Jurnal Abdimas Madani dan Lestari (JAMALI)
Vol. 07, Issue. 02, September 2025, Hal 296 - 308
e-ISSN:2686-097X | p-ISSN:2798-0227
https://journal.uii.ac.id/JAMALI

Increasing the Accuracy of Determining Activity-Based Services Tariffs for Central Surgical Installation (Case at the BLUD Hospital in Indonesia)

Yunan Najamuddin[1], Dekar Urumsah[2*], Mahmudi[3], Reni Yendrawati[4], Novi Dwi Rugiarti[5], Raden Teduh Dirgahayu[6], Asri Dwi Ariyani[7], Avininda Dewi Nindiasari[8], Rosita[9]

[1,2,3,4,9]Department of Accounting, Faculty of Business and Economics, Universitas Islam Indonesia, Yogyakarta, Indonesia
[5]Department of Pharmacy, Faculty of Mathemathics and Natural Science, Universitas Islam Indonesia, Yogyakarta, Indonesia
[6]Department of Informatics, Faculty of Industrial Technology, Universitas Islam Indonesia, Yogyakarta, Indonesia
[7]Department of Accounting, Faculty of Business Economics, Universitas Alma Ata, Yogyakarta, Indonesia
[8]Department of Accounting, Faculty of Economic, Social Science, and Humanities, Universitas Aisyiah Yogyakarta, Yogyakarta, Indonesia

**Correspondence email*: dekar.urumsah@uii.ac.id

ABSTRACT

This research aims to determine the application of cost accounting (unit cost) through the Activity-Based Costing (ABC) method in establishing service rates at Regional Public Service Agency Hospitals (BLUD Hospital). Among the unit costs studied at the BLUD Hospital, the focus was on the surgical service unit. Despite its potential, the ABC method is still underutilized for calculating unit service costs in BLUD hospitals. The evaluation compared traditional tariff calculations, based on Minister of Finance Regulation No. 3 of 2023, with calculations derived from the ABC method. The study's findings revealed that activity-based surgical service units incur unit costs of Rp. 1,205,171.55 for special surgeries, Rp. 935,780.27 for major surgeries, and Rp. 510,425.60 and Rp. 283,569.78 for medium and small operations, respectively. These unit costs serve as the foundation for determining rates by adding the direct costs of each unit. In accordance, service rates will be generated. Notably, the determined tariffs in INA-CBGs are IDR 4,250,000 for special surgeries, IDR 3,300,000 for major surgeries, IDR 1,800,000 for medium surgeries, and IDR 1,000,000 for small surgeries. Consequently, this study recommends the BLUD Hospital management to adopt the ABC method in calculating unit costs as it revealed that the costs attributed to patients in the surgical service unit were lower than the traditional costing method.

Keywords: Activity-Based Costing (ABC), BLUD Hospital, Emergency Unit, Inpatient Services Unit, Tariff, Unit Cost.

INTRODUCTION

Health has become a major concern for the government, especially following the Covid-19 pandemic. The government is striving to offer optimal services to the Indonesian people, aided by health insurance cards that alleviate the community's burden regarding healthcare expenses. This governmental initiative encourages individuals to prioritize their health, prompting the government to strive for maximum service provision to the community. This effort signifies the government's commitment to public health sector accountability. Designated health facilities appointed by the government encompass community health centers and regional general hospitals.

To support health services, the government established hospitals in the form of public service agencies (BLU) at the central government level and BLUDs at the local governments. Regional hospitals in the form of BLUDs have a mission to assist the government in providing high quality health services at affordable costs to the community. In addition, BLUD hospitals are also expected to operate professionally, applying the principles of efficiency and effectiveness so that they do not burden the government budget but also do not burden patients. To achieve this mission, BLUD hospitals need to have an accurate and modern cost accounting system. This is very crucial because the main problems faced by most government hospitals are inefficiencies in operations and inaccuracies in calculating costs and rates for health services (Asbu et al., 2020).

Proof of the government's dedication to the public health sector lies in the existence of a health insurance program facilitated by the Social Security Administering Body (BPJS). This initiative is also implemented by the government of a district within the Yogyakarta Special Region, as outlined in Table 1.

Table 1. Number of Health Insurance Participants in Sleman Regency

Data	: Number of Health Insurance Participants in Sleman Regency 2020-2023							
Division	: Government in Health Sector							
Code	**Sub-Element**	**Operational Definition**	**Unit**	**2020**	**2021**	**2022**	**2023**	**Data Source**
1	Number of participants based on guarantee	Number of Participants Based on Insurance Coverage in Sleman Regency in the Given Year						
1.1	BPJS		People	3.383.049	3.397.143	3.594.991	3.690.183	
1.1.1	Kulon Progo Regency		People	-	-	-	-	Department of Health
1.1.2	Bantul Regency		People	-	-	-	-	Department of Health
1.1.3	Gunungkidul Regency		People	-	-	-	-	Department of Health
1.1.4	Sleman Regency		People	1.001.020	981.021	1.062.589	1.094.217	Department of Health
1.1.5	Yogyakarta City		People	-	-	-	-	Department of Health
3	**National Health Insurance Coverage (JKN)**	Comparison of the Population Covered by Welfare Protection to the Total Population, Expressed in Percentage	**%**	**92,21**	**91,49**	**97,76**	**99,90**	**Department of Health**
	National Health Insurance Coverage (JKN)	A part of the national social security system implemented through mandatory social health insurance mechanisms based on Law Number 40 of 2004 regarding the National Social Security System, aimed at fulfilling the basic healthcare needs of deserving communities provided to individuals who have paid their premiums or whose premiums are covered by the government.	Activites / programme; %	**92,21**	**91,49**	**97,76**	**99,90**	Department of Health

Source: https://data.BLUDkab.go.id/

The data illustrates notable fluctuations in the number of Health Insurance participants within Sleman Regency. From 2020 to 2021, there was a decline in BPJS membership; however, from 2021 to 2023, membership showed a notable increase. The Health Insurance program administered by the Social Security Administering Body (BPJS) serves as a pivotal mechanism for public health. Notably, the increasing public awareness regarding health hints at the potential for continued growth in participation within government health insurance programs.

