ORIGINAL ARTICLE

Clinical Characteristics, Degree of Severity and Mortality Rate of Covid-19 patient in Central Java, Indonesia

Coana Sukmagautama[1], Hartono[2], Adhizti Naluriannisa Edya Nugraha[3], Keumala Hayati[3], Basundara Aditya[4], Rianita Marthasari[4]

[1] Internal Medicine of UNS Hospital, Medical Faculty of Sebelas Maret University, Indonesia
[2] Department of Physiology Sebelas Maret University, Indonesia
[3] General Practicioner of UNS Hospital, Indonesia
[4] Medical Student of Medical Faculty of Sebelas Maret University, Indonesia

ABSTRACT

Introduction: COVID-19 is a disease of a thousand faces, with varied clinical characteristics, ranging from mild to severe or critical degrees. This study purposed to identify COVID-19 clinical characteristics, disease severity and mortality rates of patients admitted to UNS Hospital. **Method:** Data for 205 UNS Hospital patients were taken retrospectively from June - November 2020. Medical records were obtained including gender, age, clinical symptoms and comorbidities according to the disease severity. Data analysis was performed using a descriptive method using the Microsoft Excel 2019 application to determine the prevalence of each clinical characteristic based on the disease severity and mortality rate. **Results:** Total data were 205 analyzed, 50.7% female and 49.3% male, the most age group was 19-39 years (43.4%). Patients divided into mild, moderate and severe categories were 53.7%, 34.1% and 12.2%. Clinical symptoms include cough (64.88%), fever (47.8%), shortness of breath (45.4%), malaise (23.41%), nausea (20.49%). Meanwhile, the dominant comorbid factors were hypertension (24.3%) and diabetes mellitus (17.1%). The highest mortality rate was 40-59 years (52%). Duration of treatment 10-14 days. **Conclusion:** Clinical characteristics of confirmed SARS-COV-2 patients found at UNS Hospital still vary widely, with mild to severe symptoms with the comorbid DM and hypertension dominating the death of COVID-19 patients.

Keywords: Clinical characteristics, mortality rate, COVID-19

Corresponding Author:
Coana Sukmagautama, M.Kes., FINASIM
Email: coana.sg@staff.uns.ac.id
Tel: +628122642824

INTRODUCTION

Since March of 2020, WHO has announced COVID-19 a pandemic. The increase and spread to various countries around the world occurred in a short time (1). As of January 24, 2021 97,264,519 confirmed cases and 2,107,554 deaths due to COVID-19 were recorded by WHO (2). In Indonesia, the number of cases has reached 989,262 with deaths reached 27,835 cases or 2.8% of the total confirmed cases (3). Currently more than 200 countries confirm the existence of COVID-19, this indicates a rapid development and spread worldwide and is prognosticated to cause higher morbidity and mortality if not resolved soon. Biswas et al., (2020) stated that age, sex and comorbid were factors related to COVID-19 mortality rate (4).

COVID-19 is now the highlight in the medical field, not only because of its rapid spread and the potential to cause a collapse of the health system, but also because of the variety of clinical manifestations that appear, ranging from asymptomatic, very mild symptoms, to clinical conditions characterized by acute respiratory failure, requires the need of mechanical ventilation and support in Intensive Care Unit (ICU) (5). The most common symptoms in COVID-19 include fever (87.9%), malaise (38.1%), cough (67.7%) and some rare symptoms. such as vomiting (5%) and diarrhea (3.7%) (6). The American academy of Otolaryngology proposes that anosmia, hyposmia and dysgeusia should be considered as additional symptoms of COVID-19 in the absence of respiratory diseases (7). Because a variety of symptoms arise from various organs of the body, the SARS-CoV2, which causes COVID-19, is referred to as an excellent disguise and a thousand faces disease (8). Although there have been many studies on the characteristics and mortality rate of COVID-19, there are still few data regarding the disease severity. This study aims to identify the clinical characteristics and mortality rates of COVID-19 patients admitted to UNS Hospital based on disease severity.

MATERIALS AND METHODS

This research was conducted using a descriptive observational method at Sebelas Maret University Hospital. The subjects were confirmed COVID-19 patients who were admitted at UNS Hospital from June-November 2020. The sampling technique was carried out using a total sampling method with a total sample of 205 patients and taken retrospectively. Data obtained from medical records included gender, age, clinical symptoms and comorbidities according to the disease severity. Data analysis was performed statistically descriptive using the Microsoft Excel 2019 application to determine the prevalence of each clinical characteristic based on the disease severity and mortality rate. This study was approved by Research Ethics Committee, Faculty of Medicine Sebelas Maret University No. 10/ UN27.06.6.1/KEP/EC/2021

RESULTS

Sociodemographic and clinical characteristics of patients

Total of 205 patients with confirmed SARS-CoV-2 infection were treated at the UNS Hospital from June-November 2020 with clinical characteristics as stated in Table 1. The proportion of female patients (50.73%) compared to the male (49.27%). Most cases of COVID-19 occurred in the age 19-39 year (43.41%) followed by the age 40-59 year group (42.44%).

Patients with confirmed status of COVID-19 show cough (64.88%), followed by a history of fever (47.80%), shortness of breath (45.37%), malaise (23.41%) and nausea (20.49%) as the most frequent clinical manifestations (Table I). Most of the COVID-19 patients have major complaints of the respiratory system, and some of them with gastrointestinal complaints.

