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Timileyin Omolayo Aw... 16 Mar

kepada saya ^



Dari Timileyin Omolayo Awolola •  
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Kepada Cyntiya Rahmawati • cyntiya.apt@gmail  
.com

Tanggal 16 Mar 2022 05.32

 Enkripsi standar (TLS).  
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Thank you for your feedback. The team will review  
and publish your article.  
Best regards,

On Mon, 14 Mar 2022 at 14:57, Cyntiya Rahmawati  
<[cyntiya.apt@gmail.com](mailto:cyntiya.apt@gmail.com)> wrote:

Dear Omolayo Awolola,

Thank You for your invitation.  
I have review / final look my manuscript at copy-  
edited, and there is no changes needed.

Best regards,

Cyntiya Rahmawati



Fwd: [PIT Virtual IAI 2021] Decision on Manuscript "Cost of Illness of COVID-19 in West Nusa Tenggara, Indonesia" - cyntiya.apt@gmail.com - Gmail

Gmail

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24 dari banyak

Fwd: [PIT Virtual IAI 2021] Decision on Manuscript "Cost of Illness of COVID-19 in West Nusa Tenggara, Indonesia"

Rudi Hendra <rhendra@iaj.id>  
kepada saya

Sel, 9 Nov 2021 11:39

Inggris > Indonesia Terjemahkan pesan Nonaktifkan untuk: Inggris

----- Forwarded message -----  
From: Rudi Hendra <rhendra@iaj.id>  
Date: Sat, Oct 23, 2021 at 8:22 AM  
Subject: [PIT Virtual IAI 2021] Decision on Manuscript "Cost of Illness of COVID-19 in West Nusa Tenggara, Indonesia"  
To: <cyntiya@gmail.com>

Dear Cyntiya Rahmawati, S.Farm., M.K.M

Your manuscript, "Cost of Illness of COVID-19 in West Nusa Tenggara, Indonesia" which you submitted to the Pharmacy Education Journal in collaboration with The Indonesian Pharmacists Association (IAI), has been peer reviewed, and the reviewer comments are attached.

The reviews are generally favourable, implying that your paper may be suitable for publication with **minor correction**. Kindly consider these suggestions, and we eagerly await your revision. We will revise your revision in light of peer review comments, and once the manuscript satisfies the requirement, it will be submitted to the editor of Pharmacy Education Journal. We will notify you if any changes or additional information become available.

When revising your manuscript, please highlight the changes you make using MS Word's track changes mode or by using bold or coloured text to expedite the processing. Please click on the link below to submit your revision:

<https://forms.gle/TbBy9vp1moYUBWvx8>

Due date: **November 20<sup>th</sup> 2021**

Thank you

## **Cost of Illness of COVID-19 in West Nusa Tenggara, Indonesia**

### **Abstract**

**Background:** Currently, COVID-19 is still a pandemic throughout the world, including in Indonesia. The high number of COVID-19 cases, especially in West Nusa Tenggara (NTB) will also have an impact on financing, considering that inpatient cost in hospitals is the responsibility of the government.

**Objective:** To calculate the cost of illness for COVID-19 inpatients at the NTB Provincial Hospital.

**Method:** The method used was the cost of illness by using secondary data in 2020 retrospectively. The population consisted of 822 patients. The perspective used was payer, namely the government, so the cost components calculated were direct medical costs.

**Results:** The average treatment room cost was IDR6,681,734 per patient, the average doctor visit cost was IDR853,856 per patient, the average treatment cost was IDR1,975,585 per patient, the average laboratory cost was IDR2,996,277 per patient, the average cost of other services was IDR792,390 per patient, the average pharmaceutical cost was IDR41,724,743 per patient, and the average emergency room cost was IDR437,657 per patient.

**Conclusion:** The total cost of COVID-19 patients at the NTB Provincial Hospital in 2020 was IDR45,589,962,670 with an average direct medical cost of IDR55,462,242, and an average daily cost of IDR4,114,300. The average cost of COVID-19 patients without comorbidities was IDR45,545,441 and with comorbidities was IDR71,926,056.

