

Activity Based Costing Method as the basis for Determining Service Rates in Radiology Unit in RSGM

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INDEXING

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ABSTRACT

In the construction of a Dental and Oral Teaching Hospital, the presence of the Faculty of Dentistry also played a role. In an effort to improve the quality of dentists and services to the wider community, each Faculty of Dentistry must have a Dental and Oral Hospital (RSGM). Operation-based costing is an accounting information system that describes the various activities carried out within an entity and collects costs associated with goods based on activities undertaken to produce, operate and distribute or assist the product concerned. To determine and realize dental and oral-service costs using the ABC method at the radiology unit of dental and oral hospital Unimus. This research is a qualitative descriptive case study design with an open-ended method in the form of Focus Group Discussion (FGD) with the chairman and management of dental hospital Unimus. Based on the results of the calculation of dental and oral-service costs at the radiology unit in Unimus Oral and Dental Hospital using the ABC method was Rp. 193.037 for Cephalometric Radiograph, Rp. 162.624 for Orthopantomographic (OPG), Rp. 138.181 for bitewing radiograph and Rp. 162.624 for temporomandibular joint radiograph (TMJ).

Kata kunci:

Analisis Biaya;
Kedokteran Gigi;
Perawatan Pasien;
Unit Radiologi;

Dalam pembanunan Rumah Sakit Pendidikan Kedokteran Gigi dan Mulut, kehadiran Fakultas Kedokteran Gigi turut berperan. Untuk meningkatkan kualitas dokter gigi dan pelayanan kepada penduduk setempat, setiap Fakultas Kedokteran Gigi harus memiliki Rumah Sakit Gigi dan Mulut (RSGM). Penetapan biaya berdasarkan operasi adalah sistem informasi akuntansi yang menggambarkan berbagai aktivitas yang dilakukan dalam suatu entitas dan mengumpulkan biaya yang terkait dengan barang berdasarkan aktivitas yang dilakukan untuk memproduksi, mengoperasikan dan mendistribusikan atau membantu produk yang bersangkutan. Untuk menentukan dan mewujudkan tarif pelayanan dengan metode ABC pada unit Radiologi di RSGM Unimus. Jenis penelitian deskriptif kualitatif dengan desain penelitian studi kasus merupakan jenis penelitian yang digunakan, dilakukan *open end method* berupa *Focus Group Discussion (FGD)* dengan pihak pimpinan dan manajemen RSGM Unimus. Berdasarkan rekapitulasi perhitungan tarif pelayanan di unit radiologi berdasar metode ABC didapatkan tarif termurah pada pelayanan Rontgen Cephalometri dengan harga Rp. 193.037, diikuti tarif Rontgen Panoramik (OPG) dengan harga Rp. 162.624, diikuti tarif Rontgen Bitewing dengan harga Rp. 138.181, diikuti tarif Rontgen TMJ dengan harga Rp. 162.624.

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INTRODUCTION

In the construction of the Dental and Oral Teaching Hospital, the involvement of the Faculty of Dentistry also played a role. In an effort to improve the quality of services for dentists and the general public, each Faculty of Dentistry must have a Dental and Oral Hospital (RSGM). RSGM is also used as a school, education, and testing center for dental engineering students, in addition to offering dental and oral health services (Permenkes 1173, 2004).



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In hospitals, cost is an important aspect, because rates are a very important aspect in the hospital institution (Yanti, 2021). RSGM needs the right management pattern to produce accurate cost calculations. Accurate tariff calculation serves to archive optimal service quality standards, so that hospitals can develop both in terms of services and finances (Baykasoglu & Kaplanoglu, 2008). So far, the determination of hospital service rates has also used a traditional approach. Conventional methods do not represent specific operations. The main challenge of the traditional approach is the determination of the rate based on the volume of output, taking into account intangible hospital outputs, such as speed of operation, quality of information and patient satisfaction with varying volume and complexity of services, care, care, and facilities (Mahdi, Mohammad, Hossein, Shahram, & Masoud, 2015). It is important for hospitals to know the cost of each service unit they have as unit cost information which is the basis for determining the tariff for services. The costing method commonly used is the traditional method in which the costing is based on direct costs and indirect costs associated with the product (Purwanti, 2022). Inaccurate service prices can provide skewed cost data, namely under costing or over costing, resulting in errors in decision making and organizational continuity (Hansen D. R., 2005). Traditional cost calculations are less effective in determining the cost of products, because they only focus on presenting financial information in the form of costs incurred at the patient care stage (Rahmawari, 2019).

