



THE RELATIONSHIP BETWEEN AGE AND CLINICAL MANIFESTATIONS AND COVID-19 SEVERITY IN BENGKULU IN 2020

Utari Hartati Suryani¹, Dessy Triana², Riry Ambarsarie³, Zayadi Zainuddin⁴, Nikki Aldi Massardi⁵, Begumratu Voca⁶, Dia Triyani Putri⁷

^{1*,2,3,4,5,6,7} Faculty of Medicine and Health Sciences, Universitas Bengkulu, Kandang Limun, Bengkulu, Indonesia

¹ utarizayadi@yahoo.co.id ² dessy.triana13@gmail.com ³ riryambarsary@gmail.com ⁴ zay_adi@yahoo.co.id

⁵ nikki.alldi@gmail.com ⁶ begumratuvoca2001@gmail.com ⁷ diatriyaniputri@gmail.com

ARTICLE INFO	ABSTRACT
Published: September 25th, 2023 Keywords: infection, clinical manifestation, severity, pandemic, Covid 19	<i>The infectious disease COVID-19 caused by the SARS-CoV-2 virus can infect all age groups. The symptoms that arise can vary from no symptoms to severe and critical symptoms. Differences in clinical symptoms can occur due to differences in the distribution, maturation and function of the SARS-CoV-2 virus receptors. These clinical symptoms will determine the severity of COVID-19. This study aims to analyze the relationship between age and clinical symptoms and the severity of COVID-19 in Bengkulu Province in 2020. This study used an observational analytic study with a cross-sectional design. Samples were taken using a consecutive sampling technique and a total of 109 subjects were obtained who were COVID-19 patients in Bengkulu Province from March to December 2020. Assessment of clinical symptoms used COVID-19 epidemiological investigations. The degree of severity is determined based on the Guidelines for the Prevention and Control of COVID-19 by the Ministry of Health of the Republic of Indonesia. The relationship between the two variables was analyzed using the Spearman Rank test. The results of this study indicate that there is a significant relationship between the age factor of COVID-19 patients in determining the severity of COVID-19 ($p=0.000$; $p < 0.05$).</i>

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INTRODUCTION

The SARS-CoV 2 virus is a new type of virus from the Coronavirus which belongs to the Coronaviridae family (Li et al., 2020a). World Health Organization (WHO) established the status of this disease as a pandemic in March 2020 and this infectious disease SARS-CoV 2 was named Coronavirus Disease 2019 (COVID-19) (Song et al., 2020). On March 1 2020 the first case in Indonesia was reported and as of February 13 2022 cases of COVID-19 in Indonesia had reached 404,910,528 cases of positive confirmed COVID-19.

The infectious disease COVID-19 spreads very quickly throughout the world due to transmission of the virus via droplets, airborne, or through objects that have been contaminated (Galbadage et al., 2020). Another theory states that transmission of COVID-19 can occur directly or indirectly (Lotfi et al., 2020). Direct contact occurs through droplets that can reach a distance of 6 feet or approximately 2 meters. These droplets can survive in the environment for up to 3 hours and stick to surrounding objects. Objects contaminated with these droplets can become a medium for transmitting COVID-19. Transmission of COVID-19 can also occur indirectly through aerosols even if they are more than 2 meters in the air. This is supported by the theory that droplets can survive in the air.

The SARS-CoV-2 virus can infect humans if the virus enters the body through the mouth, nose or eyes. The SARS-CoV-2 virus that enters the human respiratory tract will attach to the receptor Angiotensin Converting Enzyme 2 (ACE-2) which is present in the epithelial cells of the trachea, bronchi, bronchioles and lungs (Hofmann et al., 2005a). After that, viruses that infect epithelial cells will attack the human immune system resulting in uncontrolled production of pro-inflammatory cytokines. This event is called a cytokine storm and can cause tissue damage (Li et al., 2020b). Differences in the distribution, maturation, and function of the SARS-CoV 2 virus receptor can affect the clinical symptoms that appear in COVID-19 patients (Hofmann et al., 2005b).

COVID-19 can infect all age groups and age is also one of the parameters determining the degree of severity of COVID-19 (Zare-Zardini et al., 2020). Symptoms that occur in COVID-19 patients vary from asymptomatic to critical, in general this virus causes respiratory problems (Ali & Alharbi, 2020). Common symptoms of COVID-19 patients consist of fever, cough, dizziness, dry throat, fatigue, shortness of breath and muscle weakness (Sun et al., 2020a). Other symptoms such as gastrointestinal disturbances can also be experienced by COVID-19 patients (Li et al., 2020b).