The BLUD Hospital plays a critical role in managing and maximizing community service through responsible management. Government agencies, including hospitals, adhere to specific regulations governing service management in each sector. Hospitals fall under the purview of the

Minister of Health Regulation (PMK), particularly the active regulation No. 3 of 2023 concerning Health Service Tariff Standards in Health Insurance Program Implementation. A significant aspect of these standards is the Indonesian tariffs – Case Based Group (INA-CBG), which determine claim payments by BPJS Health to advanced-level referral health facilities. INA-CBG tariffs encompass service packages based on diagnosis and procedure groupings, encompassing all hospital resources utilized in medical and non-medical services.

The application of PMK no. 3 of 2023 reflects in the INA-CBG tariff list, guiding the tariffs utilized by the BLUD Hospital when claiming costs from BPJS. For instance, Table 2 presents one such rate observed at the central surgical service unit in the BLUD Hospital.

Table 2. Central Surgical Unit Rates at the BLUD Hospital in 2023

No	Types of Procedure	Class III and Outpatients Services				Class III and Outpatients Services		
		Facilities Services	Services		Rates	Services		Rates
			Operator	Anesthesia		Operator	Anesthesia	
1	Simple	290.000	80.000	-	370.000	100.000	-	390.000
2	Small (ASA 1)	605.000	235.000	82.000	922.000	293.500	102.500	1.001.000
	Small (ASA 2)	605.000	235.000	94.000	934.000	293.500	117.500	1.016.000
	Small (ASA 3)	605.000	235.000	105.000	945.000	293.500	131.500	1.030.000
3	Medium (ASA 1)	995.000	450.000	157.000	1.602.000	562.500	196.000	1.753.500
	Medium (ASA 2)	995.000	450.000	180.000	1.625.000	562.500	225.000	1.782.500
	Medium (ASA 3)	995.000	450.000	202.000	1.647.000	562.500	252.500	1.810.000
4	Large (ASA 1)	1.635.000	965.000	337.000	2.937.000	1.206.250	421.250	3.262.500
	Large (ASA 2)	1.635.000	965.000	386.000	2.986.000	1.206.250	482.250	3.323.500
	Large (ASA 3)	1.635.000	965.000	434.000	3.034.000	1.206.250	542.250	3.383.500
5	Special (ASA 1)	2.030.000	1.250.000	437.000	3.717.000	1.562.500	546.000	4.138.500
	Special (ASA 2)	2.030.000	1.250.000	500.000	3.780.000	1.562.500	625.000	4.217.500
	Special (ASA 3)	2.030.000	1.250.000	562.000	3.842.000	1.562.500	702.500	4.295.000
6	Advanced (ASA 1)	3.320.000	2.500.000	875.000	6.695.000	3.125.000	1.093.500	7.538.500
	Advanced (ASA 2)	3.320.000	2.500.000	1.000.000	6.820.000	3.125.000	1.250.000	7.695.000
	Advanced (ASA 3)	3.320.000	2.500.000	1.125.000	6.945.000	3.125.000	1.406.000	7.851.000

The rates presented above are the values that BLUD Hospital will be able to claim for BPJS participating patients for surgical services. Surgical service categories consist of Simple, Small, Medium, Large, Special and Advanced. So, the BLUD Hospital management must determine the costs of its services using an activity basis so that it can be effective in determining the costs used to calculate rates. This also makes it easier for BLUD hospitals to obtain accurate cost information so that it is easy for BLUD hospitals to make decisions about service costs and budgeting decisions (Yereli, 2009). The need for detailed and accurate cost calculations to determine the right price for products or services in order to compete competitively (Bataineh, 2018; Lin et al., 2013).

One of the problems faced by government hospitals is the inability to calculate the correct cost of health services. So far, government hospitals have used a traditional costing system. The traditional cost system falls short in meeting today's business needs and creates cost distortions. Hence, there's a pressing need for a more effective cost system. The Time-Driven Activity-Based Costing System (TDABC) as an alternative, considering both capacity costs and the time required to execute specific activities. This system offers a more comprehensive approach to address these shortcomings (Öker & Özyapc, 2013). To be able to calculate costs accurately, many hospitals are starting to invest in building cost management systems, including activity-based costing. By using the ABC system, hospitals can increase cost efficiency without reducing the quality of health services received by patients. With the ABC system, hospitals can allocate indirect costs to cost objects or health services based on multistage allocation systematically and rationally (Neriz et al., 2014).

Hospital management necessitates comprehensive information regarding the utilization of resources across all health service activities within the context of value-based healthcare. To achieve this, management must possess adequate tools for collecting such crucial information. The utilization of the Activity-Based Costing (ABC) method for determining health service costs yields more precise calculations regarding resource consumption when compared to standard cost accounting systems

(Fidanza et al., 2022). The "bottom-up" accounting approach enables a transparent analytical identification of all care cycles in health services by aggregating individual costs of resources utilized by each patient (Akhavan et al., 2016).

