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ANALYSIS OF UNIT COST USING ACTIVITY BASED COSTING (ABC) METHOD, HOSPITAL TARIFFS, INDONESIAN CASE BASE GROUPS (INA-CBGS) TARIFFS AND COST RECOVERY RATE AS A BASIS FOR COST CONTAINMENT STRATEGIES IN HEMODIALYSIS SERVICES AT X HOSPITAL, INDONESIA

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Abstract

The coverage of the National Health Insurance (NHI) programme in Indonesia by Badan Penyelenggara Jaminan Sosial (BPJS) Kesehatan, which reaches 90% of the total population in Indonesia, has a significant impact on health services in Indonesia. With the NHI, hospitals must face changes in the payment system from fee for service to payment with Indonesian Case Base Groups (INA-CBGs) tariff claims. This is a challenge for hospitals, especially in catastrophic disease services that require long treatment and expensive costs. X Hospital as a class B hospital also provides catastrophic disease services, one of which is haemodialysis services for patients with chronic renal failure. Pricing at X Hospital still follows tariffs from surrounding hospitals and has never conducted a unit cost analysis. So it is necessary to conduct a unit cost analysis to determine the hospital's cost recovery rate (CRR) and as a basis for develop cost containment strategies. This study aims to analyse the cost recovery rate (CRR) of hemodialysis services at X Hospital in Makassar, Indonesia, using unit cost analysis, hospital tariff and INA-CBGs tariff as a basis for cost containment. This is a mix-method, quantitaive-qualitative study with an exploratory sequential design. Quantitative data in this study used descriptive analysis to determine unit cost using the Activity Based Costing (ABC) method and calculate the CRR of X Hospital's haemodialysis procedure in 2023. Qualitative data uses content analysis of the results of observations, in-depth interviews and focus group discussions from the research subjects. The results showed that unit cost analysis using the ABC method had a result of IDR 1,163,240, which was greater than hospital tariff and INA-CBGs tariff with a CRR of 80.82%. The implementation of cost containment is generally going well, except that the informants' knowledge of costs is still lacking and the implementation of cost incentives has not been implemented. The strategies proposed by the research subjects to optimize the CRR of haemodialysis procedures include re-evaluating joint cooperation with third parties, adjusting hospital tariffs, increasing the number of actions and efficiency of consumable medical materials, drugs, laboratories. It can be concluded that X Hospital must immediately analyse all unit costs for each service, adjust the new tariff, implement the planned cost containment strategy and socialize it to every staff in the hospital.

Keywords: Unit Cost, Hospital Tariff, Indonesian Case Base Groups Tariff, Cost Recovery Rate, Cost Containment, Activity Based Costing.

INTRODUCTION

Along with the development of human civilization and advances in science and technology, especially in the health sector, hospitals as health services providers must deliver a high quality of health services for the community. The challenge for hospitals is to deliver comprehensive services at competitive prices, in response to the increasing public demand for health services.[1]

The implementation of the National Health Insurance Program (NHI) organised by Badan Penyelenggara Jaminan Sosial (BPJS) Kesehatan has had a significant impact on health services in Indonesia. With the introduction of NHI, hospitals have transitioned from a fee-for-service (FFS) payment mechanism to a claims mechanism based on Indonesian Case Base Groups (INA-CBGs). This disease grouping system is based on the same clinical features and resources used in medicine. This section on health financing and health insurance provision through a prospective payment model is implemented to ensure high-quality service for patients and standard tariffs for hospitals. The tariff, based on costing data and disease coding using the International Classification of Diseases (ICD) compiled by the World Health Organization (WHO), is intended to cover all hospital costs. The diagnosis is made using ICD-10, which includes 14,500 codes, and ICD-9 Clinical Modifications, which includes 7,500 codes. [2], [3]

The determination of the INA-CBGs Tariff is a well-established process that begins with the calculation of unit costs (UC) by the Ministry of Health's Tariff Team. We analysed several selected hospitals for basic data and hospital costing data. The INA-CBGs tariffs are the average cost required for a detailed diagnosis group for hospital regions, hospital classes, and hospital ownership (public or private). The development of standardized hospital services with financing or payment will be able to provide many benefits for patients, health service providers and funders. [3]

By March 1st, 2023, NHI coverage had reached almost 90% of Indonesia's total population. This represents a significant opportunity for hospitals in the country to expand their services and improve healthcare access for all Indonesians. Hospitals will benefit from the NHI program if they effectively adjust to the INA-CBGs rates, resulting in a positive difference in claims. Efficient services are crucial to achieving this outcome, otherwise their financial management could be threatened if the difference is negative. [2]

Catastrophic diseases require prolonged and expensive medical treatment, making them the most expensive health service claims. In 2020, BPJS Kesehatan paid for 19.9 million catastrophic cases, costing IDR 20.0 trillion, which accounted for 25% of the total health service claims that year. Heart disease occupies the largest proportion of catastrophic financing at 49%, followed by cancer at 18%, stroke at 13%, kidney failure at 11%, thalassaemia, hepatic cirrhosis, leukaemia, and haemophilia.[4]

