

CALCULATION OF UNIT COST IN ECHOCARDIOGRAPHY USING ABC METHODS BASED ON TARIFF OF INA CBG'S IN PKU MUHAMMADIYAH HOSPITAL YOGYAKARTA

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Abstract

Background: Tariffs on health services at advanced health facilities are performed under the Indonesian Case Base Groups (INA-CBG's) payment scheme. The unequal real tariff for echocardiography treatment causes hospital to perform cost-effective financial management. The high number of echocardiography treatment in PKU Muhammadiyah Hospital Yogyakarta and the lack of data on how many unit cost of echocardiography action make the researcher feel the need to calculate unit cost of echocardiography by using Activity Base Cost method.

Method: This research is descriptive qualitative with research design of retrospective observation. This research was limited to patients over the age of 45 years.

Result and Discussion : The result of unit cost calculation of echocardiography treatment using Activity Based Costing method is Rp. 309,370 and from the calculation of real cost using the management policy obtained Rp. 343,000. While the claims of INA-CBG's for patients with echocardiography for type B hospital located in Regional I is Rp. 369.500. The difference of its calculation is that unit cost is Rp. 33,630 lower than hospital tariffs and Rp. 60,130 lower than INA CBGs tariff.

Conclusion and Recommendation: Based on the calculation, it can be concluded that the unit cost of echocardiography treatment in PKU Muhammadiyah Hospital Yogyakarta using ABC method is lower than Real Cost and INA-CBG's tariff.

Keywords: *Activity-Based Costing, Echocardiography, Unit Cost*

A. INTRODUCTION

On January 1, 2014 has been implemented a new tariff for payment of health services in Indonesia. INA-CBG'S stands for Indonesia Case Base Group's. SISTEMINA-CBG'S is an application that is used as an application for filing a claim to Hospital, Puskesmas and all Health Service Provider (PPK) for Indonesian society started from January 2014. INA-CBG'S Casemix System is a classification of patient care episodes designed to create classes relatively similar in terms of resources used and contains patients with similar clinical characteristics (George, 2013).

Case Base Groups (CBG's), which is payment method for patient care based on relatively similar diagnoses or cases. Hospitals will be paid based on the average cost spent by a group of diagnoses. In payments using the INA-CBG'S system, neither the Hospital nor the payer details the bill based on the

details of the services provided, but only by delivering a patient's diagnosis and DRG code (Disease Related Group). The amount of reimbursement for the diagnosis has been agreed between the provider/insurance or established by the previous government. The estimated length of stay of patient has also been predicted to be adjusted to the type of diagnosis and case of illness. INA-CBG'S is a continuation of the INA-DRG application which license expired on September 30, 2010 and INA-CBG'S replaced the function of INA-DRG application. The INA-CBG'S system has been implemented in several hospitals throughout Indonesia. Rates of INA-CBG'S system are expected to be more efficient (Kepmenkes Number 440 of 2012).

Social Security Administering Body or BPJS is an institution established to organize social security program in Indonesia according to Law Number 40 Year 2004 and Law Number 24 Year 2011. In accordance with Law Number 40 Year 2004 regarding National Social Security System, BPJS is a non-profit legal entity. Based on Law No. 24 Year 2011, BPJS will replace a number of social security institutions in Indonesia namely PT Askes (Health Insurance) Indonesia into BPJS Health and social labor security agencies PT Jamsostek into BPJS Employment. The transformation of PT Askes and PT Jamsostek into BPJS was done gradually. In early 2014, PT Askes would become BPJS of Health then in 2015 PT Jamsostek into BPJS of Employment. This institution is responsible to President. BPJS is headquartered in Jakarta, and has representative offices at the provincial level as well as branch offices at the municipal district level.

The impact of the INA-CBG'S payment system enforced for hospitals is large because hospital is a complex organization and a very important component of the health care system. The hospital is in a difficult position, especially for private hospital. On the one hand it is required to provide good service in accordance with the demands of society and on the other side it is required to make efficiency in its implementation (Ruci, 2011). One example of hospital affected by the new payment system is PKU Muhammadiyah Hospital.

Echocardiography or cardiac ultrasonography is a technique of examination of the heart and big blood vessels by using ultrasound waves (ultrasound). This examination is an investigation to make the diagnosis, determine the procedure, and predict the prognosis of cases of heart disease and blood vessels. Some of these features make echocardiography play an important role in the development of modern cardiology. With echocardiography, the morphology of the heart spaces and valves can be evaluated, as well as the non-invasive cardiac hemodynamic functions and conditions (without inserting the device into the body), so that it has relatively no risks or side effects.