Review the Determination of Service Rates at BLUD Hospitals

BLUD Hospitals are responsible for providing the best services to the community at an affordable cost. This aligns with Universal Health Coverage (UHC), one of its aims being to enhance healthcare quality at affordable rates. Fair and high-quality healthcare access and financial risk protection in obtaining healthcare services for the entire population are two main components of UHC (Yogyakarta Health Office, 2018).

The status of the BLUD Hospital compels them to be cautious in selecting cost units and service charges for the public. This aligns with Minister of Health Regulation (PMK) No. 3 of 2023 concerning the Standard Tariff of Health Services in the Implementation of Health Insurance Programs, mandating hospitals to revise their charges and service tariffs. Moreover, the BLUD Hospital must review their cost units and service tariffs at least every four years to keep up with hospital service developments. The BLUD Hospital has added various types of services since 2018, and their tariffs have been established through the Director's Decree (SK) of the BLUD Hospital. Local Government Regulations (Perda) should integrate tariffs from local government regulations, typically from the regent's regulations and the Director's Decree of the BLUD Hospital. In other words, changes in service tariffs are expected to correspond to the costs that should be borne by the public.

Overall, service tariffs should be carefully set by the BLUD Hospital. This is because of the expectation that the BLUD Hospital will be a healthcare solution that doesn't burden the public with high costs. Improvements are needed in determining appropriate service tariffs. It is expected that these improvements will enable effective and efficient planning for management in standardizing BLUD Hospitals' cost models and service tariffs. Using an activity based cost system is the right choice for government hospitals in the form of BLUD. Kaplan & Cooper (998) explain that ABC provides several advantages, namely that ABC can help provide information to managers regarding service costs which are the basis for determining service prices. ABC can also be used to eliminate non-value-added activity and increase efficiency and improve service quality.

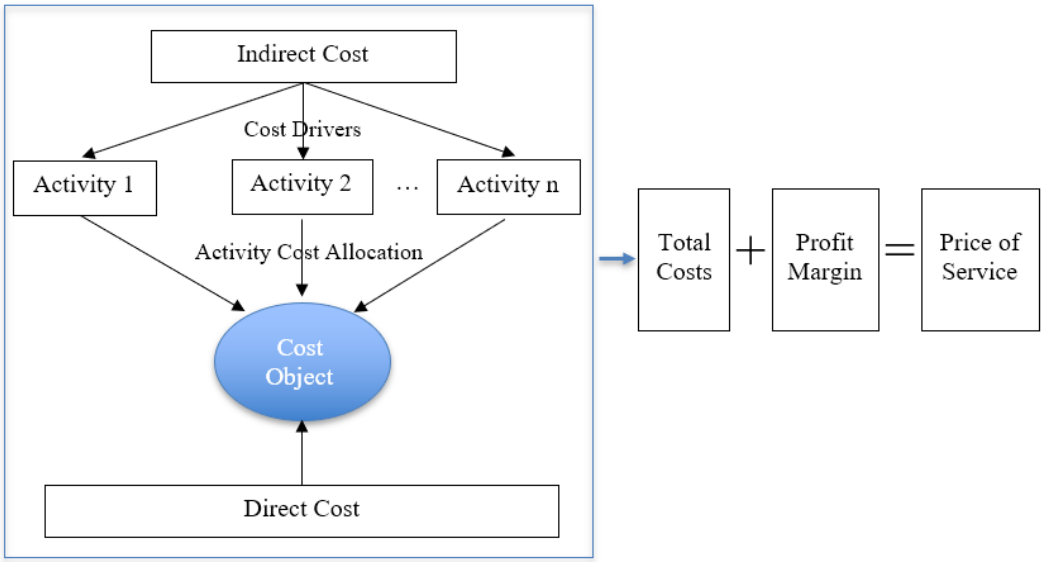

Figure 1. Activity Based Costing and Pricing Method

Figure 1 explains how to calculate the price of services using ABC which consists of direct costs and indirect costs that will be calculated on the cost object. Indirect costs will be allocated to cost objects according to the grouping of activities based on cost drivers for each existing activity. Direct costs are costs that can be directly and easily traced to cost objects. Unlike indirect costs, these costs cannot

be traced easily and clearly to cost objects. Cost allocation is used for the term for the process of charging indirect costs to cost objects (Datar & Rajan, 2021).

Traditional methods for cost allocation often use a general approach without in-depth details. Costs are allocated based on broad indicators, such as the number of patients or service hours, without regard to the specific activities performed (Datar & Rajan, 2021). In comparison, the Activity-Based Costing (ABC) method offers a more detailed approach, where costs are assigned according to the actual activities or processes that take place in the hospital. This makes the ABC method more accurate because it considers the impact of each activity (such as doctor consultations, medical device use, or hospitalizations) on the overall cost. In the conventional method, overhead cost allocation is done in two main steps. First, the hospital calculates the total overhead costs, such as staff salaries, administrative costs, or utilities, for the entire hospital. Second, the overhead is allocated to various departments or services based on general measures, such as the number of patients or length of stay.

For example, if the total hospital overhead costs reach IDR 2,000,000,000 in a month, with 2.000 patients (1.500 outpatients and 500 ICU), then the overhead cost per patient is IDR 1,000,000. This calculation does not distinguish between intensive care patients who require more costs and outpatients who require fewer resources, thus underrepresenting the true complexity of service costs.