The Indonesian Renal Registry (IRR) data shows a consistent increase in the number of hemodialysis patients every year since 2007, from 4,977 patients to 66,433 patients in 2018. The Ministry of Health's data up until 2022 reveals that 6 million people in Indonesia are suffering from chronic kidney failure, with 100,000 of them undergoing hemodialysis. Hemodialysis is a highly effective kidney replacement therapy that expertly removes uremic toxins and regulates body electrolyte fluids in patients with chronic kidney disease. This therapy is performed using specialized equipment and can be safely administered 2-3 times a week for patients with chronic kidney failure.[5], [6], [7]

X Hospital is a class B hospital located in Makassar, Indonesia. It offers hemodialysis services for patients with chronic kidney failure. X Hospital determines its tariffs based on those of similar hospitals. While it may seem convenient to ignore unit costs due to the large number of service actions carried out in the hospital, doing so can potentially cause financial losses. Instead, hospital should conduct detailed unit cost calculations

to ensure quality control and cost containment. In 2022, there were 1,206 outpatient hemodialysis cases at the hospital, with a notable negative claim difference of IDR 317,096,837 for hemodialysis, according to pre-research data from the hospital's casemix section.

Accurately calculating unit costs is crucial when determining service rates. Calculating the cost recovery rate (CRR) of services is also essential in determining hospital profitability. An ideal hospital organization has a CRR greater than 1 or 100%, indicating profitability. A CRR equal to 1 or 100% means that the organization has not made a profit as the income obtained is the same as or less than the costs incurred. Calculating service costs is crucial for determining the exact amount required. Unit costs and cost recovery rates are essential for hospital management to develop cost containment strategies. [1], [8]

There are several methods that can be used to carry out unit cost analysis. Activity Based Costing (ABC) is considered the best method for cost analysis in some contexts because it provides a more accurate and detailed picture of the actual use of resources and costs for each activity or product. ABC helps hospitals to price products or services more accurately. By understanding costs in more detail, hospitals can set prices that cover true costs and generate desired profits.

MATERIAL AND METHODS

Study Design

This study aims to analyse the cost recovery rate (CRR) of hemodialysis services at X Hospital in Makassar, Indonesia, using unit cost analysis, hospital tariff and INA-CBGs tariff as a basis for cost containment. The research used a combination of quantitative and qualitative methods with an exploratory sequential design. The first step of the quantitative research involved identifying the activities that incur costs in hemodialysis services at X hospital during the period January-December 2023, and then calculating the unit costs using the Activity Based Costing (ABC) method. The result of the unit cost calculation were compared with the INA-CBG tariff and the hospital tariff for hemodialysis service, and was also used to determine the cost recovery rate (CRR). Qualitative research was conducted through observations and in-depth interviews with hemodialysis unit staff related to the implementation of cost containment in X hospital. This was followed by a focus group discussion (FGD) with hospital management to develop cost containment strategies to optimise the cost recovery rate (CRR).

Data Analysis

The quantitative analysis in this study used descriptive analysis by searching documents on hemodialysis costs, then unit costs were analysed using the Activity Based Costing (ABC) method and compared with the INA-CBGs tariff and the hospital tariff. In addition, the unit cost data analysed is used to calculate the cost recovery rate (CRR). Data are presented in the form of calculation results, tables and narratives.

Content analysis began with the use of qualitative data from observations, in-depth interviews and focus group discussions (FGDs) related to cost containment in the form of text, then conjecture according to the researcher's thinking. This was followed by coding and interpretation of the findings in the form of explanation or description.

To visualise the results of the analysis, the researcher used the NVIVO 14 application in the form of project maps.

Ethical Considerations

This study received ethical approval from the Health Research Ethics Committee, Faculty of Public Health, Hasanuddin University on 27 December 2023, number: 6392/UN4.14.1/TP.01.02/2023.

RESULTS

Several steps are taken to analyse unit costs using the Activity Based Costing (ABC) method, including activity identification, direct cost identification, overhead cost identification, and the final step of adding direct and overhead costs to obtain the unit cost value. The activity centre of haemodialysis treatment was obtained from the Standard Operating Procedure (SPO) document of the haemodialysis unit of X hospital and confirmed by interviews with the supervising specialist, the performing doctor and the performing nurses, as well as by direct observation during the service to patients.

Table 1: Activity Centre of Hemodialysis Service

Activity Centre	*First Stage Cost Driver (Minutes)*	*Second Stage Cost Driver (Numbers of actions)*
Patient Preparation Stage		
Patient Registration	1	Numbers of actions
Body Weight Check	0,5	Numbers of actions
Anamnesis, Physical Examination, Vital Signs and Patient Evaluation	2	Numbers of actions
Nurse Preparation Stage		
Personal Protective Equipment (PPE) Usage and Handwashing	1,5	Numbers of actions
Hemodialysis Machine Preparation Stage		
Switching on the Hemodialysis Machine	1	Numbers of actions
Installing a bed side monitor	2	Numbers of actions
Putting the tube on the infusion	1	Numbers of actions
Filling 0.9% Sodium Chloride to extra corporeal fluid	2	Numbers of actions
Connecting the dialyser to dialysate	8	Numbers of actions
Vascular accessing to the patient	5	Numbers of actions
Programming the machine (for 4 hours)	1	Numbers of actions
Hemodialysis Process Stage		
Hemodialysis Process	240	Numbers of actions
Patient observation (vital signs, vascular access, and machine)	5	Numbers of actions
Removing the vascular access from the patient	1	Numbers of actions
Body Weight Check	0,5	Numbers of actions
Rinsing the machine with disifectant liquid and water in the engine circulation	30	Numbers of actions
Switching off the Hemodialysis Machine	1	Numbers of actions
TOTAL ACTION TIME	**300**	

From the activity centre table above, it can be concluded that haemodialysis services at hospital X can generally be divided into 4 stages, namely patient preparation, nurse preparation; haemodialysis machine preparation and haemodialysis process.