**Keywords:** cost of illness, COVID-19, West Nusa Tenggara, Indonesia, Hospital

## **Introduction**

Corona Virus Disease 2019 (COVID-19) is caused by SARS-CoV-2 with the most common symptoms being fever and cough, but the patients with this disease are often present without fever, and many do not have abnormal radiological findings (Guan, et al., 2020). In January 2020, WHO declared a public health emergency of international concern over the global outbreak of novel coronavirus (WHO, 2020). The COVID-19 pandemic has hit Indonesia for more than a year. However, positive cases are still growing. Based on the government data in August 2021, there were a total of 3.9 million confirmed positive cases (Satuan Tugas Penanganan COVID-19, 2021). Meanwhile, the total confirmed positive cases of COVID-19 in West Nusa Tenggara in August 2021 reached 24,763 cases, and a total of 1,555 cases were treated (Dinas Kesehatan NTB, 2021)

The current outbreak of COVID-19 is estimated to cost \$1 trillion to world's economy during year 2020 (Singh & Misra, 2020). Based on a study by Maltezou, et al (2021), the total costs for the management of the healthcare personnel (HCP) were estimated at €1,735,830 (€772,890 Euros for HCP with COVID-19 and €962,940 for exposed HCP) (Maltezou, et al., 2021). Meanwhile, treating COVID-19 patients in Indonesia costs a lot, an average of IDR 184 million per person due to the need for special treatment, such as the use of ICU, ventilators, and the presence of comorbidities (Tim Komunikasi Komite Penanganan COVID-19 dan Pemulihan Ekonomi Nasional, 2020). Based on the Infectious Disease Outbreak Act, the government has the duty to bear the financial burden of the treatment the community undergoes due to infectious diseases, in this case COVID-19.

Cost analysis is usually used to determine the average direct medical costs. Cost of illness studies measure the economic burden of a disease and estimate the maximum value that can be saved or obtained if the disease can be cured (Rascati, 2009). This study aimed to conduct a

health technology assessment through the cost of illness for COVID-19 patients to get an overview of the direct medical costs of hospitalized COVID-19 patients at the West Nusa Tenggara (NTB) Provincial Hospital during 2020 with the perspective of the payer, namely the government.

## **Methods**

This study was an economic evaluation of health, namely the cost of illness with a top-down prevalence approach and used retrospective data during 2020. Patient demographic data and cost data were obtained from medical records and receipts issued by hospitals. Demographic data recorded were length of hospitalization, comorbidities or without comorbidities, gender, age, and hospital discharge status. Cost data were calculated based on the perspective of the payer, namely the government, so the calculated costs were direct medical costs. The cost of each patient was calculated for each component, then the average cost was calculated. After that, the average daily cost was calculated.

The population in this study were all the patients with confirmed COVID-19 who were hospitalized at the NTB Provincial Hospital during 2020 with a total of 822 patients. The samples were taken from the entire population, or total sampling.

## **Results**

### **Overview of COVID-19 Patients in West Nusa Tenggara, Indonesia**

NTB Provincial Hospital is one of the referral hospitals for patients with confirmed COVID-19. There were 513 COVID-19 patients admitted to the hospital without comorbidities and 309 patients with comorbidities. The most commonly found comorbidities in COVID-19 patients at the NTB Provincial Hospital were pneumonia, diabetes mellitus, essential hypertension, and multiple comorbidities.

COVID-19 patients who were hospitalized at the NTB Provincial Hospital had an average length of hospital stay of approximately 13 days. The average hospital stay for COVID-19 patients without comorbidities was around 12 days, while the average for COVID-19 patients with comorbidities was about 15 days.

Based on the data in Table I, COVID-19 patients were predominantly in the group without comorbidities (62%), male (55%), and in the age range of 23-40 years (42.6%). The hospital discharge status of the COVID-19 patients in this study was 95% alive and 5% dead. The patients who died were mostly in late adulthood and the elderly who had comorbidities or multiple comorbidities.