Based on the exposure, the researcher is interested to conduct research which aims to find out the unit cost of cardiac echocardiography at PKU Muhammadiyah Hospital Yogyakarta by using activity based costing method, knowing the difference between unit cost calculation of cardiac echocardiography with activity based costing method and tariff applied in PKU

Muhammadiyah Hospital Yogyakarta, and find out the claim filed by BPJS in accordance with the unit cost of cardiac echocardiography at PKU Muhammadiyah Hospital Yogyakarta.

B. THEORETICAL FRAMEWORK

Data processing is in the ABC system. The steps used by Baker, 1998 are:

1. *Activity analysis*

Baker used 4 steps in analyzing activity, namely:

- a. Determine activity
- b. Classify activity
- c. Create map activity
- d. Complete analysis

2. *Activity Costing*

Steps used are;

a. *Determine Cost Object.*

It can use CBGs system which already has procedure or clinical pathway. Activity that occurs should be organized into activity centers.

b. *Link cost to activity using cost driver*

It is the concept of tracing and allocating in the ABC. Tracing methodology is the cost charged to activities that show a causal relationship between the consumption of resources and the activity concerned. Allocation is the cost charged to activities through arbitrary basis. It causes the charge to be inaccurate.

Direct costs are easily identified with something that is financed through direct tracing. Indirect costs are charged in various types of activity centers that use a variety of cost drivers. First Cost Driver in direct cost can be directly traced, while indirect costs must use various allocations. Second stage cost drivers are used in calculating indirect costs including overhead. Second stage cost drivers are measured by the number of resource activities used by the cost object such as procedures that differ from patient to patient. Activities must be detailed in activity centers.