As additional data, it is known that the number of haemodialysis procedures in hospital X in 2023 was 3,787 procedures.

Direct Tracing aims to identify the direct costs of activities that involve the consumption of products or services and only appear when there is activity.

Table 2: Total Direct Costs of Hemodialysis Service

Cost Type	Cost (IDR)	Proportion (%)
Doctor & nurse's service fee	2,00,436	22.44
Medical consumables materials	5,85,775	65.57
Medicines	98,958	11.08
Laboratories	8,222	0.92
Total Direct Costs	**8,93,391**	**100**

From Table 2 above, it can be seen that the direct cost of haemodialysis at X Hospital was IDR 893,391 per procedure. These costs consist of the service fees of doctors and nurses, single use consumable medical materials from operational cooperation with third parties, drugs and laboratories that are routinely given to haemodialysis patients without indications.

Overhead costs are additional or miscellaneous costs that are not directly related to health care activities. Overhead costs are made up of direct resource overhead and indirect resource overhead costs, each of which is divided into four cost categories: labour, equipment, space and service related. Direct resources overhead costs are additional or other costs in the hemodialysis unit of X Hospital that are not directly related to the hemodialysis services.

Table 3: Direct Resource Overhead Costs of Hemodialysis Service

Cost Type	Cost (IDR)
LABOUR RELATED	
Employee Costs	34,34,35,200
EQUIPMENT RELATED	
Machine Maintenance and Repair	0
SPACE RELATED	
Building Maintenance	2,15,00,000
SERVICE RELATED	
Electricity	1,28,37,930
Medical waste	1,28,75,800
Water	69,87,015
Total *Direct Resource Overhead* Cost	**39,76,35,945**
Total *Direct Resource Overhead* Cost per Procedure	**1,05,000**

Based on Table 3 above, it can be concluded that the total direct resource overhead cost of the haemodialysis unit at X Hospital in 2023 was IDR 397,635,945. This cost is then allocated to each haemodialysis procedure by dividing this cost by the total number of haemodialysis procedures in 2023. This resulted in a cost of IDR 105,000 per procedure.

The cost of indirect resource overheads is the cost of non-functional (non-revenue) units that will be charged to the haemodialysis unit according to the proportion of the haemodialysis unit's revenue to the total revenue of X Hospital in 2023.

Table 4: Proportion of X Hospital Revenue in 2023 Based on Units

Unit of Revenue	Revenue	Proportion Revenue (%)
Inpatient Unit	42,074,242,160	29.43
Outpatient Unit	28,286,772,737	19.79
Operating Room	22,116,072,151	15.47
Emergency Room	1,390,061,300	0.97
Maternity Room	691,484,569	0.48
Hemodialysis Unit	**3,560,438,200**	**2.49**
Medical Rehabilitation Unit	1,511,929,000	1.06
Medical Support Unit	8,039,955,763	5.62
Non-medical Support Unit	4,588,346,000	3.21
Others (Medicine, Medical Equipment,Services, Covid)	30,701,250,578	21.48
TOTAL REVENUE	**142,960,552,458**	**100.00**

Table 5: Indirect Resource Overhead Costs of Hemodialysis Service

Cost Type	Cost (IDR)
LABOUR RELATED	
Employee Costs	9,377,000,000
Education and Training	175,761,000
EQUIPMENT RELATED	
Inventory Procurement	9,565,640,445
Tool Maintenance and Repair	430,907,630
Vehicle Maintenance	97,843,500
SPACE RELATED	
Building Maintenance	606,161,337
SERVICE RELATED	
Electricity	2,362,334,400
Water	977,936,190
Phone/Internet	286,159,780
Stationery and Household Equipment	1,191,799,210
Total Indirect Resource Overhead Cost	**25,071,543,492**
Indirect Resources Overhead Cost for Hemodialysis Unit	**624,281,433**
Indirect Resources Overhead Cost per Procedure	**164,849**

Based on the table 4 and table 5 above, it can be concluded that the total cost of indirect resource overheads for non-functional units in X Hospital in 2023 was IDR 25,071,543,492.

These costs were charged to the haemodialysis unit according to its revenue share of 2.49%, and then to each procedure performed in the haemodialysis unit in 2023. This resulted in a cost of IDR 164,849 per procedure.

Table 6: Total Overhead Costs of Hemodialysis Service

Cost Type	Total (IDR)
Direct Resources Overhead Cost	105,000
Indirect Resources Overhead Cost	164,849
TOTAL *OVERHEAD* COSTS	**269,849**

After knowing the direct resource overhead cost and the indirect resource overhead cost, the total overhead cost is obtained by adding the two costs, resulting in IDR 269,849, which can be seen in the table 6 above.

