UNIT COST ANALYSIS OF COVID-19 PATIENT MADANI PALU HOSPITAL

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Abstract: *Coronavirus Disease* 2019 known as Covid-19 is a pandemic outbreak that attacks the respiratory system caused by SARS-COV. The impact of this outbreak is so massive that it has paralysed global economic activities in various business sectors. With the soaring number of Covid-19 patients admitted to the hospital, the hospital's operational costs are absorbed more for Covid-19 services. This study aims to analyse the unit cost of Covid-19 patients at Madani Palu Hospital based on direct costs and indirect costs. This research is experimental research with a quasi-experimental design by consecutive sampling, by collecting data prospectively, 173 patients who meet the inclusion criteria and 21 exclusions. Grouping based on direct and indirect costs, then the data was analysed by the Unit Cost of Covid-19 patients. The results of the study were total direct costs of Rp. 1,778,635,758 and an average of Rp. 10,281,131 and total indirect costs of Rp. 1,559,095,030 and an average of Rp. 9,012,110. The total cost of Covid-19 patients is Rp. 3,337,730,788. Analysis of the calculation of Unit Cost for Covid-19 patients is Rp. 19,293,241. In conclusion, the Unit Cost for Covid-19 patients is IDR 19,293,241, compared to the service tariff for inpatient Covid-19 patients using the INA-CBGs tariff after 1 October 2021 approaching level 2 suspect claims of IDR 20,703,700. There is a difference of Rp. 2,518,601 which can be used as a basis for the local government to determine the health expenditure budget related to infectious diseases at the Central Sulawesi Provincial Health Office, which can make considerations for additions in determining the expenditure budget at the Madani Palu Regional General Hospital.

Keywords: Unit Cost, Covid-19, INA-CBGs.

INTRODUCTION

The impact of this outbreak is so massive that it can paralyse global economic activity in various business sectors (Singh, et al). Indonesia is predicted to experience a 0.2 per cent decline in Gross Domestic Product (GDP) from 2019 (OECD, 2020).

Drugs and pharmaceutical supplies are an important part of health care; in addition, it is well known that drug costs generally account for 30-40 per cent of total health care costs and tend to continue to increase. For Health

commodities, prices are expected to have a negative impact, i.e. higher prices will reduce the amount of medicine needed through the demand for medical care inputs.

demand for medical care inputs. An increase in medical costs (ceteris paribus) weakens the purchasing power of health care and thus tends to reduce the amount of demand for health care. Conversely, relatively lower health care prices will strengthen purchasing power and increase the amount of demand for medical care (Ichwan, et al., 2021). Estimates of drug costs have recently reached almost 60 per cent of the total cost of health services. One of the business sector operations affected by this outbreak is supply chain activities. The supply chain is a series of systems consisting of organisations, personnel, activities, information, and all kinds of other resources related to supplying products for consumers (Kozlenkova, et al., 2015).

Various business sectors have been affected by the Covid-19 pandemic, one of which is the pharmaceutical industry sector in various parts of the world. Ozili and Arun stated that as much as 60 per cent of the active pharmaceutical raw materials used throughout the world are produced in China (Ozili & Arun, 2020). Rude mentioned that the pharmaceutical industry in various parts of the world has been highly dependent on the supply of medicinal raw materials from China since 2013. In 2018, China was the world's largest pharmaceutical producer, accounting for 32.2 per cent of pharmaceutical products, an increase from 26.5 per cent since 2013. This caused China to occupy the number one position as a producer of pharmaceutical raw materials (Rude, 2020). Until now, the pharmaceutical industry in Indonesia still relies on imports of around 90 per cent of pharmaceutical raw materials used in the drug manufacturing process from abroad. The value of these imports reaches USD 2.5 billion to USD 2.7 billion per year (Ramadhani, 2020).

The Covid-19 pandemic has implications for the sustainability of hospital operations. Patient visits are greatly reduced, causing hospital revenues to decrease significantly, and contribution margins to decline. With the soaring number of Covid-19 patients admitted to the hospital, the hospital's operational costs are absorbed more for Covid-19 services. In Covid-19 services, hospitals must fulfil isolation room requirements, prepare oxygen therapy and intensive care with ventilators and other relatively high maintenance cost components (American Heart Association, 2020) and (Khullar, et al., 2020).

Analysis of claims data at 195 hospitals in Japan showed a decrease in the number of visits and hospital revenue since March 2020 compared to the previous year. The greater financial impact occurred in hospitals serving Covid-19 patients (Shin, et al., 2020). To be able to improve post-disaster recovery such as the current Covid-19 pandemic will be an opportunity for human resource development through restructuring the education, health, and economic sectors in a more inclusive development (Tope, et al., 2022).

MATERIAL AND METHODS

Ethics Statement

This research had been approved by the Research Ethics Committee of the Faculty of Medicine and Health, Tadulako University, with a letter number 1970/UN28.1.30/KL/2023

Subject

Patients included in this study were patients with Covid-19 who met the predetermined inclusion and exclusion criteria.