The ABC method uses a more detailed approach by allocating costs based on specific activities or processes that actually occur in the hospital. This approach offers a higher level of accuracy because it considers the contribution of each activity, such as doctor consultations, use of medical equipment, or inpatient services, to the total operating costs. The first step in this method is to identify the main activities in the hospital, such as "patient consultations," "use of diagnostic equipment," or "intensive care." After that, cost drivers are determined, such as the number of consultations performed, the number of patients in the intensive care unit, or the duration of medical equipment use. The final step is to calculate the costs associated with each of these activities and allocate these costs proportionally to services or patients, based on the extent to which they utilize the activity.

METHOD

The methodology employed in establishing service tariffs in the Activity-Based Costing (ABC) model involves Focus Group Discussions (FGDs) and interviews. This stems from the significance of information acquired from both stages, which forms the basis for addressing BLUD Hospital's issues. The FGD activity involves hospital management, physicians, pharmacists, local government officials, and community figures. FGDs aim to gather specific information regarding the ongoing service tariff issues, specifically those not based on activities (traditional). Community figures provide insights into tariff and service costs, ensuring these aren't burdensome for the populace.

The subsequent interview phase aims to interview top hospital management and the regional government's secretary to gather essential data. Moreover, apart from the primary stages, the program gathers data through questionnaires and surveys. These activities offer additional insights beyond FGD and interview participants. Information derived from these activities supports the opinions and conclusions drawn from the primary stages. In other words, these advanced program stages complement information obtained from the primary stages, enhancing the overall comprehensiveness of the results.

To date, the research team and partners (the BLUD Hospital) have been planning the formulation of service tariffs. Additionally, the partners have been investigating tariff items for adjustments. Benchmarking, undertaken to gather insights into service tariff setting from similar institutions such as the Regional Public Service Agency, is an essential activity. Consultation follows all stages to complete the service tariff calculation model using the ABC method, enabling more accurate tariff establishment by the BLUD Hospital management.

Results from prior stages reveal shortcomings in previous service tariff determination methods for services rendered by the hospital. This necessitates the breakdown of costs into two categories: direct costs and indirect costs. Subsequently, using the ABC method, activity centers in

each service unit are determined, followed by cost allocation in these activity centers. Indirect costs encompass administrative and operational costs based on cost drivers, utilizing weighting methods to ascertain the percentage of service delivery or acceptance from/to other service centers. Determining activity center and operational costs based on activity volume (patients, patient-days, or floor area) yields the actual hospital service costs (unit costs). This aligns with the approach adopted in Rajabi's research (2008).

The chosen application of the ABC method in the BLUD Hospital involves dividing service units into three cost centers: administration, inpatient accommodation, and operational support. Activity centers are established by determining the relationship between activities and costs. Costs are allocated to unit costs based on cost triggers. Consequently, adding direct costs to service units produces hospital service tariffs or prices.

The application of tariffs to the central surgery unit becomes the focal point of this study because it represents a unit consuming different resource levels in the hospital. The central surgery unit comprises four categories: Special, Large, Medium, and Small. The ABC method is applied to these categories using Multi-Criteria Decision Making (MCDM) to differentiate cost values among these categories within the central surgery unit. MCDM employs measures or standards aiding management in decision-making processes.

RESULTS AND DISCUSSION

Results

Hospitals rely heavily on accurate and precise cost allocation to ensure revenue surpasses their expenditures. The ABC method stands out as a suitable approach for this purpose. ABC is a cost allocation technique enabling hospitals to determine actual costs relevant to services rendered based on the resources consumed (Ibrahim et al., 2018). Cost allocation using the ABC method involves categorizing total indirect costs into individual cost groups that represent the resources used and identifying activities associated with these resources (West & West, 1997).

Since the establishment of the BLUD Hospital, there hasn't been a systematic cost calculation to determine service tariffs based on the utilization of resources by each service. This has made it challenging for management to accurately identify the specific resources used and the cost components relevant to the activities of each service unit. The hospital struggles to find the precise costs for these services and to set their pricing. So far, the tariffs set have still been following traditional methods.

Many studies explain ABC in hospitals. Kalinowski (2024) conducted an analysis of medical costs in radiology services at a hospital in Poland. This study calculated costs based on activities and processes. The implementation of this system can improve operational efficiency and internal communication. This study suggests that actual costs incurred in hospitals should be taken into consideration in assessing hospital services to reduce financial risk in medical entities. Another study on costing in hospitals in Brazil is from Sanches et al., (2020) which highlights the weaknesses of traditional methods that cause distortions in calculating direct costs and hospital service products so that they cannot control and manage human resources in the hospital. Cost calculations using ABC can monitor consumption from various existing activities. However, it does not rule out the possibility of difficulties in implementing the ABC method in hospitals. Furthermore, this study conducted a simulation for ABC calculations in a surgical center by mapping the process, identifying activities, and classifying and measuring the costs based on each cost driver.

A comparison of traditional costing with the ABC method in a hospital surgery center showed that ABC produced lower and more accurate costs (Koolmees et al., 2021). Other studies by (Ibrahim et al., 2018; Javid et al., 2016; Kuchta & Sabina, 2011; Rajabi & Dabiri, 2012) have positive conclusions when entities apply Activity-Based Costing (ABC) in calculating their costs.

The application of the ABC method in radiology procedures in Malaysian hospitals resulted in calculations that were much higher than the rates charged to patients. The ABC method can help hospitals improve services and formulate tariff policies that reflect actual costs (Ibrahim et al., 2018). Unit cost calculation using ABC in Iranian hospitals improves efficiency and transparency. The

hospital can show that ABC method can be used for more effective decision making in cost management compared to traditional methods (Javid et al., 2016). In the research Kuchta & Sabina, (2011) delivered the results that the ABC model is an accurate approach in cost management in hospitals in Poland compared to traditional methods. The application of ABC is an effective management tool in the face of increasing competition and pressure for efficiency in the health system in Poland.