Table 7: Total Unit Cost of Hemodialysis Service

Cost Type	Total (IDR)	Proportion (%)
Direct Costs	893,391	76.80
Overhead Costs	269,849	23.20
TOTAL *UNIT COST*	**1,163,240**	**100.00**

The final step in analyzing unit costs using the ABC method is to add up all costs, both direct costs and overheads. The calculation is shown in the table 7 above. So, it can be concluded that the unit cost of haemodialysis at X Hospital Makassar is IDR 1,163,240 per treatment.

Table 8: Comparison of ABC Method's Unit Cost, Hospital Tariff and INA-CBGs Tariff for Hemodialysis Service in 2023

ABC Method Unit Cost	Hospital Tariff	INA-CBGs Tariff
IDR 1,163,240	**IDR 1,035,000**	**IDR 950,500**
Difference with Unit Cost	**-IDR 128,240**	**- IDR 212,740**

Table 8 above shows the comparison of the ABC method unit cost of haemodialysis service at X hospital with the hospital tariff and the INA-CBGs tariff. It can be seen that there is a negative difference of IDR 128,240 between the ABC method unit cost with the hospital tariff, while when it is compared with the INA-CBGs tariff, there is a negative difference of IDR 212,740.

It is known that the total revenue of the haemodialysis unit in 2023 was IDR 3,560,438,200, while the total cost of haemodialysis procedures calculated using the ABC method in 2023 was IDR 4,405,188,311. Thus, the cost recovery rate of haemodialysis (CRR) in 2023 can be obtained by the following values:

$$Cost\ Recovery\ Rate\ (CRR) = \frac{Total\ Revenue}{Total\ Cost} \times 100\%$$

$$CRR = \frac{3{,}560{,}438{,}200}{4{,}405{,}188{,}311} \times 100\% = \mathbf{80.82\%}$$

From the calculation, the CRR result is 80.82%, which means that the cost recovery rate for haemodialysis treatment is still below the ideal value (>100%). This result shows that X Hospitals's revenue still unable to cover the hospital's costs for haemodialysis procedure in 2023.

To analyse the implementation of cost containment, in-depth interviews and observations were conducted to assess cost awareness, cost monitoring, cost management and cost incetive efforts in the haemodialysis unit of X hospital.

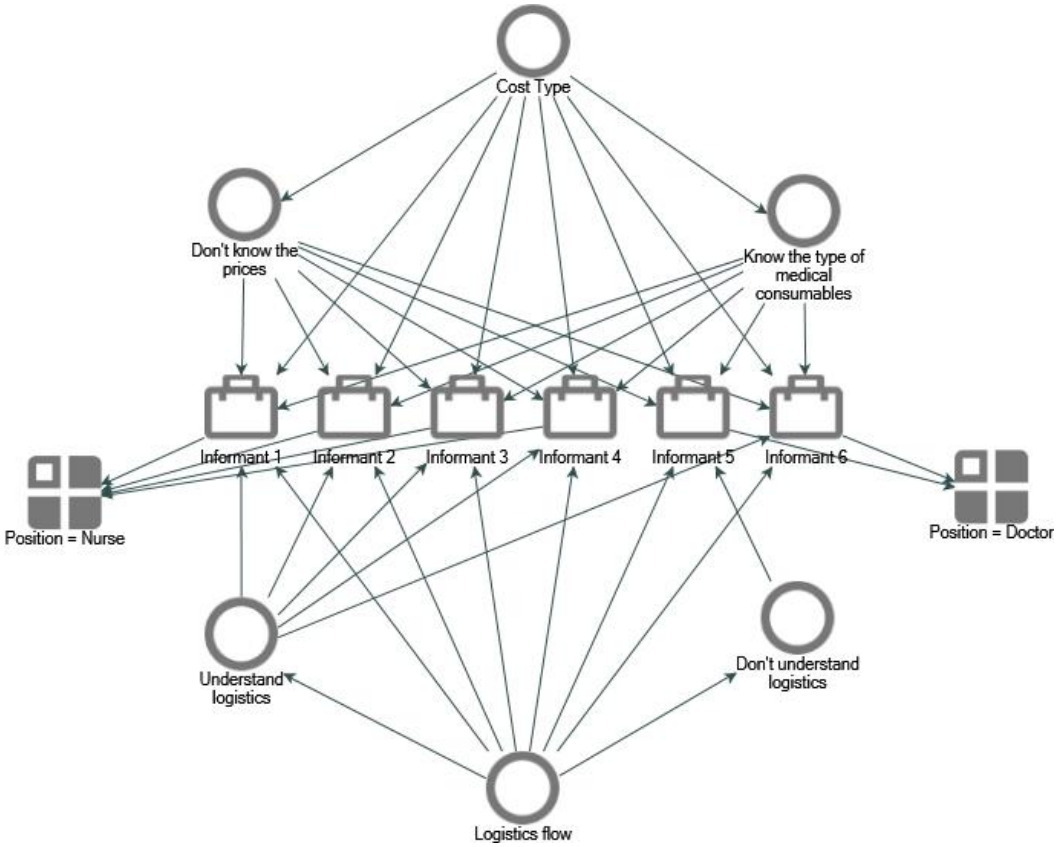

Figure 1: Project Map of Cost Awareness Implementation

Figure 1 above shows that the informants' knowledge of costs is still lacking. They only know the types of medical consumable materials used in haemodialysis procedures, but not the exact price of the materials used, including drugs. Regarding their understanding of the logistics flow, 5 out of 6 informants had a good understanding of the logistics flow of tools and materials that used for haemodialysis procedure. Only 1 informant works as a doctor who does not know the logistics flow.

