

Analysis of basic hospital pricing using the unit cost double distribution method

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Abstract. The basic rate of a hospital is a benchmark for the sustainability of a hospital in providing services to hospital patients. Determining rates in a hospital requires a lot of consideration, many factors that become variables to be taken into account. This study aims to determine a method of determining rates that are in accordance with the needs of the hospital. This study is a descriptive study of the assessment of previous studies compared to the double distribution method. Most studies state that the ABC method is appropriate for determining hospital rates because it calculates rates based on activities in the hospital. However, with the double distribution method, it applies two stages to determine prices from work units that do not have income to the second stage, namely service units. So that the cost burden will end up in the service unit. Basically, the determination of the calculation method needs to be adjusted to the complexity of the hospital itself, because the application of costs in each has differences from one another.

1 Background

Health development as one of the national development efforts that is directed towards achieving awareness, willingness and ability to live healthily for every resident in order to realize optimal health status [1]. Hospitals have the main task of providing treatment, care for patients, and health services to the community, making hospitals a party that is very much needed in providing community needs in providing community needs and realizing community ideals that make its citizens have a better life [2].

A hospital is a health service institution that does not take commercial advantage and is more profitable or prioritizes the community. Because of this nature, hospital management in managing hospitals is not easy because hospitals must survive, besides that social functions are maintained [3]. In the past, hospitals were non-profit oriented companies or organizations that were not oriented towards profit [4]. However, now that concept has begun to fade,

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because many private hospitals have emerged with a lot of investment and then really seek profit to be able to return the investment.

Along with the development of the times, the condition of hospitals that initially aimed to provide services to the community but according to their nature did not aim to seek profit or non-profit but that does not mean that hospitals do not seek profit in their operations [5]. This condition is caused by the increasing daily hospital expenses that are not balanced with the income of the hospital which is increasingly difficult to obtain to manage the hospital properly and try not to lose, of course knowledge about hospital management is needed [6]. Another problem that must be faced by hospitals is regarding the determination of the basic cost for services that will be provided to the community, so that there is the ability of the community to pay for the hospital costs [7].

The problem in the Hospital is that the calculation for inpatient rates in each period is not accurate because the determination of inpatient room rates uses the traditional method which is based on the calculation of the allocation of hospital overhead costs, namely the number of working hours [8], [9]. This results in limited costs, and many activities in the Hospital have different costs for each activity, but in the traditional method they are made into one cost and this is not relevant so that there will be cost deviations, namely charging costs that are too low (undercosting) or charging costs that are too high (overcosting). so that the calculation is done based on the type of inpatient room [10].

Hospitals use various costing methods to determine the cost of services, manage resources effectively, and ensure financial sustainability. Below are some common costing methods employed in hospital settings. First Activity Based Costing (ABC). In ABC method focuses on identifying and assigning costs to specific activities within the hospital, helps determine the cost of each service by tracing expenses to procedures, departments, or treatments and provides detailed insights into cost drivers and supports efficiency improvements. The variable costing method, also known as direct costing or marginal costing, is an accounting approach where only variable costs are included in the cost of a product or service. Fixed costs are treated as period expenses and are not allocated to individual products or services. Variable costing in hospitals focuses on accounting for costs that vary directly with the level of patient care or services provided. It excludes fixed costs from the cost of services and instead treats them as period expenses, providing valuable insights for short-term decision-making and operational efficiency.

Most of hospital in Indonesia using ABC method, because most easy to detect the activity to counting about patient fee. Meanwhile, if using the variable costing method, all operational costs related to inpatient rooms such as laundry costs, food costs, cleaning costs, electricity and water costs are calculated in it [9]. Where these costs are variable costs so that by using variable costing the hospital can calculate the inpatient room rates for each type of inpatient room provided by the Hospital more accurately because the costs incurred can be calculated as a whole [11]. By using the variable costing method, the costs absorbed can be reflected accordingly. Although each regional technical management unit under the regional government states that a non-profit or non-profit business, in its implementation it also requires costs for its implementation because there is the use of resources issued [12]. In Indonesia, as we know about Public Service Agency or called By BLU. BLU established causes of regional autonomy, based on groups to operation by themselves. This is because the work units within BLU-type hospitals do not generate direct revenue but operate with expenses that require funding. As a result, they allocate costs to the service units.