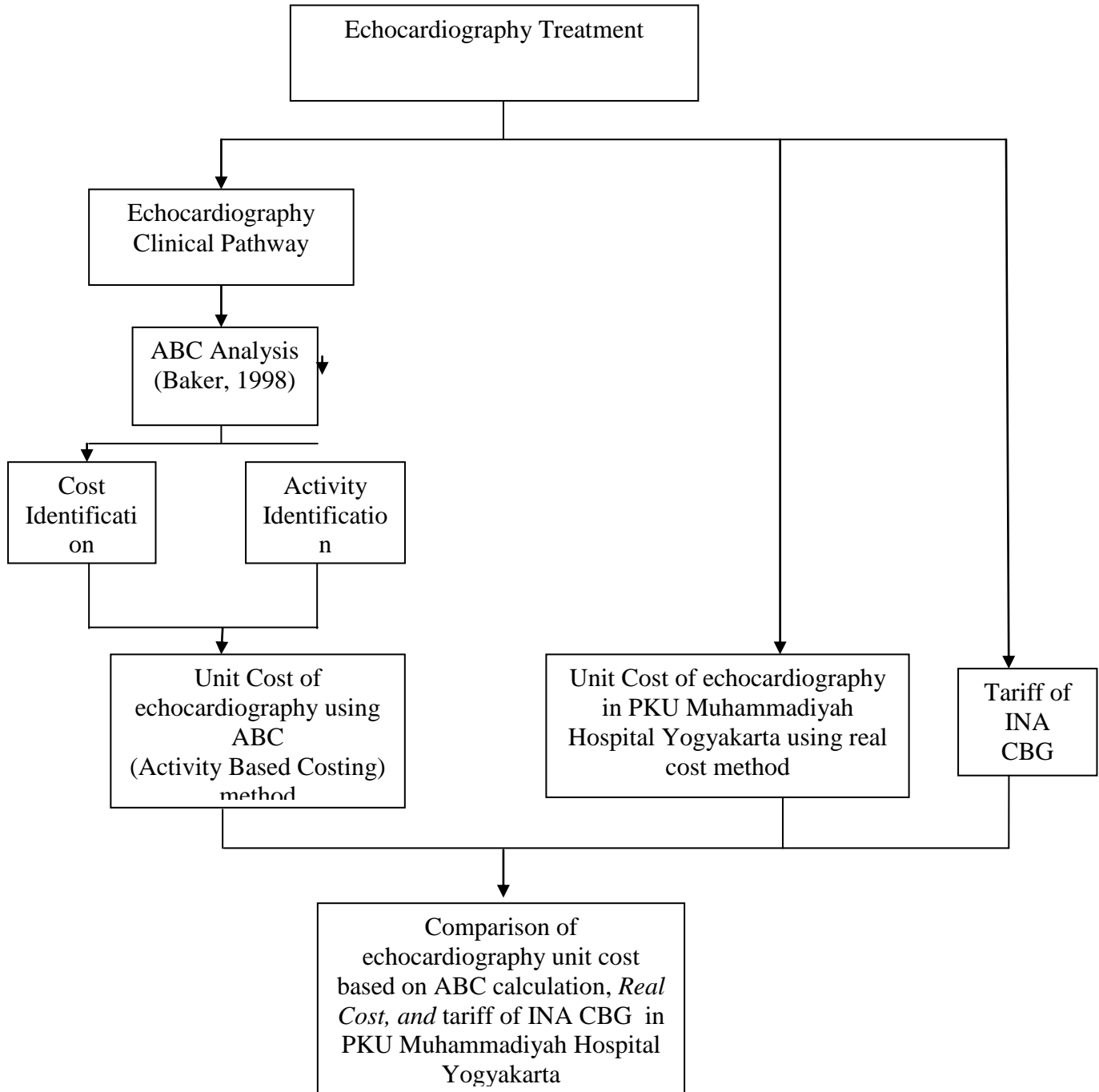
c. *Cost Calculation*

- 1) Determine the activity centers in related unit.
- 2) Charge Direct Cost
- 3) Determine the amount of consumption of overhead costs in each activity using time proportions.
- 4) Determine the activities contained in Clinical Pathways.
- 5) Charge overhead costs into each activity in the clinical pathway.
- 6) Grouping overhead costs of each activity into activity center.
- 7) Add costs according to the procedures contained in the clinical pathway to each activity center.
- 8) Compare CBG costs using ABC calculations with INA CBG costs determined by the government.

To know the unit cost of Echocardiography service in INA CBGs, the researcher must know the activity of Echocardiography service to know the cost component of Echocardiography service. After that the researcher can do cost analysis using activity based costing method so that unit cost for service of echocardiography can be known. After that, the comparison with tariffs of INA CBGs Echocardiography which has been established can be done.

C. CONCEPTUAL FRAMEWORK

Conceptual framework in this research is shown below.



D. RESEARCH METHOD

This type of research is qualitative descriptive in which each object is only observed once. The research method used in this research is qualitative. In this study, the unit cost of echocardiography services using ABC method will be calculated. Descriptive research method is a research method with main purpose to objectively describe a situation.

This research was conducted in December 2017 to February 2018 at PKU Muhammadiyah Hospital in Yogyakarta. The research subjects in this study were the Head of Finance, Heart and Vessel Specialist Doctors, administrative officers such as registration officers, medical records, quality department, marketing department and secretariat of PKU Muhammadiyah Hospital Yogyakarta. Meanwhile, the object of this research is the activity carried out to produce service products in echocardiography services at PKU Muhammadiyah Hospital Yogyakarta. The activity in question is all activities that occur in both direct and supporting echocardiography services that support echocardiography service activities. To obtain comprehensive data in PKU Muhammadiyah Hospital Yogyakarta this research will be conducted by collecting complete data from the subject and object of the study, data obtained will be repeated when the data obtained is not sufficient. The sample inclusion and exclusion criteria are as follows;

Inclusion Criteria:

1. Diagnosis of entry and exit of INA-DRG.
2. Age over 45 years

Exclusion Criteria:

1. Patients with co-morbidities, such as lung.
2. Patients with complications of bleeding, infections and other complications.
3. Echocardiographic actions stop before they are finished, because the patient's condition is not possible to continue

E. RESULT

1. Unit Cost of Echocardiography services using ABC method

The steps of unit cost calculation process of outpatients by doing echocardiography examination using activity based costing method are as follows (Baker, 1998):

- a. Determine activity centers on related units, cost and cost drivers for each cost category.

Cost Driver is factor that can explain the consumption of overhead costs and a thing that causes cost. The results of interviews and observations that have been done for patients services undergoing echocardiographic examinations at PKU Muhammadiyah Hospital Yogyakarta, the activity center in the polyclinic section is obtained which is shown in Table 1:

**Table 1 Activity Center in Polyclinic of PKU Muhammadiyah Hospital
Yogyakarta**

Activity place	Activity Center	First stage cost drivers	Second stage cost drivers
Polyclinic	Patient registration	Time	Number of patients coming
	Patient acceptance	Time	Number of patients coming
	Preliminary examination	Time	Number of patients coming
	Patient examination by a doctor	Time	Number of patients
	Vital sign examination	Time	Number of examinations
	Writing patient medical records	Time	Number of medical records filling
	Echocardiography Examination	Time	Number of examinations
	Filling heart polyclinic control letter	Time	Number of activities
	Filling follow up letter of echocardiography action	Time	Number of activities
	Take the patient home	Time	Number of activities

- b. Charge the direct costs consumed to outpatients or cardiac patients who will do Echocardiography

The Echocardiography treatment services in this research which direct costs spent on the action is calculated based on the natural course of heart disease. The direct costs in question are the costs that arise when a service is done and directly caused to the product or service. Costs are charged as cost of products or services through activities that produce the product or service concerned.