So far, hospital benefit rates have been determined using traditional methods. Traditional methods do not reflect a particular activity. The main limitation of traditional methods is to set prices based on the amount of service, and we recognize that hospital services are intangible: B (Costing of Cesarean Sections in a Government and a Non- Governmental Hospital in Cambodia- A Prerequisite for Efficient and Fair Comprehensive Obstetric Care, 2020). Providing speed of service, quality of information, and satisfaction of patient service Traditional pricing because service, handling, maintenance, and the quantity and complexity of various facilities, and most of the costs incurred are overhead. The system is at an inaccurate rate. Inaccurate service charges provide distorted cost information, that is, under or over cost, leading to decision making errors and organizational continuity. (Hansen & Mowen, 2005).

To overcome the biases that exist in traditional methods, you need an activity-based costing or activity-based costing system. Activity-based costing is an accounting that identifies various activities performed within an organization and collects product-related costs based on the activities performed to manufacture, operate, distribute, or support the product in question (Mohsen , Alireza, Abbas, Mahin, & Hassan, 2015). It is an information system (Darcy M, Ryan , & Lucy Best, 2020) Because activity-based costing methods use many cost factors when allocating costs, activity-based costing is considered to be able to create appropriate charges. Activity-based costing also has other benefits, such as improved decision-making quality, reduced overhead costs through continuous improvement of activities, and easier identification of associated costs. (Mulyadi, 2005)

Accounting is the information system that measures business activities, processes that informations into reports and communicates the result to decision maker (Horngren, 2008). Operations-based costing is an accounting information system that identifies various activities carried out within an organization and collects costs related to goods based on activities

undertaken to produce, operate, and distribute or assist the product in question. Activity-based costing is considered capable of reaching the correct level because multiple cost generators are used in the costing process from activity-based costing. (Mulyadi, 2005). Hospitals face the challenges and challenges of balancing limited resources and costs to meet their service needs. (Javid, 2016).

Activity Based Costing System Is an activity-based costing information system designed to motivate personnel to reduce costs in the long term through activity management (Mulyadi, Sistem Informasi Biaya untuk Pengurangan Biaya, 2016). The benefits of the Activity Based Costing (ABC) cost system for company management are: 1) An assessment of the ABC costing system can convince management that they should take a number of steps to become more competitive. As a result, they can strive to improve quality while simultaneously focusing on possible cost reductions. Analysis these costs can highlight how really expensive the manufacturing process is, this in turn can spur activities to organize processes, improve quality, and reduce costs, 2) ABC costing system can help in decision making (Aldi, 2019)

RSGM has a wide range of services divided into general dentistry, specialist dentistry, radiology unit, pharmacy installation, laboratory, emergency room. The specialty dental clinic consists of orthodontic specialty poly, pedodontics specialist poly, prosthodontics specialist poly, oral surgery specialist poly, conservation specialist poly, periodontium specialty poly, and oral disease specialist poly (Peraturan Menteri Kesehatan, 2004). The radiology unit is a new installation of medical support established by RSGM Unimus. Its new existence requires calculating the correct and affordable service rates without compromising on quality. This study aims to determine service rates for radiology units using the ABC method at RSGM Unimus.

RESEARCH METHOD

This type of qualitative descriptive research with a case study research design was conducted using an open-end approach in the form of a Focus Group Discussion (FGD). The research subjects included the management, the dental nurse coordinator, and the procurement of medical equipment and materials at the Dental and Oral Hospital of Unimus by using the open-end method interview.