Table 9: Observation Results of the Implementation of Cost Awareness in the Hemodialysis Unit of X Hospital

Cost Awareness		
Num	**Events**	**Results**
1	Not using the phone for chatting/personal purposes	Yes
2	Putting the receiver down tightly after using it	Yes
3	Not letting water run over after using the toilet	Yes
4	There are rotating tasks to control the water	No
5	Switch off the electricity immediately after using the electricalappliance	Yes
6	Not leaving the lights on 24 hours	Yes
7	There is an awareness to switch off the electricity if a colleagueforgets.	Yes
8	There is a rotating task to switch off the lights	No
9	Using consumables as indicated	Yes
10	Not doing other things (chatting, eating, watching) while working	Yes
11	Not leaving the work site during working hours	Yes
Observation Percentage of *Cost Awareness* Implementation		**81.82%**

In order to assess the attitude of the haemodialysis unit staff at X Hospital, observations were made using the items in Table 9 above, and the results yielded a percentage value of 81.82%.

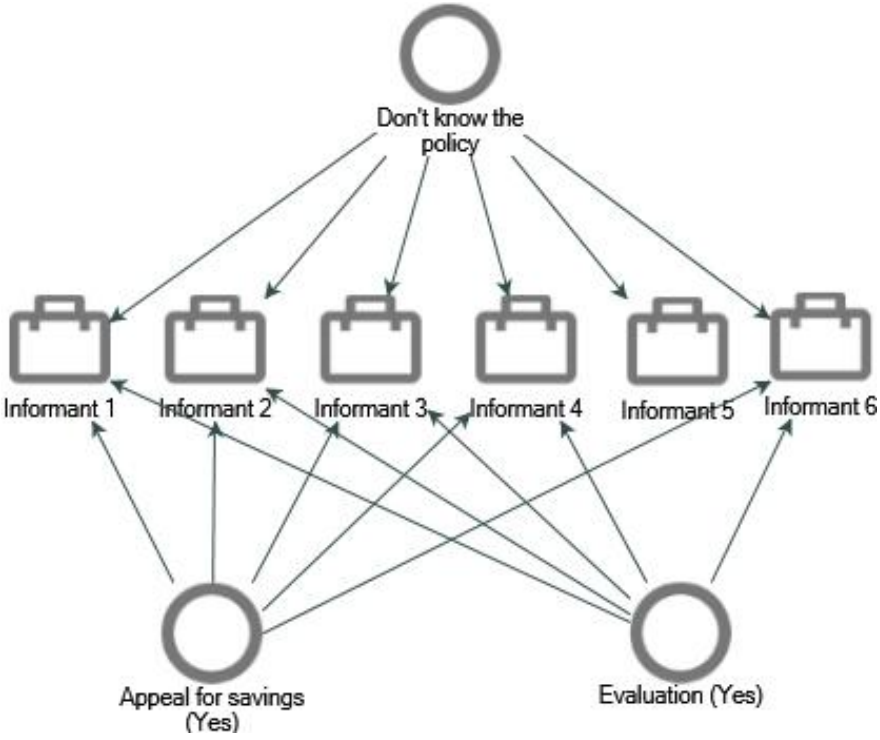

Figure 2: Project Map of Cost Monitoring Implementation

From Figure 2 above, it can be concluded that all informants were not aware of a written policy for cost savings, but stated that there was an appeal for savings from management and an evaluation of the costs incurred.

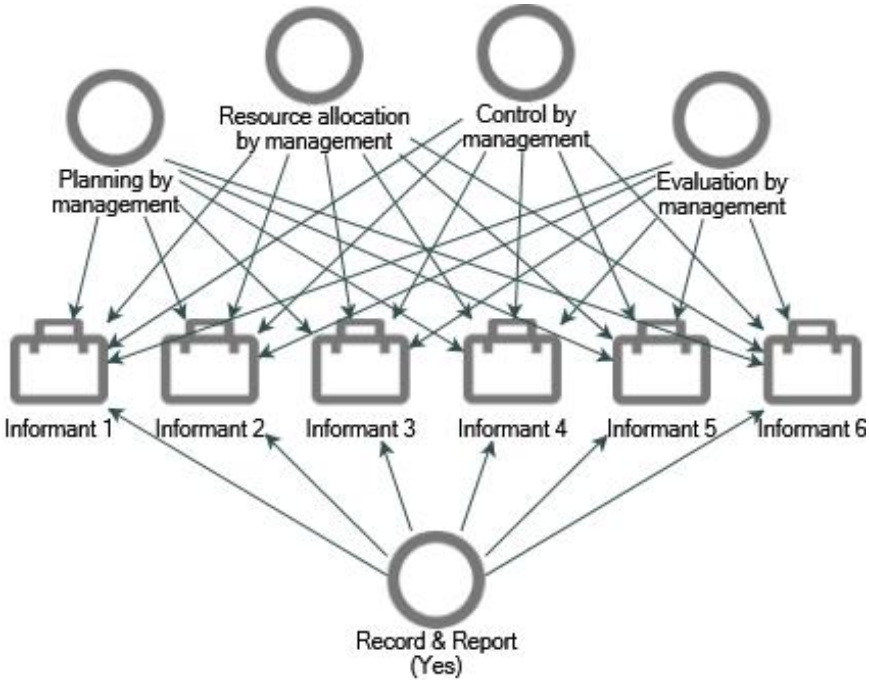

Figure 3: Project Map of Cost Management Implementation

Based on Figure 3 above, it can be concluded that the management process of budget planning, resource allocation, cost control and cost evaluation is carried out by management. The implementation process in the form of recording is carried out daily by each unit, including the haemodialysis unit, and reported monthly to management.

