be presented in three-dimensional formats, including axial, coronal, and sagittal sections.

Based on the results of research conducted at UPT.RSUD Undata, the MRI examination process begins with the patient going to the registration counter, as usual taking a queue ticket and then being served by the outpatient administration staff, and then directed to the intended clinic according to the patient's complaint. After the patient enters the clinic and is examined by the doctor at the clinic, the doctor then recommends undergoing an MRI examination because there is a condition that requires a diagnosis to be established and needs an MRI scan.

After that, the nurse at the clinic prepares a referral to radiology for an MRI examination. Once the patient is in the Radiology room, they give the referral to the administrative staff at the radiology counter. Before the MRI examination is performed, the patient is informed about the MRI requirements, such as not wearing clothes with metal and not having any metal in their body. Then the patient signs the informed consent form, indicating that they are ready to undergo the MRI examination.

The patient enters the MRI room, and the radiographer (MRI operator) guides the patient to change into clothing provided by the MRI staff. Next, the patient is positioned lying on their back on the examination table, ready for the MRI, which takes approximately 30 minutes. After the examination, the patient changes back into their own clothes. For room cleanliness, the cleaning service staff will clean before and after the MRI examination.

After the MRI examination is completed, the radiographer (MRI Operator) will conduct the process of capturing the image, and then the image will be transferred to the MRI Film. The results of the MRI image examination will then be read by a radiology specialist doctor, who will provide an expert MRI examination report. Calculating MRI examination fees using the ABC method:

Several Methods Are Commonly Used to Calculate Unit Cost Analysis in Hospitals

One of them is the Activity Based Costing (ABC) method. The ABC method, which is widely known among accountants, is an approach to identify and allocate costs related to specific products. The ABC system specifically links overhead costs to the activities performed, and then associates them with the final product.

Many companies use this method to identify and reduce unnecessary costs or activities, allowing for a more accurate and realistic calculation of the Cost of Goods Manufactured (COGM) (Rizky et al., 2025; Sinaga & Hidayat, 2024).

This study, using the ABC method on MRI examination services at UPT RSUD Undata, was conducted using secondary data, and the research was carried out from November 2024 to October 2025. Based on the analysis results mentioned above, it was found that the estimated unit cost incurred for each MRI examination service is IDR 4,419,627, with equipment investment contributing approximately 93% (IDR 2,791,643,738) of the total unit cost incurred. This is in line with previous research by Irzan in 2015, conducted by Mohksen Bayati, Alireza Mahboub Ahari, Abbas Badakhsan, Mahir Gholipur, and Hassan Joulaei, which stated that equipment investment is the largest cost in MRI examination services.

Then, in this study, it was found that the second largest financing sequence was BMHP, which represents all variable costs amounting to 4% (124,135,740). This aligns with previous research by Dwi Purnama Tirta Sari, titled "Elective Percutaneous Coronary Intervention (PCI) Heart Catheterization Research Using the TDABC Method: An Empirical Study at UPT.RSUD Undata, Central Sulawesi Province." The study results assumed that BMHP costs were quite significant, with the estimate for salaries + all allowances + service fees being 3% (107,245,728). This is also consistent with research by Mohksen Bayati titled "Cost Analysis of MRI Services in Iran: An Application of Activity-Based Costing Technique," which found that personnel service fees are one of the sizable direct cost burdens, alongside medications and AMHP.

Comparing the Results of ABC Method

Tariff calculations with INA-CBG's tariffs and general hospital tariffs through the Indonesia Case Based Group (INA-CBGs) mechanism in accordance with Presidential Regulation Number 12 of 2013 concerning Health Insurance, as amended by Presidential Regulation Number 111 of 2013. For the tariffs applicable on January 1, 2014, adjustments had been made from the INA-CBGs Jamkesmas tariffs and were stipulated in Minister of Health Regulation Number 69 of 2013 regarding Standard Health Service Tariffs at Primary Health Care Facilities and Advanced Health Care Facilities in the implementation of Health Insurance (Aminda & Rahayu, 2020). Health services for hospitals in the JKN era include the Indonesian Case Base Groups (INA CBGs) payment system, which is the amount of claim payments by BPJS Health to hospitals for service packages based on the grouping of disease diagnoses and procedures (Leonard et al., 2021). Based on the results of cost calculations and service rates for Magnetic Resonance Imaging (MRI) at RSUD Undata in Central Sulawesi Province, a significant gap was found between the actual costs (unit cost) and the prevailing service rates, both for general patients and BPJS Health participants. In detail, the comparison shows that the full cost (Scheme 1) reaches IDR 4,419,627 per examination. The general patient rate is set at IDR 4,000,000, resulting in a deficit of IDR 419,627 per procedure for the hospital. For BPJS patients under the INA-CBG's, the rate

is only IDR 2,832,000, which means there is a cost shortfall of IDR 1,587,627 per procedure compared to the full cost.