The data obtained include primary and secondary data. Primary data was obtained through the ABC calculation step, which was then carried out by FGD. Meanwhile, secondary data is obtained through documentation and direct interviews with research subjects (Nasikhatun Najah, 2016).

(Ni Luh & Putu pande Yudiastra, 2018) The data were processed using Microsoft Excel 2010 program and analysed using the ABC method steps, including:

1. Collecting all components of implementation costs in the radiology unit in RSGM Unimus.
2. Identify the costs of all activities.
3. Identify the cost driver.
4. Determination of the rate per unit cost driver, using the calculation formula:



$$\text{Rates per unit cost driver} = \frac{\text{number of activities}}{\text{Cost driver}}$$

- Using a cost machine, charge operating costs for each commodity

BOP charged = rates per unit cost driver x cost driver.

- Calculate unit cost by adding up all costs per activity.
- Conducting a Focus Group Discussion with the leadership and management of RSGM to obtain input regarding the calculated costs.
8. Perform re-analysis of the calculations based on the results of the FGD and the calculation of the ABC method.

After calculating, then conducting a Focus Group Discussion with the RSGM leadership and the management to obtain input regarding the calculated costs. The rates from the FGDs were re-analysed based on the results of the FGD and the calculation of the ABC method.

RESULT AND DISCUSSION

Activity Based Costing Method Calculation (Fitriadi, 2019).

Activity costs

Below is a list of indirect costs (Table 1) and direct costs (Table 2) charged to activities.

Table 1. Mean, standard deviation (SD)

Activity	Cost Driver		Total Fees (in thousands of Rp)	Rates / Unit (Rp)
	Unit	Number of Units		
Building Maintenance	Number of Patients	4320	60,000	13,889
Treatment Facilities (CBCT X-rays)	Number of Patients	4320	25,000	5,787
Cleanliness	Number of Patients	4320	120,000	27,778
CBCT X-ray Shrinkage	Number of Patients	4320	54,000	12,500
Maintenance Ac	Number of Patients	4320	6,000	1,389
AC	Number of Patients	4320	4,000	926
Doctor-patient consultation chair	Number of Patients	4320	10,000	2,315
Office Stationery (medical records + cbct maintenance software)	Number of Patients	4320	21,600	5,000
Electricity	Number of Patients	4320	40,000	9,259
Water	Number of Patients	4320	12,000	2,778
Security (1 person)	Number of Patients	4320	45,600	10,556
Salary for cleaning support personnel (1 person)	Number of Patients	4320	45,453	10,522
Radiology specialty printer	Number of Patients	4320	9,500	2,199

Source of the 2019 research data table



Table 2. Mean, standard deviation (SD)

Direct cost	
Tools & Consumables per Action	
Specialist Doctor Salaries	Rp 72,000,000
Salary of two medical support persons	Rp 52,800,000
TOTAL	Rp 124,800,000

Source of the 2019 research data table

Cost Driver Classification

The management of RSGM Unimus assumes 15 patients per day in the radiology unit. If there are 15 patients per day for 3 shifts with 6 working days in one week, then the number of patients per year is 4320.

Determination of Rates per Unit

The determination of the rates per unit in Table 3 is carried out using a formula:

