Clinical Characteristics, Chest X-Ray, and Laboratory Findings of COVID-19 Patients in Leona Kefamenanu Hospital, Indonesia 2021

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ABSTRACT

Introduction: COVID-19 can be life-threatening in older age group and those with comorbidities. This is a study on the clinical characteristics of COVID-19 patients in rural field hospitals in Indonesia. **Method:** A retrospective, non-experimental study on COVID-19 patients in Leona Kefamenanu Hospital, East Nusa Tenggara, Indonesia from January 2021 to December 2021. Multivariable logistic regression analysis was used to analyze the factors associated with severe COVID-19. **Results:** During the period, 153 patients were registered, 66 (43.1%) were male; mostly 40 to 59 years of age. The most common symptom was cough 144 (94.1%), followed by fever (n=105, 68.9%), fatigue (n=92, 60.1%), and nausea (n=80, 52.3%). Most patients had normal leukocyte, lymphocyte, and platelet counts; 17.6% of patients had hypokalemia, more frequently seen in severe cases (p<0.029). Most patients had an abnormality in their chest x-ray on admission (63.4%) and all were severe COVID-19. Multivariate logistic regression analysis showed that age ≥60 years (OR = 8.98, 95%CI: 1.81–44.56, p = 0.007) and dyspnea (OR = 16.83, 95%CI: 1.95–144.69, p = 0.010) were independently associated with severe cases. Fatigue (OR = 4.606, 95%CI: 1.589–13.354, p <0.005) was also independently associated with disease deterioration. **Conclusion:** Age ≥60 years, fatigue, and dyspnea were associated with severe cases in Leona Kefamenanu Hospital, East Nusa Tenggara, Indonesia.

Keywords: Clinical characteristic, COVID-19, dyspnea, fatigue, older age group.

ABSTRAK

Pendahuluan: COVID-19 dapat mengancam jiwa pasien kelompok usia lebih lanjut dan yang memiliki penyakit penyerta. Penelitian ini mengenai karakteristik klinis pasien infeksi COVID-19 yang dirawat di rumah sakit di pedalaman di Indonesia. **Metode:** Penelitian retrospektif non-eksperimental pasien COVID-19 yang dirawat di rumah sakit Leona Kefamenanu, Nusa Tenggara Timur, Indonesia, dari Januari hingga Desember 2021. Analisis regresi logistik multivariat digunakan untuk mengidentifikasi faktor penyebab COVID-19 berat. **Hasil:** Dari 153 pasien, 66 (43,1%) laki-laki, sebagian besar berusia 40 sampai 59 tahun. Gejala paling sering adalah batuk 144 (94,1%), diikuti demam (n= 105, 68,9%), kelelahan/ *fatigue* (n=92, 60,1%), dan mual (n= 80, 52,3%). Sebagian besar pasien memiliki hasil leukosit, limfosit, dan trombosit normal. Hipokalemia pada 17,6% pasien, lebih sering pada pasien dengan derajat berat (p <0,029). Sebagian besar pasien memiliki kelainan pada *rontgen* dada saat masuk (63,4%) yang semuanya COVID-19 derajat berat. Analisis regresi logistik multivariat menunjukkan bahwa usia ≥60 tahun (OR = 8,98; 95%CI: 1,81–44,56; p =0,007) dan sesak napas atau dispnea (OR = 16,83; 95%CI: 1,95–144,69; p =0,010) secara independen terkait dengan derajat keparahan COVID-19. *Fatigue* (OR = 4,606; 95% CI: 1,589–13,354; p <0,005) juga berhubungan secara independen dengan perburukan penyakit. **Simpulan:** Usia ≥60 tahun, kelelahan/*fatigue,* dan dispnea dikaitkan dengan keparahan COVID-19 di RS Leona Kefamenanu, Nusa Tenggara Timur, Indonesia. **Luzelia Marta Sequeira Saldanha. Karakteristik Klinis, Hasil Foto Toraks, dan Laboratorium Pasien COVID-19 di RS Leona, Kefamenanu, Indonesia, 2021.**

Kata Kunci: Karakteristik klinis, COVID-19, dispnea, kelelahan, kelompok usia lebih lanjut.