Based on the cost unit analysis conducted by calculating operational costs, it can be concluded that the INA-CBG's rates currently applied at UPT RSUD Undata are not sufficient to cover all expenses incurred by the hospital at the INA-CBG's rates, resulting in a deficit of IDR 1,587,627 per MRI examination. In other words, MRI services are significantly in deficit when comparing the claimed INA-CBG's rates with the actual costs incurred by the hospital. This is in line with the research by Aminda & Rahayu (2020), which states that there is still an imbalance between INA-CBGs (BPJS) rates and the hospital's actual rates for inpatient care, and the difference is negative: hospitals bear the burden because BPJS (INA-CBGs) rates are lower than the actual costs incurred by the hospital.

Analyzing the Discrepancies that Occur and the Factors Causing Tariff Mismatches

A tariff or price can be simply defined as a certain amount of money (in monetary form) or other elements (non-monetary) that have a specific value or utility and are required to obtain a service. Meanwhile, utility refers to characteristics or elements that can fulfill certain needs and desires. According to Kotler & Armstrong (2009), a price or tariff is the amount of money paid to obtain a good or service. In addition, price can also be interpreted as the value exchanged by consumers to gain benefits from owning or using the goods and services. Based on research findings conducted at UPT.RSUD Undata, based on the calculation of costs and tariffs for Magnetic Resonance Imaging (MRI) services, a significant gap was found between the actual costs (unit cost) and the applicable service tariffs, both for general patients as well as BPJS Health participants. In detail, the comparison shows that the full cost (Scheme 1) reaches Rp 4,419,627 per examination. The general patient rate is set at Rp 4,000,000, so the hospital experiences a deficit of Rp 4,419,627 per procedure. BPJS claims through INA-CBG's are only Rp 2,832,000, which means there is a cost shortfall of Rp 1,587,627 per procedure.

Several Factors Causing the Tariff Mismatch

High Equipment Investment Costs

MRI machines are high-tech medical equipment with significant investment and maintenance costs. When this investment component is accounted for in the unit cost, the service cost becomes much higher compared to the prevailing tariff. One of the main factors causing the gap between the actual cost of MRI services and the prevailing tariff at RSUD Undata is the high investment cost of acquiring the MRI equipment. According to hospital data, The investment value of the MRI equipment reached IDR 2,487,750,000, which is a very significant amount for a regional hospital. This MRI equipment has a useful life or depreciation period of around 10 years, so every year the hospital must charge a depreciation of approximately IDR 2,487,750,000 into the calculation of MRI service operational costs. This depreciation expense significantly increases the cost per procedure, making the actual cost per examination (unit cost) much higher compared to the rates applied for general patients and BPJS claims. This aligns with previous research by Irzan in 2015 conducted by Mohxsen Bayati,

Alireza Mahboub Ahari, Abbas Badakhshan, Mahir Gholipur, and Hassan Joulaei, which stated that equipment investment is the largest cost in MRI examination services.

The BPJS rates are Standardized National (INA-CBG's)

BPJS Health claim rates are determined nationally through the INA-CBG's system, so they do not take into account regional condition differences, hospital facility capacities, or variations in operational costs in each area (Erniaty & Harun, 2020; Sopiyan, 2020). As a result, hospitals in certain regions – especially referral hospitals like RSUD Undata – often face situations where BPJS claim rates are much lower than the actual costs that must be incurred to provide services. This mismatch is particularly felt in services that require high-tech equipment or high operational costs, such as MRI.

Providing Recommendations for Cost-Based Rate Setting to Support Managerial Decision-Making

Tariffs are a financial mechanism used to generate revenue to cover the costs of providing services as well as to obtain additional profit. Costs are the amounts of money spent to acquire goods or services that are expected to provide benefits either directly or in the future. (Ramadhan et al., 2022; Sesilia Anggraeni Sili et al., 2025) Based on research findings conducted at UPT.RSUD Undata, based on the results of cost and service tariff calculations for Magnetic Resonance Imaging (MRI), according to the analysis above, it was found that the estimated unit cost incurred for each MRI examination service is IDR 4,419,627. The tariff for general patients is set at IDR 4,000,000, resulting in a deficit per procedure for the hospital. BPJS claims through INA-CBG's are only IDR 2,832,000, which means there is a cost shortfall of IDR 1,587,627 per procedure compared to the full cost.