$$\frac{\text{Number Of Activities}}{\text{Cost driver}}$$

Table 3. Rates Per Unit

Activity	Cost Driver		The amount of costs (Rp)	Rates / Unit (Rp)
	Unit	Number of Units		
Building Maintenance	Number of Patients	4320	Rp 60,000,000	Rp 13,889
Treatment Facilities (CBCT X-rays)	Number of Patients	4320	Rp 25,000,000	Rp 5,787
Cleanliness	Number of Patients	4320	Rp 120,000,000	Rp 27,778
CBCT X-ray Shrinkage	Number of Patients	4320	Rp 54,000,000	Rp 12,500
AC Maintenance	Number of Patients	4320	Rp 6,000,000	Rp 1,389
AC	Number of Patients	4320	Rp 4,000,000	Rp 926
Doctor-patient consultation chair	Number of Patients	4320	Rp 10,000,000	Rp 2,315
Office Stationery (medical records + cbct maintenance software)	Number of Patients	4320	Rp 21,600,000	Rp 5,000
Electricity	Number of Patients	4320	Rp 40,000,000	Rp 9,259
Water	Number of Patients	4320	Rp 12,000,000	Rp 2,778
Security (1 person)	Number of Patients	4320	Rp 45,600,000	Rp 10,556
Salary for cleaning support personnel (1 person)	Number of Patients	4320	Rp 45,453,000	Rp 10,522
Radiology specialty printer	Number of Patients	4320	Rp 9,500,000	Rp 2,199

Source Table 2019 research data

Calculating Consumables

In Table 4, you can see some of the tools and consumables in the radiology unit.

Calculates the Rate of each Radiology Unit Measures



There are 15 activities in the radiology unit, the steps taken to calculate the rate for the radiology unit are as:

1. Calculating the overhead costs charged to each activity, the formula for calculating overhead costs is as follows:

$$\text{BOP charged} = \text{cost driver rate per unit} \times \text{drive used}$$

2. Calculates all classified activity costs
3. Divide the total activity cost for each action by the number of patients per treatment.

Table 4. Disposable

Tools and Materials	a lot	Unit	Price	Unit Rate
Hijab masks	50	Patients	21,000 Rp	420
Non-Hijab masks	50	Patients	21,000 Rp	420
Handsocon	50	Patients	38,000 Rp	760
Tissue	150	Patients	35,000 Rp	233
Film Cephalometry	125	Patients	5,148,000 Rp	41,184
Hand rub	50	Patients	105,000 Rp	2,100
Total				Rp 45,117

Source Table 2019 research data

Table 5. Cephalometric X-rays

Activity	Cost Driver Rates	Cost Driver	Total (Rp)
Building Maintenance	Rp 13,889	6.75	Rp 93,751
Treatment Facilities (CBCT X-rays)	Rp 5,787	4320	Rp 24,999,840
Cleanliness	Rp 27,778	288	Rp 8,000,064
CBCT X-ray Shrinkage	Rp 12,500	4320	Rp 54,000,000
AC Maintenance	Rp 1,389	4320	Rp 6,000,480
AC	Rp 926	4320	Rp 4,000,320
Doctor-patient consultation chair	Rp 2,315	4320	Rp 10,000,800
Office Stationery (medical records + cbct maintenance software)	Rp 5,000	4320	Rp 21,600,000
Electricity	Rp 9,259	288	Rp 2,666,592
Water	Rp 2,778	4320	Rp 12,000,960
Security (1 person)	Rp 10,556	4320	Rp 45,601,920
Radiology specialty printer	Rp 2,199	4320	Rp 9,499,680
Salary for cleaning support personnel (1 person)	Rp 10,522	288	Rp 3,030,336
Specialist Doctor Salaries	Rp 16,667	4320	Rp 72,001,440
Salaries of two medical support	Rp 12,222	4320	Rp 52,799,040
BMHP X-ray Cephalometry	Rp 45,117	4320	Rp 194,905,440
Total Cost 1 year			Rp 521,200,663
Number of patients in 1 year			4320
Cephalometric X-rays Cost			Rp 120,648
Profit 50%			Rp 60,324
Medical Services 10%			Rp 12,065
Total Rates			Rp 193,037