Cardiac patients who come to polyclinic who suffer chest pain or discomfort in their chest will have clinical examination that will be performed by a specialist, initial treatment, and radiological examination, namely echocardiography if needed and also routine blood tests, then preparation for entering echocardiography room is performed until the nurse prepares all the needs that a specialist will need when the echocardiogram is taking place. In this research the patients treated in the ward were not included. The direct costs that appear can be seen in table 2 below:

**Table 2 Direct Costs for Cardiac Patients Who Perform Echocardiography
Actions in PKU Muhammadiyah Hospital Yogyakarta in 2017**

Cost category	Unit	Unit Number (b)	Unit Cost (c)	Number (a)
Cardiac Polyclinic				
1. Registration	Activity	1	12.500	12.500
2. Examination by a cardiologist	Action	1	45.500	45.500
3. Echocardiography	Action	1	136.100	136.100
Service of Polyclinic				
1. Handscoen	Pcs	2	330	660
2. Mask	Pcs	1	2.150	2.150
3. Tissue	Pcs	5	120	600
4. Reading paper	Pcs	1	2.100	2.100
5. Jelly	Gr	2	1.500	3.000
6. Electrode	Pcs	3	2.680	8.040
7. Envelope	Pcs	1	400	400
8. Disinfectant	spray	4	200	800
9. Photo paper	Pcs	1	3.000	3.000
Total of Direct cost				214.850

Annotation: a=bx c, a=total cost b=unit c=unit cost

- c. Determine the amount of direct resource overhead and indirect resource overhead costs consumed by each activity by using the proportion of time in the relevant unit, namely the Heart Polyclinic.

To calculate overhead costs, it can be divided into two, namely indirect resource overhead costs and direct resource overhead costs. There are four categories of overhead costs, namely labor related, related equipment, related space, and service related.

1) Indirect Resource Overhead Cost

Calculation of indirect resource overhead costs was calculated to determine the indirect resource overhead costs of PKU Muhammadiyah Hospital Yogyakarta in general which became a burden of the hospital. Direct resource overhead costs consist of labor related which includes employee costs, related equipment which includes equipment and machinery costs, machine depreciation costs and installation, office furniture depreciation costs. The related space includes the cost of maintaining and repairing non-functional buildings. Usage costs for procurement items, office and subscription fees, water costs, electricity costs, and telephone and cleaning costs are Service-related components.

Table 3 Indirect Resource Overhead Cost in PKU Muhammadiyah Hospital Yogyakarta in 2017

<i>Indirect Resource Overhead Cost</i>	Cost (Rp)
<i>Labour-related</i>	
Cost of employees	12.077.399.881
<i>Equipment-related</i>	
Cost of tools and machines	1.034.078.473
Cost of machine depreciation and installation	61.954.057
Cost of office furniture depreciation	156.416.473
<i>Spaced-related</i>	
Cost of building maintenance and repairs	250.655.230
Cost of non-functional building depreciation	38.602.974
<i>Service-related</i>	
Cost of procurement goods usage	1.846.833.242
Cost of office and subscription	1.132.655.461
Electricity costs	357.250.686
Telephone fees	37.384.676
Water costs	1.671.221
Cleaning costs	151.676.542
Total	17.146.578.915

The cost of indirect resource overhead in PKU Muhammadiyah Hospital Yogyakarta is Rp. 17.146.578.915 which is charged to the functional unit of PKU Muhammadiyah Hospital Yogyakarta which uses the basis of the proportion of income in each functional unit.

Table 4 Charge of Indirect Resource Overhead Costs in PKU Muhammadiyah Hospital Yogyakarta in 2017

Functional Unit	Amount of Income	Proportion (Percentage)	Cost (Rp)
Inpatient	12.949.890.399 ^(a)	12,00 ^(c)	2.057.150.622 ^(d)
Outpatient	9.555.061.131 ^(a)	8,85 ^(c)	1.517.866.125 ^(d)
Central Surgical Installation	14.089.990.180 ^(a)	13,05 ^(c)	2.238.260.802 ^(d)
Emergency Installation	2.437.973.616 ^(a)	2,26 ^(c)	387.283.505 ^(d)
Supporting Unit	68.393.921.695 ^(a)	63,36 ^(c)	10.864.694.160 ^(d)
Birthing Room	511.937.730 ^(a)	0,47 ^(c)	81.323.701 ^(d)
Total	107.938.774.751^(b)	100	17.146.578.915^(e)

Annotations : $(c=a:b*100\%)$, $(d=c*e)$, a=amount of income/unit, b=total amount of income, c=proportion(percentage), d=cost of each installation, e=total cost

After getting the result from the calculation of non-functional unit load to each functional unit, the next step is calculate the load of each patient who gets echocardiographic action.

