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## Original Article

### Clinical Profiles, Laboratory, Radiological and Outcome of COVID-19 Elderly Patients in Waikabubak Regional General Hospital, West Sumba

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#### ABSTRACT

Cases of COVID-19 in the elderly show varied clinical characteristics. Elderly patients tend to be easily infected with COVID-19 and experience more severe conditions. This study aims to analyze the correlation between clinical characteristics of elderly COVID-19 patients and severity of COVID-19 disease at Waikabubak Regional General Hospital. Retrospective study from the medical records of elderly patients with confirmed COVID-19 at Waikabubak Regional General Hospital in March 2020 – September 2021. Inclusion criteria were elderly patients with confirmed COVID-19 who underwent treatment in COVID isolation room and did rapid antigen examination. The data collected were demographics, clinical manifestations, laboratory, radiological features, comorbid, and outcomes. Data analysis using SPSS for Window 12.0 version. There were 33 patients with 18 men and 15 women. Patients aged 65-74 are the most infected with COVID-19 and experience more severe conditions. Patients with no previous vaccine history were associated with the severity of COVID-19. Elderly patients with obesity tend to experience severe COVID-19 symptoms. Elderly patients with multi-comorbidities tend to experience severe COVID-19 symptoms. Dominant clinical symptoms in elderly patients were cough (33%), shortness of breath (25%) and fever (21%). Hematologic parameters that correlated with severity were hemoglobin, platelets, NLR, ALC and RBG. The most common radiological findings were bilateral infiltrates (92%). Mortality rate of elderly COVID-19 patients treated at the Waikabubak Regional General Hospital still tends to be high (42%). Age, vaccine history, obesity, shortness of breath, multi-comorbidities, laboratory and radiology significantly influence the severity of COVID-19 infection in the elderly.

**Keywords:** clinical profile; COVID-19; East Nusa Tenggara; elderly; severity

#### ABSTRAK

Kasus COVID-19 pada lansia menunjukkan karakteristik klinis yang bervariasi. Lansia mudah terinfeksi COVID-19 dan mengalami kondisi lebih berat. Penelitian ini bertujuan untuk menganalisis korelasi antara karakteristik klinis pasien lansia COVID-19 dengan tingkat keparahan penyakit di RSUD Waikabubak. Penelitian retrospektif, data dari rekam medis pasien lansia dengan terkonfirmasi COVID-19 di RSUD Waikabubak pada periode Maret 2020 – September 2021. Kriteria inklusi pasien lansia dengan terkonfirmasi COVID-19 yang dirawat di ruang isolasi COVID, dan dilakukan pemeriksaan rapid antigen dengan spesimen swab. Data yang dikumpulkan adalah demografi, manifestasi klinis, laboratorium, gambaran radiologis, penyakit komorbid, dan luaran. Analisis data menggunakan SPSS for Window 12.0 version. Didapatkan 33 pasien dengan jumlah pria 18 orang dan wanita 15 orang. Pasien yang berusia 65-74 merupakan pasien terbanyak terinfeksi COVID-19 dan mengalami kondisi lebih berat. Pasien yang tidak memiliki riwayat vaksin sebelumnya berkaitan dengan derajat keparahan COVID-19. Pasien lansia dengan obesitas cenderung mengalami gejala COVID-19 berat.

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*Pasien lansia dengan multikomorbid cenderung mengalami gejala COVID-19 berat. Gejala klinis yang dominan pada pasien lansia adalah batuk (33%), sesak napas (25%) dan demam (21%). Parameter hematologi yang berkorelasi dengan derajat keparahan adalah hemoglobin, trombosit, NLR, ALC dan GDS. Gambaran radiologis yang tersering didapatkan adalah infiltrat bilateral (92%). Angka kematian pasien lansia COVID-19 yang dirawat di RSUD Waikabubak masih cenderung tinggi, yaitu sebanyak 14 pasien (42%). Karakteristik klinis seperti usia, riwayat vaksin, obesitas, sesak napas, multikomorbid, laboratorium dan radiologis berpengaruh secara bermakna terhadap tingkat keparahan dari infeksi COVID-19 pada lansia.*