Source Table 2019 research data



Table 6. Panoramic X-rays

Activity	Cost Driver Rates	Cost Driver	Total (Rp)
Building Maintenance	Rp 13,889	6.75	Rp 93,751
Treatment Facilities (CBCT X-rays)	Rp 5,787	4320	Rp 24,999,840
Cleanliness	Rp 27,778	288	Rp 8,000,064
CBCT X-ray Shrinkage	Rp 12,500	4320	Rp 54,000,000
AC Maintenance	Rp 1,389	4320	Rp 6,000,480
AC	Rp 926	4320	Rp 4,000,320
Doctor-patient consultation chair	Rp 2,315	4320	Rp 10,000,800
Office Stationery (medical records + cbct maintenance software)	Rp 5,000	4320	Rp 21,600,000
Electricity	Rp 9,259	288	Rp 2,666,592
Water	Rp 2,778	4320	Rp 12,000,960
Security (1 person)	Rp 10,556	4320	Rp 45,601,920
Radiology specialty printer	Rp 2,199	4320	Rp 9,499,680
Salary for cleaning support personnel (1 person)	Rp 10,522	288	Rp 3,030,336
Specialist Doctor Salaries	Rp 16,667	4320	Rp 72,001,440
Salaries of two medical support	Rp 12,222	4320	Rp 52,799,040
BMHP Panoramic X-ray (OPG)	Rp 26,109	4320	Rp 112,790,880
Total Cost 1 year			Rp 439,086,103
Number of patients in 1 year		4320	
Cephalometric X-rays Cost			Rp 101,640
Profit 50%			Rp 50,820
Medical Services 10%			Rp 10,164
Total Rates			Rp 162,624

Source Table 2019 research data

Table 7. Bitewing X-rays

Activity	Cost Driver Rates	Cost Driver	Total (Rp)
Building Maintenance	Rp 13,889	6.75	Rp 93,751
Treatment Facilities CR	Rp 1,505	4320	Rp 6,501,600
Cleanliness	Rp 27,778	288	Rp 8,000,064
CR Shrinkage	Rp 1,505	4320	Rp 6,501,600
AC Maintenance	Rp 1,389	4320	Rp 6,000,480
AC	Rp 926	4320	Rp 4,000,320
Doctor-patient consultation chair	Rp 2,315	4320	Rp 10,000,800
Office Stationery (medical records + cbct maintenance software)	Rp 5,000	4320	Rp 21,600,000
Electricity	Rp 9,259	288	Rp 2,666,592
Water	Rp 2,778	4320	Rp 12,000,960
Security (1 person)	Rp 10,556	4320	Rp 45,601,920
Radiology specialty printer	Rp 2,199	4320	Rp 9,499,680
Salary for cleaning support personnel (1 person)	Rp 10,522	288	Rp 3,030,336
Specialist Doctor Salaries	Rp 16,667	4320	Rp 72,001,440
Salaries of two medical support	Rp 12,222	4320	Rp 52,799,040
BMHP Bitewing X-rays	Rp 26,109	4320	Rp 112,790,880
Total Cost 1 year			Rp 373,089,463
Number of patients in 1 year		4320	
Cephalometric X-rays Cost			Rp 86,363
Profit 50%			Rp 43,182
Medical Services 10%			Rp 8,636
Total Rates			Rp 138,181

Source Table 2019 research data



Table 8. TMJ X-rays

Activity	Cost Driver Rates	Cost Driver	Total (Rp)
Building Maintenance	Rp 13,889	6.75	Rp 93,751
Treatment Facilities (CBCT X-rays)	Rp 5,787	4320	Rp 24,999,840
Cleanliness	Rp 27,778	288	Rp 8,000,064
CBCT X-ray Shrinkage	Rp 12,500	4320	Rp 54,000,000
AC Maintenance	Rp 1,389	4320	Rp 6,000,480
AC	Rp 926	4320	Rp 4,000,320
Doctor-patient consultation chair	Rp 2,315	4320	Rp 10,000,800
Office Stationery (medical records + cbct maintenance software)	Rp 5,000	4320	Rp 21,600,000
Electricity	Rp 9,259	288	Rp 2,666,592
Water	Rp 2,778	4320	Rp 12,000,960
Security (1 person)	Rp 10,556	4320	Rp 45,601,920
Radiology specialty printer	Rp 2,199	4320	Rp 9,499,680
Salary for cleaning support personnel (1 person)	Rp 10,522	288	Rp 3,030,336
Specialist Doctor Salaries	Rp 16,667	4320	Rp 7 2,001,440
Salaries of two medical support	Rp 12,222	4320	Rp 52,799,040
BMHP TMJ X-rays	Rp 26,109	4320	Rp 112,790,880
Total Cost 1 year			Rp 439,086,103
Number of patients in 1 year			4320
Cephalometric X-rays Cost			Rp 101,640
Profit 50%			Rp 50,820
Medical Services 10%			Rp 10,164
Total Rates			Rp 162,624