INTRODUCTION

Severe acute respiratory syndrome coronavirus-2 (SARS-COV-2) was first identified in Wuhan, China in December 2019.[1] It has quickly spread globally and the first confirmed cases of COVID-19 in Indonesia were reported on March 2nd 2020.[1] The disease can occur in any age group, more complicated and life-threatening in the older age group and those with underlying comorbid conditions such as diabetes, hypertension, cardiovascular, and cerebrovascular disease.[2-4] The early clinical presentation of COVID-19 varies from entirely asymptomatic to severely symptomatic.[1] Patients may present with asymptomatic,

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mild, moderate, or severe disease. The vast majority of symptomatic patients commonly present with fever, cough, and shortness of breath and less commonly with sore throat, anosmia, dysgeusia, anorexia, nausea, malaise, myalgias, abdominal pain, and diarrhoea.[2–5] Suspected risk factors for severe COVID-19 include age > 65 years, residence in long-term care facilities, and underlying conditions such as chronic lung disease, serious heart condition, severe obesity, diabetes, chronic kidney disease, liver disease, and immunocompromising conditions.[6] The gold standard diagnostic test for COVID-19 is the real-time reverse transcription-polymerase chain reaction- (RT-PCR-) based detection of the viral nucleic acids.[6,7]

A large meta-analysis evaluating clinicopathological characteristics of 8,697 COVID-19 patients in China reported laboratory abnormalities that included lymphopenia, elevated C-reactive protein levels, elevated cardiac enzymes, and abnormal liver function tests.[8] Other laboratory abnormalities included leukopenia, elevated D-dimer, elevated erythrocyte sedimentation rate, leukocytosis, elevated procalcitonin, and abnormal renal function.[9] COVID-19 patients had typical chest radiological findings including multifocal and bilateral ground glass opacities and consolidations with peripheral and basal predominance. Septal thickening, bronchiectasis, pleural effusion, lymphadenopathy, and cavitation were less commonly seen.[10] The Brixia scoring system interpreted chest x-ray changes, serves as an indicator of the extent of changes in the lung parenchyma. A higher score correlates with a more severe clinical course and higher mortality.[11]

This is a study on the clinical characteristics of COVID-19 patients in a rural field hospital in Indonesia.

METHODS

A retrospective, non-experimental study on COVID-19 patients admitted to Leona Kefamenanu Hospital, East Nusa Tenggara, Indonesia from January 2021 to December 2021. This date ranges from the first COVID-19 case until the lowest COVID-19 case rate in this hospital. All data were obtained from hospital medical records. Only researchers of this study have access to these data to protect confidentiality. Patients with confirmed COVID-19 (Positive RT-PCR SARS-CoV-2 RNA) were enrolled in the study. Patients with atypical clinical symptoms or chest radiology changes combined with negative SARS-CoV-2 RNA test results were excluded from this study. The study was approved by the Ethics Committee of Leona Kefamenanu Hospital. The need for individual consent was waived due to the retrospective and non-interventional nature of this study.

Data recorded were the initial, gender, age, signs and symptoms: fever, cough, nasal congestion, shortness of breath, nausea, vomiting, diarrhoea, abdominal pain, fatigue, anosmia, and ageusia. The recorded sign was oxygen and saturation on admission, categorized as hypoxia or

Table 1. Operational definition and variables.