**Kata kunci:** COVID-19; derajat keparahan; lansia; Nusa Tenggara Timur; profil klinis

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## INTRODUCTION

The Coronavirus Disease (COVID-19) pandemic is still happening today. The first case of COVID-19 was reported in China's Wuhan Province in December 2019. The virus has infected more than 150 million people worldwide and caused more than five million deaths.<sup>1</sup> Indonesia is in the 16<sup>th</sup> position with the most COVID-19 cases in the world based on data from *Gugus Tugas Penanganan COVID-19* on January 31, 2022. Confirmed COVID-19 cases in Indonesia have reached more than 4.3 million cases. Currently, NTT COVID-19 cases have reached 64,600 cases (1.5% of all cases in Indonesia).<sup>2</sup>

Among the confirmed cases at the end of October in Indonesia, 11.8% were elderly patients aged 60 years and over. The elderly also contributed to 46.8% of COVID-19-related deaths nationwide. Older age and comorbidities have been noted as major factors of susceptibility to COVID-19.<sup>3</sup> Liu et al., stated that the mortality rate of COVID-19 patients aged 60 years and over (5.3%) was significantly higher than that of patients under 60 years (1.4%).<sup>4</sup> Unfortunately, data regarding the clinical profile of the elderly hospitalized with COVID-19 in Indonesia is still limited. The elderly are a population that is very at risk in a pandemic, so more attention is needed.

Waikabubak Regional General Hospital is one of the COVID-19 referral centre in West Sumba, which has integrated care and a special isolation ward for COVID-19

patients. Enforcing COVID cases in remote areas is a challenge because of the limited support. The good news is that currently rapid antigen can be used to diagnose COVID-19.

Aspects that need to be considered in reducing COVID-19 cases are treating infected patients and avoiding the spread of the virus. This study aims to analyse the correlation between clinical characteristics of elderly COVID-19 patients and the severity of COVID-19 disease. We hope that by knowing a significant relationship between the clinical characteristics and the severity of COVID-19 disease, patients will receive optimal therapy, thereby reducing mortality.

## MATERIALS AND METHODS

This retrospective study used secondary data from medical record data of elderly patients with confirmed COVID-19 at Waikabubak Regional General Hospital in the period March 2020 to September 2021. The inclusion criteria were elderly patients with symptoms of COVID-19 based on the criteria of the Indonesian Ministry of Health 2020, who underwent treatment in the ward isolation of COVID and examination of nasal swab specimens using rapid antigen according to established standards.

The data collected were age, gender, epidemiological history (contact with adult patients whether suspected, probable, or positive COVID-19, and/or traveling or living in infected areas, red zone areas according to

the Ministry of Health), vaccination history, smoking history, body mass index, clinical symptoms, comorbidities, laboratories, and chest X-ray. images. Laboratory examinations and X-rays were performed using the same equipment and protocol for all patients. Patient outcomes were categorized as discharge with improvement and death. Patients were excluded from the study if data were incomplete and patients aged <65 years. The collected data were analyzed using SPSS for window 12.0 version.

## RESULTS AND DISCUSSION

### Socio-demography

During the study period, 33 patients were obtained who had complete data, consisting of 18 men and 15 women (Table 1).

**Table 1.** Demographics of Elderly Patients with COVID-19

Parameters	Severity		p	
	Severe/ARDS	Moderate		
BMI	Normal	5 (15%)	7 (22%)	0,251
	Overweight	8 (24%)	5 (15%)	0,201
	Obesity	8 (24%)	0 (0%)	0,001*
Early symptom	Fever	2 (6%)	5 (15%)	0,564
	Cough	8 (24%)	3 (9%)	0,153
	Shortness of breath	7 (22%)	1 (3%)	0,042*
	Chest pain	2 (6%)	0 (0%)	0,274
	Malaise	0 (0%)	2 (6%)	0,274
	Nausea and vomit	0 (0%)	1 (3%)	0,553
	Anosmia	0 (0%)	1 (3%)	0,553
	Decrease of consciousness	1 (3%)	0 (0%)	0,553
Comorbid	Hypertension	3 (9%)	6 (18%)	0,301
	Diabetes Mellitus	1 (3%)	2 (6%)	0,352
	Coronary arterial disease	1 (3%)	0 (0%)	0,553
	Tuberculosis	2 (6%)	1 (3%)	0,401
	Hepatitis	0 (0%)	1 (3%)	0,553
	Absent	0 (0%)	3 (9%)	0,165
	Multi-comorbid	13 (40%)	0 (0%)	0,001*