The research utilizes Actual Expenditure Reports (LRA) data, which represents the accounting data of BLUD Hospital in 2023. The LRA data is supplemented by other relevant sources for the observed year, 2023. The calculation of unit costs, used to determine hospital service tariffs, applies the ABC method. The hospital's costs are categorized into equipment, administration, salaries, medication, and space. Subsequently, activity centers are established. The implementation of the ABC method involves two stages:

1) The total costs from the indirect cost centers will be allocated using relevant cost factors. These costs will then be distributed to cost objects using cost drivers. Subsequently, the unit costing for each service unit will be calculated. The unit cost value will then be augmented with medical services and medication (direct costs) to determine the service tariff.
2) The service tariffs calculated using the ABC method are then compared with the existing service tariffs of the BLUD Hospital to enable claims to the Health Care and Social Security Agency (BPJS) according to the rates stipulated in INA-CBGs.

The implementation of unit costing calculation in the hospital is carried out through the following steps:

Step 1. Cost Center Classification for Service Units

In this study, the service units subjected to tariff calculation are the central surgery units. Each service unit is assumed to receive allocations from indirect costs, which include administrative and operational expenses. The research will calculate services provided by the central surgery units, categorized as Special, Large, Medium, and Small, existing within the BLUD hospital so far.

Step 2. Identifying Primary Activities in the Hospital

Activities within the hospital are classified into two types: those related to medical services, administration, and support processes in the service units (indirect), and those directly associated with the inpatient units.

Step 3. Define the Cost Driver from the Activity

The researcher determines cost drivers for activities related to medical services, administration, and their support. The cost driver level for each activity is then calculated. Cost drivers are used to allocate indirect costs to cost centers and services. All data from the hospital for the year 2022 is sourced from the financial reports of that year. Service units are costed using the ABC method, categorizing expenses into salaries, equipment, space, medication, consumables, and overhead. These expenses are further classified into direct and indirect costs. The ABC method allocates cost drivers according to their respective activities. Calculating costs based on these activities is conducted. Cost drivers are chosen based on recommendations from the BLUD hospital management: floor area, patients, prescription sheets, and patient days, gathered from FGD outcomes and consultations with the BLUD hospital management.

Step 4. Assigning Cost to Cost Center

The allocation process within the ABC system involves charging costs to cost centers. Allocating indirect costs requires determining the cost drivers for the resources utilized. Costs are allocated to cost centers engaged in cost-driving activities, such as operational charges, administrative expenses, personnel, equipment quantity, and floor area.

Step 5. Calculating Unit Costs for Activities and Services

Indirect costs are allocated to specific activities, and then these activity costs are assigned to their cost objects through a two-step cost allocation process.

The calculation of indirect costs performed in this research is illustrated in the diagram as illustrated in Figure 2.

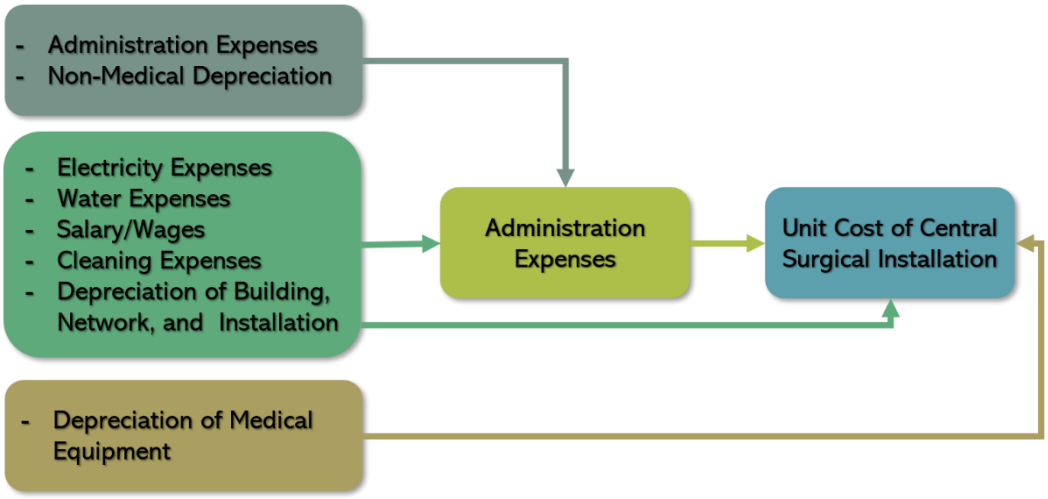

Figure 2. Cost Allocation Model Using ABC Method in Central Surgery Service Units

From the figure above, it can be explained about the indirect costs in the BLUD hospital for the central surgery service unit. Cost allocation can be done through a direct one-stage allocation to the service unit or through a two-stage allocation involving administrative spending. Previous researchers have classified direct and indirect costs to the service unit to calculate the unit cost. The calculation of indirect costs uses the ABC allocation method with the number of patients as the cost driver. The chosen cost driver aligns with the resource utilization activities within the assessed service unit.

The calculated unit cost for the service unit, when added to the direct costs and margin, will generate the service tariff for setting the service unit's price in the BLUD Hospital. Management can utilize the calculated service tariff with more accuracy compared to the simple method previously used.