Collecting cost data related to the handling of Covid-19 which is categorised as follows:

a. Direct costs: Administration, treatment, drugs and medical equipment, pharmaceutical care, drug service facilities, consumables, nutrition, nursing care, personal protective equipment (PPE), electrocardiogram (ECG), laboratory, blood transfusion, radiology, doctor's visit and services.
b. Indirect costs: other equipment, medical and non-medical equipment, vehicles, staff salaries, medical and non-medical maintenance costs.

Method and Analysis

This research uses Quasi Experimental Design. The data collection method was carried out descriptively, namely observing Covid-19 patients at Madani Hammer Hospital who received treatment and analytically knowing the unit cost of Covid-19 patients. Data collection was also carried out in medical, general, medical support, non-medical support and hospital finance departments to find out the details of the costs used during the patient's hospitalisation. Details are grouped based on direct costs and indirect costs billed by the hospital during the patient's stay at Madani Palu Hospital for the period March 2022 to May 2022 with a total of 173 patients.
Then the total unit cost of direct costs and indirect costs were analysed.

RESULT AND DISCUSSION

Analisis Demographic Characteristics

Table 1 shows that adults are very vulnerable to Covid-19 exposure, because at this age on average they do a lot of activities outside the home such as work or other activities and lack of awareness in complying with health protocols. This needs to be a concern, because the higher the frequency of activities outside the home (crowded places), the higher the risk of exposure to Covid-19 (Nurhayatun et al., 2021). Several studies have shown that age is one of the determinant factors affecting the transmission of Covid-19, even the number of severe infections and deaths increases as the age group increases (Kahar et al., 2020; Lakshmi Priyadarsini & Suresh, 2020; Liu et al., 2020). The high rate of Covid-19 infection and fatality in the old age group is related to the decrease in immunity in that age group. Some people in this age group have comorbid diseases that can exacerbate Covid-19 infection. In addition, the age range of 31-60 years is a working age period so that the intensity of interaction with other people is also high. This is what increases the potential for exposure to Covid-19.

Table 1. Baseline Overview of Covid-19 Patients

No	Characteristics	Total (%) (n = 173)
1.	Age (Years)	
	a. 1-20	20,8
	b. 21-40	48,6
	c. 41-60	19,1
	d. 61-80	9,8
	e. 81-100	1,7
2.	Gender	
	a. Male	43
	b. Female	57
3.	Comorbid	
	a. Comorbid	52
	b. No Comorbidities	48
4.	Length of stay	
	a. 1-7 Days	58,4
	b. 8-15 Days	41,6

Based on the table above, female patients have a greater number of presentations than men, namely women 57 per cent and men 43 per cent. According to Gewalt et al, women have higher stress levels than men, which is one of the factors why women are more susceptible to Covid-19 infection (Gewalt et al, 2022).

In comparison, preliminary data on Covid-19 patients by gender in Indonesia shows that the number of male patients exposed to Covid-19 cases is higher than that of females (Task Force for the Acceleration of Covid-19

Handling, 2020). Data as of 28 May 2020 illustrates that 55 per cent of men are positive for Covid-19. This pattern occurs not only nationally, but also in provinces in Indonesia. In fact, this pattern was also found in cases in other countries which concluded that men are more vulnerable to exposure to the Covid-19 virus (Begley, 2020; Wenham et al., 2020). Research by Wenham et al. (2020) stated that there were no significant gender differences in cases of Covid-19 infection. The vulnerability faced by men is related to their movement patterns which are more outside the home than women (Begley, 2020). This may be related to differences in immunity between men and women. Covid-19 is a respiratory disease. Meanwhile, behaviours that can reduce respiratory quality such as smoking are found more in men than women (Kahar et al., 2020; Wenham et al., 2020). In addition, during this pandemic, women are more disciplined in undergoing health protocols such as implementing physical distancing, diligently washing hands, and using masks compared to men (BPS, 2020). Even so, Wenham et al. (2020) stated that this data could not yet be the basis for footing related to gender conditions in Covid-19.

According to research by Fang et al (2020), severe and critical patients are older and mostly male and have low recovery rates and high mortality rates and longer lengths of stay. Disease history is one of the factors causing death. Congenital diseases that can worsen when contracting Covid-19 such as diabetes, which is a chronic disease characterised by high levels of sugar in the blood. Covid-19 is a disease that attacks the respiratory system (Nurhayatun et al., 2021). In particular, coronary heart disease, diabetes, and hypertension are risk factors for in-hospital mortality in Covid-19 patients. In addition, the length of hospital stay was longer for diabetic patients who died than for non-diabetic patients who died, and for patients who died with hypertension than for non-hypertensive patients who died. Results from our study showed that patients with comorbid conditions of cancer and ischaemic heart disease had a higher likelihood of a shorter hospital stay when adjusted for age, but when analysed separately by age group or in a crude analysis for each comorbid condition as a single variable, neither was significant (Jang Yeon Su, et al, 2021).