The results showed that gender did not correlate with the severity of COVID-19 (p=0.435). Patients aged 65-74 years correlated with the severity of COVID-19

(p=0.045). Patients who were exposed to cigarette smoke were also not related to the severity of COVID-19 (p=0.481). Patients who had no previous vaccine history were associated with the severity of COVID-19 (p=0.05). Patients with a history of COVID-19 contact and travel history were not associated with the severity of COVID-19 (p=0.515) and (p=0.737).

### Clinical

In the analysis of body mass index (BMI), obese patients tend to experience more severe symptoms (p=0.001) (Table 2). Patients with normal BMI and overweight did not correlate with severity (p=0.251 and p=0.201).

**Table 2.** Clinical Elderly Patients with COVID-19

Parameter	Severity		p	
	Severe/ARDS	Moderate		
Sex	Men	12 (36%)	6 (18%)	0,435
	Women	8 (24%)	7 (22%)	
Age	65-74	14 (43%)	8 (24%)	0,045*
	75-84	5 (15%)	3 (9%)	0,873
	≥85	1 (3%)	2 (6%)	0,607
Smoking	Exposed	19 (58%)	7 (22%)	0,481
	Not exposed	3 (9%)	4 (12%)	
Vaccine history	Yes	3 (9%)	6 (18%)	0,05*
	No	17 (52%)	7 (22%)	
COVID-19 contact history	Yes	10 (31%)	5 (15%)	0,515
	No	10 (31%)	8 (24%)	
Travel history	Yes	4 (12%)	2 (6%)	0,737
	No	16 (49%)	11 (34%)	

On examination of clinical symptoms, fever did not correlate with the degree of severity (p=0.564). Cough symptoms did not correlate with severity (p=0.153). Patients with shortness of breath tended to experience severe symptoms (p=0.042). Symptoms of chest pain did not correlate with severity (p=0.274). Symptoms of weakness also did not correlate with the degree of severity (p=0.274).

Complaints of nausea and vomiting did not correlate with the degree of severity (p=0.553). Symptoms of anosmia did not correlate with severity (p=0.553). Symptoms of decreased consciousness did not correlate with severity (p=0.553).

Patients with multi-comorbidity tended to have severe symptoms ( $p=0.001$ ). Patients with one or no comorbidities did not correlate with severity.

**Table 3.** Laboratory Results of Elderly Patients with COVID-19

Parameters	Severity		<i>p</i>	OR (CI 95%)
	Severe/ARDS	Moderate		
Blood routine test				
Low Hb level	11 (33%)	5 (15%)	0,049*	1,833 (0,299-11,259)
High WBC level	12 (36%)	10 (30%)	0,411	1,421 (0,812-1,824)
Low WBC level	3 (9%)	1 (3%)	0,056	0,186 (0,054-1,254)
Thrombo-cytopenia	6 (18,2%)	2 (6%)	0,011*	0,912 (0,785-1,341)
COVID-19 support parameter				
NLR	$\geq 3.13$	20 (61%)	0,001*	0,561 (0,421 - 1,125)
	$< 3.13$	0 (0%)	0,004*	0,462 (0,208-1,022)
ALC	$\geq 1500$	0 (0%)	0,001*	8,915 (1,514-66,081)
	$< 1500$	20 (61%)	0,002*	0,814 (0,456-1,208)
Blood glucose				
RBG	$\geq 200$	17 (52%)	0,001*	0,441 (0,215-0,822)
	$< 200$	3 (9%)	0,042	2,513 (1,107-4,255)

Note. Hb=haemoglobin; WBC=white blood cell; NLR=Neutrophil-lymphocyte ratio; ALC=Absolute-lymphocyte count; RBG=Random blood glucose.