In the world of health, determining hospital service rates is a complex and dynamic issue. The rates set must not only reflect the operational costs of the hospital, but must also consider social, economic, and quality aspects of service [13]. In general, the use of methods is quite

extensive using the method of charging costs to patients, such as unit costs with double distribution, activity-based Costing, INA-CBGs [14]. Traditional methods were not included in this study because they were not effective and efficient for hospital operations. Several studies have stated that using Activity Based Costing is an efficient and effective method for determining hospital rates such as studies conducted by [12-17]. However, there are also those who state that the use of unit cost calculations with double distribution is an efficient method to use, as proven by research conducted by [15], [18-20].

In the method of determining the basic hospital rates, several appropriate methods can be used. The method used is adjusted to the needs of the hospital itself, so of course there will be differences between the methods of determining rates from private hospitals or hospitals owned by the local government. The main focus of this study is to determine the unit cost calculation method that allows for cost efficiency that will be charged to patients, so that patients do not mind paying hospital fees, this is also driven by the existence of health cost services with payment for the use of Social Security Administering Body for Health (in Indonesia called as BPJS) for Health and BPJS Employment. So that it will bring up the positive and negative sides of the use of each cost and its application in the internal operations of the hospital. This study was conducted at one of the hospitals in Central Java Province specifically in Kebumen Regency.

2 Literature Review

In the literature review, the discussion will focus on Public Service Agencies (PSA) in Indonesia, which operate autonomously to enhance their capabilities and independence in providing hospital services. Public Service Agencies are authorized to set service fees individually, tailored to the needs and conditions of the respective hospitals or healthcare facilities. The provisions for determining tariffs follow established and commonly used patterns. The methods employed in each regency also vary, such as the use of Activity-Based Costing, the INA-CBGs method, and the Double distribution method.

2.1 Hospital with Public Service Agency

In accordance with the Hospital with the status of Public Service Agency is a government-owned hospital that is given flexibility in its financial management. This means that BLU hospitals are not fully bound by very strict budget rules like other government institutions. The goal is for hospitals to be more efficient and productive in providing health services to the community. In general, hospitals established by the central government or local governments can be in the form of Technical Implementation Units (UPT) with management of Public Service Agency (BLU). By becoming a BLU, hospitals are given flexibility in financial management but remain under government supervision [8].

The government has a specific objective in making hospitals into BLUs, namely to increase efficiency and productivity so as to improve the quality of service and minimize medical costs and also increase income for hospitals with BLU status by seeking sources of income other than the government budget through cooperation with the private sector or development of business units.

The status of BLU Hospitals is regulated in various laws and regulations, especially those related to hospitals and state financial management. Some relevant laws include: (a) Undang-Undang Nomor 44 Tahun 2009 About Hospitals [2]: This law generally regulates the

organization of hospitals, including the form of hospital legal entities. (b) Undang-Undang Nomor 1 tahun 2004 concerning State Treasury: This law regulates the management of state finances, including financial management in regional work units (SKPD) that implement the Public Service Agency financial management pattern. (c) Government Regulations and Ministerial Regulations: In addition to laws, there are various government regulations and ministerial regulations that more specifically regulate the management of BLU hospitals, such as those related to the procedures for determination, financial management, and supervision.

2.2 Public Service Agency Hospital Rates

In accordance with the Regulation of the Minister of Health of the Republic of Indonesia Number 1165/MENKES/SK/X/2007 concerning the Cost Pattern of Public Service Agencies, it states that the tariff is part or all of the cost of organizing service activities in a hospital, which is charged to patients as compensation for the services received (Kementerian Kesehatan RI, 2007). Then it is also adjusted to the Law on Hospitals of the Republic of Indonesia Nomor 44 tahun 2009 concerning Hospitals where in Article 49 paragraph (2) the National Tariff Pattern referred to in paragraph (1) is determined based on the component of the unit cost of financing by considering regional conditions and is strengthened again by higher regulations, namely the Regulation of the Minister of Health of the Republic of Indonesia Number 85 of 2015 concerning the National Hospital Tariff Pattern in Article 1 Number 91) where the national tariff pattern is a basic guideline that applies nationally in the regulation and calculation to determine the amount of hospital tariffs based on unit cost components and by considering regional conditions".