Characteristics	Definition
Fever	Axillary temperature of at least 37.3 °C
Anosmia	Complete loss of the sense of smell
Ageusia	Loss of sense of taste
Fatigue	Excessively tired despite adequate rest
Diarrhoea	Loose, watery stools three or more times a day.
Hypoxia	Oxygen saturation (SPO_2) ≤93% on atmospheric air,[15] measured with pulse oximetry
Oxygen Supplemental Therapy	Classified into: No supplemental therapy Nasal cannulas Simple masks Non-rebreather (reservoir) masks
Diabetes Mellitus	Defined as having polyuria, polydipsia, polyphagia with random blood glucose ≥200 mg/dL (11.1 mmol/L).[16] Random blood glucose defined as blood sample taken at a random time, irrespective of last meal;[16] or defined as having polyuria, polydipsia, polyphagia with fasting blood glucose ≥126 mg/dL.[16]
Hypertension	Systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg.[17]
Bronchial Asthma	A chronic inflammatory disease of the airways characterized by bronchial hyperreactivity and a variable degree of airway obstruction.[18] On this research based on patient history.
Comorbidity	Refer to any long-term health condition that coexists in an individual with a specific condition of interest, in this case COVID-19.[19] The recorded comorbidities in this research are diabetes mellitus, hypertension and asthma bronchial, cardiovascular disease, cerebrovascular disease, chronic liver disease, kidney disease, autoimmune, and HIV. Kidney disease was diagnosed according to the KDIGO (Kidney Disease Improving Global Outcomes).[20] These comorbidities were classified into one comorbidity and more than one comorbidities.
Leukopenia	Leukocyte count less than 5,000/mm^3
Leukocytosis	Leukocyte count more than 10,000/mm^3
Lymphopenia	Lymphocyte count ≤1,000/μL
Lymphocytosis	Lymphocyte count >4,000/μL
Thrombocytopenia	Platelet count <150×10^3 per μL
Elevated Serum Creatinine	Serum creatinine level >1.3 mg/dL
Hypokalemia	Serum potassium level <3.5 mEq/L (3.5 mmol/L)
Chest X-ray	Performed by radiology department. The results are divided into normal, mild consolidation, moderate or severe based on Brixia scoring system
COVID-19 Diagnosis	According to the Indonesia COVID-19 management guideline (versions 1-3).[12-14]

normal. Comorbidities such as diabetes mellitus, hypertension, asthma bronchiale, cardiovascular disease, cerebrovascular disease, kidney disease, autoimmune disease, and HIV were recorded. The recorded laboratory tests were white blood cell, lymphocyte, platelet, creatinine, SARS-COV-2 rapid antigen test, potassium serum and chest x-ray on admission day. The diagnosis was based on the Indonesian COVID-19 management guideline (v.1 to 3) which were divided into mild, moderate, severe, and critical stage;[12-14] in this study we categorized mild as non-severe whereas moderate, severe, and critical stage as severe. Treatments were recorded. The outcome such as recovery, referred to another hospital or death were also collected.

DEFINITIONS

Statistical Analysis

Samples were divided into non-severe and severe cases. Categorical variables were expressed as frequencies and percentages. Continuous data were presented as mean ± standard deviation (SD), and were compared using independent group t-tests. The chi-square and Fisher's exact test were used for categorical variables as appropriate. Variable differed at a significance level of <0.05 were first screened with univariate logistic regression; variables with p-values <0.05 for association with severe COVID-19 were included in a multivariate logistic regression analysis. Odds ratios (OR) and the corresponding 95% confidence intervals (CI) were calculated. For all analyses, a two-sided p-value less than 0.05 was regarded as statistically significant. Statistical analyses were generated using SPSS version 29.0 (IBM, Armonk, NY, USA).

RESULTS

Demographics and Comorbidities

Of 153 patients, 66 (43.1%) were males and 87 (56.9%) were females, most patients were 40 to 59 years old (37.3%) **(Table 2).** Several patients have more than one comorbidity. Compared to non-severe cases, severe cases were generally older and had a higher proportion of males (p 0.008). Patients with comorbidities were more often severe and patients with more than one comorbidities tend to have severe symptoms (n=13, 12.6%, p 0.005).

Table 2. Demographics and comorbidities of COVID-19 patients.