## Laboratory

On laboratory results (Table 3), patients with anemia tended to have severe symptoms ( $p=0.049$ ; OR=1.833; 95% CI=0.299-11.259), as well as thrombocytopenia ( $p=0.011$ ; OR=0.912; 95% CI=0.785-1.341). Patients with NLR  $\geq 3.13$  tend to experience more severe symptoms ( $p=0.001$ ; OR=0.561; 95% CI=0.421-1.125), while patients with NLR  $< 3.13$  tend to experience milder symptoms ( $p=0.004$ ; OR=0.462; CI95%=0.208-1.022). Patients with ALC  $< 1500$  tended to experience milder symptoms ( $p=0.001$ ; OR=8.915; 95% CI=1.1514-66.081), while patients with ALC  $< 1500$

tended to experience more severe symptoms ( $p=0.002$ ; OR = 0.814; 95% CI = 0.456-1,208). Patients with random blood glucose (RBG)  $\geq 200$  tended to have severe symptoms ( $p=0.001$ ; OR=0.441; 95% CI=0.215-0.822).

## Radiological Feature

Elderly patients with COVID-19 had abnormal radiological features as shown in Table 4, showing a tendency to experience severe symptoms ( $p=0.070$ ). X-rays with bilateral infiltrates tend to have severe symptoms ( $p=0.024$ ). The radiological features of pulmonary oedema were not related to the severity ( $p=0.530$ ).

**Table 4.** Radiological Feature of Elderly Patients with COVID-19

Parameter		Severity		<i>p</i>
		Severe/ARDS	Mode-rate	
X-Ray	Abnormal	20 (61%)	11 (33%)	0,070*
	Normal	0 (0%)	2 (6%)	
Infiltrate	Unilateral	0 (0%)	3 (9%)	0,024*
	Bilateral	20 (61%)	10 (31%)	
Pulmonary oedema	Yes	3 (9%)	1 (3%)	0,530
	No	17 (52%)	12 (37%)	

## Outcome

Patients with severe symptoms tend to have a worse outcome than patients with moderate symptoms as shown in Table 5.

**Table 5.** Outcome of Elderly Patients with COVID-19

Parameter		Severity		<i>p</i>
		Severe/ARDS	Mode-rate	
Outcome	Not survived	14 (42%)	0 (0%)	0,0002*
	Survived	6 (18%)	13 (40%)	

## DISCUSSION

The results of this study showed several characteristics that correlated with the severity of the patient. Based on socio-demography, ages 65-74 are the most infected patients with COVID-19 and experience more severe conditions. Aging is associated with ACE-2 overexpression, immune dysregulation, decreased sex steroids, poor nutrition, vitamin D deficiency, mitochondrial dysfunction and oxidative

stress, comorbidities, and lower physical activity. These effects result in increased viral replication, cytokine storm, and poor lung protection against viruses.<sup>5</sup> However, based on CDC data, 80% of deaths occur among adults aged 65 years with the highest percentage in older adults aged  $\geq 85$  years.<sup>6</sup>

In this study, 80% of patients were exposed to cigarettes, both active and passive smokers. However, patients exposed to cigarettes were not associated with the severity of COVID-19. It is known that recent reviews show that nicotine exposure is associated with cardiopulmonary susceptibility to COVID-19 and tobacco use is at risk of viral infection and more severe clinical symptoms.<sup>7, 8</sup>

From our study data, it was found that patients who had no previous vaccine history were associated with the severity of COVID-19. The COVID-19 vaccine is highly effective in preventing COVID-19-related hospitalizations in older adults. In the elderly aged 65-74 years, the effectiveness of 2 doses of the vaccine is 96%, while in the elderly aged  $\geq 75$  years it reaches 91%.<sup>9</sup>

Based on clinical findings, patients with obesity tend to experience more severe symptoms. Recent evidence suggests that obesity weakens the immune system, leaving the host vulnerable to infectious diseases.<sup>10</sup> Obesity is a risk factor for the development of severe COVID-19 with the need for hospitalization and mechanical ventilation, especially in elderly patients. Obesity causes changes in the microbiota, physiological and immune responses associated with poor viral responses.<sup>11</sup> While the most common symptoms were cough (33%), shortness of breath (25%) and fever (21%). A systematic review of Singhal et al, stated similarly that the most common symptoms in elderly patients were fever, cough and shortness of breath.<sup>12</sup>