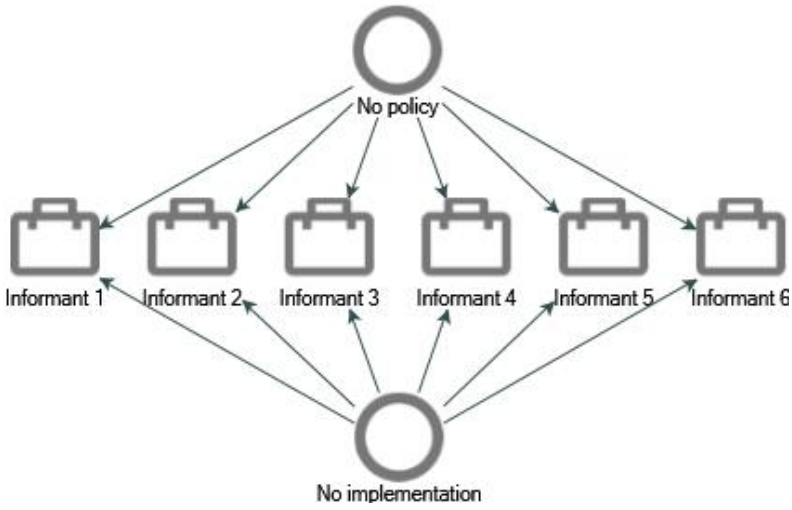

Figure 4: Project Map of Cost Incentive Implementation

Figure 4 shows that all informants from the in-depth interviews said that the policy or implementation of providing incentives for staff who save costs does not yet exist in X hospital. It can therefore be concluded that hospital X has not implemented cost incentives.

After analysing unit costs, cost recovery rate (CRR), interviews and observing the implementation of cost containment in X Hospital, the researchers then held a Focus Group Discussion (FGD) with the management of X Hospital to develop the cost containment strategies to optimise the CRR value. The FGD began with a presentation of the research findings on the negative difference between the unit costs analysed using the ABC method with the hospital and INA-CBG tariff.

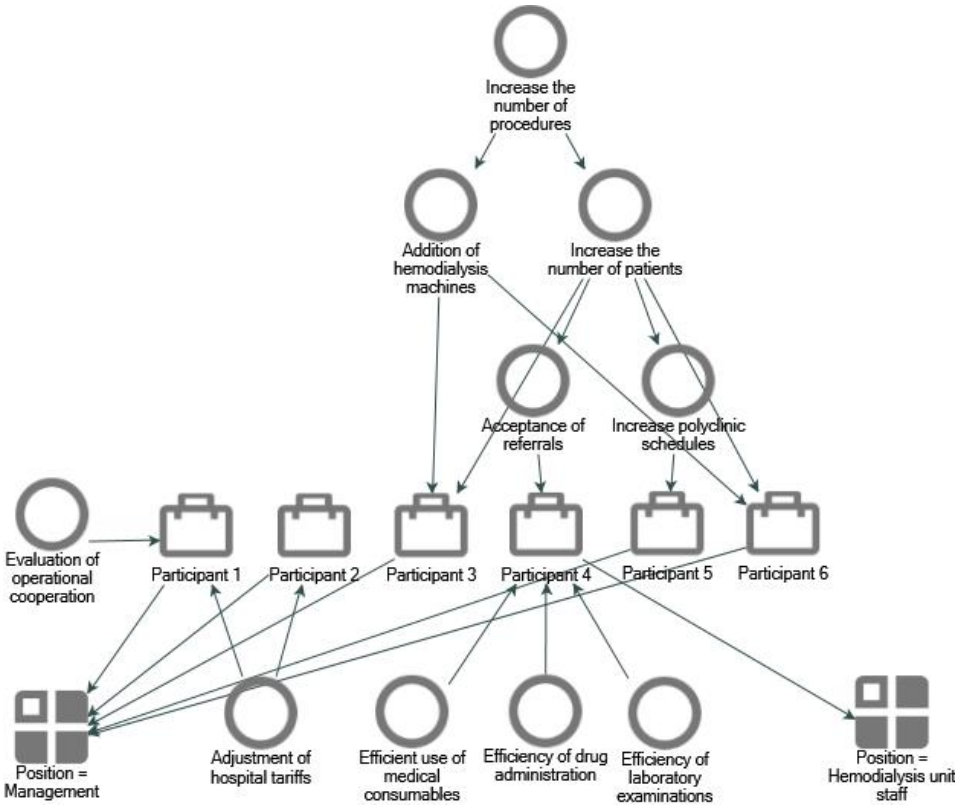

Figure 5: Project Map of Cost Containment Strategies for Hemodialysis Service

On the basis of Figure 5 above, it is possible to identify several cost containment strategies proposed by the participants. From the results of the unit cost analysis, it is known that the direct costs of haemodialysis are high. Therefore, one of the participants suggested to minimise these costs, such as medical consumables, drugs and laboratory costs. The efficiency of medical consumables can be applied to patients who undergo haemodialysis with a short duration, so that there are several types of materials that are left over and can still be reused. The efficiency of drug administration and laboratories can be moved by educating patients so that drug administration and laboratory tests can be done through consultation with the nephrologist in the outpatient clinic.

