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Analysis of the Risk Factor for Mortality in COVID-19 Patients in Mohammad Hoesin Hospital, Palembang, Indonesia

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Abstract

World Health Organization (WHO) has declared the novel corona virus (COVID-19) as a pandemic due to its high rate of transmission and the rapid spread of the COVID-19. Along these lines, there is a need for more research about risk factors that can affect the spread of COVID-19 and its fatality. Therefore, this study aims to analyze risk factors in patients who died from COVID-19 at the Mohammad Hoesin Hospital in Palembang, South Sumatra, Indonesia. This study used a cross-sectional approach. Data on death due to COVID-19 were collected with suspect, probable, and confirmed status. The results showed that comorbidity became the most dominant factor (62.1%) with (OR Adj) 3.780 (1.000 – 3.168) after controlling for contact history with confirmed cases and sex, there were differences in the mean age and length of stay in patients with confirmed COVID-19 and not. Prevention of death in COVID-19 patients can be done by controlling comorbidities and contact history with positive cases of COVID-19.

Keywords: COVID-19, Comorbid, Contact History, Sex, Age

Introduction

The first novel corona virus (COVID-19) case was found in China and reported in December 2019. It has spread rapidly to over 210 countries worldwide. COVID-19 has high morbidity and mortality rates in the world and becomes pandemic according to World Health Organization (WHO). [1] The COVID-19 caused respiratory tract infection followed by several symptoms such as common cold, fever, dry cough, shortness of breath, up to more severe symptoms. [2,3]

The pandemic poses many challenges in providing health care. Elderly groups and people who have health problems such as hypertension, heart problems, and diabetes are susceptible to be infected with this virus. It can deteriorate a person's condition and even increase the risk of death. The potential for transmission of this disease can also be from people that are asymptomatic.[4,5].

Transmission of this disease can occur in hospitals. The most recent case reported 41% of infected patients were in the hospital, 29% were medical staff with a death rate of 4.3%. [6] The risk factors for death related to COVID-19 are elderly with ages 65 years and over that accompanied by the presence of comorbidities. Michelozzi et al, (2020) showed men have a higher risk of death than women. [7] Reported from the United States that 71% (732/1037) of people with COVID-19 were hospitalized.[8]

In reducing transmission, it is necessary to restrict local and international travel and implement quarantine. Travel restrictions can mitigate potential transmission from local transmission areas.[9] Movement of the population such as, going to the office by public transportation and travel to the infected areas can increase the risk of transmission when returning home.[10] The death toll due to COVID-19 in the world is 2.85 %.[1] Properly treated COVID-19 patients can reduce morbidity and mortality in this pandemic. Medical

workers must be equipped with adequate knowledge, skills on preventive measures, and confidence in diagnosing and treating COVID-19 patients. Medical workers who are directly involved in the diagnosis, treatment, and care of COVID-19 patients have a high-risk exposure to the virus from aerosol and droplet contamination. This caused nosocomial infections.[11]

As part of the ongoing pandemic preparedness, it is very necessary to analyze risk factors of death in the hospital to help service health management design protocol in proper handling of COVID-19 patients.

Method

This study used a cross-sectional approach using medical record and COVID-19 surveillance data in September 2020 from Mohammad Hoesin Hospital. The data were collected from all patients who died with suspected, probable, and confirmed status until September 2020. Mohammad Hoesin Hospital is a national referral hospital and accepts COVID-19 patients from all city/districts in South Sumatra.

The independent variables in this study were sex, age, length of stay, contact history with positive confirmed cases, comorbidities, and chief complaint in admission to hospital. The dependent variable was the patient's status (suspected, probable, and confirmed), based on the respondent's medical record.

The data analyzed were from the 235 patients who went to the hospital and died till September 2020 amid this pandemic. Data analysis was performed by univariate, bivariate, and multivariate. Univariate analysis provides an overview of the variables studied, bivariate analysis examines the relationship between the independent variables and the dependent variable using the chi-square test, and multivariate analysis explain the

character of the predictor variables in explaining the dependent variable with multiple logistic regression. This study has been reviewed and received ethical clearance from the Mohammad Hoesin Hospital with No. 10 / kepkrsmh / 2020.

Results

Table 1 shows data on COVID-19 dead patients. 40.9% was confirmed, 55.7% was probable status, 3.4% was suspected, 62.1% with comorbidities, and 71.5% did not know that they had contact with positive cases. At the time of admission to the hospital, the most chief complaint was dyspnea (30.3%).

Table 1. Characteristic of respondent COVID-19 patient (n= 235)

Variables	Categories	N	%
Patient death status	Confirmed	96	40.9
	Probable	131	55.7
	Suspected	8	3.4
Contact history	Yes	43	18.3
	Not known	168	71.5
	No	24	10.2
Comorbidity	Yes	146	62.1
	No	89	37.9
Chief complaint of admission	Dyspnea	71	30.3
	Dyspnea and loss of consciousness	36	15.3
	Loss of consciousness	14	6
	Cough	10	4.3
	Dyspnea and fever	24	10.2
	Limp	6	2.6
	Nausea and vomiting	2	0.9
	Unstable bradycardia	1	0.4
	Trauma dan RO Pneumonia	6	2.6
	Fever	3	1.3
	Cough and dyspnea	10	4.3
	Dyspnea and limp	12	5.1
	Abdominal pain	1	0.4
	Planning for blood transfusion	1	0.4
	Planning for chemotherapy	1	0.4
	Respiratory failure	2	0.9
	None	35	14.9
	Mean – Median	Minimum	Maximum
Age (years)	49-54	0	86
Length of stay (days)	3,54 – 2	0	51

Using Mann-Whitney test (Table 2), the age variable with p-value = 0.007 reported a difference in the mean age in the group of confirmed and unconfirmed patients. Variable length of stay with p-value = 0.0001 showed that there is a difference in the average length of stay in the group of confirmed and unconfirmed patients.