Unit Cost is a combination of two words, namely unit and cost, so that they are combined into unit costs, in hospitals, units are work units that carry out activities. Hospitals group units into 2, namely work units and service units. Work units are units that do not charge rates while service units emphasize more on the service rates of each work unit in the hospital. Examples of hospital service units such as Central Surgical Installation (IBS), Emergency Installation (IGD), Inpatient Installation (IRNA), Radiology, Hemodialysis and so on.

Costs that arise in hospital units, both work units and service units, will arise when carrying out an activity. So, every work unit or service unit that arises requires resources and therefore gives rise to costs incurred. So that it raises problems in the service unit, namely costs arise and have income and finally costs are charged to income. In the work unit, there is a problem where there are costs that come out due to the use of resources but do not have income. So, it cannot cover these costs. So that generally hospitals in work units that do not have income, charge their costs to service units that have income, to cover the operational activities.

2.3 Method for Determining Public Service Agency Hospital Rates

The unit cost method is an approach that calculates the average cost per unit of health care. This unit of service can be a medical action, procedure, or even a day of hospitalization. By knowing the cost per unit, the hospital can determine the appropriate rate for each type of service.

2.3.1. Activity Based Costing (ABC)

In the increasingly complex world of healthcare, determining hospital service rates is becoming increasingly crucial. Traditional methods of calculating costs are often considered less accurate in reflecting the actual costs incurred for each type of service. This has led to the emergence of more sophisticated methods, one of which is Activity Based Costing (ABC). The ABC method is a cost accounting approach that traces costs to various activities carried out to produce a product or service. In the context of a hospital, these activities can include laboratory tests, surgery, patient care, and others. By tracing costs to these activities, the ABC method can provide more accurate information about the actual costs associated with each type of service [21].

The use of the ABC method is important in determining rates because: (a) cost accuracy, where the type of service provided to patients will be more relevant to the actual costs incurred. (b) efficiency, hospitals are able to identify inefficient activities and eliminate them to take corrective steps, (c) related to decision making, the ABC method can be more accurate in strategic decision making, such as determining rates, allocating resources and developing new services, (d) transparency, ABC provides transparency regarding the cost structure incurred so that management, stakeholders and patients can understand the components of the cost burden that must be paid by the patient [5].

2.3.2. Indonesia Case Based Groups

INA CBGs (Indonesia Case Based Groups) is a case-based disease grouping system used by the Social Security Administering Agency (BPJS) Health in Indonesia to determine health service rates. Simply put, INA CBGs groups patients based on disease diagnosis and medical procedures performed, then sets appropriate rates for each group [22].

The first INA CBGs work system is by grouping patients where each patient who receives health services will be grouped according to the diagnosis of the disease they are suffering from, this has been adjusted based on the International Classification of Diseases (ICD) and the medical procedures that must be performed. Second, determining the rate, in the group of patients who have been categorized have different rates covering hospital costs starting from doctor's fees, medicines and treatment costs. Third, claim financing, where the hospital submits a claim to BPJS Health based on the patient group and the rates set. BPJS then makes payments according to the claims that have been submitted.

3 Research Methodology

This research employs a qualitative methodology, designed to evaluate and compare the most feasible hospital service tariff calculation methods from various approaches. The methods are tailored to meet the needs of hospitals in general and regional general hospitals (RSUD) in particular. To achieve this, the study involves an in-depth analysis of hospital tariff determination practices, focusing specifically on the application of activity-based costing and double distribution methods.

Data collection includes interviews with key hospital stakeholders, observation of financial and operational processes, and document analysis of hospital financial reports and tariff policies. This approach ensures a comprehensive understanding of how different methods influence tariff calculations. The ABC method, INA-CBGs, and Double

Distribution Method are key indicators for this study, as they are widely used by general hospitals.

The research aims to identify the method best suited for regional general hospitals, considering the balance between affordability for patients and financial sustainability for hospital management. The study was conducted at one of the regional general hospitals in Central Java Province, providing a practical case study for understanding the implementation of these methods in a real-world context.