In this study, there were 2 groups of patient care lengths of 1 to 7 days by 58.4 per cent and the second group of 8 to 15 days by 41.6 per cent. The highest LOS in 1 to 7 days of care was 58.4 percent where the data according to research (Li et al., 2020) the average incubation period of Covid-19 is 5.2 days and symptoms can appear variously in each individual ranging from 2 to 14 days after exposure and the results of this study were also confirmed by Jamini that the number of days of care for covid-19 patients of all characteristics was dominant ≤ 14 days (Jamini Theresia, 2021). Therefore, WHO sets a period of self-isolation or quarantine for 14 days (Sanyaolu et al., 2020).

Unit Cost Analysis

Research on Covid-19 patients was conducted at the inpatient installation at Madani Hospital for the period 01 March 2022 to 31 May 2022. To determine the unit cost analysis, the data collected were direct cost and indirect cost data for fiscal year 2022. Data were obtained from 194 patients. A total of 173 patients (89.2 per cent) met the inclusion criteria, and 21 patients (10.8 per cent) were excluded because they did not meet the inclusion criteria for various reasons, including forced discharge.

Table 2. Description of Cost Analysis Results

Description of Cost Analysis Results	Direct Cost	Indirect Cost	Total	*Unit Cost*
173	1,778,635,758	1,559,095,030	3,337,730,788	19,293,241

Table 2 The results of the calculation of direct costs in table 1 totalled Rp. 1,778,635,758 and averaged Rp. 10,281,131. The direct cost component consists of medical material costs, medical and paramedical personnel costs and medical equipment costs. This is in accordance with the cost components in theory (Mulyadi, 2007), that direct costs consist of material costs, tool costs, and personnel costs or what is called medical and paramedical labour. Direct costs must apply to every hospital, because these costs occur as a result of activities that use

resources provided directly to patients. This is supported by the theory (Mulyadi, 2007) which states that direct costs are costs that are directly charged to service products.

Indirect costs in this study are costs incurred by supporting units that do not directly produce output, including other equipment, medical and non-medical equipment, vehicles, employee salaries, medical and non-medical maintenance costs. The results of the calculation of indirect costs in Table 2 totalled 1,559,095,030 and averaged Rp.

9,012,110. The increase in investment costs, especially medical devices from year to year, also affects health financing, but to be able to improve service quality, hospitals need to be supported by adequate medical equipment. This research is also in line with Bunga's research (2018) which states that the amount of indirect costs in each supporting cost centre of the production cost centre in the inpatient unit of the Tora Belo Regional General Hospital in 2015 still relies on subsidised funds from the local government based on financial reports to cover budget deficits. Maintenance costs in a hospital are costs that are absolutely necessary in order to maximise the production of an investment item and can continue to produce according to its long life (Long Life = L), so it can be concluded that effective' spending and in accordance with its function will bring savings to Madani Palu Hospital.

Total cost is the total cost required by the hospital for the treatment of Covid-19 patients at Madani Hospital. The type of total cost in this study is Total direct costs + Total indirect costs. The total cost is Rp. 3,337,730,788. After the cost components are obtained, the original total cost of each cost centre can be calculated. The amount of total cost is strongly influenced by these components, so the greater the value of indirect costs and direct costs, the higher the total cost value. With a large total cost, it will affect the financial condition of the hospital, namely burdening patients with high costs, so that a rationality of expenditure is needed by paying attention to the output produced by the service unit, especially for employee salary costs included in indirect costs whose magnitude is strongly influenced by service output, so that savings on these components will directly affect Unit Cost savings.

Unit Cost Calculation is the final result of the calculation between the amount of total costs after simple distribution by moving costs from supporting units to production units directly and simply, which will be divided by the output of each inpatient room at Madani Palu Hospital. As the name implies, this technique is very simple, distributing the costs incurred in the supporting cost centre directly to the various production cost centres. This distribution is done one by one from each supporting cost centre. The purpose of distribution from a particular supporting unit is relevant production units, which are functionally known to be supported by that particular supporting unit. The advantage of this method is its simplicity so that it is easy to do.

The total unit cost of Covid-19 patients at Madani Palu Hospital is Rp. 19,293,241. Compared to the service tariff for inpatient covid-19 patients using the INA-CBG tariff after 1 October 2021, level 1 suspects amounted to IDR 17,253,000, level 2 suspects amounted to IDR 20,703,700, and level 3 suspects amounted to IDR 24,844,500.

The average value of claims paid for Covid-19 patients at Civil Hospital based on INA-CBG rates is IDR 16,774,640. There is a difference of Rp. 2,518,601 in the tariff set by the government so the need for advice in additional funds in handling Covid-19 so that excellent health services to patients can be achieved.

CONCLUSIONS

This study was conducted to determine the analysis of the amount of Unit Cost for COVID-19 patients treated in the inpatient ward of Madani Palu Hospital from March to May 2022. Several conclusions can be drawn from the research and discussion as follows:

1. Unit cost for COVID-19 patients is IDR 19,293,241. Compared to the service tariff for inpatient COVID-19 patients using the INA-CBG'S tariff after 1 October 2021, it is close to the level 2 suspect claim of IDR 20,703,700.
2. There is a difference of Rp. 2,518,601 which can be used as a basis for the local government to determine the health expenditure budget related to infectious diseases at the Central Sulawesi Provincial Health Office, which

can make considerations for additions in determining the expenditure budget at the Madani Palu Regional General Hospital.

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