### **Cost Components**

The calculation of direct medical costs in this study was based on the government's perspective. The cost components calculated were treatment room costs, doctor visit cost, treatment costs, laboratory cost, other service costs, pharmaceutical costs, and emergency room costs. All these costs were borne by the government, so there was neither cost charged to patients nor cost-sharing with patients.

Based on Table II, the average direct medical cost for the COVID-19 patients without comorbidities was IDR 45,545,441, while the average cost for the COVID-19 patients with

comorbidities was IDR 71,926,056. From all the patients, the average direct medical cost was IDR 55,462,242 and the total cost for the COVID-19 inpatients at the NTB Provincial Hospital during 2020 was IDR 45,589,962,670.

The treatment room cost consisted of a COVID-19 isolation room with a ventilator, a negative pressure isolation room without a ventilator, a natural air flow isolation room without a ventilator, an intermediate room, and so on. Doctor visit costs were the costs paid for the visits and examinations by general practitioners, and various specialist doctors, such as pulmonary specialists, surgeons, etc. Other service cost or medical support costs, included the cost of the SARS-Cov-2 RT PCR swab. Meanwhile, the treatment costs were the installation and maintenance of infusions, the use and installation of oxygen, high care per day, intravenous injection, blood sampling, and so on.

## **Discussion**

In this study, the COVID-19 patients were predominantly male (55%), according to Wenham, et al (2020) who stated that although sex-disaggregated data for COVID-19 showed the same number of cases between men and women, more men died than women due to immunological differences, as well as smoking patterns and prevalence (Wenham, et al., 2020).

Most of the COVID-19 patients in this study were adults, namely between the ages of 23 to 65 years. Older adults are more likely to suffer from a severe illness from COVID-19. More than 80% of COVID-19 deaths occur in people over the age of 65, and more than 95% of COVID-19 deaths occur in people older than 45 (CDC, 2021).

The deaths in COVID-19 patients in this study were found in patients with comorbidities and multiple comorbidities. This is accordance with the results stated by Sanyaolu, et al (2021) that COVID-19 patients who had comorbidities, such as hypertension or diabetes mellitus, were

more likely to develop a more severe course and progression of the disease. Furthermore, older patients, especially those aged 65 years old and above who have comorbidities and are infected, have an increased admission rate into the intensive care unit (ICU) and mortality from the COVID-19 disease (Sanyaolu, et al., 2020). Based on a study in the United States, cumulative deaths were estimated at 625,000 yielding \$4.4 trillion in losses for premature death (Cutler & Summers, 2020).

In Table II, it can be seen that the COVID-19 patients with comorbidities had a higher average direct medical cost compared to those without comorbidities, namely the costs of treatment rooms, doctor visits, care, laboratories, pharmaceuticals, and emergency rooms. This is because COVID-19 patients with comorbidities require additional care and treatment to overcome the comorbidities as well as the COVID-19 infection they suffer from, such as medicines, specialist doctors, use of ICU rooms, use of ventilators, laboratories, and so on. This is similar to research in India, showing that interruption of medical care and supervision during lock down may be deleterious for patients with diabetes, CAD and other chronic noncommunicable diseases, which may add to further economic losses in the future due to an increase in complication and disease burden, and further people with chronic conditions, particularly among poor, rural, and marginalized populations who experienced difficulties in accessing healthcare and had been severely affected both socially and financially by the COVID-19 pandemic (Singh & Misra, 2020; Singh, et al., 2021). Moreover, syndemic of tuberculosis with diabetes may worsen, adding further to the morbidity and mortality burden and thus economic losses (Hogan, et al., 2020). In the United States, losses from long-term COVID-19 complications were estimated at \$2.6 trillion and lost income from COVID-19-induced recession accounted for 50% of the total losses, and in Europe, the costs of COVID-19 associated with



diabetes were higher than those of patients without diabetes (Cutler & Summers, 2020; Bain, et al., 2020).

