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Artikel

The correlation between Children's Age Factors toward the clinical manifestation and the severity level of COVID-19 in Bengkulu Province in 2020

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Abstract: Coronavirus Disease 2019 (COVID-19) is a disease that can infect people of all ages. Symptoms can range from asymptomatic to severe in certain age groups. It can occur due to differences in the innate immune response, comorbidities and the function, distribution, maturation of the SARS-CoV-2 receptor. This study aimed to determine the correlation between children's age factors toward the clinical manifestation and the severity level of COVID-19 in Bengkulu Province in 2020. An observational analytic study with cross-sectional design was used in this study. This study included 86 children aged 0-18 years old who were confirmed positive for COVID-19 and lived in Bengkulu Province from March to December 2020. The clinical manifestation was assessed using the COVID-19 epidemiological investigation form and medical records from M.Yunus Hospital. The degree of severity is determined using Ministry of Health of Indonesia's Guidelines for COVID-19 Prevention and Control. The result showed that of the majority of children aged 0-1 years old, 5-11 years old, and 12-18 years old have asymptomatic severity illness. While children are between the ages of two and four, the majority of their illnesses are of a mild severity. There was no significant correlation between children age factors and the severity of COVID-19 in Bengkulu Province in 2020.

Kata Kunci: COVID-19; Children; The Clinical Manifestation; Severity

1. Introduction

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) outbreak has been reported in China. The virus has spread all over the world, including Indonesia. In March 2020, World Health Organization (WHO) declared Coronavirus Disease 2019 (COVID-19) to be pandemic. On February 15, 2021, the Ministry of Health of the Republic

of Indonesia reported 1,233,959 positive cases spread across 34 provinces, with 4,726 positive cases of COVID-19 in Bengkulu Province [1].

SARS-CoV-2, which causes COVID-19 can infect people of all ages. Until February 2021, as many as 2.8% of positive cases of COVID-19 in Indonesia were 0-5 years old and 9.1% of positive cases of COVID-19 in Indonesia were 6-18 years old [1]. In Bengkulu Province, 2.1% of positive cases of COVID-19 were under the age of five and 7,7% were between the ages six and eighteen [1].

Symptoms can range from asymptomatic to severe in certain age groups. COVID-19 is most commonly found in respiratory tract and other body organs such as gastrointestinal [2]. COVID-19 symptoms include dry cough, fever, dyspnea, myalgia, sore throat, headache, vomiting and diarrhea [3]. Children who tested positive for COVID-19 tend to have mild to moderate disease severity compared to adults [4]. Children and adults have different clinical symptoms and severity levels. It could be caused by differences in the innate immune response, comorbidities, the distribution, maturation and function of the SARS-CoV-2 virus receptor and so on [5].

2. Material and Methods

This is cross-sectional observational analytic study. This study was conducted in Bengkulu Province from March to December 2020 in a retrospective setting. This study included 86 children aged 0 to 18 years old who were confirmed positive for COVID-19 and lived in Bengkulu Province. The consecutive sampling technique was used for sampling. The COVID-19 epidemiological investigation form and medical records from M. Yunus Hospital were used as the instruments of this study

3. Result and Discussion

2.1 The Characteristics of Research Subjects

According to the findings of this study, COVID-19 is found to be more prevalent in females (64.3%) than in males (33.7%). However, according to a study in the United States, male COVID-19 patients predominate female COVID-19 patients in children [6]. Woman have a stronger immune response than men. The number of ACE-2 receptors in men's lungs seems to be higher than in women's [7]. According to a study in China stated that COVID-19 in males and females are not different [6].

Children aged 12 to 18 years old are the age group most likely to be infected with that experience COVID-19 (50%). The epidemiological data in Bengkulu Province showed the 6-18 years age group is more likely to be infected with COVID-19 than the 0-5 year age group [1]. According to a study in United States, the 12-18 year age group has the highest prevalence of COVID-19 [8]. Children aged 0-9 years old have the lowest COVID-19 prevalence of any age groups [9].

The level of transmission and exposure to the SARS-CoV-2 is related to the prevalence of COVID-19 infection in children of various ages. School-age are 12-18 years old, and transmission of the SARS-CoV-2 was higher in this group than in other age groups of

children [9]. Another factor influencing SARS-CoV-2 viral transmission is variation in the quantity and affinity of ACE-2 receptors for SARS-CoV-2. The number and sensitivity of ACE-2 receptors increase with age [10]. According to the findings, children aged 12-18 years old have more ACE-2 receptors than children of other ages.

COVID-19 was found to be asymptomatic in almost all of the children in this study (53.5%). Asymptomatic COVID-19 infections are more common in younger people with no comorbidities. The ACE-2 receptor is involved in severe lung organ damage during viral infection, and the severity of the illness influences the development and affinity of the SARS-CoV-2 ACE-2 receptor [11].

Table 1. The Distribution of COVID-19 Clinical Manifestation

Clinical Manifestation	%
Asymptomatic	34
Cough	11
Fever	15
Flu	10
Weak	7
Shortness of breath	5
Anosmia	2
Sore throat	6
Headache	4
Diarrhea	2
Vomiting	2
Apnea	1
Nausea	1

2.2 The Correlation between Children's Age Factor toward the Clinical Manifestation and The Severity Level of COVID-19

The clinical symptoms that determine the severity of COVID-19 in children are often non-specific. Some clinical signs may go unidentified due communication barriers. Pediatric patients under the age of one year have been unable to communicate subjective symptoms such as weakness, myalgia, dizziness, and headaches [12].