4 Result

The rates charged in the hospital are the sum of the service rates for facilities and service fees. The service fee itself is a unit cost added to the price policy I. Price policy I includes: profit margin, interest rate, ability to pay, willingness to pay, shadow price (competitor). Then the service fee is determined after the service fee has been calculated, this is calculated by applying the proportion or percentage of service fees to the rate [23]. This can be seen in the rates calculation milestone below.

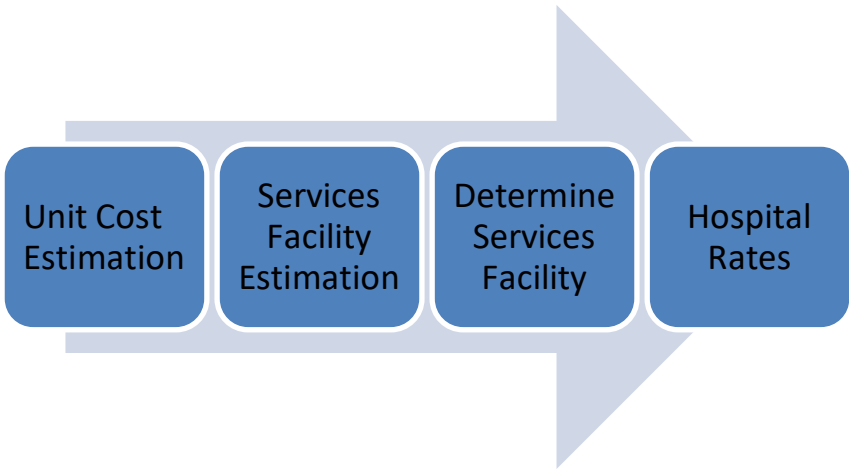


Fig. 1. Milestone Hospital Rates

4.1. Unit Cost Calculation

Basically, cost is all the sacrifices made to produce or consume a particular commodity or product in the form of goods and/or services. Costs in unit cost are said to be all inputs used to produce output that is adjusted to the needs of the hospital [24]. The form of sacrifice for the intended expenditure is such as money, energy, goods, time and opportunities which are all calculated in monetary value. To calculate the cost in unit cost, it must first be traced

regarding the costs of each according to its location, function and output. It can be seen in the chart below for the classification of the intended costs.

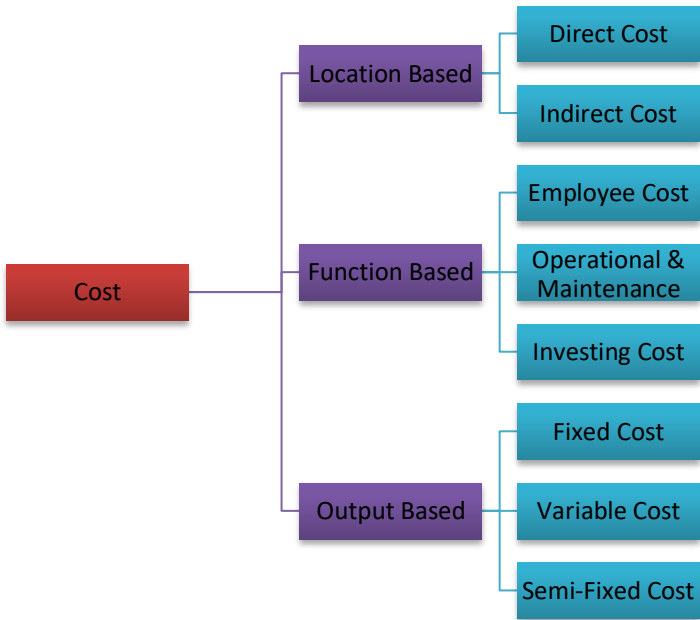


Fig. 2. Cost Classification for determine unit costs

If seen in figure 2 then for the category based on location, there are direct costs and indirect costs. Then based on its function there are employee costs, operational and maintenance costs and investment costs. The investment costs referred to are for the purchase of equipment for operational activities in a business.