Based on Table II, the highest average cost for the COVID-19 inpatients, both with and without comorbidities was pharmaceutical costs (IDR 41,724,743), which reached 72% of the total cost. The pharmaceutical costs consisted of the cost of medicines and medical equipment, as well as the cost of personal protective equipment (PPE). The cost of PPE reached 96% of the total pharmaceutical costs and the remaining 4% was for medicines and other medical equipment. PPE consisted of a level 3 PPE set. PPE serves to protect themselves, preventing doctors or other medical personnel from transmission when treating COVID-19 patients. In one day, a minimum of four sets of level 3 PPE were needed per patient. In addition, the drugs widely used to treat the COVID-19 patients were Oseltamivir 750 mg and N-Acetylcysteine 200 mg.

Based on the researchers' calculations, the average cost of the COVID-19 patients at the NTB Provincial Hospital was IDR 4,114,300 per day. If a patient were treated for 12-15 days, the cost required would be between IDR 49,371,604 to IDR 61,714,505. Then, indirect costs were difficult to calculate in real terms because they were retrospective data that neither provide information on employment nor income of the COVID-19 patients. So the researchers used an estimate of indirect costs from the cost of productivity lost which was calculated from the Regional Minimum Wage in West Nusa Tenggara in 2020 multiplied by the average length of hospital stay. The Regional Minimum Wage was IDR 2,183,883 per month, if in one month it was 26 working days, then the estimated cost of productivity lost was between IDR 1,007,946 – 1,259,932 per patient. The estimated total cost of productivity lost by the COVID-19 patients in 2020 was IDR 828,531,612 – 1,035,664,515. It can be said that treating COVID-19 patients requires a high cost, therefore preventive efforts are needed to reduce the incidence of COVID-

19 in Indonesia, especially in West Nusa Tenggara. “Delays in implementing the strategies to suppress transmission will lead to worse outcomes and fewer lives saved” (Walker, et al., 2020).

### **Conclusion**

The total cost of the COVID-19 patients at the NTB Hospital during 2020 was IDR 45,589,962,670 with an average direct medical cost of IDR 55,462,242 and an average daily cost of IDR 4,114,300. The average cost of the COVID-19 patients without comorbidities was IDR 45,545,441 and that with comorbidities was IDR 71,926,056.

### **Limitations of Study**

This study only calculated direct medical costs incurred by the government according to its perspective as a payer. However, this study did not calculate other costs such as direct non-medical costs and indirect costs in real terms. Future research can calculate costs from a different perspective.

### **Acknowledgements**

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### **Conflict of Interest**

The authors declare no conflict of interest.

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**Table I. Overview of COVID-19 Patients at West Nusa Tenggara, Indonesia**

<b>Demography of patients</b>	Total	Percentage
	(n=822)	
<b>Comorbidity</b>		
Patients without comorbidities	513	62%
Patients with Comorbidities	309	38%
<b>Gender</b>		
Male	454	55%
Female	368	45%
<b>Age</b>		
0-12 years old (children)	23	2.8%
13-22 years old (teenager)	102	12.4%
23-40 years old (early adulthood)	350	42.6%
41-65 years old (late adulthood)	292	35.5%
> 65 years old (elderly)	55	6.7%
<b>Hospital discharge status</b>		
Alive	780	95%
Dead	42	5%

**Table II. The Average of Cost Components**

<b>Cost Components</b>	Patients Without Comorbidities (n=513)	Patients With Comorbidities (n=309)	Cost Average of the COVID-19 patients (n=822)
Room	IDR 5,183,791	IDR 9,168,608	IDR 6,681,734
Doctor	IDR 733,830	IDR 1,053,123	IDR 853,856
Care	IDR 1,215,179	IDR 3,238,007	IDR 1,975,585
Laboratory	IDR 1,655,366	IDR 5,222,448	IDR 2,996,277
Other service	IDR 967,510	IDR 501,657	IDR 792,390
Pharmaceutical	IDR 35,507,406	IDR 52,046,729	IDR 41,724,743
Emergency	IDR 282,358	IDR 695,483	IDR 437,657
Total Cost Average	IDR 45,545,441	IDR 71,926,056	IDR 55,462,242