Then, regarding to the indirect costs in the BLUD Hospital for the central surgery service unit, cost allocation can be done through a direct one-stage allocation to the service unit or through a two-stage allocation involving administrative spending. Previous researchers have classified direct and indirect costs to the service unit to calculate the unit cost. The calculation of indirect costs uses the ABC allocation method with the number of patients as the cost driver. The chosen cost driver aligns with the resource utilization activities within the assessed service unit.

The calculated unit cost for the service unit, when added to the direct costs and margin, will generate the service tariff for setting the service unit's price in the BLUD Hospital. Management can utilize the calculated service tariff with more accuracy compared to the simple method previously used.

This research has computed the unit cost for surgical services (operations) in the BLUD Hospital. The unit cost calculation for surgeries based on the ABC method receives an allocation from the indirect operational costs over a year and determines an average value for the four operation categories, which amounts to Rp. 916,000. However, this does not display values for each unit cost of different types of surgical services. Therefore, the ABC method calculation continues by utilizing patient data from the BLUD Hospital (Table 4) and the BLUD Hospital tariff data based on the INA-CBGs tariff, which has been used thus far. The data employed approaches the service tariff, but to simplify the calculation, approximated values close to the tariff are used (Table 3). The tariff values used are as illustrated in Table 3.

Table 3. The Tariff Data Used as the Basis for Calculation

Types of Procedure	Class III and Outpatients Services				Class III and Outpatients Services			Rates Used in The Study
	Facilities Services	Services		Rates	Services		Rates	
		Operator	Anesthesia		Operator	Anesthesia		
Small (ASA 3)	605.000	235.000	105.000	945.000	293.500	131.500	1.030.000	**1.000.000**
Medium (ASA 3)	995.000	450.000	202.000	1.647.000	562.500	252.500	1.810.000	**1.800.000**
Large (ASA 3)	1.635.000	965.000	434.000	3.034.000	1.206.250	542.250	3.383.500	**3.300.000**
Special (ASA 3)	2.030.000	1.250.000	562.000	3.842.000	1.562.500	702.500	4.295.000	**4.250.000**

The first step was to create a Multi-Criteria Decision Making (MCDM) comparison for tariffs, starting from the highest tariff category, which is the Special category (4,250,000), resulting in MCDM values (presented in table 5) with the respective values being Small (0.23), Medium (0.42), Large (0.77), and Special (1). The total tariff value was then multiplied by the number of patients in each category in 2022 (shown in table 5 column 4). The subsequent step involved computing the values in column 4 to generate the MCDM in column 5 with values for Special (0.52), Large (0.40), Medium (0.04), and Small (0.05). Consequently, the MCDM in column 5 was used to allocate the total operational costs from RS BLUD, resulting in specific cost values of 1,089,475,084.73 (Special), 829,101,315.13 (Large), 82,178,521.49 (Medium), and 94,712,305.65 (Small). The final result of the ABC method's tariff calculation per patient cost is presented in table 5, column (8).

Table 4. Number of Specialized Services Patients

No	Specializations	Special	Large	Medium	Small	Totals
1	General Surgery	214	332	62	143	751
2	Obstetrician & Gynecologist	98	310	43	132	583
3	Ear, Nose, and Throat (ENT)	21	39	5	1	66
4	Eye	168	21	31	2	222
5	Teeth and Mouth	106	34	6	0	146
6	Orthopedic Surgery	166	127	3	32	328
7	Urology	131	23	11	24	189
		904	**886**	**161**	**334**	**2285**

The patient data presented represents specialized services available at the BLUD hospital. The patient classification includes categories such as Specialized, Large, Medium, and Small. Regarding the INA-CBGs service tariff data in the surgical unit, it encompasses Simple, Small, Medium, Large, Specialized, and Advanced categories. However, this research focuses solely on Specialized, Large, Medium, and small types as these are the four service types still utilized by the BLUD hospital under investigation.

Table 5. The Data of Calculated Unit Costs for Surgical (Operation) Services

Types of Surgery	Number of Patients	The Averages of Cost per Patients	MCDM Collumn	Rates of BLUD Hospital	Multiply Collumn (1) by Collumn (3)	MCDM Collumn	Total of Surgery Cost	Cost per Class	Per Patient
	(1)	(2)		(3)	(4) = (3) x (1)	(5)	(6)	(7) = (5) x (6)	(8) = (7) : (1)
Special	904	916.000,00	1,00	4.250.000	3.842.000.000	0,52		1.089.475.084,73	1.205.171,55
Large	886	916.000,00	0,77	3.300.000	2.923.800.000	0,40		829.101.315,13	935.780,27
Medium	161	916.000,00	0,42	1.800.000	289.800.000	0,04		82.178.521,49	510.425,60
Small	334	916.000,00	0,23	1.000.000	334.000.000	0,05		94.712.305,65	283.569,78
	2.285				7.389.600.000		2.095.467.227		

*MCDM = Multi-Criteria Decision Making

The result of calculating the unit cost using the ABC method for the average cost per patient in the surgical service is Rp 916.000, -. However, historically, the rates at the BLUD Hospital have been adjusted for each type of operation, ranging from the highest for special operations to the lowest for small operations. Thus, it's improbable that the average per-patient cost is the same across the

board. Therefore, an allocation was made based on MCDM, assuming there's cross-subsidization among different types of surgical services.

Discussion

Cost accounting considers activity analysis and always pays attention to factors that drive costs. Cost drivers represent events that cause a total cost change in an activity, making effective cost drivers the core element in an organization's efforts towards continuous improvement.