As a public service institution, RSUD Undata operates within the framework of the government's task to provide health services that are easily accessible and affordable for the public. Regional hospitals are not aimed at pursuing commercial profit, but rather ensure that every citizen can obtain medical services according to their needs. Due to its nature as a public service, some cost components, especially salaries and employee benefits, have been covered by the government as a form of support to maintain operational continuity. Therefore, even though there is a difference between the actual cost of services and the rates applied, this condition is not automatically considered a loss in the context of a government hospital. The main focus of Undata Regional General Hospital is to maintain the quality of services and the availability of healthcare facilities, not to achieve profit, so tariff disparities are seen more as part of a subsidy mechanism and the state's responsibility in ensuring healthcare services for the community.

Strengths and Limitations of the Research

Research Strengths

Research on the analysis of MRI service tariffs using the Activity-Based Costing (ABC) method has several notable strengths, including more accurate calculations. The use of the ABC method allows costs to be allocated based on activities that actually occur in the MRI service process. This provides a more realistic picture of unit costs compared to traditional methods that generally rely on proportional cost allocation. The ABC method helps map each activity in MRI services, so that management can identify which activities consume the most resources and which activities can be optimized without reducing service quality. This study produces a detailed cost structure – from direct costs (labor, consumables) to indirect costs (overhead). Thus, the final recommended rates have a clear and accountable calculation basis.

Research Limitations

This study has several limitations. One of them is the limitation of data on the acquisition value of goods, both medical and non-medical, which were only obtained from the prices listed in the e-catalog of the Government Goods/Services Procurement Policy Agency (LKPP). This is because some equipment was purchased quite some time ago, so the original acquisition data is no longer available at the hospital.

In addition, the available maintenance data is not presented in detail, so the costs of building and equipment maintenance cannot be classified separately. As a result, all maintenance costs are included in the total indirect costs, which are allocated evenly across all services.

Time constraints and incomplete data in some units also pose challenges in implementing the Activity-Based Costing (ABC) method, particularly in units such as laundry where some data is obtained through interviews without direct observation of activities. Nevertheless, this study still shows that the activity-based method is an appropriate approach for analyzing hospital service unit costs, especially for high-cost examination procedures. Accurate information on unit costs can serve as an important basis for hospital management in setting more rational and efficient pricing policies.

CONCLUSIONS

Based on the results of research and discussion on Environmental Sanitation Management Strategies Post-Earthquake in the Working Area of Pantoloan Boya Health Center, Palu City, Central Sulawesi, it can be concluded that:

1. There is a positive relationship between the level of public knowledge and behavior in managing environmental sanitation. Communities with good knowledge about the importance of sanitation and its impact on health tend to exhibit more hygienic behavior and are more responsible for maintaining environmental cleanliness. However, some community members with low knowledge still engage in less healthy sanitation practices.
2. Specific knowledge about environmental sanitation, such as clean water management, liquid waste management, and the use of healthy latrines, significantly influences community behavior. The higher the understanding of correct sanitation principles, the better the community's behavior in maintaining cleanliness and preventing environment-based diseases.
3. The attitude of the community shows a strong influence on sanitation behavior. Respondents with a positive attitude toward cleanliness, environmental health, and the use of proper sanitation facilities are more consistent in practicing clean and healthy living behaviors. Conversely, an apathetic or indifferent attitude toward environmental cleanliness becomes a major obstacle in the implementation of good sanitation practices.

RECOMMENDATIONS

For sustainable sanitation management. The suggestions that the researcher can provide in this study are as follows:

1. For Local Government

- a. Local governments are expected to strengthen policies and community-based sanitation development programs through the Community-Led Total Sanitation (CLTS) and Community-Based Total Sanitation (STBM) approaches.
- b. There is a need to increase budget allocations for the development of clean water facilities, wastewater disposal channels, and healthy latrine facilities in disaster-affected areas.

Cross-sector coordination is required between the Health Office, the Environmental Office, and other relevant agencies to ensure the sustainability of sanitation programs, as well as to conduct regular monitoring and evaluation.

2. For Academics (Universities)

- a. Universities are expected to play an active role in research and community service related to environmental sanitation, especially in post-disaster areas.
- b. Academics can become partners of the government and community health centers in providing scientific guidance, policy studies, and environmentally friendly technological innovations

FURTHER STUDY

This research still has limitations so that further research is needed on the topic of Analysis of MRI (Magnetic Resonance Imaging) Examination Service Rates: An Implementation of the Activity Based Costing (ABC) Method in order to perfect this research and increase insight for readers and writers.

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