In hospital institutions, it emphasizes several costs such as service costs and work unit costs. In service units, it can be said to be direct costs. If traced based on its function, such as employee costs, namely for doctor's salaries, honorariums for head of installations, honorariums for nurses and so on. On operational and maintenance costs such as laboratory reagents, Personal Protective Equipment consumables, Assistant Medical Health Practitioner in Radiology, routine maintenance of medical devices and so on. Then on the investment costs incurred such as the construction of inpatient installation buildings, the purchase of medical devices and others.

Classification based on the output of the hospital such as, fixed costs incurred are for payment of doctor's salary, health workers, head of installation salary and depreciation of medical equipment. Then for variable costs such as medical consumables, laboratory reagents and so on. For semi-fixed costs such as ambulance maintenance and hospital building maintenance.

If the service unit has been classified as a whole, then the next is the work unit where if according to its location it is included in the category of indirect costs, meaning costs incurred but not directly for practice activities in the hospital for services to hospital patients. Such as employee costs, namely to pay the director's salary, treasurer's honorarium and secretary. For operations and maintenance such as office stationery, duplication, maintenance and hospital management buildings. As well as investment costs such as purchasing computers, printers, scanners and others.

If based on the output or output of costs in the work unit such as fixed costs that must be incurred routinely such as the salary of the head of the division, honorarium for goods managers and so on, then for variable costs such as office stationery, utility costs and semi-permanent costs such as computer maintenance, office vehicle maintenance and director vehicles. The next stage carried out after cost tracing is to allocate and distribute costs or commonly referred to as cost charging. In principle, transferring costs in the work unit (non-revenue center) to the service unit (revenue center) so that every detail of expenditure from the service unit and work unit can be recognized monetarily. So that in the end all costs collected in the service unit are then divided by the utilities that produce unit costs.

4.2. Allocation and Distribution Methods

For the allocation and distribution method, it adheres to several activities that can be used for an institution or industry that is adjusted to its needs. The needs of each industry have differences that must be adjusted so that there are no errors in determining the calculation of costs that can cause losses. The following is for the allocation and distribution method in an institution.

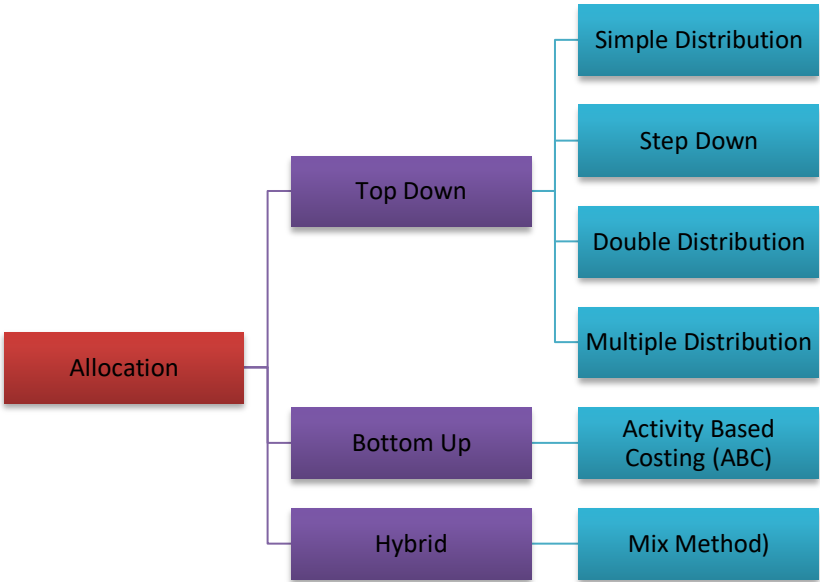


Fig. 3. Cost Allocation and Distribution Methods

In the Simple Distribution method, namely the transfer of costs incurred from the work unit to the service unit directly and simply (the cost of a work unit is transferred to the service unit that is considered relevant) then for the step down method is to transfer costs from the work unit to the service unit with a certain allocation basis such as the number of employees, utilities used, floor area and so on, and this is done in one stage. Furthermore, the double distribution method is to transfer all costs incurred from the work unit to the service unit with a certain allocation basis and is done in two stages. The first stage is to allocate costs between work units and the second stage is to allocate to the service unit to be calculated for each monetary.