The cost of outpatients indirect resource overhead is Rp.1,517,866,125 which will be charged to all outpatients. Therefore, if all patients in 2017 were 82,350 patients then for the average indirect resource overhead costing was Rp. 18,891.

2) Direct resource overhead cost.

Calculation of direct resource overhead costs can be done by knowing the direct resource overhead costs in each unit related to echocardiographic actions in PKU Muhammadiyah Yogyakarta Hospital which is the burden of the unit related to echocardiography at the hospital. The amount of direct resource overhead costs borned by the PKU Muhammadiyah Hospital Yogyakarta can be seen in the following units:

a) Polyclinic

Heart disease patients come to the polyclinic, then an examination is performed by the Specialist in charge. Then a physical examination and continued with echocardiography examination. In terms of calculating direct resource overhead costs, it is also the same as indirect resource overhead costs which are divided into 4 categories, namely labor-related, equipment-related, space-related and service-related. In 2017 the PKU Muhammadiyah Hospital Yogyakarta Polyclinic has 82,350 patients. The following are the costs incurred by the PKU Muhammadiyah Yogyakarta Hospital Polyclinic in 2017.

Table 5 Category of Indirect Resource Overhead Costs in PKU Muhammadiyah Hospital Yogyakarta in 2017

Type of Cost	Cost (Rp)
<i>Labour related</i>	
Employee	1.949.199.096
<i>Equipment Related</i>	
Depreciation cost in polyclinic	97.457.720
<i>Space Related</i>	
Maintenance cost (tools and cleanliness)	1.359.069.932
<i>Service related</i>	
Cost of consumable goods usage	1.517.741.122
Electricity costs	1.175.541.558
Telephone fees	111.008.995

Water costs	18.373.800
Total	6.228.392.223

(1). Labour related

PKU Muhammadiyah Hospital Yogyakarta in 2017 pay the cost of Polyclinic employees, that is Rp. 1.949.199.096 for 19 employees in one year. Total patient in polyclinic is 82,350. If the salary of a polyclinic employee is charged to the patient, so the average patient get a charge of Rp. 23,670.

(2)Equipment related

Equipment financing at PKU has the following provisions, one of them is the equipment that does not included in the procurement is the equipment that will not exhausted in one year and medical devices with price above Rp. 5,000,000.00 or non-medical equipment with price above Rp. 2,500,000.00. There are three categories in economic value, they are the tools have economic value of four years, machine have economic value for 10 year, and building have economic value for 20 year. Equipment-related that costs incurred by the polyclinic are divided into the cost of tools and machinery, the cost of depreciation of medical devices, the cost of machine depreciation and installation and the cost of depreciation of office furniture. Equipment-related polyclinics is Rp. 97,457,720 which will be charged to all Polyclinic patients, there are 82,350 patients so that one patient gets Equipment-related load of Rp.1,183.

(3)Spaced related.

Spaced related categories in polyclinic will contain the cost of repairs and maintenance of buildings and depreciation of the building. The cost of repairs and maintenance of the Polyclinic during 2017 is Rp. 1.359.069.932 which will be charged to all patients of Polyclinic in 2017 that is 82,350 patients, so that each patient will get the cost of spaced-related Rp. 16,500.

(4)Serviced related.

Serviced related costs in the polyclinic will be categorized into new consumable usage costs, electricity costs, water costs, and telephone costs. The overall polyclinic service-related costs can be seen in table 4.7 below:

Table 6 Cost of *Service Related* in Polyclinic of PKU Muhammadiyah Hospital Yogyakarta in 2017

Type of Cost	Cost (Rp)
Cost of Consumable Goods Usage	1.517.741.122
Electricity Cost	1.175.541.558

Telephone Fees	111.008.995
Water Costs	18.373.800
Total Costs	2.822.665.475

According to the table above, the serviced cost is Rp. 2,822,665,475 to be charged to all Polyclinic patients, so that one patient of Polyclinic will get a charge of Rp. 34.276.

After knowing direct resource overhead cost on Polyclinic hence can know the amount of direct resource overhead cost in Emergency Installation (IGD) that is:

Table 7 Cost of Direct Resource Overhead in Polyclinic in PKU Muhammadiyah Hospital Yogyakarta in 2017

Cost of Direct Resource Overhead	Cost
Labour related	23.670
Equipment related	1.183
Space related	16.500
Service related	34.276
Total	Rp 75.629

3) Total of Overhead Cost

After performing calculations indirect resource overhead and direct resource overhead, it can be seen the total cost of overhead on each unit that can be seen in table 8.

