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Research Article

Clinical Profile and Prognostic Factors of Mortality in Elderly Covid-19 at Ansari Saleh Hospital

Profil Klinis dan Faktor Prognostik Mortalitas pada Lansia dengan *Covid* -19 di RSUD Ansari Saleh

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ABSTRACT

Morbidity and mortality of elderly with Covid-19 are higher than in adults. This study aimed to determine the prognostic factors of mortality in elderly with Covid -19. This research was a retrospective cohort study in patients aged 60 years and older with a PCR-confirmed diagnosis of Covid -19 admitted to Ansari Saleh Hospital, South Kalimantan, Indonesia between January to July 2021. Data on age, sex, comorbidities, symptoms, physical examinations, laboratory examinations, chest x-rays, and Covid severity degree were collected, univariate and multivariate analyses performed to determine the independent prognostic factors. The research results showed 209 samples met the criteria. The average age was 66,94 years, dominated by men (57.9%). The most common comorbidities were hypertension (48.8%), diabetes mellitus (35.4%), and chronic heart failure (8.1%). The most frequent symptoms were dyspnea (79.9%), cough (74.2%), and fever (56.5%). Patients treated mostly had severe/critical degree of Covid -19 (140 patients, or 67%). The results of multivariate logistic regression analysis on the variables of respiratory rate (p=0.009; OR=1.1), NLR level (p=0.002; OR=1.081), age (p=0.025; OR=2.479) and Covid severity degree (p=0.008; OR=8.206) showed significant results as independent prognostic factors of mortality. Covid severity degree variable has the highest prognostic level; patients with severe Covid degree have an 8.206 times higher chance of death than mild-to-moderate degrees. In conclusion, respiratory rate, NLR level, age, and Covid severity degree can act as prognostic factors of mortality in elderly suffering from Covid-19.

Keywords: *Covid, elderly, mortality, prognostic factors*

ABSTRAK

Pasien lanjut usia dengan Covid-19 memiliki morbiditas dan mortalitas lebih tinggi dibanding orang dewasa. Tujuan dari penelitian ini adalah untuk mengetahui faktor prognostik mortalitas lansia dengan infeksi Covid-19. Penelitian dilakukan dengan studi kohort retrospektif pada pasien berusia 60 tahun atau lebih, dengan diagnosis infeksi Covid-19 yang dikonfirmasi PCR, dirawat di Rumah Sakit Umum Daerah Ansari Saleh, Kalimantan Selatan, Indonesia, antara Januari hingga Juli 2021. Kami mengumpulkan data usia, jenis kelamin, komorbid, kemunculan gejala, pemeriksaan fisik, pemeriksaan laboratorium, rontgen thoraks dan derajat Covid. Data dianalisis secara univariat dan multivariat untuk mengetahui faktor prognostik yang independen. Hasil penelitian menunjukkan terdapat 209 sampel yang memenuhi kriteria penelitian. Rata-rata usia sampel 66.94 tahun, yang didominasi oleh laki-laki (57.9%), Komorbid terbanyak yaitu hipertensi (48.8%), diabetes melitus (35.4%), dan chronic heart failure (8.1%). Gejala yang mendominasi yaitu sesak (79.9%), batuk (74.2%), dan demam (56.5%). Pasien yang dirawat didominasi oleh pasien dengan derajat Covid berat/kritis dengan jumlah 140 (67%). Hasil analisis multivariat regresi logistik variabel laju nafas (p=0.009; OR=1.1), kadar NLR (p=0.002; OR=1.081), usia (p=0.025; OR=2.479) dan derajat Covid (p=0.008; OR=8.206) menunjukkan hasil signifikan bermakna sebagai faktor prognostik kematian secara independen. Variabel derajat Covid menunjukkan tingkat prognostik yang paling tinggi, yaitu pada pasien dengan derajat Covid berat berpeluang terjadi kematian 8.206 kali dibandingkan dengan pasien derajat ringan-sedang. Didapatkan kesimpulan laju nafas, kadar NLR, usia dan derajat Covid dapat berperan sebagai faktor prognostik mortalitis pada lansia yang menderita Covid-19.

