

FACTORS RELATED TO THE DEGREE OF SEVERITY OF CORONAVIRUS DISEASE 2019 (COVID-19) INFECTION IN INPATIENT PATIENTS AT DR. M. DJAMIL HOSPITAL, PADANG

Masrizal¹⁾, Ade Suzana Eka Putri¹⁾, Nabila Putri Rahmatillah²⁾,
Muhammad Alfarezi³⁾

¹⁾Lecturer of Public Health Faculty, Andalas University

²⁾Undergraduate Student of Masters in Epidemiology, Andalas University

³⁾Graduate Student of Public Health Faculty, Andalas University

ABSTRACT

Background: The severity of COVID-19 is highly variable, ranging from asymptomatic infection to a complicated and sometimes lethal course. Case series (hospital based studies) have identified risk factors associated with poor outcomes, including older age, male sex and certain underlying diseases. The aimed of this study was to determine factors associated with severity of covid-19 infection.

Subjects and Method: This was a cross-sectional study conducted at Dr. M. Djamil Hospital Padang, West Sumatra, from March 2020 to February 2021. A random sample of 95 patients were selected for this study. The dependent variable was severity of COVID-19. The independent variables were age, sex, hypertension status, diabetes mellitus status, cardiovascular disease status, respiratory disease status, and smoking history. The data were obtained from medical record and analyzed reporting by chi-square and described by the Prevalence Odds Ratio (POR).

Result: The severity of COVID-19 infection increased with older age (POR= 4.52; 95% CI= 1.48 to 12.1), cardiovascular disease (POR= 5.99; 95% CI= 1.67 to 21.4), and respiratory disease (POR= 6.61; 95% CI= 2.09 to 20.8).

Conclusion: The severity of COVID-19 infection increased with older age, cardiovascular disease, respiratory disease.

Keywords: COVID-19, cardiovascular, respiration, severity, age.

Correspondence:

Masrizal. Faculty of Public Health, Andalas University. Jl. Limau Manis, Pauh, Padang 2-5175, West Sumatera. Email: masrizal.dtmangguang@gmail.com. Mobile: +62812673-3228

BACKGROUND

Coronavirus Disease 2019 (COVID-19) is a respiratory infectious disease caused by the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) or what is often called the corona virus. This virus is a zoonotic pathogen that has a high mutation rate so it can live in humans and animals with a variety of clinical presentations, ranging from asymptomatic, mild to severe symp-

toms, to death. Common signs and symptoms of COVID-19 infection include symptoms of acute respiratory distress such as fever, cough and shortness of breath. The average incubation period is 5-6 days with the longest incubation period being 14 days. In severe cases of COVID-19 it can cause pneumonia, acute respiratory syndrome, kidney failure and even death (Mendagri RI, 2020; Cascella et al, 2021)

According to data on the distribution of cases of COVID-19 worldwide, there has been an increase in the number of positive cases and deaths, which fluctuate every day and even tend to rise and increase significantly. Based on data on the distribution of COVID-19 cases reported by WHO as of August 4, 2021, it was recorded that 227 countries and regions around the world have been infected with SARS-CoV-2. There was an additional 548,167 cases worldwide, bringing the total recorded cases to approximately 199 million cases with a cumulative total death of 4.2 million cases. The countries recorded as having the highest number of positive cases were the United States which reached 35 million cases, followed by India around 31.7 million cases, Brazil around 19.9 million cases, Age around 6 million cases, France around 6 million cases, England around 5.9 million cases (WHO, 2021).

West Sumatra is ranked 11th nationally as the province with the highest number of positive COVID-19 cases in Indonesia. The number of cases is still fluctuating. Based on data on the distribution of the coronavirus situation in West Sumatra as of August 4, 2021, there were around 806 confirmed cases and 52 deaths. The regency/city with the most cases is Padang City with the number of positive confirmed cases around 1,760 cases and 44 cases dying. Padang, which has the highest number of cases among other regenci-

es/cities, has been designated a COVID-19 red zone (Diskominfo, 2021).

Central General Hospital DR. M. Djamil Padang City was appointed by the Ministry of Health as one of the COVID-19 referral hospitals to carry out the management of COVID-19 cases in accordance with the Decree of the Minister of Health no. 169 of 2020 concerning Determination of Hospital Dr. M. Djamil Management of Certain Emerging Infectious Diseases. As a referral hospital RSUD DR. M. Djamil not only accepts patients from within the city of Padang, but also accepts referral patients from outside the city and various areas in West Sumatra. Based on initial data obtained, the cumulative data on COVID-19 patients from March 2020 in February 2021, there were a total of 782 confirmed positive cases. This number will continue to change as the number of COVID-19 cases increases every day (Kemenkes RI, 2021)