Table 8 Total Cost of Overhead in PKU Muhammadiyah Hospital Yogyakarta in 2017

Hospital Unit	Overhead Cost		Total Cost Overhead^(c) (Rp)
	Indirect Resource^(a) (Rp)	Direct Resource^(b) (Rp)	
Polyclinic	18.891	75.629	Rp 94.520

annotations : c=a+b, a= indirect resource, b= direct resource, c= total cost of overhead

a) Overhead costs per polyclinic activity

Based on the calculations that have been done for the cost of indirect resource overhead and direct resource overhead for Polyclinics then the overall overhead cost of Polyclinic is as follows:

Table 9 Charge of Overhead Costs per Polyclinic Activity

<i>Activity Center</i>	<i>First stage cost drivers (Minutes)^(a)</i>	Overhead Costs	
		<i>Indirect Resource Overhead^(c)</i>	<i>Direct Resource Overhead^(e)</i>
Patient Registration	3	886	3.545
Patient Acceptance	3	886	3.545
Patient preliminary examination	5	1.476	5.909
Patient examination by doctor	10	2.952	11.817
Vital sign examination	10	2.952	11.817
Recording the patient medical records	5	1.476	5.909
Echocardiography examination	10	2.952	11.817
Filling the cardiac polyclinic control card	10	2.952	11.817
Filling the follow-up letter of echocardiography action	5	1.476	5.909
Take the patient home	3	886	3.545
Total	64^(b)	Rp 18.891^(d)	Rp 75.629^(f)

Annotation : $c=a*b*d$, $e=a*b*f$, a =time(minutes), b =total time, c = *indirect resource overhead costs* per activity, d = total cost of *indirect resource overhead*, e = *direct resource overhead* cost per activity, f = total cost of direct resource overhead

b) Determine activity centers related to echocardiographic actions in the clinical pathways and charge overhead costs to each activity center in the clinical pathway.

The next stage of the ABC unit cost calculation according to Baker (1998) is to charge overhead to each activity. This can be seen in each of the related units. namely as follows:

Table 10 Cost of Indirect Resource Overhead of Echocardiography in Accordance with the Clinical Pathway

<i>Activity</i>	<i>Number of Transactions^(a)</i>	<i>Second Stage Cost Driver</i>	<i>Indirect Resource Overhead Costs per Activity</i>	
			<i>Unit price^(b) (Rp)</i>	<i>Number of costs^(c) (Rp)</i>
Patient Registration	1	patient	886	886
Patient Acceptance	1	activity	886	886
Patient preliminary	1	activity	1.476	1.476

examination				
Patient examination by doctor	1	activity	2.952	2.952
Vital sign examination	1	activity	2.952	2.952
Recording the patient medical records	1	activity	1.476	1.476
Echocardiography examination	1	activity	2.952	2.952
Filling the cardiac polyclinic control card	1	activity	2.952	2.952
Filling the follow-up letter of echocardiography action	1	activity	1.476	1.476
Take the patient home		Patient	886	886
Total Cost of Overhead				Rp 18.891

Imposing indirect resource overhead costs in the Polyclinic in total based on the trigger of costs, namely time and activity of Rp. 18891. Whereas the imposition of direct resource overhead costs on the polyclinic in total is based on the cost trigger, ie the time and activity can be seen in table 11 below:

Table 11. Direct Resource Overhead Cost of Echocardiography in accordance with Clinical Pathway

Activitiy	Number of Transactions ^(a)	Second Stage Cost Driver	Indirect Resource Overhead Costs per Activity	
			Unit price ^(b) (Rp)	Number of costs ^(c) (Rp)
Patient Registration	1	patient	3.545	3.545
Patient Acceptance	1	activity	3.545	3.545
Patient preliminary examination	1	activity	5.909	5.909
Patient examination by doctor	1	activity	11.817	11.817
Vital sign examination	1	activity	11.817	11.817
Recording the patient medical records	1	activity	5.909	5.909
Echocardiography examination	1	activity	11.817	11.817
Filling the cardiac polyclinic control card	1	activity	11.817	11.817
Filling the follow-up letter of echocardiography action	1	activity	5.909	5.909
Take the patient home		Patient	3.545	3.545
Total Overhead Cost				Rp 75.629

c) Summing up the direct and overhead costs contained in the clinical pathway.