On hematological examination, almost half of the patients were anemic (48%). This study is in accordance with Bergamaschi et al, who stated that older people are at risk for

anemia and it can affect their quality of life.<sup>13</sup>

In COVID-19 patients, inflammation can cause changes in iron hemostasis and reduced iron absorption in the intestine, resulting in reduced metal availability in the process of erythropoiesis and hemoglobin (Hb) production.<sup>14</sup> Several studies have focused on the relationship between anemia and the severity or mortality of COVID-19, the results are still controversial.<sup>15, 16</sup>

In this study, the leukocyte count was increased (66%). The results of this study are similar to those of Liu et al., the increase in white blood cell count was significantly more common in elderly patients, indicating that elderly patients infected with 2019-nCoV were more likely to have bacterial infections.<sup>3</sup> The increase in the number of white blood cells and neutrophils in elderly COVID-19 patients was 30.64% and 33.33%.<sup>17</sup> In particular, a high neutrophil count was an independent predictor of poor outcome. Neutrophilia observed during a cytokine storm caused by viral infection.<sup>18</sup> In the study of Betsy et al, after autopsy they showed neutrophils infiltrating the lungs in the context of a cytokine storm triggering ARDS and causing organ damage and death in COVID-19.<sup>19</sup>

In this study, the percentage of thrombocytopenia did not predominate, but patients with thrombocytopenia tended to experience severe symptoms. Platelets tend to be activated in viral pneumonia causing lung damage by stimulating the respiratory inflammatory response. A tendency to thrombocytopenia in elderly COVID-19 patients may indicate a worsening of the thrombotic state, which is associated with increased mortality.<sup>20</sup> In elderly COVID-19 patients, thrombocytopenia is associated with a 4.24-fold increased risk of death.<sup>21</sup>

Inflammatory biomarkers describe immune status which is a predictor of COVID-19 prognosis. Hematological ratios such as neutrophil to lymphocyte ratio (NLR) and absolute lymphocyte count (ALC) are markers of systemic inflammation that have

been extensively investigated as potential predictors of viral pneumonia. Increased NLR and decreased ALC predict poor outcome in elderly COVID-19 patients.<sup>22</sup> In this study, supporting examination for COVID-19 showed an increase in NLR (82%) and a decrease in ALC (82%).

In our study, RBG value  $\geq 200$  mg/dL was present in most of the patients (58%). Severe hyperglycemia is common in critically ill patients and is seen as a marker of disease severity. The study of Li et al., examined COVID-19 patients with hyperglycemia who were hospitalized, consisting of 21.6% of the elderly who had a history of diabetes, 20.8% were newly diagnosed with diabetes, and 28.4% were diagnosed with dysglycemia.<sup>23</sup> The mechanism by which new-onset diabetes develops in the elderly with COVID-19 remains unknown, but it is possible that a number of complex etiologies exist, including disturbances in glucose disposal and insulin secretion, stress hyperglycemia, diabetes preadmission, and steroid-induced diabetes.<sup>24</sup>

Based on radiological results, 94% of chest X-rays had abnormal features with bilateral infiltrates (92%). Our study is consistent with the Neumann-Podczaska study, which stated that the most common radiological features in the elderly were ground glass opacities (GGO) (28.6%), or GGO + consolidation (12.9%), affecting multiple lobes (62.2%) with a bilateral distribution (58.2%). Although most studies did not specify a peripheral or central distribution specifically (93.0%), some studies tended to show a peripheral picture (4.5%) with some cases being peripheral and central (2.5%).<sup>25</sup>

The mortality rate for COVID-19 elderly patients treated at the Waikabubak Regional General Hospital still tends to be high, namely 14 patients (42%), which are included in the severe category. This figure is not much different from the national elderly mortality rate of 46% which was reported on January 31, 2022.<sup>2</sup>

## CONCLUSIONS

The results of this study indicate that clinical characteristics such as age, vaccine history, obesity, clinical symptoms (shortness of breath), multi-comorbid, laboratory (hemoglobin, platelets, NLR, ALC and GDS) and radiologically have a significant effect on the severity of COVID-19 infection in the elderly. By knowing the severity of the disease, patients will receive optimal therapy and reduce mortality. In addition, early diagnosis and supportive care are very important for elderly COVID-19 patients.

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## CONFLICT OF INTEREST

All authors declared that they do not have any conflict of interest in both the research and also in the article writing process.

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