Characteristics	Non-severe n=50		Severe n=103		Total n=153		p-value
Age, Mean (±SD)	36.7 (13.9)		53.4 (15.3)		47.9 (16.7)		<0.001
Age Group (year)							
18-39	32	64%	21	20.4%	53	34.6%	<0.001
40-59	14	28%	43	41.7%	57	37.3%	<0.001
≥60	4	8%	39	37.9%	43	28.1%	<0.001
Gender							
Male	14	28%	52	50.5%	66	43.1%	0.008
Female	36	72%	51	49.5%	87	56.9%	0.008
One Comorbidity							
Diabetes Mellitus	0	0	24	23.3%	24	15.7%	<0.001
Hypertension	5	10%	32	31.1%	37	24.2%	0.004
Bronchial Asthma	1	2%	3	2.9%	4	2.6%	1.000
Cardiovascular Disease	0	0	1	1%	1	0.7%	1.000
Chronic Liver Disease	1	2%	1	2%	2	1.3%	0.548
HIV	0	0	1	1%	1	0.7%	1.000
Multiple Comorbidities	0	0	13	12.6%	13	8.5%	0.005
DM + Hypertension	0	0	4	3.9%	4	2.6%	0.005
DM + Kidney Disease	0	0	1	1%	1	0.7%	0.005
DM + Cardiovascular Disease	0	0	1	1%	1	0.7%	0.005
Asthma + Kidney Disease	0	0	1	1%	1	0.7%	0.005
Hypertension + Kidney Disease	0	0	1	1%	1	0.7%	0.005
DM + Hyperthyroid	0	0	1	1%	1	0.7%	0.005
Hypertension + Cardiovascular Disease	0	0	1	1%	1	0.7%	0.005
DM + Hypertension + Psoriasis	0	0	1	1%	1	0.7%	0.005
DM + Hypertension + Cerebrovascular Disease	0	0	1	1%	1	0.7%	0.005
Hypertension + Cardiovascular Disease + Kidney Disease	0	0	1	1%	1	0.7%	0.005

Clinical Characteristics

The most common symptom was cough 114 (74.5%), followed by fever (n= 105, 68.9%), fatigue (n=92, 60.1%), and nausea (n=80, 52.3%) **(Table 3).** Fever, fatigue, nausea, and shortness of breath were more common in severe cases. Severe patients were frequently associated with the classic triple signs (p <0.001). All non-severe patients did not have hypoxia (0 vs 53, p <0.001).

Laboratory and Chest X-Ray Findings

On hospital admission, all patients underwent relevant laboratory examinations to assess the patients' condition and to guide treatments **(Table 4).**

Of 153 patients, most had normal leukocytes, lymphocytes, and platelet count: 17.6% of patients had hypokalemia, which was more frequently seen in severe patients (p <0.029). All non-severe patients had positive SARS-CoV-2. Most patients had a mild abnormality on chest x-ray (n=68) and all severe patients had chest x-ray abnormality (p <0.001); mild chest x-ray abnormality was found in 68 patients in the severe group (68/103) followed by moderate chest x-ray abnormality in 22 of 103 severe patients (21.4%) and severe chest x-ray abnormality in 7 patients in severe group (6.8%).

Treatment and Outcome

All COVID-19 patients receive therapy based on Indonesian COVID-19 management guidelines (the 1st to 3rd edition) **(Table 5).** [12-14] All COVID-19 patients both severe or non-severe (100%) got supportive therapy, so supportive therapy was not included in this analysis. We like to point out oxygen supplemental therapy as we have no ventilator for COVID-19 patients, both invasive or non-invasive ventilator. Among severe cases, 48.5% required oxygen supplemental therapy.

Among all patients, 85% (130/153) received antiviral therapy, 76.5% were treated with antibiotics. The choice of antibiotics was based on the local epidemiological situation, either oral antibiotics (azithromycin) or intravenous antibiotics (ceftriaxone, levofloxacin iv,


meropenem); 107 (69.9%) patients received corticosteroid; dexamethasone and methylprednisolone are the most commonly used. Most severe patients receive heparin as thromboprophylaxis (n=81, 78.6%, p <0.001). Most patients recover (n=145, 94.8%).

Identification of Risk Factors for Severe Cases

Multivariate logistic regression analysis showed that age ≥60 years (OR = 8.98, 95%CI: 1.81–44.56, p =0.007) and shortness of breath or dyspnea (OR = 16.83, 95%CI: 1.95–144.69, p =0.010) were independently associated with severe cases (**Table 6b**). Fatigue (OR = 4.606, 95%CI: 1.589–13.354, p <0.005) was also independently associated with disease deterioration.

DISCUSSION

Age ≥60 years, fatigue, and dyspnea were associated with severe COVID-19. Patients with those characteristics should be more aggressively managed earlier to prevent complications.