Kata Kunci: Covid, faktor prognostik, lanjut usia, mortalitas

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INTRODUCTION

Corona Virus Disease 2019 (Covid-19), which is caused by acute respiratory syndrome coronavirus (SARS-CoV-2) infection, emerged in Wuhan in December 2019. According to preliminary data from China, the case-fatality rate (CFR) in patients over 60 years old is significantly higher than the CFR in general, with a CFR of 14. 8% in patients over 80 years old, a CFR of 8. 0% in patients aged 70-79 years, and a CFR of 3. 6% in patients aged 60-69 years. The proportion of deaths of patients over 60 years old accounted for 81% of overall deaths in the country, showing that the elderly are more susceptible to SARS-CoV-2 (1-3).

Until October 2020, in South Korea, Covid-19 was confirmed in 23.889 patients, a total of 415 patients with Covid-19 died (4) The CFR in Italy was 7. 2%, with 22.512 confirmed cases and 1.625 deaths (5,6). Meanwhile, the CFR in France was 6. 0%, with 526.435 confirmed cases and 31, 691 deaths, and 9. 7% in New York City, with 244, 757 confirmed cases and 23, 823 deaths (7,8). The Government of the Republic of Indonesia on June 29, 2021, reported 2,156,465 people confirmed positive for Covid-19 and 58,024 deaths (a CFR of 2,7%) (9). On June 27, 2021, the number of positive cases of Covid-19 in South Kalimantan province was 35,891 people, with 1,064 deaths, and the CFR of South Kalimantan in June 2021 was 3% (10).

Several studies have described the characteristics of elderly patients with Covid. Age is a factor contributing to a poor prognostic for Covid-19. Elderly patients infected with Covid-19 have a higher morbidity and mortality rate than adults. Elderly with underlying diseases are more prone to Covid-19. Several chronic diseases increase the risk of a poor prognosis for Covid-19 (11-14).

Prognostic studies of elderly patients with Covid-19 infection are required to control Covid-19 infection. Understanding the characteristics of elderly patients with Covid-19 infection is important for lowering the mortality rate of Covid-19 patients and overcoming their illness. The purpose of this study was to determine the clinical profile and prognostic factors of elderly patients with Covid-19 infection.

METHODS

This study was a retrospective cohort study in patients aged 60 years and older with a PCR-confirmed diagnosis of Covid-19 infection admitted to Dr. H. Moch Ansari Saleh South Kalimantan, Indonesia, between January 2021 to July 2021. Demographic, clinical, and laboratory data were obtained from hospital medical records, and names were anonymized before being entered into the database. The research subjects were patients over the age of 60 who were diagnosed with Covid-19 and admitted to the inpatient room of dr. Moch. Ansari Saleh Hospital Banjarmasin. All Covid-19 patients were diagnosed positive using RT-PCR for SARS-CoV2 on nasopharyngeal and oropharyngeal swabs. The patients were classified into mild, moderate, and severe/critical pneumonia according to the guideline from the Ministry of Health of the Republic of Indonesia (15). Mild Covid pneumonia is described as a symptomatic patient who does not show any evidence of viral pneumonia or without hypoxia. Moderate Covid pneumonia is defined as a patient with clinical signs of pneumonia (fever, cough, dyspnea, rapid breathing) without signs of severe pneumonia, including SpO2 >93% on room air. Severe Covid pneumonia is defined as a patient with clinical signs of pneumonia (fever, cough, dyspnea, rapid breathing) accompanied by either respiratory rate >30 times/minute, severe respiratory distress, or SpO2 <93% on room air. Critical Covid pneumonia is defined as a patient with acute respiratory distress syndrome (ARDS), sepsis, and septic shock (15).