Another method is with multiple distribution where this method is similar to the double distribution method but added with the loading between service units [13]. Furthermore, the Activity based costing method or commonly known as the ABC method where the costing method is based on the activities that occur. Each activity that occurs will absorb resources and these funding sources are charged to the production object and the output results. The last method is with a mixture or mix between the double distribution (DD) and ABC methods, where the DD method is used to calculate unit costs and to calculate costs per activity or action given by the ABC method [13].

4.3. Pricing with Double Distribution

Many studies state that the ABC method is the most suitable for hospital institutions such as research conducted by [15], [16], [20], [25], [26]. According to research conducted by [27], there are basically several methods that can reduce hospital costs so that they are not too expensive and there is no gap in paying hospital costs to patients and without reducing the quality of service to patients. This double distribution (DD) method is most widely used for hospital institutions because it is considered to have high and adequate accuracy with reciprocal allocation between work units but does not require complex data like the ABC and hybrid methods.

In the double distribution method, the distribution process is carried out twice. The first stage is from work units to other work units and to service units, then the second is from work units to service units so that the cost of the work unit becomes zero. Service units can be carried from medical support units and medical service units. The basis for allocation used is floor area, number of human resources, amount of food, electricity load used and its utilities.

The stages used in double distribution are starting with data collection, calculation of original costs, distribution of stage one and distribution of stage two and ending with calculation of total cost and its unit cost. Furthermore, the calculation of original costs begins with determining the cost center which is divided into three large groups in hospital activities, namely work units, medical support units and medical service units. Then continued by calculating the total cost per each cost center, then by determining the allocation basis and ending with collecting allocation value data.

4.4. Distribution Stage 1

In the first stage of distribution where the distribution of the original cost of the unit or cost center from the work unit that is not a revenue center to other work units that are not revenue centers, medical support service units and medical service units [28]. In principle, this first stage is to transfer costs from work units that are non-revenue centers to other similar work units, medical support units and medical service units.

4.5. Distribution Stage 2

Distribution of cost loading results from the first distribution from the work unit group to the service unit which is the revenue center. In this stage, in principle, the cost is transferred from the work unit that cannot generate income to the service unit that has income. So that later the work unit will be empty again because it has been transferred to the service unit, which will then be billed to the patient for the services provided. The sum of each medical support

service unit (intermediate) and medical service unit (final) becomes the total cost that will be used to calculate the unit cost.

4.6. Total Cost and Unit Cost

Activities on total cost and unit cost are dividing the total cost to the medical support service unit and medical service unit with utilization to obtain the unit cost per unit of medical support service and medical service. This activity ends with the unit cost of medical support services where the unit cost per unit or installation in the hospital, the unit cost of inpatient medical services, in this case the unit cost is the treatment room and finally the outpatient medical service unit, namely the unit cost of each type of service in the form of a polyclinic in the hospital for patient services [29].

4.7. Pricing Policy (Stage 1)

In the pricing policy to calculate the unit cost (actual unit cost) becomes a means after going through the policy stages to determine the service rates to patients. The service price policy by considering the profit margin (PM), bank interest (interest rate) and inflation movements, the ability to pay Ability To Pay (ATP), Willingness To Pay (WTP) and Shadow Price or competitor rates. So, the formula used is as follows:

- **Unit Cost = Total Cost (TC) divided by volume**
- **Service Facilities = Unit Cost + Pricing Policy Stage 1**
- **Service Facilities = (TC/Vol) + (PM + BB + ATP + WTP + SP)**

4.8. Pricing Policy (Stage 2)

At the cost determination stage in the second stage to determine the hospital rate is to add up the service facilities and hospital service services. So that it results in determining the price policy in the second stage. However, in this case to determine the amount of service portions and the total rate is in accordance with the internal hospital policy, especially the board of directors and the service rate determination team in the hospital. The considerations needed are the financial capacity of the hospital, competitiveness with competitors or other hospitals, the external environment of the hospital and its normative rules. So that with these considerations, the rates will be adjusted by internal and external parties in the hospital.

4.9. Tariff Calculation Process

In the process of calculating hospital rates, it begins with calculating service facilities, namely by calculating the actual unit cost. Calculating service facilities can also be done with the actual unit cost added to the stage I price policy. Then to determine the proportion of service services to the rate is the proportion of ideal service services added to the second stage price policy. And the final rate is determined by the sum of service facilities plus service costs.