The degree of severity of COVID-19 can be determined based on clinical symptoms. The determination of the degree of severity used in Indonesia refers to the 2020 Guidelines for Prevention and Control of COVID-19 by the Indonesian Ministry of Health. The guidelines classify COVID-19 into five degrees, namely asymptomatic degree, mild illness degree, moderate illness degree, severe illness degree, and critical illness degree.

Table 1. Classification of COVID-19 Severity (Ministry of Health, 2020)

Degree of Severity	Clinical Symptoms	Explanation
Without symptoms (asymptomatic)	There are no clinical symptoms	The patient does not show any symptoms
Mild Pain	Mild illness without complications	Patients with non-specific symptoms such as fever, cough, sore throat, nasal congestion, malaise, headache, muscle aches.
Moderate Pain	Mild pneumonia	Children with mild pneumonia have a cough or difficulty breathing with fast breathing; respiratory rate: age <2 months ≥ 60 breaths/minute; age 2-11 months ≥ 50 x/minute; age 1-5 years ≥ 40 x/minute. Patients aged 6-17 years with clinical signs of pneumonia (fever, cough, dyspnea, rapid breathing) and no signs of severe pneumonia.

		In patients >18 years with clinical signs of fever, cough, rapid breathing, dyspnea without symptoms of severe pneumonia.
		Child with cough or difficulty breathing, plus at least one of the following: 1. Central cyanosis or SpO₂ < 90% 2. Severe respiratory distress eg snoring, heavy chest indrawing 3. Signs of severe pneumonia: inability to breastfeed or drink, lethargy, seizures 4. Tachypnea: age <2 years ≥60 breaths/minute; age 2-11 months ≥50 x/minute; age 1-5 years ≥40 x/minute; age >5 years ≥30 x/minute.
Severe pain	Severe pneumonia	Age 5-17 years with complaints of fever or under surveillance for respiratory infections, plus one of; respiratory rate >30 x/minute, distress heavy breathing, or oxygen saturation <90% at room temperature. Patient >18 years symptomatic fever as well as in the monitoring of respiratory tract infections, frequency breath >30 breaths/min, severe respiratory distress, oxygen saturation <90%.
Critical Pain	Acute Respiratory Distress Syndrome (ARDS)	Onset: recent or worsening within one week. Chest imaging (thoracic CT scan or lung ultrasound): bilateral opacity, unexplained pleural effusion, lung collapse, lobar collapse or nodule. Cause of edema: respiratory failure not due to heart failure or fluid overload.

This study aims to analyze the relationship between age and clinical symptoms and the severity of COVID-19 in Bengkulu Province in 2020. This study aims to analyze the relationship between age and clinical symptoms and the severity of COVID-19 in Bengkulu Province in 2020. The study will contribute to the understanding of the correlation between adult age with clinical manifestation and severity of COVID-19 in Bengkulu Province. The study will also add to the existing research on the clinical presentation of COVID-19, which ranges from asymptomatic infection to severe fatal diseases. Additionally, the study will provide insights into the COVID-19

situation in Bengkulu Province, which had a lower COVID-19 mortality rate compared to other provinces in Indonesia in 2020.

METHOD

The research was conducted in Bengkulu Province with retrospective study from March to December 2020. The research design is an observational study with a study for cross-sectional. The study population was patients who were confirmed to have COVID-19 in 2020 and who live in Bengkulu Province. Determination of the sample was calculated using the slovin formula and obtained a sample of 109 subjects, then the sample was taken randomly non probability sampling using techniques of consecutive sampling.

The research data was obtained from the COVID-19 Epidemiological Investigation Form which included the research variables in the form of age and clinical symptoms of COVID-19 patients. These clinical symptom variables will be interpreted in terms of the severity of COVID-19 which is guided by the 2020 Guidelines for Prevention and Control of COVID-19 by the Indonesian Ministry of Health.

The collected data will be analyzed univariate and bivariate. The results of univariate analysis in the form of distribution and percentage of each variable studied. Bivariate analysis is intended to analyze the relationship between the two research variables, namely the independent variable in the form of age and the dependent variable in the form of the degree of severity of COVID-19. The test used in the bivariate analysis is the Spearman Rank correlation test with a confidence level of 95% and a degree of deviation of 5%. The results are significant if the p value <0.05 and not significant if the p value ≥ 0.05 .