The sampling technique used was total sampling. Data were collected based on age, sex, comorbidities (hypertension, diabetes mellitus (DM), chronic heart failure (CHF), acute kidney injury (AKI), pulmonary tuberculosis (TB), anemia, multimorbidity status (patients with two or more comorbidities), symptom emergence (dyspnea, fever, anosmia, cough, sore throat, diarrhea), physical examinations (consciousness, systolic blood pressure (SBP), diastolic blood pressure (DBP), pulse rate, respiratory rate, temperature, SpO2/FiO2), laboratory examinations (haemoglobin (Hb), leukocytes, thrombocytes, neutrophil-lymphocyte ratio (NLR), D-dimer, urea, creatinine, SGOT, SGPT, random blood glucose (RBG)), chest X-ray results (without pneumonia/unilateral pneumonia/bilateral pneumonia), and degree of Covid severity.

Age is classified into elderly (60-70 years) and high-risk elderly (>70 years). Hypertension is defined as systolic blood pressure $\geq$140mmHg or diastolic blood pressure $\geq$90 mmHg. Diabetes mellitus is defined as a patient with a previous history of diabetes mellitus and who has received therapy, or fasting blood glucose $\geq$126mg/dL, or random blood glucose $\geq$200mg/dL with classic symptoms of diabetes mellitus (polyuria, polydipsia, polyphagia). Chronic heart failure is defined as a patient with clinical CHF according to the Framingham criteria. Acute kidney injury is defined as a patient with serum creatinine $\geq$1.5 times baseline or serum creatinine increase $\geq$0.3 or urine output <0.5ml/kg/hour for 6-12 hours. Pulmonary tuberculosis is defined as a patient with active tuberculosis confirmed by chest x-ray or positive geneXpert test. Mild anemia is defined as hemoglobin levels of 11-11.9mg/dl in women dan 11-12.9mg/dl in men. Moderate anemia is defined as hemoglobin levels of 8-10.9mg/dl. Severe anemia is defined as hemoglobin levels of <8mg/dl. D-dimer levels are categorized based on normal (<0.5) or high (>0.5). Fever is defined as a temperature of 37,5°C or higher during hospitalization. Other physical examination and laboratory data were based on data first taken in the emergency room. Fasting blood glucose examination was measured on the second day of hospitalization. Total hospitalization is defined as days from admission to discharge or date of death. The research outcome is the patient's status as alive or dead during hospitalization.

Continuous variables with normal distribution were presented as mean ± standard deviation. Continuous variables that were not normally distributed were reported as the median. Categorical variables were presented as percentages. Comparisons between continuous variables were performed using Student's T-test if they had a normal distribution, otherwise, the Mann-Whitney U test was used. Comparisons between categorical variables were performed by 2 Test. Logistic regression analysis was performed to evaluate factors associated with mortality to determine prognostic factors that were involved independently.

This study has been approved by the ethics committee of Lambung Mangkurat University, Banjarmasin, on October 12, 2021. Informed consent was not required since this study only used medical record data.

RESULTS

There were 209 samples that met the research criteria. Data on sample characteristics are shown in Table 1. The most common comorbidities were hypertension (48.8%), diabetes mellitus (35.4%), and CHF (8.1%). There were 57 samples (27.28%) with multicomorbidity. The most common symptoms in the sample of this study were dyspnea (79.9%), cough (74.2%), and fever (56.5%). Patients receiving treatment were dominated by patients with severe/critical Covid degrees, with a total of 140 (67%). Only one (0.5%) patient was with mild Covid, while 68 (32.5%) patients were with moderate Covid. Patients who died during treatment were 51 (24.4%), and patients who lived were 158 (75.6%).

