Risk Factors Related to Mortality in COVID-19 Patients Hospitalized at Dr. Mohammad Hoesin General Hospital Palembang

Nieke Erianita[1*], Sari MP[1], Alfiah L[1]

[1]Instalation of Medical Record, Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia

A B S T R A C T

The high risk of death for patients infected with COVID-19 has resulted in many stakeholders making policies and regulations related to COVID-19 in an effort to prevent the spread of this virus in Indonesia, starting from activating lockdowns, physical distancing to vaccinations in order to reduce morbidity and mortality rates. This study aimed to analyze various factors that could increase the risk of death of COVID-19 inpatients at Dr. Mohammad Hoesin General Hospital Palembang. The study uses the design of case-control by analyzing univariate, bivariate, and multivariates. The place of this research was carried out in Dr. Mohammad Hoesin General Hospital Palembang in the range of April until June 2020. It uses subjects based on study criteria. The result of bivariate analysis of the cause of death with independent variables based on data of COVID-19 claims in 2020. Statistically, there were some relationships among the gender (p-value=0,010), age (p-value=<0,0001), comorbid diseases (p-value=<0,0001), history of close contact with COVID-19 sufferers (p-value=0,006), length of stay (p-value=<0,0001). COVID-19 patients who have aged ≥50 years are at risk 2,74 to a higher risk of causing death than those aged <50 years after controlling for comorbid disease variables and length of stay (95% CI: 1,84-4.07). In conclusion, age is the dominant factor causing death. It can be used as a policy reference and additional information for readers. To apply the health protocols correctly and always consume nutritious food, especially for risky groups.

1. Introduction

Coronavirus 2019 disease (COVID-19) is caused by SARS-CoV-2, which belongs to the same family of coronaviruses that caused SARS in 2003, only with a different type of virus. COVID-19 also has a wider and faster spread to several countries than SARS. On March 11th, 2020, the World Health Organization (WHO) declared the disease outbreak due to COVID-19 as a global pandemic. The virus can be passed from person to person and has spread widely in China and more than 190 other countries and territories. WHO declared the COVID-19 pandemic.[1]

As of March 29th, 2020, there were 634,835 cases and 33,106 deaths worldwide.[1] The update until March 12th, 2021, showed that globally from 223 countries, there are 118.268.575 people who have confirmed COVID-19, and 2.624.677 COVID-19 patients have been declared dead.[2] Meanwhile, in Indonesia, 1.528 cases have been confirmed positive for COVID-19, and 136 cases have died. WHO states

that so far, there has never been a pandemic triggered by the coronavirus, and at the same time, there has never been a pandemic that can be controlled. On this basis, WHO asks countries to take urgent and aggressive action to prevent and contain the spread of the COVID-19.[3]

In Palembang, South Sumatra, based on data taken on the website https://hallo.palembang.go.id/covid19/ by of March 13th, 2021, it shows that 10282 total cases were detected. Based on claim data for inpatients from February 2020 to February 2021 at Dr. Mohammad Hoesin General Hospital Palembang, there were a total of 1799 patients with 1057 confirmed Covid-19 patients, 708 suspected, and 34 probables.[4] Then, 1420 patients were declared cured, 54 patients were still under treatment (as of March 11th, 2021), and 368 patients were declared dead (confirmed with suspected and probable). Died, including gender, age, comorbid diseases (comorbid hypertension, diabetes mellitus, and others), as well as other risk factors.

2. Methods

The study uses a case-control study approach with univariate, bivariate (Chi-square and T-test), and multivariate (multiple logistic regression analysis) analysis. The place of this research was conducted at Dr. Mohammad Hoesin General Hospital Palembang in the range of April to June 2020, using subjects that match the research criteria. The data used is secondary data at the Medical Record Installation with a retrospective type of research in the form of claim data for inpatient COVID-19 patients. The population in this research were COVID-19 patients who were hospitalized at Dr. Mohammad Hoesin General Hospital Palembang. The sample in this study was obtained by determining the inclusion and exclusion criteria. The inclusion and exclusion criteria are as follows. The inclusion criteria that have been determined by the researcher are COVID-19 patients who are hospitalized at Dr.

Mohammad Hoesin General Hospital Palembang from February until December 2020. In this study, the sample size used was 1:2, which means that the minimum sample size in this study was 209 for the group of COVID-19 patients who died and 418 for the group of COVID-19 patients who were alive.