Traditionally set service rates at the BLUD Hospital do not reflect the actual costs consumed by the service units within the hospital. Hospital service rates include medical and non-medical service costs that should not exceed INA-CBGs. The central surgical unit sets rates by allocating direct costs to medical services and indirect costs to non-medical services. However, using the ABC method breaks down the cause-and-effect relationship between activities and cost objects, providing information about the actual unit costs consumed by the hospital service units.

The results of this study show that the application of the ABC method in the BLUD Hospital provides benefits such as the ability to measure the actual activity costs and identify the relationship between costs and activities. Similar conclusions were drawn in other studies, indicating that the unit cost determination system using the ABC method can be implemented in hospitals (Doyle, 2014; Javid et al., 2016).

The results of this study show that the application of the ABC method in the BLUD Hospital provides benefits such as the ability to measure the actual activity costs and identify the relationship between costs and activities. Similar conclusions were drawn in other studies, indicating that the unit cost determination system using the ABC method can be implemented in hospitals (Rajabi, 2008). Another study by Rajabi and Dabiri (2012) also calculated hospital service and treatment costs in Iran using the ABC method to improve the previous tariff calculation method based on applied prices. ABC is a more suitable mechanism as it calculates costs by considering cost drivers. It also presents more accurate information on the quantity and combination of service costs in the hospitals.

Other studies, such as Aldogan et al., (2014), Ali Habibi (2012), Fidanza et al., (2022), and Lievens et al., (2015) also calculated and established costs using the ABC method in hospitals. According to Demeere et al., (2009) research conducted in a London hospital proved that the ABC method was an appropriate cost calculation system for that hospital.

A deeper analysis of this study involves comparing the calculated unit costs using ABC with the tariffs applied at BLUD Hospital to determine that the difference between unit costs and tariffs of the BLUD Hospital is assumed to be direct costs. The data is presented in the Table 6.

Table 6. Calculation of Direct Costs for Surgical Operation Services

Types of Surgery	Number of Patients	RSUD Rates	Unit Cost per Patients (Indirect Cost)	Direct Cost
Special	904	4.250.000,00	1.205.171,55	3.044.828,45
Large	886	3.300.000,00	935.780,27	2.364.219,73
Medium	161	1.800.000,00	510.425,60	1.289.574,40
Small	334	1.000.000,00	283.569,78	716.430,22
	2.285			

The usefulness of the ABC method for patients is that this method can be affordable because patients pay according to the services received and the resources used. This allows patients to pay efficiently as they only pay for the activities and services they receive. The efficiency that hospitals can achieve with the ABC method is the ability to specifically identify healthcare services and calculate costs based on the resources used in service activities, enabling hospitals to determine the actual cost of each service or treatment provided to patients.

CONCLUSION

The result of calculating the unit cost for the surgical unit (operation) using the ABC method reveals a closer approximation to the actual resource consumption within the company. Determining the unit cost for the surgical unit using the ABC method in BLUD Hospital is crucial and beneficial in enhancing the accuracy of the unit cost as the basis for setting service tariffs. Contrasting the unit cost calculation using the ABC method with the tariffs set by BLUD Hospital can segregate indirect and direct costs for each type of service in the surgical unit (operation). This should particularly concern the hospital management, observing the outcomes derived from the ABC method. Calculating the unit cost in the surgical unit using the ABC method provides insight to the management about various processes involving resource utilization and assessment within BLUD Hospital.

One of the recommendations that can be proposed is for RSUD BLUD to adopt the use of technology-based systems, such as applications or web-based software, to support cost calculation processes using the Activity-Based Costing (ABC) method. This system can serve as a solution to address the complex data processing needs in a hospital environment, making data management more efficient, structured, and accurate. With the assistance of such a system, hospitals can expedite data collection, minimize human errors in calculations, and provide cost information that is more transparent and accountable.

In addition, an alternative solution that can be implemented is the use of the Multi-Criteria Decision Making (MCDM) method for calculations. This method can be applied when certain data is unavailable or difficult to obtain, by considering various relevant criteria in the decision-making process. MCDM enables hospitals to continue performing analyses and making decisions based on specific priorities, even when complete data is not yet fully available. This approach allows hospitals to be more flexible in addressing data constraints while maintaining the quality of cost analysis conducted.

These steps are expected to help RSUD BLUD manage costs more effectively, support strategic planning, and provide better healthcare services to the community. The combination of web-based technology methods with the MCDM approach can also enhance the hospital's competitiveness in addressing increasingly complex operational challenges.

Acknowledgment

Grateful thanks to the management of BLUD Hospital in Yogyakarta and all its staff who graciously collaborated and participated in this research.

Funding

This research signifies a partnership collaboration between the Universitas Islam Indonesia and the BLUD Hospital in Yogyakarta in computing the unit costs of services provided by the hospital. The research received funding support from the Matching Fund Kedaireka grant in 2023, along with both in-cash and in-kind contributions from our partners.

REFERENCES

Akhavan, S., Ward, L., & Bozic, K. J. (2016). Time-driven Activity-based Costing More Accurately Reflects Costs in Arthroplasty Surgery. *Clinical Orthopaedics and Related Research*, *474*(1), 8–15. https://doi.org/10.1007/s11999-015-4214-0

Aldogan, M., Austill, A. D., & Kocakülâh, M. C. (2014). *Journal of Health Care Finance www.HealthFinanceJournal.com*. *13*(July).