Based on global research, WHO states that the severity or degree of severity of COVID-19 can be influenced by various risk factors such as age, smoking habits, underlying diseases (comorbid) such as asthma, diabetes mellitus and hypertension. This statement is also in line with and strengthened by the results of a study by Alqah-tani, et al (2020) which stated that the percentage of patients with diabetes, hypertension, or thyroid disease was significantly higher ($p < 0.001$, $p < 0.001$, $p = 0.002$) related to the severity COVID-19. Dan Wang, et al (2020) also found that

138 COVID-19 patients had comorbidities. Patients who are in the Intensive Care Unit (ICU) have a higher percentage of comorbidities (72.2%) than those who are not admitted to the ICU (Alqahtani et al, 2020; Wang D et al, 2021)

The factors related to the severity are considered important to study in view of this case that has not been disabled so it is necessary to find out what factors are associated with an increase in the severity of COVID-19. Because in the prevention and control of the severity that can cause death, it is necessary to first know the risk factors that cause it. Moreover, some of the factors previously described are closely related to the pattern of daily life, such as smoking, Hb, and comorbidities. Assessing these risk factors is considered important so that it can be conveyed to the community, especially the people of West Sumatra, so that people can be motivated in maintaining the health of themselves and others.

Based on the initial survey, the high prevalence of COVID19 with different levels of severity need to know the risk factors to minimize the higher risk. So this research was conducted with the aim of knowing the factors associated with the degree of severity of COVID-19 infection in inpatients at Dr. M. Djamil Hospital, Padang.

SUBJECTS AND METHOD

1. Study Design

This was a cross sectional study conducted at DR. M. Djamil Hospital, from Auguts 2021 to June 2022

2. Population and Sample

The study population was all confirmed positive COVID-19 patients who was hospitalized at DR. M. Djamil Hospital, Padang, from March 2020 to February 2021, as many as 782 patients. A sample of 95 COVID-19 patients was selected for this study.

3. Study Variables

The dependent variable was severity of COVID-19. The independent variables were age, sex, hypertension, diabetes mellitus, cardiovascular disease, respiratory disease, and smoking history.

4. Operational Definition of Variables

Severity of COVID-19, a person who is diagnosed with COVID-19 infection after a swab test is carried out whose degree of severity can be seen from the clinical manifestations and medical procedures performed and listed in the medical record of inpatients at DR M. Djamil Hospital.

Age, the patient's life span is calculated from birth to the time the patient is hospitalized for the first time.

Sex, gender differences in COVID-19 patients.

Hypertension was defined as patients diagnosed with comorbid hypertension history recorded in the patient's medical record.

Diabetes mellitus was defined as patients diagnosed with comorbid Diabetes Mellitus history recorded in the patient's medical record.

Cardiovascular disease was patients diagnosed with comorbid cardiovascular disease history recorded in the patient's medical record.

Respiratory disease: Patients diagnosed with comorbid respiratory

disease history recorded in the patient's medical record.

Smoking history, the activity of inhaling cigarette smoke is burned and exhaled. Smoking history recorded in the patient's medical record.

5. Study Instruments

The data were obtained from medical record.

6. Data Analysis

The data were analyzed using Chi-square test and reported Odds ratio (OR).

Table 1. Characteristics Sample

Variables	n	%
Severity		
Severe	41	43.2
No Severe	54	56.8
Age		
>60 Years old	32	33.7
≤60 Years old	63	66.3
Sex		
Male	49	51.6
Female	46	48.4
Hypertension status		
Yes	47	49.5
No	48	50.5
Diabetes Mellitus		
Yes	37	38.9
No	58	61.1
Cardiovascular disease		
Yes	20	21.1
No	75	78.9
Respiratory Disease		
Yes	27	28.4
No	68	71.6
Smoking History		
Yes	13	13.7
No	82	86.3

2. Bivariate Analysis

Table 2 described the results of Chi square test. It was found that age was related to the degree of severity of COVID-19 (OR= 4.10; p= 0.002). It means that patients aged over 60 years was at risk of 4.10 times

RESULTS

1. Univariate Analysis

Based on table 1, it was found that the proportion of patients infected with COVID-19 hospitalized at Dr. M. Djamil Padang Hospital in 2020-2021 was 43.2%. As many as 33.7% of patients were at age 60 years. Several comorbidities that the patient had, including hypertension (49.5%), diabetes mellitus (38.9%), cardiovascular disease (21.1%), and respiratory diseases (28.4%). As many as 13.7% of patients had a history of smoking.

increasing the severity of COVID-19. Male is related to the degree of severity of COVID-19. Male patients are at risk of 2.33 times increasing the severity of COVID-19 (OR= 2.33; p= 0.044). There were no relationship between hypertension and the seve-

rity of COVID-19 (OR= 1.13; 95% CI= 0.50 to 2.54; p= 0.767).

Diabetes mellitus (OR= 2.49; 95% CI= 1.07 to 5.81; p= 0.033), cardiovascular disease (OR= 5.65; 95% CI= 1.84 to 17.2; p= 0.001), respira-

tory disease (OR= 6.39; 95% CI= 2.34 to 17.4; p= 0.001) and smoking (OR= 3.51; 95% CI= 0.99 to 12.3; p= 0.041) increased the risk of the severity of COVID-19.