3. Results
Univariate analysis

In COVID-19 patients hospitalized at Dr. Mohammad Hoesin General Hospital Palembang from February until December 2020, the majority of patients had confirmed status is dead (45,9%) and alive (53,6%). The proportion of male patients (52,3%) were more respondents in this study than female patients (47.7%). Meanwhile, most patients who are hospitalized are less than 50 years old (50,6%). More than 60% of patients had comorbidities (65,1%). Of the COVID-19 patients who were hospitalized at Dr. Mohammad Hoesin General Hospital Palembang, more than 5% each had a contact history and travel history and lived in a local transmission area. For patients who have a history of contact with COVID-19 patients (16,6%), who have a history of travel (6,9%), and who live in local transmission areas (29,2%). In addition to the length of stay, the average patient was treated for 9 days, with a median value of 7 days, which means that 50% of patients were treated for less than 7 days and 50% of patients were treated for more than 7 days with the shortest length of stay is 1 day, and the longest length of stay is 52 days. Patients of COVID-19 who were hospitalized at Dr. Mohammad Hoesin General Hospital Palembang from February until December 2020 in the comorbid death group consisted of hypertension (7,03%), diabetes mellitus (10,27%), heart (5,51%), CKD (3,42%). Cancer (5,13%) and others (68,63%). In the group of patients with comorbid conditions consisting of hypertension (7,83%), diabetes mellitus (8,60%), heart (7,22%), CKD (3,53%), cancer (4,76%) and others (68,05%).

Bivariate Analysis

Factors related to the cause of death in COVID-19 patients hospitalized at Dr. Mohammad Hoesin General Hospital Palembang from February until December 2020 as gender, age, comorbid diseases, contact history, and length of stay (p-value <0,05). Male patients had a 1,57 higher risk than female patients (95% CI: 1.12-2.2). Then patients with an age above or equal to 50 years risk 3.36 higher than those aged less than 50 years (95% CI: 2.36-4.78). Comorbid COVID-19 patients had a 2,32 higher risk than patients without comorbidities (95% CI: 1.59-3.38). Meanwhile, for patients who have a history of contact with COVID-19 patients, the risk is 0,48 lower than those without a history of contact (0.29-0.79). Meanwhile, the average length of stay for patients returning home dead is 4 days, and for patients returning home alive, 11 days (Table 1).

Table 1. Analysis of the cause of death of inpatients of COVID-19 at Dr. Mohammad Hoesin General Hospital Palembang from February until December 2020.

Variable	Dependent variable				OR (95% CI)	p-value
	Dead		Alive			
	n	%	n	%		
Gender						
Male	125	59,8	203	48,6	1,57 (1,12-2,20)	0,010*
Female	84	40,2	215	51,4	References	
Age						
High risk (≥50 years)	144	68,9	166	39,7	3,36 (2,36-4,78)	<0,0001*
Less risk (<50 years)	65	31,1	252	60,3	References	
Comorbid						
Yes	161	77,0	247	59,1	2,32 (1,59-3,38)	<0,0001*
No	48	23,0	171	40,9	References	
Contact history						
Yes	22	10,5	82	19,6	0,48 (0,29-0,79)	0,006*
No	187	89,5	336	80,4	References	
Travel history						
Yes	12	5,7	31	7,4	0,76 (0,38-1,51)	0,539
No	197	94,3	387	92,6	References	
Local transmission						
Yes	66	31,6	117	28,0	1,18 (0,82-1,70)	0,402
No	143	68,4	301	72,0	References	
Variable			**Dead**		**Alive**	**p-value**
Length of stay	Mean (SD)		4,8 (5,37)		11,4 (7,6)	<0,0001*
	Med (Min-Max)		3 (1-52)		9 (1- 46)	

*) Significant at 0,05.

Multivariate analysis

The most dominant variable in this research was age. COVID-19 patients aged more than or equal to 50 years had a 2,74 higher risk of causing death than patients aged less than 50 years after controlling for comorbid disease variables and length of stay (95% CI: 1,84-4,07 (Table 2).

Table 2. Cause of death.

Variable	Model I		Model II	
	PR (95% CI)	*p-value*	PR (95% CI)	p-value
Gender				
Male	1,26 (0,84-1,88)	0,25	-	
Female	References			
Age				
High risk (≥50 years)	2,65 (1,77-3,97)	<0,0001	2,74 (1,84-4,07)	<0,0001*
Less risk (<50 years)	References		References	
Comorbid				
Yes	1,55 (0,99-2,41)	0,051	1,60 (1,03-2,48)	0,033
No	References		References	
Contact history				
Yes	0,74 (0,41-1,35)	0,33	-	
No	References			
Travel history				
Yes	1,32 (0,57-3,04)	0,50	-	
No	References			
Local transmission				
Yes	1,19 (0,76-0,84)	0,42	-	
No	References			
Length of stay	0,8 (0,76-0,84)	<0,0001	0,80 (0,76-0,84)	<0,0001

*) Dominant variable.