Patients with severe/critical degree of Covid at admission experienced deaths (49 or 35%) and the moderate degree (2 or 2.9%) were higher than those with mild degree of Covid but did not show a significant difference (p>0.05). Due to the small sample size for mild degree, severe/critical

Table 1. Data on the basic characteristics of the sample

No	Characteristic		N (%)	Mean±SD	Median (min-max)
1.	Sex	Male	121(57.9)		
		Female	88(42.1)		
2.	Age	60-70 years	46(22.0)		
		>70 years	163(78.0)		
3.	Comorbidity				
	Multicomorbidity		57(27.3)		
	HT		102(48.8)		
	DM		74(35.4)		
	CHF		17(8.1)		
	Asthma		2(1.0)		
	AKI		33(15.8)		
	Pulmonary TB		52(4)		
	Anemia		71(44)		
4.	Symptoms				
	Dyspnea		167(79.9)		
	Fever		118(56.5)		
	Anosmia		11(5.3)		
	Cough		155(74.2)		
	Sore throat		9(4.3)		
	Diarrhea		16(7.7)		
5.	Physical examination				
	GCS			14.8±1.06	
	Systolic blood pressure			138.27±26.76	
	Diastolic blood pressure			81.32±16.62	
	Pulse rate			95.69±19.58	
	Temperature				36.6(35-39.2)
	Respiratory rate				26(18-45)
	SpO2/FiO2			85.48±13.43	419.05 (4.48-471.42)
6.	Laboratory Results				
	Hb			12.87±1.75	
	Leukocytes				7.54 (1.72-39.8)
	D-Dimer	High	105(50.2)		
		Low	104(49)		
	NLR				5.25 (6.0-48.5)
	Thrombocytes			258.09±144.70	
	Urea				34.90 (2.19-211.8)
	Creatinine				1(0.20-5.50)
	SGOT				54(13-626)
	SGPT				33(7-538)
	RBG			161.51±89.58	134(19-681)
	Pneumonia	Bilateral	112(53.6)		
		Unilateral	94(45.0)		
		No	3(1.4)		
7.	Covid severity on hospital admission	Severe	140(67.0)		
		Moderate	68(32.5)		
		Mild	1(0.5)		

and moderate-mild recoding was carried out and resulted in significant differences between the mild-moderate categories compared to the severe/critical degrees.

Age, D-dimer, degree of Covid severity at hospital admission, respiratory rate, SPO2/FiO2, leukocyte levels, ANC, ALC, NLR, urea, and SGOT were significant prognostic variables for patient mortality (Table 2 and Table 3). The analysis continued with multivariate analysis to determine independent risk factors (Table 4).

The results of multivariate logistic regression analysis showed that the variables of respiratory rate (p=0,009; OR=1,1), NLR level (p=0.002; OR=1.081), age (p=0.025; OR=2.479), and degree of Covid severity (p=0.008; OR=8.206) showed significant results as independent prognostic factors of mortality. The highest prognostic level is indicated by the degree of Covid severity variable, meaning that patients with severe Covid degrees have an 8.206 higher chance of death compared to patients with mild-to-moderate degrees.

DISCUSSION

The sample in this study had an average age of 66.94 years and was dominated by males (57.9%). It is similar to previous research in Indonesia by Azwar. A death rate of 24.4% is almost similar to the previous study by Azwar, which found that the Covid death rate among the elderly was 23% (16). The most common comorbidities were hypertension (48.8%), diabetes mellitus (35.4%), and chronic heart failure (8.1%). In this study, neither patients with multicomorbidity nor comorbidities had significant