Table 2. The relationship between independent variables and severity of COVID-19 in Inpatients at Dr. M. Djamil Hospital, Padang

Independent Variables	OR	(95% CI)		p
		Lower Limit	Upper Limit	
Age	4.10	1.66	10.1	0.002
Sex	2.33	1.01	5.37	0.044
Hypertension status	1.13	0.50	2.54	0.767
Diabetes Mellitus status	2.49	1.07	5.81	0.033
Cardiovascular disease status	5.65	1.84	17.2	0.001
Respiratory disease status	6.39	2.34	17.4	0.001
Smoking history	3.51	0.99	12.3	0.041

DISCUSSION

Based on the results of the study, it was found that age was related to the severity of COVID-19. Age affects the severity of disease and mortality in COVID-19 patients. Age that has a high level of severity occurs in elderly people, namely individuals who are more than 60 years old. This is presumably because the competence of a person's immune system decrease with age (Wang et al, 2021; Sohrabi et al, 2021; Pustahija et al, 2021).

Based on the results of the study, it was found that gender was related to the severity of COVID-19. The variability of innate immunity, steroid hormones and factors associated with sex chromosomes make men more susceptible to viral infections. Men found to be more prone to SARS infection CoV-2 and have a lower life

expectancy than women (Wang et al, 2021; Sohrabi et al, 2021; Priya et al, 2021).

In this study it was found that hypertension was not related to the degree of severity of COVID-19 infection. The results of this study are in line with research conducted by Zhang, et al (2020) which found hypertension unrelated to the severity of COVID-29. However, these results contradict the research conducted by Pustahija, et al. (2020) and Wang et al. (2020) which stated that hypertension is one of the factors associated with the severity of COVID-19. The difference in the results of this study could be caused by several factors, including patients with COVID-19 who have a history of hypertension, the number is also in patients with less severe degrees. Some patients who are not at risk or with a non-severe degree on average have a history of

controlled hypertension, namely taking medication regularly and maintaining better health (Wang et al., 2021; Pustahija et al, 2021; Zhang J et al, 2021). Research by Al-qahtani, et al (2020), Thasya (2022) and Merlin (2021). Patients with diabetes mellitus have unstable blood sugar levels and are easy to lose weight, causing impaired immunity. The unstable health condition of people with diabetes mellitus makes it difficult for the body to fight other viral infections (Alqahtani et al, 2020; Thasya, 2021; Ndera et al, 2020).

Based on the research results, it was found that cardiovascular disease is associated with the degree of severity of COVID-19. The results of this study are in line with research that has been conducted by Wang et al., (2020), El Raheem, et al (2021) and Priya, et al (2021). Cardiovascular disease is a common co-morbidity found in patients infected with COVID-19. The high risk that can increase the severity in patients infected with COVID-19 with CVD may be due to the presence of ACE2 receptors on the heart organs and the endothelial lining of blood vessels which have the potential to be involved in SARS-CoV-2 infection in the cardiovascular system. (Wang et al, 2021; Priya et al, 2021; El Raheem et al, 2021).

Based on the research results, it was found that respiratory disease is related to the degree of severity of COVID-19. The results of this study are in line with research conducted by Priya, et al

(2021) and Wang et al. (2020). The most common respiratory diseases were asthma (13.2%), COPD (2.3%) and bronchiectasis (0.5%). People with respiratory diseases have a weak physical condition so they are very vulnerable and at risk of infection with COVID-19 (Wang et al, 2021; Priya et al, 2021) Based on the results of the study, it was found that smoking history was associated with the severity of COVID-19. The results of this study are in line with Priya et al (2021) and Sohrabi et al (2021). WHO states that smoking is associated with an increase in severity.

Based on the results of the study, it was found that smoking history was associated with the degree of severity of COVID-19. The results of this study are in line with Priya et al (2021) and Sohrabi et al., (2021). WHO states that smoking is associated with an increased degree of severity and mortality due to COVID-19 who are treated in hospitals. WHO also recommends quitting smoking considering the dangers of using tobacco and exposure to second hand smoke (Sohrabi et al, 2021; Priya et al, 2021).

Based on the results of a study conducted on 95 patients, it was found that most of the patients who were hospitalized were patients with mild-moderate symptoms. Factors related to the severity of COVID-19 in hospitalized patients at Dr. M.Djamil Hospital, Padang in 2020-2021 are age, gender, diabetes mellitus, cardiovascular disease, respiratory disease, and smoking history variables. Meanwhile,

the most dominant factor related to the severity of COVID-19 is respiratory disease. The advice given is that hospitals should further improve health promotion in respiratory diseases, cardiovascular disease which is the disease most often found in patients who have grades severity of COVID-19 infection.

AUTHOR CONTRIBUTION

All authors contributed to this study

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CONFLICT OF INTEREST

The authors have no conflicts of interest to declare

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