The next suggestion is to set a new hospital tariff for haemodialysis procedures and to re-evaluate the joint operation with the third party to see if it needs to be negotiated or replaced. The last suggestion is to increase the number of haemodialysis procedures for one year, so that the overhead cost sharing is greater and the cost per procedure can be reduced. The number of procedures can be increased by increasing the number of patients and increasing the number of haemodialysis machines.

DISCUSSION

Unit cost is the total cost charged to carry out a production activity or to produce a certain service or activity divided by the number of units of the product or service produced. Costs calculated as unit costs include costs for treatment, doctor services, supporting examinations, drugs, and any indirect costs that support the services.[8], [9] Hospital cost analysis is a dynamic process often referred to as cost finding, which means: the allocation of costs between services that do not produce revenue and others, and the calculation of services that require acceptance with the results of services in each service field.[10] Hospital management really needs complete information of unit cost to ensure that hospitals can continue to provide quality services and survive in the face of intense competition. This information will be useful in financial decisions, financial control, and tariff setting.[8], [10]

The results of the study showed that the unit cost of haemodialysis at X Hospital, analysed using the Activity Based Costing (ABC) method, was IDR 1,163,240. This value was found to be higher than the hospital and INA-CBGs tariffs, with a negative difference of IDR 128,240 for the hospital tariff and IDR 212,740 for the INA-CBGs tariff. The results of this study are in line with previous studies[11], [12], [13], [14] Although there is a positive difference with the applicable hospital tariff in one of the previous studies, this result is still likely to have an impact on hospital finances, as most patients receiving haemodialysis services are NHI participants.[11] This situation will certainly affect the financial health of the hospital, as the haemodialysis unit has not been able to generate profits that can cover the operating costs incurred.

Several factors can affect the unit cost of haemodialysis treatment include direct costs, overhead costs and number of procedures. The direct costs of haemodialysis were IDR 893,391. These direct costs strongly influence the unit cost of haemodialysis treatment, as they are not divided by the number of procedures. Direct costs consisted of service fees, medical consumable materials (MCMs), routine drugs and non-indicated laboratories. The cost of CMMs was the highest, amounting to IDR 585,775 or 65.57% of the total direct costs. It is divided into MCMs of haemodialysis machine joint operation with a third party and other MCMs of IDR 83,500. Thus, during the

contract for the joint operation of haemodialysis machines, the hospital is obliged to use MCMs from this third party. In the next order, the proportion of direct costs for services was 22.44% for doctors' and nurses' services, 11.08% for drugs and 0.92% for laboratories. This proportions are in line with previous studies that hemodialysis MCMs have the highest proportion in the direct cost: 62%[13], 61.98% [11], 51.76%[14]. Therefore, based on the above data, the choice of a third party haemodialysis machine is one of the most important things to consider. This is not only related to the quality of the machine, but also to the price of the CMMs offered. This also applies to the choice of other MCMs suppliers and the drugs used.

Overhead costs consist of direct overhead costs and indirect overhead costs, each of which is divided into 4 categories, namely labour-related, equipment-related, space-related and service-related. In this study, both direct and indirect overheads have a high proportion in the labour-related category. These labour costs consist of salaries, benefits, education and training costs. X Hospital, being a government hospital, has a large number of employees, namely 892 employees who receive salaries. So this is one of the things that affects the high value of overhead costs. The results of this study are similar to previous studies [11], [13], [15] Indrianty Sudirman (2020) also states that government hospitals tend to have high overhead costs due to high salary costs due to the large number of permanent employees.[16] Efforts to reduce labour-related costs include evaluating the number of employees in each facility and conducting workload analyses. In addition, even if the hospital has a large number of employees, efforts can still be made to reduce costs, for example by increasing the efficiency of other costs and increasing the utilisation of haemodialysis treatments.

This study found that the number of haemodialysis procedures recorded in X Hospital in 2023 was 3,787. This number is only 50.57% of the total maximum treatment capacity (7,488 procedures per year). The maximum value that should be reached in one year for regular dialysis services with the current capacity of 12 haemodialysis machines and two shifts per day for 6 working days. The number of haemodialysis treatments per year should be increased, so that the divisor value of each overhead cost is higher, making the total overhead cost lower. Socialisation and promotion by the marketing team can be one way of increasing the number of procedures. Previous research has shown that there is a relationship between the marketing mix and patient satisfaction, which is measured by the number of patient visits to the hospital. Therefore, hospitals need to improve their marketing strategies to increase the number of haemodialysis patients.[15], [17]

The cost recovery ratio (CRR) is the degree to which a business unit is able to recover its costs in a given period. In hospitals, CRR aims to determine how much hospital revenue can cover the costs incurred by the hospital, using the formula for the ratio of total revenue to total costs. An organisation is said to be ideal if its CRR is > 1 or >100%.[8], [18], [19] Based on the results of the study, the cost recovery rate (CRR) for haemodialysis treatment at X Hospital in 2023 was found to be 80.82%. These results are consistent with several previous studies with CRRs still below the ideal value (21.74%[12], 71.38%[1], 95.97%[11]).