Ali Habibi. (2012). Activity based costing model in laboratory of care hospital. *African Journal of Business Management*, *6*(23), 6811–6817. https://doi.org/10.5897/ajbm11.405

Asbu, E. Z., Masri, M. D., & Naboulsi, M. Al. (2020). Determinants of Hospital Efficiency: insights from the literature. *International Journal of Healthcare*, *6*(2), 44-53. https://doi.org/10.21203/rs.2.15354/v2

Bataineh, A. (2018). Applicability of activity-based costing in the Jordanian hospitality industry.

International Journal of Economics and Business Research, *15*(4), 475–489. https://doi.org/10.1504/IJEBR.2018.092153

Datar, S. M., & Rajan, M. V. (2021). *Horngren' s Cost Accounting A Managerial Emphasis* (Seventeent).

Demeere, N., Stouthuysen, K., & Roodhooft, F. (2009). Time-driven activity-based costing in an outpatient clinic environment: Development, relevance and managerial impact. *Health Policy*, *92*(2–3), 296–304. https://doi.org/10.1016/j.healthpol.2009.05.003

Doyle, G. (2014). *An Empirical Study of Adoption / Non-adoption of Activity Based Costing in Hospitals in Ireland Gerardine Doyle, Lisa Duffy and Melissa McCahey UCD Business Schools*. *November*.

Fidanza, A., Schettini, I., Palozzi, G., Mitrousias, V., Logroscino, G., Romanini, E., & Calvisi, V. (2022). What Is the Inpatient Cost of Hip Replacement? A Time-Driven Activity Based Costing Pilot Study in an Italian Public Hospital. *Journal of Clinical Medicine*, *11*(23). https://doi.org/10.3390/jcm11236928

Ibrahim, R., Muhd Nur, A., S. A. Zafirah, & Aljunid, S. M. (2018). The Cost of Radiology Procedures Using Activity Based Costing (ABC) for Development of Cost Weights in Implementation of Casemix System in Malaysia. *Jurnal Sains Kesihatan Malaysia*, *16*(01), 155–162. https://doi.org/10.17576/jskm-2018-1601-19

Javid, M., Hadian, M., Ghaderi, H., Ghaffari, S., & Salehi, M. (2016). Application of the Activity-Based Costing Method for Unit-Cost Calculation in a Hospital. *Global Journal of Health Science*, *8*(1), 165–172. https://doi.org/10.5539/gjhs.v8n1p165

Kalinowski, J. (2024). Cost Analysis of Medical Procedures: A Case Study on Interventional Radiology. *European Research Studies Journal*, *XXVII*(S2), 290–300.

Kaplan, R. S., & Cooper, R. (1998). *Cost and effect: Using integrated cost systems to drive profitability and performance.* Harvard Business School Press.

Koolmees, D., Bernstein, D. N., & Makhni, E. C. (2021). Time-Driven Activity-Based Costing Provides a Lower and More Accurate Assessment of Costs in the Field of Orthopaedic Surgery Compared with Traditional Accounting Methods. *Arthroscopy - Journal of Arthroscopic and Related Surgery*, *37*(5), 1620–1627. https://doi.org/10.1016/j.arthro.2020.11.028

Kuchta, D., & Sabina, Z. (2011). Activity-based costing for health care institutions. *8thInternational Conference on Enterprise Systems, Accounting and Logistics (8th ICESAL 2011) 11-12 July 2011, Thassos Island, Greece*, *July*, 300–311.

Lievens, Y., Obyn, C., Mertens, A. S., Halewyck, D. Van, & Hulstaert, F. (2015). Stereotactic body radiotherapy for lung cancer: How much does it really cost? *Journal of Thoracic Oncology*, *10*(3), 454–461. https://doi.org/10.1097/JTO.0000000000000421

Lin, C., Wang, S., & Qiao, Z. (2013). Product Profitability Analysis Based on EVA and ABC. *International Journal of Business and Management*, *8*(12), 73–82. https://doi.org/10.5539/ijbm.v8n12p73

Neriz, L., Núñez, A., & Ramis, F. (2014). A cost management model for hospital food and nutrition in a public hospital. *BMC Health Services Research*, *14*(1), 1–12. https://doi.org/10.1186/s12913-014-0542-0

Öker, F., & Özyapc, H. (2013). A new costing model in hospital management: Time-driven activity-based costing system. *Health Care Manager*, *32*(1), 23–36. https://doi.org/10.1097/HCM.0b013e31827ed898

Rajabi, A. (2008). The role of activity-based costing (ABC) system in governmental hospital services in Iran. *Iranian Red Crescent Medical Journal*, *10*(2), 89–94.

Rajabi, A., & Dabiri, A. (2012). Applying activity-based costing (ABC) method to calculate cost price in hospital and remedy services. *Iranian Journal of Public Health*, *41*(4), 100–107.

Sanches, L. B., Junior, T. P., Bonizio, R. C., Piratelli, C. L., & Gaio, L. E. (2020). Activity Based Cost System Applied in Surgical Center of a Brazilian Large Hospital. *FACEF Pesquisa - Desenvolvimento e Gestão*, *23*(3).

West, T. D., & West, D. A. (1997). Applying ABC to Healthcare. *Management Accounting*, *February*, 22–33. http://dx.doi.org/10.1016/j.jaci.2012.05.050

Yereli, A. N. (2009). Activity-Based Costing and Its Application in a Turkish University Hospital. *AORN Journal*, *89*(3). https://doi.org/10.1016/j.aorn.2008.09.002

Peraturan Menteri Kesehatan no 3 tahun 2023, "Tentang Standar Tarif Pelayanan Kesehatan Dalam Penyelenggaraan Program Jaminan Kesehatan", Menteri Kesehatan Republik Indonesia.