4. Discussion

The results showed that COVID-19 patients aged over or equal to 50 years had a 2,74 higher risk of causing death than patients aged less than 50 years after controlling for comorbid disease variables and length of stay (95% CI: 1,84-4,07). Age is one of the factors that is closely related to the cause of death due to COVID-19. The proportion of deaths due to COVID-19 increases with increasing age, with the youngest patient being 5% of the oldest patient at 55%.[5] People in the elderly age category will experience an aging process marked by decreased physical endurance, causing the body to be more susceptible to certain diseases. In Indonesia, 40% of patients died aged over 60 years.[6] According to Raden Muhammad Ali Satria et al., showed that patients aged more than 64 years had a 2,097 greater risk of dying from COVID-19.[7] The group that is vulnerable and at high risk for exposure to COVID-19 is the elderly due to a weakened immune system with age. However, this does not mean that other age groups cannot.[8] Henry Surendra et al. explained in their research that the risk of death from COVID-19 will increase with age. The age group of more than or equal to 70 has a risk of 10,37 higher than other age groups to cause death.[9] As age increases, the body's susceptibility to disease increases so that it is at high

risk of causing health complaints, and this can also be exacerbated by several other factors as well.

The high number of COVID-19 deaths among the elderly is also likely due to the fact that many elderly people have comorbid chronic diseases, such as hypertension, heart disease, or diabetes. COVID-19 infection and comorbidities are at risk of worsening the person's condition. COVID-19 patients who are in the category of at-risk age group and have comorbidities are at high risk of dying. This is in accordance with statistics that show that the majority of COVID-19 patients who are susceptible (>= 50 years) have comorbidities (77.4%) compared to no comorbidities (22.6%). Patients who have comorbid not only have one comorbid but there are patients who have more than one comorbid. The types of comorbidities suffered by patients include hypertension, diabetes mellitus, CKD, cancer, heart disease, and other comorbidities. Patients with comorbid diabetes and heart disease are risk factors for COVID-19 death in BDH General Hospital, with the value obtained that patients with comorbid diabetes have a 4,38 higher risk of dying from COVID-19 than patients without comorbid diabetes (p-value 0,000). Meanwhile, patients with cardiac comorbidities had a 4,31 higher risk of dying from COVID-19 than patients without cardiac comorbidities (p-value 0,009).[7] However, the Shrupti Gupta study in 2020 showed that patients with coronary artery disease (OR = 1, 47 95% CI: 1,07-2,02) and active cancer (OR= 2,15 95% CI: 1,35-3,43) have a high risk of dying from COVID-19.[10]

Patients with 2 or more comorbidities (AOR 2,8; 95% CI 2,12–3,70) were at higher risk of dying from COVID-19 than patients with one comorbid (AOR 1,74; 95% CI). 1,35-2,26). Patients aged <50 years who had one comorbid had a 1,73 higher risk of dying than those who had no comorbidity (AOR=1,73; 95% CI 1,02-2,94) for those who had one comorbidity and patients with two or more comorbidities were at 5,87 greater risk than those without comorbidities (AOR=5,87; 95% CI 3,28-10,52). For patients over 50

years of age, compared with those with had no comorbidity, the AOR=1,75 (95% CI 1,30-2,34) for those who had one comorbid and AOR=2,51 (95% CI 1,85-3,42) for those who had two or more comorbid.[9]

These diabetic patients have a 2 times greater risk of developing severe or critical illness requiring treatment in the treatment room.[11] In hospitalization, patients with diabetes mellitus are three times at risk of dying from COVID-19. Diabetes mellitus is a risk factor independent of age and gender.[7]

The course of illness in COVID-19 shows that the median time from symptom onset to death is 18,5 days (15-22 days). The median duration of hospitalization is 11-16 days, and admission to the ICU has a median of 8 days (4-12).[1] In this study, the average length of stay for patients with the discharge was 5 days, and for patients with discharge, 11 days alive. Among patients who were discharged from the hospital alive had a time span of 28 days in the ICU, the average length of stay in the ICU was 9 days (IQR 5-14 days) and the average length of stay in the hospital was 16 days (IQR 11-22 days). Overall, 35,4% died within 28 days of ICU admission, 37,2% returned alive within 28 days, and 27,4% remained hospitalized after 28 days.[10] For Most of the patients receiving health care (69%), the median length of stay was 13 days, and the median duration from testing positive to death was 17 to 19 days. The majority of patients ended up in the ICU (76%) and hospital wards (20%), whereas 4% expired on emergency department (ED) arrival or shortly thereafter (within 1 hour), and their nasopharyngeal swabs turned positive.[12] However, this length of stay did not directly affect the mortality of COVID-19 patients.

5. Conclusion

Age is the dominant factor causing death. COVID-19 patients who have aged ≥50 years are at risk 2,74 to a higher risk of causing death than those aged <50 years after controlling for comorbid disease variables and length of stay.

6. References

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