In this study, the age range is from 18 to 81 years with a mean of 47.9 years; mostly in the middle-aged group (40-59 years old, 37,3%). This result is similar to reports by Ibrahim ME, *et al,*[21] that middle-aged, from 40 to 60 years, were the most commonly infected group. Meister T, *et al*, found mean age was 44.1 (SD ±20.6) and had the strongest effect on the severity of COVID-19: a 10-year increase in age was associated with a RRR of 1.68 (95% CI 1.65-1.72) for severe cases.[22] This study shows most severe patients were in the middle age group followed by the ≥60 years group. Pandita A, *et al,* found that severe cases were older.[23] Chen H, *et al,* also show that the majority (75%) of severe cases were older than 50 years old.[24] Gong X, *et al*, suggest that age ≥60 years was associated with severe COVID-19.[6]

Most COVID-19 patients were female but there were more male patients in the severe group. This result is similar to a previous study by Gong, *et al*, who found that more females in confirmed COVID-19 cases (292 of 550) but more males in severe cases (58.4% vs 41.6%).[6] Meister, *et al*, showed female gender was clearly associated with a lower risk of severe COVID-19, the protective effect of the female sex was strong and the strength of association increased with disease severity.[22] But Ibrahim, *et al,* found a different result that men (n = 85) were more likely to be infected by the disease than women (n = 47).[21] This discrepancy can be due to many factors, including the transmission route, willingness to undergo screening, and socioeconomic factors.

This study shows majority of COVID-19 patients had cough, fever, fatigue, and nausea. This result is similar to a case-control study by Zhang H, *et al*,[25] and Kaeuffer C, *et al*.[26] Previous studies state that the most common symptoms were fever, cough, and shortness of breath followed by fatigue and other symptoms like abdominal pain or vomit or muscle pain.[21,24,25] Other signs that significantly related to severe COVID-19 was hypoxia, found in 53 (34.6%) severe cases at admission and none of non-severe group. Pandita A, *et al,* found hypoxia (96.4% vs. 67.9%, p<0.0001) in the first 24 hours were associated with progressing to severe condition.[23] Hypoxia is independently associated with in-hospital mortality and can be an important predictor to risk intensive care.[27]

Hypertension and diabetes were the most common accompanying diseases observed in patients with severe COVID-19. Kaeuffer C,

Table 3. Clinical characteristics of COVID-19 patients on hospital admission.

Characteristics	Non-Severe n=50		Severe n=103		Total n=153		p-value
	n	%	n	%	n	%	
Symptom							
Fever	27	54	78	75,7	105	68.6	0.007
Congested Nose	16	32	25	24.3	41	26.8	0.311
Cough	31	62	83	80.6	114	74.5	0.013
Shortness of Breath	1	2	36	35	37	24.2	<0.001
Anosmia	4	8	8	7.8	12	7.8	1.000
Ageusia	2	4	15	14.6	17	11.1	0.051
Nausea	18	36	62	60.2	80	52.3	0.005
Vomit	2	4	14	13.6	16	10.5	0.069
Diarrhoea	2	4	1	1	3	2	0.249
Abdominal Pain (Stomach Ache)	16	32	45	43.7	61	39.9	0.166
Fatigue	16	32	76	73,8	92	60.1	<0.001
Fever, Cough, Shortness of Breath	0	0	24	23.3	24	15.7	<0.001
Signs							
Hypoxia (SpO_2 ≤93%)	0	0	53	51.5	53	34.6	<0.001

Table 4. Laboratory and chest x-ray findings on admission.