Some factors, such as age, influence the severity of COVID-19. COVID-19 is less likely to affect younger people [13]. On the other hand, infant are more vulnerable to and at risk of severe COVID-19 infection than other children of other ages [14]. In infants infected with COVID-19, proinflammatory cytokines such as Interleukin 6 (IL-6), Tumor Necrosis Factor α (TNF-α) and Interferon γ (IFN-γ) will increase. One factor contributing to the worsening of COVID-19 prognosis is an increase in proinflammatory cytokines [12].

Fig. 1. The Distribution of The Severity Level of COVID-19 patients aged 0 to 1 years old

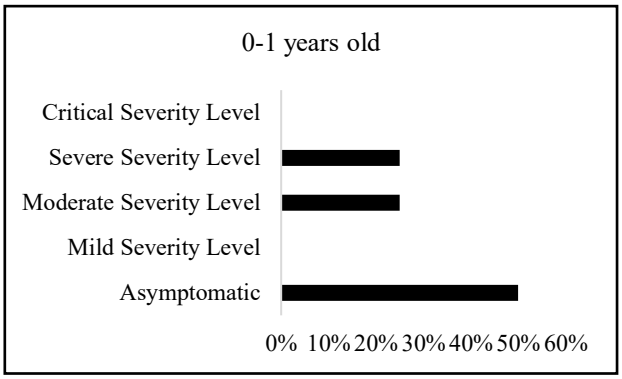


Fig. 2. The Distribution of The Severity Level of COVID-19 patients aged 2 to 4 years old

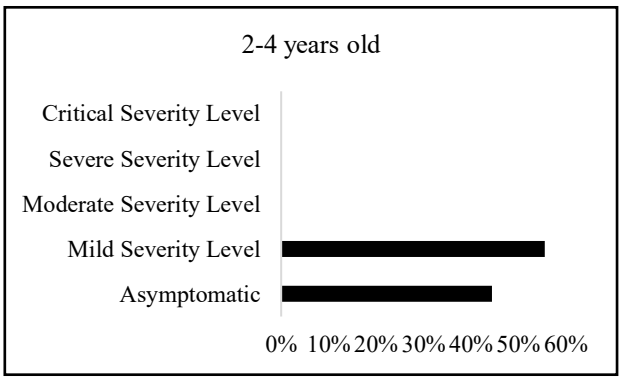


Fig 3. The Distribution of The Severity Level of COVID-19 patients aged 5 to 11 years old

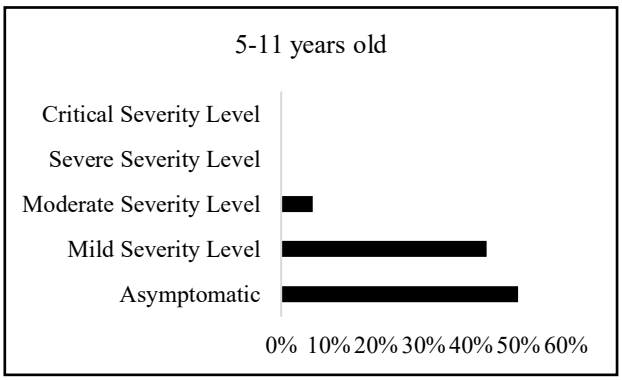
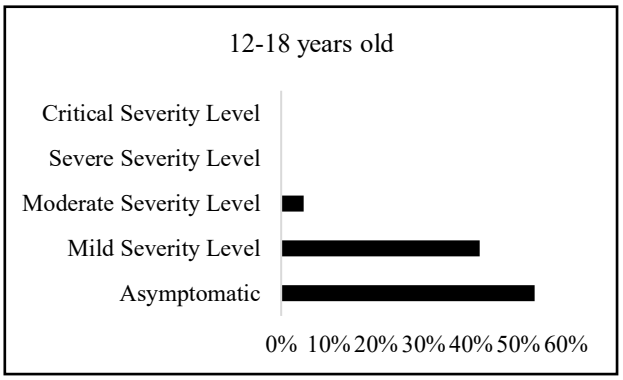


Fig 4. The Distribution of The Severity Level of COVID-19 patients aged 12 to 18 years old



According to the findings of this study, there was no significant correlation between children's age factor and the severity level of COVID-19 (p = 0,454, p>0,05); (r = -0,082). The majority of COVID-19 pediatric patients were asymptomatic (51.2%) and had mild illness (41.9%). This study did not include any patients who were critically ill. According to other studies, COVID-19 symptoms and disease severity are milder in children than in adults [14]; [15]. It is associated with a more active innate immune response, a healthier respiratory system, and immaturity of the ACE-2 receptor in children. ACE-2 immaturity may reduce the risk of COVID-19 infection in children [16].

COVID-19 patients over the age of 60 had lower lymphocyte levels than COVID-19 patients under the age of 60. Lymphocytes will increase in number in response to viral infection. Reduced lymphocyte levels in SARS and COVID-19 are abnormal. The mechanism underlying this condition remain unknown. Low levels of lymphocytes, on the other hand, can be used to determine the severity of COVID-19 [17]. COVID-19 patients over the of 60 have a higher incidence of respiratory organ failure than those under the age of 60, requiring more time for treatment and recovery. It demonstrates that those over 60 years old have more severe COVID-19 symptoms than those under 60 years old and have poorer response to therapy during the treatment period [17]

4. Conclusion

The age of children does not predispose the clinical manifestation and the severity level of COVID-19 in Bengkulu Province in 2020.

5. Acknowledgement

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