The last stage of cost calculation of Echocardiography treatment unit by ABC method according to Baker (1998) is to add up all the costs that appear which can be seen in table 12 below:

Table 12. Unit Cost of Echocardiography in PKU Muhammadiyah Hospital Yogyakarta in 2017

Cost Structure			Cost (Rp)
Direct cost of Echocardiography			Rp 214.850
<i>Overhead Cost</i>	<i>Indirect Resource Overhead</i>	<i>Direct Resource Overhead</i>	
<i>Overhead Cost of Echocardiography in Polyclinic</i>	18.891	75.629	Rp 94.520
Total Cost			Rp 309.370

From the calculation above, it was obtained that unit cost of Echocardiography treatment in PKU Muhammadiyah Hospital Yogyakarta using ABC method is Rp.309,370.

F. DISCUSSION

From the calculation using Activity Based Costing method above, the unit cost of echocardiography treatment at PKU Muhammadiyah Hospital Yogyakarta using the ABC method is Rp. 309,370. Unit cost of echocardiography treatment consists of:

1. Direct cost in Unit cost Calculation for Echocardiography Treatment

In this research, direct cost were calculated based on Clinical Pathway for the Echocardiography treatment for patients. Clinical Pathway as defined by Queensland Health ClinicalPathways Boards 2002 (Queensland Government, 2012) is a multi-disciplinary patient management plan, includes the steps of a patient's handling from hospital admission to hospital exit. Clinical pathway is a measure of therapy protocol and patient service standard, and a reminder and evaluation tool for patient progress (Wasis and Mugeni, 2012).

The direct cost of Echocardiography treatment is Rp 214,850, which is 69% of the total cost of Echocardiography treatment. The total of overhead costs that more than half (50%) of the total cost is spent on consumables, medicines, echocardiographic checks-up for diagnostic and follow-up.

The largest cost of direct costs is spent on echocardiography examination that is as much as Rp. 136,100 which is about 63% of total direct costs. The amount of money spent on this echocardiographic

examination has been adapted to Clinical Pathway for the echocardiography diagnosis and it has adapted to the the natural history of the disease.

The second largest cost of direct cost is spent on the examination fees of the cardiologist that is Rp. 45,500 or around 6% of total direct costs.

2. Overhead Cost in Unit Cost Calculation of Echocardiography Treatment

The overhead cost of each unit is divided into indirect resource overhead and direct resource overhead. In this research it was calculated at 1 polyclinic unit. The total cost of overhead for echocardiography treatment is Rp 94,520 which consists of indirect resource overhead cost of Rp. 18,891 and direct resource overhead that is Rp. 75.629. The burden of overhead costs is smaller when compared to the direct cost of echocardiographic diagnostic treatment that is 13% of the total cost.

From the calculation in this research, indirect resource cost overhead I is smaller when compared to direct resource overhead cost. This is because the cost of indirect resource overhead will be charged to all the functional units in PKU Muhammadiyah Hospital Yogyakarta so that the cost burden becomes smaller. The direct resource overhead cost will only be borne by the related unit.

3. Unit Cost of Echocardiography Treatment through Calculation of Activity Based Costing, Real Cost of Echocardiography Treatment, and INA-CBG's Tariff at PKU Muhammadiyah Hospital in Yogyakarta

The results of unit cost calculation for echocardiography treatment using Activity Based Costing method is Rp. 309,370 and from the calculation of real cost using the management policy obtained Rp. Rp. 343,000. While the claims from INA-CBG's for patients with echocardiography for type B hospital located in Regional I is Rp. 369.500.

Unit cost calculation for echocardiography treatment with ABC method is Rp. 309,370 with direct costs of Rp. 214,850 and overhead costs of Rp. 94,520 while the Real Cost of PKU Muhammadiyah Hospital was Rp. 343,000 so that a positive cost gap was found in the cost of Rp. 33,630 which means that the Real Cost set by PKU Muhammadiyah Hospital has been able to finance operational costs (direct costs), while the overhead cost is Rp. 94,520 can also be fulfilled from the real cost of the hospital.

Tabel 4. 1 The Price Gap between *Unit Cost ABC*, *Real Cost*, and Tariff of INA CBG Claims for Echocardiographic Care

<i>Unit Cost ABC (Rupiahs)</i>	<i>Real Cost (Rupiahs)</i>	<i>Gap (Rupiahs)</i>	<i>(%)</i>
309.370	343.000	33.630	10
<i>Unit Cost ABC (Rupiahs)</i>	<i>Tariff of INA CBG (Rupiahs)</i>	<i>Gap (Rupiahs)</i>	<i>(%)</i>
309.370	369.500	60.130	16

Real Cost (Rupiahs)	Tariff of INA CBG (Rupiahs)	Gap (Rupiahs)	(%)
343.000	369.500	26.500	7