Characteristics	Non-severe n=50		Severe n=103		All Patients n=153		p-value
	n	%	n	%	n	%	
Laboratory Findings							
Leukocytosis	10	20%	17	16.5%	27	17.6%	0.536
Normal Leukocyte Count	30	60%	71	68,9%	101	66.0%	0.536
Leukopenia	10	20%	15	14.6%	25	16.3%	0.536
Normal Platelet Count	46	92%	82	79,6%	128	83.7%	0.052
Thrombocytopenia	4	8%	21	20,4%	25	16.3%	0.052
Normal Lymphocyte Count	31	62%	59	57,3%	90	58.8%	0.578
Lymphocytopenia	19	38%	44	42,7%	63	41.2%	0.578
Normal Creatinine Serum	48	96%	93	90.3%	141	92.3%	0.339
Elevated Creatinine Serum	2	4%	10	9.7%	12	7.8%	0.339
Normal Kalium Serum	46	92%	80	77.7%	126	82.4%	0.029
Hypokalemia	4	8%	23	22.3%	27	17.6%	0.029
Positive Antigen Test	50	100%	95	92.2%	145	94.8%	0.054
Negative Antigen Test	0	0	8	7.8%	8	5.2%	0.054
Chest X-Ray Findings							
Normal	50	100%	6	5.8%	56	36.6%	<0.001
Mild	0	0	68	66%	68	44.4%	<0.001
Moderate	0	0	22	21.4%	22	14.4%	<0.001
Severe	0	0	7	6.8%	7	4.6%	<0.001

Table 5. Treatment and outcome.

Treatment	Non-severe n=50		Severe n=103		Total n=153		p-value
	n	%	n	%	n	%	
Supplemental Oxygen							
No O_2 Supplemental Therapy	47	94%	12	11.7%	59	38.6%	<0.001
Nasal Cannula	3	6%	50	48.5%	53	34.6%	<0.001
Simple Mask	0	0	9	8.7%	9	5.9%	<0.001
Non-rebreather Mask	0	0	32	31.1%	32	20.9%	<0.001
Antiviral	**34**	**68%**	**96**	**93.2%**	**130**	**85%**	**<0.001**
Antibiotic	**29**	**58%**	**88**	**85.4%**	**117**	**76.5%**	**<0.001**
Corticosteroid	**26**	**52%**	**81**	**78.6%**	**107**	**69.9%**	**<0.001**
Thromboprophylaxis	**1**	**1.2%**	**81**	**78.6%**	**82**	**53.6%**	**<0.001**
Outcomes							
Recover	50	100%	93	90.3%	143	93.5%	0.054
Refer	0	0	2	1.9%	2	1.3%	1.000
Death	0	0	8	7.8%	8	5.2%	0.054

Table 6a. Early warning indicators for severe COVID-19 cases.

Variables	Univariate			
	OR	95% CI		p-value
Demographic				
Age, years				
≥60	14.031	3.226	61.024	<0.001
Sex				
Male	2.622	1.266	5.431	0.009
Comorbidities				
Hypertension	4.056	1.472	11.180	0.007
Symptoms				
Fever	2.658	1.299	5.437	0.007
Cough	2.544	1.200	5.392	0.015
Dyspnea	26.328	3.490	198.644	0.02
Nausea	2.688	1.336	5.410	0.006
Fatigue	5.981	2.857	12.522	0.001
Laboratory Findings				
Hypokalemia	.302	.098	.929	0.037

Univariate logistic regression analysis

Diabetes, triple sign, hypoxia, and chest x-ray all in severe group and none in non-severe group group so to avoid bias it was excluded.

Table 6b. Early warning indicators for the occurrence of severe cases with COVID-19 (2).

Characteristics	Multivariate			
	OR	95% CI		p-value
Demographics				
Age, years				
≥60	8.989	1.813	44.569	0.007
Sex				
Male	1.586	.596	4.220	0.355
Comorbidity				
Hypertension	2.358	.623	8.916	0.206
Symptoms				
Fever	2.084	.765	5.677	0.151
Cough	1.668	.601	4.628	0.326
Dyspnea	16.830	1.958	144.691	0.010
Nausea	1.036	.357	3.007	0.949
Fatigue	4.606	1.589	13.354	0.005
Laboratory Findings				
Hypokalemia	2.154	.582	7.971	0.250

Multivariate logistic regression analysis

Diabetes, triple sign, hypoxi,a and chest x-ray all in severe group and none in non-severe group so to avoid bias it was excluded.