Cost containment is an effort to keep costs at a reasonable level without compromising the quality of service. Cost containment in hospitals does not only aim to save costs that have to be incurred, but rather to change the perception or awareness of the need for cost containment itself for the future of the hospital. [10], [20] There are several

techniques and methods for organising and implementing a cost containment programme. In general, there are 4 stages to cost containment: cost awareness[10], [20], [21], [22], [23], cost monitoring[10], [24], cost management[10] and cost incentive[10], [25].

From the assessment of the implementation of cost awareness in this study, it can be concluded that the level of knowledge and understanding of costs is quite good for some informants, but still lacking for others. The attitude of the staff of the haemodialysis unit of X Hospital towards cost awareness is good. Previous studies have stated that cost awareness is the most important component of cost containment efforts and needs to be applied to all human resources in the hospital.[25] Others stated that training and seminars can be used to increase staff awareness.[26] Educating staff on the cost of production is important and aims to reduce/eliminate waste.[27]

The results of the interviews with the informants of cost monitoring showed that all informants were not aware of a written policy for cost savings, but stated that there was an appeal for savings from management and an evaluation of the costs incurred. This is in line with previous research which found that it was unknown whether many policies existed or not.[28] As an input for management similar to cost awareness, it is better to socialise the cost monitoring policy.[27]

The cost management process begins with cost budget planning, resource allocation, recording implementation, control in the form of implementation and evaluation. From the results of interviews with informants, it was found that planning, allocation, control and evaluation were fully carried out by the management. The implementation of recording was carried out by the staff of the haemodialysis unit of X hospital. This finding is consistent with previous research. The staff in these units had never been involved in budget planning, so there was still a lack of understanding of the cost control process.[29]

It was found that all informants stated that there was no policy or incentive from management for those who were successful in making cost savings. So far, what has been received from the hospital are fees for services for doctors, incentives for services for nurses are given as a percentage according to hospital policy. It is necessary to review the incentive structure to improve a cost awareness culture.[30]

Based on the results of the FGD with the management, some of the strategies suggested by the participants to optimise the CRR of haemodialysis procedures are reassessing joint operation with third parties, adjusting hospital tariffs, efficiency of medical consumables, efficiency of drugs, efficiency of laboratory tests and increasing the number of procedures. Increasing the number of procedures can be done by increasing the number of patients and adding more haemodialysis machines. Patient growth will be achieved through referrals and outpatient nephrology services. In general, the participants' suggestions were similar to those suggested by previous research to optimise the CRR of haemodialysis procedures.[11], [13]

CONCLUSIONS

In conclusion, this study aims to analyse unit costs using the ABC method, comparing unit cost results with the hospital and INA-CBGs tariff. Then, cost recovery rate (CRR) analysis and cost containment implementation were conducted. These results were then conducted Focus Group Discussion (FGD) to develop cost containment

strategies to optimise the CRR of haemodialysis procedures at X hospital. The results of the study obtained a unit cost of IDR 1,163,240. This value was found to be greater than the hospital and INA-CBGs tariff with a negative difference of IDR 128,240 at the hospital tariff and IDR 212,740 at the INA-CBGs tariff. So that the cost recovery rate (CRR) for haemodialysis procedures in 2023 has a value of 80.82%. This value is still below the ideal value (>100%) so it can be concluded that hospital revenue is not able to cover the costs incurred by the hospital to carry out haemodialysis procedures in 2023. The implementation of cost containment in Hospital X generally runs quite well, except for the implementation of cost incentives on staff who managed to save which has not been implemented. In general, haemodialysis unit staff have a good attitude in saving costs, but they do not know exactly the price of each type of cost and the cost control policy that applies in the hospital because it is implemented by management. So it is recommended that there is socialisation about costs and cost control in every staff in the hospital. From the results of FGD with management, some of the strategies proposed by participants in optimising the CRR of haemodialysis procedures are evaluation of joint operation with the third party, adjustment of hospital tariffs, efficiency of consumable medical materials, efficiency of drugs, efficiency of laboratory tests and increasing the number of procedures. Increasing the number of procedures can be done by increasing the number of patients and adding more haemodialysis machines. Increasing the number of patients is done through accepting referrals and outpatient services with nephrologists. The researchers suggest that Hospital X should immediately analyse all unit costs of each service, adjust the new tariff, implement the planned cost containment strategy and communicate it to all staff in the hospital. Future research is expected to conduct unit cost analysis for more services. FGD can still be conducted because different services require different cost containment approaches.

Limitations of the Study

There are several limitations of the research experienced, including the data collection process which is quite long because it uses the latest year data and qualitative data collection such as interviews and focus group discussions which require appropriate time with the schedules of each informant and participant.

Conflict of Interest

There are no known conflicts of interest associated with this publication.

Authorship Contributions

The authors contributed to the conception, design, data collection, interpretation, analysis, and drafting of this research paper.

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