Based on the hospital law in accordance with the provisions of article 18, it states that regular outpatient care that is appropriate must find a break-even point, then for larger emergency care installations and class two (II) will be determined with a break-even point.

The price policy for class three (III) is set at a lower cost than class two (II) or can be included in the subsidy class classification. For class I, VIP, VVIP, Special Class and IGD are determined to be greater than class II by considering the principle of compliance, this classification emphasizes the profit class, so that it can cover expenses in the subsidy class [18].

Table 1. Classification Services in Hospital with Double Distribution Methods

Class III	=	Subsidy Class
Class II and Outpatient	=	Break Even Point Class
Class I, VIP, VVIP, Specialized Class, IGD, ICU	=	Profit Class

4.10. Determination price service with Activity Based Costing

The calculation of unit costs using the ABC method is based on the service activities received by patients or on activities provided by the hospital to patients, according to the clinical pathway for each patient. The calculation of unit costs using the ABC method is different from the DD method, in the DD method the calculation of unit costs is carried out in 2 stages. The first stage is to distribute all supporting costs (cost centers) to other supporting costs. After that, the second distribution is carried out, namely by distributing the total supporting costs to each supporting unit that has been distributed first to all revenue centers. To obtain the results of unit costs in each revenue center, the results of the second distribution are divided by each output from each revenue center.

From the results of the study conducted by Utami & Sulistiadi, (2019) it shows that the basic hospital rates applicable to class II and class III inpatients are smaller than the results of calculations using the ABC method which according to calculations are losses. This can happen because the rates charged by the hospital do not take into account the basic price of the room, but are based on the rates of other general hospitals in the vicinity. Then the difference also occurs because of the imposition of overhead costs on each service product provided. In the previous unit cost calculation, overhead costs in each overhead cost system, costs are charged to several cost drivers so that the ABC system can allocate costs to each product appropriately based on the consumption of each activity. So that the increasing number of inpatients, the hospital institution will experience losses if the patient is in class III and II inpatient rooms, while in the era of JKN facilities, the need for class III inpatient rooms will increase. So, by charging rates with unit cost calculations using the ABC method, the hospital needs to calculate the right amount of subsidy according to the cost of class I and class II inpatient rooms.

5 Conclusion

Determining hospital service rates is a complex task because it involves balancing public service obligations with the financial sustainability of the institution. In particular, hospitals must consider their ability to maintain operations and continue serving the community, which is critical for achieving broader public health goals. The determination of hospital rates is not only essential for financial management but also serves as a benchmark for the hospital's long-term sustainability.

Two commonly used methods in determining hospital service rates are Activity-Based Costing (ABC) and Double Distribution (DD). The ABC method allocates costs based on specific activities performed, providing highly accurate and detailed cost information. This method is generally more suited to profit-oriented hospitals due to its focus on identifying cost drivers at a granular level. Conversely, the DD method uses double cost allocation, distributing costs from non-income-generating units (e.g., administrative or support units) to service units that generate revenue. This approach is particularly advantageous for government-owned hospitals, where the emphasis is on maximizing resource efficiency while maintaining public service quality.

The research contributes significantly to One Health topics by addressing how hospitals, especially public ones, can optimize resource allocation and ensure equitable access to healthcare. One Health emphasizes the interconnectedness of human, animal, and environmental health, requiring sustainable healthcare systems to manage public health challenges effectively. By identifying the most appropriate methods for hospital tariff determination, this research supports: Sustainability of Healthcare Systems: Ensuring that government hospitals can operate efficiently and continue providing essential services, which directly impacts public health outcomes. Equitable Access to Services: Developing fair and transparent pricing mechanisms to prevent overburdening patients while maintaining hospital sustainability. Resource Optimization: Enhancing cost management strategies to allocate resources more effectively, aligning with the principles of One Health by reducing waste and improving operational efficiency. Policy Recommendations: Providing evidence-based insights that inform policymakers on how to implement cost models that balance public service obligations with financial sustainability.

This study bridges the gap between financial management in healthcare and the overarching goals of One Health by emphasizing the role of cost methodologies in creating resilient healthcare systems that can respond to the diverse health needs of populations.

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