RESULT AND DISCUSSION

Characteristics of Research Subjects

Table 2. Gender Distribution of Research Subjects

Gender	%
Man	45,9%
Woman	54,1%

Based on table 2, there are more female research subjects (54.1%) than male sex (45.9%). This is different from the results of a study conducted in the United States which stated that there were more male subjects than female (Covid et al., 2020).

The proportion of male sex mortality is higher than female mortality, this is due to the habit of smoking and drinking alcohol in men (Vahidy et al., 2021). WHO European Region also stated that COVID-19 infection is more often found in males than females (WHO, 2021).

Table 3. Age Distribution of Research Subjects

Age	%
0 – 18 Years	49,5%
>18 Years	50,5%

Based on table 3, most of the COVID-19 patients are >18 years old.

Table 4. Distribution of Clinical Symptoms of COVID-19 in Research Subjects

Clinical Symptoms	%
Cough	18,1%
Fever	16,2%
Have a cold	18,1%
Weak	10,8%
Hard to breathe	13,2%
Severe Respiratory Distress	2,5%
Sore throat	6,4%
Headache	2,5%
Not Symptomatic	19,6%
Anosmia	1,5%
Nauseous	0,5%
Vomiting	0,5%

Based on table 3, most COVID-19 patients do not experience any symptoms (19.6%). The clinical symptoms most felt by the COVID-19 patients who were the subjects of this study were coughs (18.1%) and runny nose (18.1%). Demographic research conducted in Indonesia using the spatial-temporal method also yielded results that COVID-19 patients in Indonesia had the most clinical symptoms, namely cough and fever. Not all COVID-19 patients experience breathing difficulties (Aisyah et al., 2020).

The results of demographic data findings by (Aisyah et al., 2020) are in line with the profiles of COVID-19 patients in other Southeast Asian countries. One of the spreads of COVID-19 in Indonesia is suspected to be due to the transmission of people from infected areas such as Malaysia (Aisyah et al., 2020). Complaints in the form of cough, runny nose, and fever are included in the classification of severity of mild illness COVID-19 which is the most common classification in this study (Fig. 3).

Relationship between Age and Severity of COVID-19

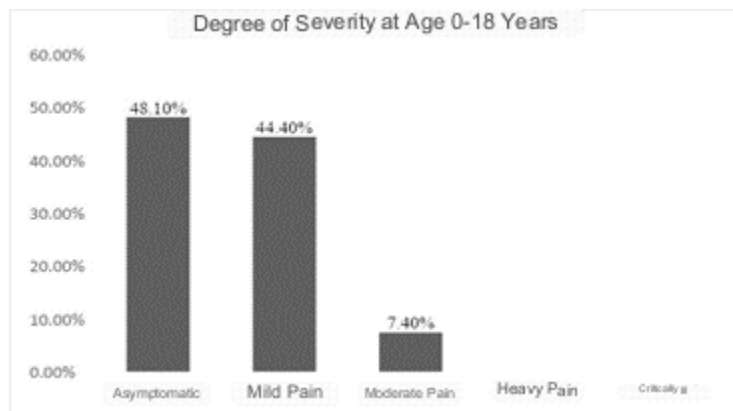


Figure 1. Distribution of COVID-19 Severity in Patients Aged 0 – 18 Years

Based on Figure 1. Shows that at the age of 0 – 18 years the most subjects suffer from asymptomatic degrees of COVID-19 (48%). Clinical symptoms that exist at the age of 0-18 years tend to be non-specific. For example, children aged 1 year cannot convey subjective complaints, then these non-specific symptoms are due to overlap with other infectious diseases besides COVID-19, such as when the seasons change there will be an increase in the incidence of influenza in children (Sun et al., 2020b; Yonker et al., 2020).

The results of this study indicate that there is no degree of severity of critical illness found at the age of 0-18 years. This statement is in line with research (Lingawi, 2021) which states that COVID-19 that occurs in children has a milder degree of severity than in adults (Lingawi, 2021). Similar studies also suggest that children have a more active innate immune response and a healthy respiratory system (Lu et al., 2020).