Based on this research, the tariff of echocardiography treatment at PKU Muhammadiyah Hospital is Rp 343.000, while unit cost calculated based on Activity Based Costing method is Rp. 309,370. The difference of calculation is lower unit cost Rp. 33,630 of hospital fees. The tariff of this hospital is direct cost overhead and indirect resource overhead costs such as electricity, water costs, equipment procurement, building depreciation costs and others that should be charged to patients directly or indirectly related to the patient's treatment. Calculated unit cost component is direct costs and overhead costs, both indirect resource and direct resources which includes the cost of tools and machinery, depreciation costs of machinery and installation, depreciation costs of office furniture, spaced related includes the cost of maintenance and repair of buildings, building depreciation costs non-functional and service-related that include the cost of procurement, office costs and the cost of electricity, telephone costs, water costs and the cost of cleanliness. Each patient will be charged a fee indirectly related to patient during treatment. These are important things to be reevaluated by PKU Muhammadiyah Hospital Yogyakarta about the current tariff, whether it includes direct and indirect costs that should also be charged to the patient. If this is unnoticed and unaccounted for, non-functional units do not have parties to bear so that hospitals can suffer losses.

The price gap between unit costs calculated using the ABC method is Rp. 309,370, while the rate of INA CBGs claimed by BPJS in 2016 for type B class III hospital with echocardiography treatment is Rp. 369.500. So, the price gap is Rp. 60,130 or 16% lower than the tariff of INA CBGs. Unit cost calculated in this study based on clinical pathway in hospital. Clinical pathway can be used as a reference for future financing, so that hospitals do not lose if they have patients with echocardiography treatment. In the year 2017 clinical pathway care of echocardiography has not been used by PKU Muhammadiyah Hospital Yogyakarta, then by knowing the unit cost calculated using ABC method, it expected the Clinical Pathway will be used. PKU Muhammadiyah Hospital Yogyakarta should update and look at the components on clinical pathway, because based on observations from clinical pathway researchers with echocardiographic care, this can not be used if patients with other disease complications. This will be significantly different in number of its CBAs INA rates if the diagnosis listed with complications or not. This can be an input to PKU Muhammadiyah Hospital Yogyakarta for its future clinical pathway that has been made to be enforced so they can get effective cost with the maximum treatment.

Unit cost calculation results using the ABC method can provide information about cost calculations that are more accurate, so it can be used by management in determining the rates of products or services offered by

the hospital. Moreover, it can also be used to make accurate decisions in cost budgeting and planning. The reimbursement of insurance claims from BPJS is in accordance with the type of hospital and the diagnosis of the patient, whether the patient diagnosis used is primary or secondary diagnosis. Accordingly, the coding problem also greatly affects the claims of the BPJS.

According to M Panella et al (2013), the purpose of the clinical pathway is to improve outcomes by improving the care coordination mechanism and reducing costs, which in turn will have a positive impact on the quality of health services. The enforcement of clinical pathways in health services is absolutely necessary because it is a standard protocol for treatment of diseases so that it expected to be maximum patient care with effective cost. The Sakir Muhammadiyah Hospital Yogyakarta has not used echocardiographic in his clinical pathway until 2017. Hope this research can be used as a reference for the implementation of clinical pathway in 2018.

G. CONCLUSION AND RECOMMENDATION

1. Conclusion

The results from this study are:

- a. From the results of this study obtained the data as follows:
The cost of direct expenses on echocardiography treatment at PKU Muhammadiyah Hospital Yogyakarta is Rp 214,850
- b. Unit cost of Echocardiography treatment using Activity Based Costing method in PKU Muhammadiyah Hospital Yogyakarta is Rp 309,370.
- c. The calculation of unit cost of echocardiography treatment using Activity Based Costing method is Rp. 309,370 and the calculation of real cost using management policy is Rp. Rp. 343,000. While, the claims of INA-CBG's for patients with echocardiography for type B hospital located in Regional I is Rp. 369,500.

2. Recommendation

- a. For PKU Muhammadiyah Hospital, Yogyakarta

The management needs to take control over the implementation of Clinical Pathways at the Hospital, it needs a special team for evaluating and monitoring, so the implementation of the Clinical Pathway can be effective and for cases that do not have a Clinical Pathway, can be made immediately and can be implemented especially the Clinical Pathway for echocardiographic problems.

- b. For the next researcher

You need to do a similar research with different cases, which which lead to evaluate the cost-matching between the costs applied by the hospital and the replacement rate based on INA-CGB's especially for echocardiographic treatment with complications because the treatment costs vary greatly, and it potentially causing losses to the Hospital.

3. Limitations of this research

There are limitations in this research, the first is this research is based on one sample; the second is the sample is case study, so that the result of this research may differ from other hospitals.