Source Table 2019 research data

Based on the results of the calculation of the ABC method in this study, it was found that the unit cost of action at the radiology unit at the GMU Unimus Hospital was as table 9:

Table 9. TMJ X-ray

No	Services	Cost
1	Cephalometric X-rays	Rp 193,037.00
2	Panoramic X-ray (OPG)	Rp 162,624.00
3	Bitewing X-rays	Rp 138,181.00
4	TMJ X-rays	Rp 162,624.00

According to (Luthfita, 2016), the ABC method uses many activities as cost drivers to determine how much overhead is consumed by each action. This is the difference in calculating the ABC method with conventional or traditional methods, because this method only charges one cost driver.

Determination of depreciation costs for CBCT X-rays originated from the decision of a Focus Group Discussion. CBCT X-rays have a 5-year warranty, so management wants a 5-year depreciation fee. Using the straight-line depreciation calculation method (straight line) with the calculation formula:



By calculation, D = depreciation cost per year, P = starting price of the machine, S = final price of the machine is set at 10% of the initial price, N = estimated economic life, in this case it is determined to be 5 years (Hery, 2014).

$$D = \frac{P - S}{N}$$

The assumed number of the patients is gathered through interviews with the RSGM management. The assumption is 15 patients per day for 3 shifts. RSGM Unimus has 6 working days in one week, so there are a total of 288 working days a year with the number of patients totaling 4,320 patients a year for all services in the radiology unit. Based on the results of the calculation of service rates at the radiology unit RSGM Unimus using the Activity Based Costing method, the highest tariff obtained is Rp. 193,037 for the type of cephalometric x-ray, and the lowest rate was Rp. 162,624 on the type of TMJ X-ray. This rates variation is due to differences in the cost of consumables used in each action. In charging the activity costs in the radiology unit using 3 types of cost drivers, namely the number of patients, the area of the building, and the number of working days. This is a contrast between the calculation of the ABC method and the traditional method, because the ABC method uses more cost drivers than the conventional method which only uses one cost driver (Brando Kaunang, 2015). The rates shown in table 9 have been approved by the leadership and management of RSGM Unimus in the Focus Group Discussion with accordance to the policy that 50% is apportioned for profit and 10% is allocated for medical service.

Focus Group Discussion (FGD) is a form of discussion designed to produce information about the wants, needs, and points of view desired by the participants. The aim of the FGD is to explore specific problems and get explanations for the questions answered. The FGD in this study was conducted in 2 days at RSGM Unimus. With the subject of discussion of exposure and questions and answers related to rates on radiology unit. This FGD was carried out with the leadership and management of RSGM Unimus. The final FGD, namely FGD II, received a rates approval in accordance with the wishes of the Unimus RSGM management.

CONCLUSION

In charging the activity costs that exist in the radiology unit at the Dental Hospital of Unimus using 3 kinds of cost drivers, namely the number of patients, building area, and the number of working days. Then the rates obtained have been through Focus Group Discussions (FGD) with the leadership and management of RSGM Unimus. From the results of the FGD, the leader wanted 10% medical services and 50% profit for each action. The end result of service in the radiology unit using the ABC method is the lowest tariff for the Cephalometric X-ray service at a price of Rp. 193,037, followed by a Panoramic X-ray (OPG) tariff at a price of Rp. 162,624, followed by Bitewing X-ray rates at a price of Rp. 138,181, followed by the TMJ X-ray tariff at a price of Rp. 162,624.

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