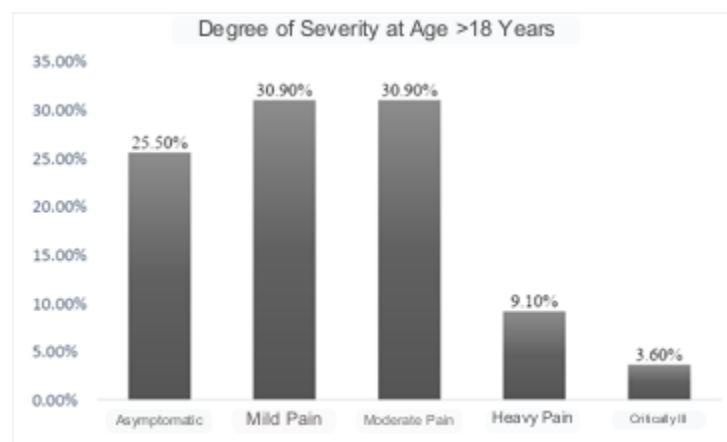


Figure 2. Distribution of COVID-19 Severity in Patients > 18 Years Old

Figure 2 states that the highest degree of severity of COVID-19 at the age of > 18 years is moderate illness (31%) and mild illness (31%). The older a person is, the faster the process of aging occurs on the immune system in the body when fighting coronavirus although the number

of alveolar macrophages increases but their plasticity to transform pro-inflammatory and anti-inflammatory has decreased. Therefore, this lack of plasticity affects the degree of lung damage in COVID-19 patients (Mueller et al., 2020).

Prognostic mortality and severity of COVID-19 patients are influenced by conditions such as epigenetic dysregulation, age, immune defects, and comorbidities (Mueller et al., 2020). A state of defective immunity such as an excessive and out-of-control increase in the number of cytokines that the body protects against coronavirus but this can cause cytokine storm syndrome (Bajaj et al., 2021).

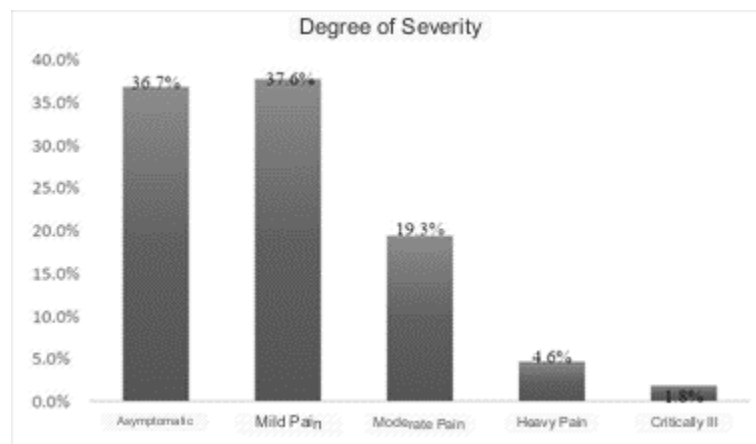


Figure 3. Distribution of COVID-19 Severity

Figure 3 shows the results of the severity of COVID-19 at the age of 0 -> 18 years, the mildest illness (38%) followed by the severity of asymptomatic illness (37%) and critical illness (19%).

This study obtained $p = 0.000$, which means that there is a statistically significant relationship between the age of COVID-19 patients in determining the severity of COVID-19 ($p < 0.05$). Ages 0-18 years are easily infected with COVID-19 due to activities outside the home such as at school and playgrounds, but diagnosing COVID-19 based on clinical symptoms alone is very difficult at this age because ages 0-18 years predominantly experience the degree of severity of COVID-19. 19 were asymptomatic (Chai et al., 2021).

Based on previous studies, it was also stated that COVID-19 patients with an age range of less than 20 years' experience a milder degree of severity of COVID-19 than adult patients (Shoaib et al., 2021). It is possible for COVID-19 patients with an age range of >18 years to experience a degree of asymptomatic severity to mild illness. This can happen because of differences in a person's immune condition. If immunity is still good, the subject is classified as asymptomatic to mildly ill and vice versa (Bajaj et al., 2021). The same thing was also stated by (Manivannan et al., 2021). Patients aged 0-18 years with asymptomatic severity to mild illness can be associated with a heterologous immune response mechanism and a higher number of memory T cells and a higher level of ACE-2 expression so as to prevent worsening (Manivannan et al., 2021).

The limitations of this study are that researchers did not analyze other factors that influence the degree of severity of COVID-19 such as gender, habits, and comorbidities. Researchers also

did not look at laboratory results and radiological imaging results in COVID-19 patients. Researchers only looked at the initial symptoms of patients infected with COVID-19 on the Epidemiological Investigation forms and medical records.

CONCLUSION

This study illustrates that age can be a risk factor related to clinical symptoms and the degree of severity of COVID-19 patients. The research implication of this study is that age should be considered as a factor in determining the severity of COVID-19 and the clinical manifestation of the disease. The study suggests that patients aged 0-18 years have a milder degree of severity than patients aged >18 years. However, further studies are needed to analyze other factors that may determine the susceptibility of COVID-19 patients of a certain age.

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