Table 2. Categorical variable bivariate analysis

Variable		Outcome						
		Dead		Alive		P	RR	CI 95%
		N	%	n	%			
Age	Old	20	43.5%	26	56.5%	0.001*	2.28	1.45-3.61
	Elderly	31	19.0%	132	81.0%			
Multimorbidity	Yes	15	26.3%	42	73.7%	0.693	1.11	0.66-1.87
	No	36	23.7%	116	76.3%			
Sex	Male	29	24.0%	92	76.0%	0.864	0.96	0.59-1.55
	Female	22	25.0%	66	75.0%			
HT	Yes	23	22.5%	79	77.5%	0.543	0.86	0.53-1.39
	No	28	26.2%	79	73.8%			
DM	Yes	17	23.0%	57	77.0%	0.722	0.91	0.55-1.52
	No	34	25.2%	101	74.8%			
CHF	Yes	7	41.2%	10	58.8%	0.136$	1.79	0.97-3.36
	No	44	22.9%	148	77.1%			
AKI	Yes	12	36.4%	21	63.6%	0.081	1.64	0.97-2.79
	No	39	22.2%	137	77.8%			
Pulmonary TB	Yes	0	0.0%	5	100.0%	0.338$	-	-
	No	51	25.0%	153	75.0%			
Anemia	Severe	1	33.3%	2	66.7%	1.000$	1.28	0.25-6.49
	Moderate	5	20.8%	19	79.2%	0.585	0.79	0.35-1.83
	Mild	9	20.5%	35	79.5%	0.451	0.78	0.41-1.49
	No	36	26.1%	102	73.9%			
Dyspnea	Yes	41	24.6%	126	75.4%	0.920	1.03	0.57-1.89
	No	10	23.8%	32	76.2%			
Fever	Yes	32	27.1%	86	72.9%	0.298	1.29	0.80-2.14
	No	19	20.9%	72	79.1%			
Anosmia	Yes	1	9.1%	10	90.9%	0.302$	0.36	0.06-2.37
	No	50	25.3%	148	74.7%			
Cough	Yes	42	27.1%	113	72.9%	0.124	1.62	0.85-3.12
	No	9	16.7%	45	83.3%			
Sore throat	Yes	1	11.1%	8	88.9%	0.691$	0.44	0.07-2.87
	No	50	25.0%	150	75.0%			
Diarrhea	Yes	5	31.3%	11	68.8%	0.547$	1.31	0.60-2.84
	No	46	23.8%	147	76.2%			
D-Dimer	High	34	32.4%	71	67.6%	0.007*	1.98	1.18-3.32
	Low	17	16.3%	87	83.7%			
Pneumonia	Bilateral	33	29.5%	79	70.5%	0.556	-	-
	Unilateral	18	19.1%	76	80.9%	1.000$	-	-
	No	0	0.0%	3	100.0%			
Covid severity on hospital admission	Severe	49	35.0%	91	65.0%	1.000$	-	-
	Moderate	2	2.9%	66	97.1%	1.000$	-	-
	Mild	0	0.0%	1	100.0%			
Covid severity on hospital admission	Severe	49	35.0%	91	65.0%	<0.001*	12.08	3.03-48.19
	Moderate-Mild	2	2.9%	67	97.1%			

Note: *) significant p<0.05, Chi-Square test, $) Fisher exact test

Table 3. Numerical variable bivariate analysis

	Died (n=51)		Alive (n=158)		p
	Median	Mean±SD	Median	Mean±SD	
GCS	15(4-150)		15(5-15)		0.040*
Respiiratory rate	30(20-43)		25(18-45)		<0.001*
Systolic blood pressure		136.7±28.4		138.7±26.3	0.504
Diastolic blood pressure		83.6±20.2		80.6±15.3	0.708
Pulse rate		98.5±24.5		94.8±17.7	0.317
T		36.2±4.4		36.6±0.6	0.746
SpO2/FiO2	3.81(0.59-4.48)		4.36(0.59-8.17)		<0.001*
Hb		13.2±1.9		12.7±1.7	0.109
Leukocyte	9.68(1.86-28.1)		6.95(1.72-39.8)		0.002*
NLR	6.99(2.30-48.50)		4.58(60-29.42)		<0.001*
Thrombocytes		237.7±90.0		264.7±158.0	0.488
Urea	46(3.27-211.80)		31.35		<0.001*
Creatinine	1.10(60-3.30)		1(20-5.50)		0.023*
SGOT	69(17-626)		50.50(13-451)		0.011*
SGPT		51.1±78.6		40.6±27.6	0.551
RBG		182±123.1		154.9±74.9	0.267