Table 2. Mann-Whitney Test

Variable		N	Mean Rank	Significance
Age	Confirmed	96	132.34	
	Not yet confirmed	139	108.10	0.007
Length of stay	Confirmed	96	154.07	
	Not yet confirmed	139	93.09	0.0001

Table 3, shows that among the 3 variables (gender, comorbidity, and contact history with confirmation), the contact history with confirmation had a significant relationship with the dead COVID-19 patients with sig ($0.017 < \alpha = 0.05$). This suggests that contact history with positive COVID-19 confirmed patients was associated with mortality status. Variables with sig <0.25 were candidates for multivariate analysis with multiple logistic regression. Table 3 shows that the variables for sex, comorbidity, and confirmed contact history were included in the multivariate analysis.

Table 3. Bivariable analysis of factors associated with COVID-19

Variable	Category	COVID-19 Cases				p-value
		Confirmed		Not yet confirmed (probable + suspect)		
		N	%	n	%	
Sex	Male	65	46.1	76	53.9	0.062
	Female	31	33	63	67	
Comorbidity	Yes	67	45.9	79	54.1	0.061
	No	29	32.6	60	67.4	
History of contact with confirmed case	Yes	15	34.9	28	65.1	0.0000
	Not known	77	45.8	91	54.2	0,017
		4	16.7	20	83.3	

In Table 4, the most dominant variable in predicting mortality in COVID-19 patients was comorbidity with an Odds Ratio (OR Adj) value of 3,780 (1,000 - 3,168) after controlling for contact history with confirmed cases and sex. This result showed that COVID-19 patients with comorbidities had a 3,780 times greater risk of dying than patients who do not have comorbidities. Confirmed positive COVID-19 patients who had a history of contact with confirmed cases had a greater risk of death 2,055 (0.572 - 7,381) times compared to patients who had no contact history with confirmed cases after controlling with comorbidity and sex.

Table 4. Multivariate analysis with Multiple Logistic Regression

Risk Factors	Category	B	p-value	OR (95% CI)
Comorbidity	No	0.577	0.050	Reff
	Yes			3.780 (1.000 – 3.168)
History of contact with confirmed case	No			Reff
	Not known	0,720	0.270	2.055 (0.572 – 7.381)
	Yes	1.2991	0.025	3.666 (1.176 – 11.429)

Abbreviations: OR: Odd Ratio, CI: Confidence Interval

Discussion

The presence of comorbid, age, and ethnicity is known to be a factor that affects the survival and mortality rates for people with COVID-19. [12,13]

This study reported that COVID-19 patients who died with comorbid (61.2%) were more than patients those without. Comorbidity such as hypertension, diabetes, and heart disease were known to increase mortality. [13] In addition, age significantly affected ($p = 0.0007$) when compared between positive confirmed patients and those who were not. The sex variable in this study was dominated by men. Male over 65 years are known to have a higher mortality rate than female in people with COVID-19. [14,15] This can be due to differences in innate immune system responses such as cytokines and chemokines. Male have a higher innate immune response than female and this can aggravate the condition of people with COVID-19. Moreover, activated T cells increased significantly in female patients but not in male. [16]

Symptoms frequently appear in patients of COVID-19 are fever, cough, shortness of breath, muscle pain, headache, sore throat, rhinorrhea, diarrhea, and vomiting. [17] In severe conditions, patients in Intensive Care Unit had difficulty breathing compared to patients who were not, [18] Allegedly, chief complaint upon admission to the hospital in this study were related to the mortality rate characterized by difficulty breathing or dyspnea. In this study, dyspnea was the most common chief complaint (30.3%) in admission to hospital among people with COVID-19.

Another risk factor related to the mortality rate in this study was close contact with a confirmed COVID-19 patient. The high incidence of COVID-19 patients is related to close contact between currently and previously positive patients. The spread of SARS-Cov-2 through close contact can occur through people who are symptomatic or

asymptomatic, making the spread unnoticeable. SARS-Cov-2 screening on people with close contact with COVID-19 patient can reduce the spread of this disease. [19]

Conclusion

This study showed that COVID-19 patients who died at the hospital suffered from dyspnea as chief symptom and had contact history with positive confirmed COVID-19 patients. Patients who had comorbidities had a greater risk of suffering fatality than patients who do not have comorbidities.

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Competing interest

The Authors declare that there is no conflict of interest

Authors' Contribution

Rico januar dan Nyoman contribute in data analysis and writing manuscript, Rosyada Elviani, Zen Ahmad, Harun Hudari as data supplied and crosschecking missing data, and Reymart V. Sangalang contribute in writing and proof reading

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