et al, shows similar results, where 613 (58.7%) patients had at least one comorbidity and the most predominant comorbidity was hypertension, followed by diabetes and chronic respiratory disease.[26] Meister T, *et al*, report hypertension has relatively modest effect on the risk of severe COVID-19, and also the most common comorbidity, therefore it's contribution at the population level is likely to be substantial.[22] Dennis J, *et al*, demonstrates that type 2 diabetes is associated with ~ 20% increase in mortality risk in people with severe COVID-19, independent of age, sex, ethnicity, obesity, and other major comorbidity.[28] Chen N, *et al*, suggested that COVID-19 is more likely to infect older adult men with chronic comorbidities as a result of weaker immune functions.[29]

Laboratory findings in our study found no significant correlation of leukocyte, lymphocyte, thrombocyte or creatinine serum with COVID-19 severity. This result is similar to the study by Pandita A, *et al*,[23] however this study shows a significant correlation between hypokalemia and severe COVID-19 (p-value 0.029). Yin J, *et al*, showed that the level of serum potassium was negatively correlated with length of hospital stay.[30] Moreno P, *et al*, reported hypokalemia as a predictor for invasive mechanical ventilation requirement in severe COVID-19.[31] Hypokalemia was associated with ICU admission and the requirement for IMV: OR 4.48 (95% CI 2.35–8.53) and OR 5.49 (95% CI 2.66–11.33), for hypokalemia, respectively.[31]

It is also important to note that in this study, not all laboratory tests are presented due to the lack of other supporting tests, such as CRP, D-Dimer, APTT, procalcitonin, or arterial gas analysis. Consequently, the probability of accurately finding the predictor for disease severity is lower compared to hospitals that have access to the required laboratory tests.

Radiology findings show most of the patients had an abnormality in their chest x-rays on admission (63.4%) and all were severe COVID-19. Hafiz M, *et al*, study results shows most of the patient had an abnormality in their chest x-ray and most of the result were categorized as severe chest x-rays.[32]

Among treatment, the present study shows 61.4% require oxygen supplemental therapy


and most of severe COVID-19 require oxygen supplemental therapy. Oxygen supplemental therapy needs to be adjusted according to the patient's condition to prevent disease progression and to avoid the need for ventilator. Antiviral therapy started on the day patients were admitted to the hospital and if there were no contraindications, then the antiviral therapy was administered as soon as the patient was diagnosed. At least 117 patients received one antibiotic either it be oral or intravenous antibiotics, in which 85.4% of severe COVID-19 patients received antibiotics treatment. The choice of antibiotics based on local epidemiological or based on Indonesian COVID-19 Management Guideline and the indication to give antibiotics based on evidence of secondary infection or if there was a presumption of bacterial pneumonia. In addition, 107 patients received corticosteroid therapy, and most of them were from the severe group (81 patients out of 103 patients, 78.6%), the outcome of these patients was 73 (90.1%) recovered and 8 death cases (9.9%). Dexamethasone and methylprednisolone were most commonly used in this hospital. Sterne J, *et al*, meta-analysis result shows corticosteroids were associated with lower mortality among critically ill patients who were and were not receiving invasive mechanical ventilation at randomization.[33]

This study shows that which 53.6% received thromboprophylaxis therapy and 98.8% were from the severe group. Heparin was the thromboprophylaxis agent that was used here. Based on the study by Tang N, *et al*, found that thromboprophylaxis has been associated with statistically significant reduction in mortality rate, especially in patients with severe COVID-19.[34] Most patients recovered, having 145 out of 153 patients in total. 8 of them passed away in which all of them were from severe cases.

This study has several limitations. First of all, this was a retrospective study that was conducted at a single center, with a cohort of 153 patients, which might not necessarily represent the general population of patients. The patients in this study were all from one hospital in Timor Tengah Utara district of East Nusa Tenggara Province, where medical supplies and equipment may have differed from those of other regions. Nonetheless, we tried our best to precisely describe all the clinical and laboratory findings; also chest x-ray features of COVID-19 in rural areas, allowing an adequate comparison with other previously published studies conducted in cities.

CONCLUSION

Age ≥60 years, having fatigue and dyspnea were associated with severe COVID-19. The common symptoms found in this study may help in identifying potential severe COVID-19 patients. This study presented a detailed description of clinical, laboratory, and chest x-ray characteristics of COVID-19 patients in rural areas, thus helping clinicians better manage patients.

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