Note: *) significant p<0.05

Table 4. Multivariate analysis for independent prognostic factors

		Univariate			Multivariate		
		P	OR	CI 95%	P	OR	CI 95%
Age	Old Elderly	0.001*	3.28	1.62-6.61	0.025*	2.49	1.12-5.48
D-Dimer	High Low	0.008*	2.45	1.26-4.75	-	-	-
Covid severity on hospital admission	Severe Moderate-Mild	<0.001*	18.04	4.24-76.79	0.008*	8.21	1.73-38.95
GCS		0.197	0.84	0.64-1.09	-	-	-
RR		<0.001*	1.17	1.10-1.25	0.009*	1.10	1.02-1.18
SpO2/FiO2		0.001*	0.61	0.46-0.82	-	-	-
Leukocyte		0.019*	1.07	1.01-1.13	-	-	-
NLR		<0.001*	1.09	1.05-1.14	0.002*	1.08	1.03-1.13
Urea		<0.001*	1.02	1.01-1.03	-	-	-
Creatinine		0.073	1.54	0.96-2.48	-	-	-
SGOT		0.050	1.01	1.00-1.01	-	-	-

significance as a prognostic factor of morbidity. Similar to the study by Barron *et al.*, no comorbid factors act as prognostic factors (16). In contrast, research by Wang et al. showed that cardiovascular disease and COPD have a role as prognostic factors of morbidity in elderly patients with Covid-19. Since there were no patients with COPD in this study, the role of COPD could not be analyzed (1).

The most common clinical symptoms found in this study were dyspnea (79.9%), cough (74.2%), and fever (56.5%). It is similar to a previous study by Wang *et al.,* (2019) that Covid symptoms in the elderly were dominated by dyspnea, cough, and fever, although in their study, the most dominant symptom was fever (1). Multivariate logistic regression test showed that the variables of respiratory rate (p=0.009; OR=1.1), NLR level (p=0.002; OR=1.081), age (p=0.025; OR=2.479), and degree of Covid severity (p=0.008); OR=8.206) had significant results as the independent prognostic factors of morbidity. Research by Wang *et al.,* and Li *et al.,* demonstrated that dyspnea has a prognostic role in mortality in elderly Covid patients (1,17). In this study, the symptom of dyspnea was not proven to have any significance, but the respiratory rate, which is a more objective form of dyspnea, has a significant role as a prognostic factor of morbidity in the elderly.

Several conditions, such as infection, can cause an increase in neutrophils (18,19). Research by Wang et al. showed that neutrophils increased in Covid patients who died, and the absolute lymphocyte number decreased significantly. (1). Increased numbers of neutrophils and decreased lymphocytes correlate with increasing neutrophil-lymphocyte ratio (NLR). In this study, the neutrophil-lymphocyte ratio proved to play a role as a prognostic factor of mortality. It is in accordance with previous research by Li Xiaoming et al. (LI 2020) and Li Ping (LI 2020) (20,21). Other studies have also demonstrated that NLR plays a role as a prognostic factor in severity and mortality in patients in general, without being related to age (22-24).

Age older than 70 years has a significant role as a prognostic factor of mortality, with a risk of 2,479 times higher than age 60-70 years. A relationship between increasing age and increasing risk of morbidity and mortality in Covid-19 patients has been shown in previous research (11,25). In the elderly, the production of naive T cells and B cells decreases, which affects the efficiency of virus clearance and leads to immune dysregulation (26,27).

This study shows that the degree of Covid severity at the hospital admission has a significant role as a prognostic

factor in mortality. Clinical, respiratory rate, and oxygen saturation levels (SpO2) are the components of the Covid severity degree. According to the study by Bradley *et al.*, there is a relationship between Covid severity and the death rate within 28 days (28).

This study did not classify patients based on the therapy they received. The therapy given to patients in this study was adjusted to the COVID-19 guidelines from the Ministry of the Republic of Indonesia based on the degree of Covid severity. It is necessary to conduct research that analyzes the mortality prognosis over a 28-day period, even though the patient has already been discharged from the hospital.

LIMITATION OF THE STUDY

Most of the variables in this study were collected only when the patient arrived at the emergency room. Future research could include ongoing follow-up of physical and laboratory examinations during hospitalization.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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