Disease severity of the patients

Complete data regarding the disease severity of confirmed SASR-CoV-2 patients are presented in Table II. Most of the patients showed mild symptoms (53.7%) at the time of admission, followed by moderate (34.1%) and severe (12.2%) symptoms. Mild symptoms were dominated by the age group 19-39 years (56.4%), while for severe symptoms dominated by the 40-59 years age group (56%). In addition, male was more likely to show moderate (62.9%) and severe (60%) symptoms than female. The duration of treatment for COVID-19 patients of any disease severity is in the range of 10-14 days.

Comorbid diseases in confirmed COVID-19 patients

Three most frequent comorbid diseases of COVID-19 are hypertension (24.39%), diabetes mellitus (17.07%), and other lung diseases (9.76%) which are completely listed in Table I. Severe symptoms are mostly accompanied by comorbid diabetes mellitus (44%), followed by hypertension (27.1%) and cardiovascular disease (16%) (Table II).

Table I: Sociodemographic, Clinical Characteristic and Mortality Rate

Variable	Categories	N	%	Mortality	
				N	**%**
Sociodemographic	Male	101	49.27	17	68
	Female	104	50.73	8	32
	Age Groups 0-18	2	0.98	0	0
	19-39	89	43.41	2	8
	40-59	87	42.44	13	52
	>=60	27	13.17	10	40
Comorbid	Diabetes Mellitus	35	17.07	11	44
	Hypertension	50	24.39	8	32
	Cardiovascular Disease	9	4.39	3	12
	Chronic Kidney Disease	7	3.41	2	8
	Lung Disease	20	9.76	6	24
	Cerebrovascular Disease	1	0.49	0	0
	Others	5	2.44	0	0
Clinical Symptoms	Headache	37	18.05	4	16
	Fever	98	47.80	17	68
	Cough	133	64.88	20	80
	Shortness of breath	93	45.37	23	92
	Cold	32	15.61	2	8
	Sore throat	30	14.63	2	8
	Anosmia	9	4.39	0	0
	Diarrhea	21	10.24	1	4
	Nausea	42	20.49	6	24
	Vomiting	16	7.80	3	12
	Ageusia	2	0.98	0	0
	Fatigue	48	23.41	4	16
	Myalgia	11	5.37	3	12
	Loss of consciousness	8	3.90	6	24
	Others	51	24.88	6	24

Mortality rate for COVID-19 patients in UNS Hospital

The mortality rate (Table I) was higher for male (68%) than female (32%). In addition, the highest mortality rate was also dominated by the age 40-59 years group (52%) followed by the age ≥60 years group (40%).

DISCUSSION

In December 2019, pneumonia with an unknown etiology was first discovered in Wuhan, China. The pathogen causing the case then identified was the novel enveloped RNA betacoronavirus, which is currently called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and is said to have phylogenetic properties similar to SARS-CoV (cause of SARS 2003) (9). In March 2020, the current COVID-19 epidemic caused by SARS-CoV-2 was declared a pandemic by WHO.

Table II: Baseline Characteristic Based on Disease Severity

Variable	Mild	Moderate	Severe
Total (%)	110 (53.7)	70 (34.1)	25 (12.2)
Age (Mean±SD)	36.58±13.03	46.44±13.36	57.24±7.69
Age groups (year)			
0-18	2 (1.8)	0 (0)	0 (0)
19-39	62 (56.4)	17 (24.3)	0 (0)
40-59	34 (30.9)	33 (47.1)	14 (56)
≥60	12 (10.9)	20 (28.6)	11 (44)
Gender			
Male	45 (40.9)	44 (62.9)	15 (60)
Female	65 (59.1)	26 (37.1)	10 (40)
Clinical Symptoms			
Headache	21 (19.1)	12 (17.1)	4 (16)
Fever	39 (35.5)	43 (61.4)	16 (64)
Cough	61 (55.5)	53 (75.7)	19 (76)
Shortness of breath	29 (26.4)	40 (57.1)	24 (96)
Cold	22 (20)	7 (10)	3 (12)
Sore throat	13 (11.9)	15 (21.4)	2 (8)
Anosmia	4 (3.6)	5 (7.1)	0 (0)
Diarrhea	11 (10)	8 (11.4)	2 (8)
Nausea	12 (10.1)	22 (31.4)	8 (32)
Vomiting	6 (5.5)	8 (11.4)	2 (8)
Ageusia	1 (0.1)	1 (1.4)	0 (0)
Fatigue	18 (16.4)	20 (28.6)	10 (40)
Myalgia	3 (2.7)	3 (4.3)	5 (20)
Loss of consciousness	0 (0)	2 (2.9)	6 (24)
Others	21 (19.1)	19 (27.1)	11 (44)
Duration of Treatment			
Days (Mean±SD)	10.47±11.73	14.91±9.54	10±10.22
Comorbid			
Diabetes Mellitus	8 (7.3)	16 (22.9)	11 (44)
Hypertension	23 (20.1)	19 (27.1)	8 (32)
Cardiovascular Disease	10 (9.1)	6 (8.6)	4 (16)
Chronic Kidney Disease	4 (3.6)	2 (2.9)	3 (12)
Lung Disease	4 (3.6)	2 (2.9)	1 (4)
Cerebrovascular Disease	1 (0.1)	0 (0)	0 (0)
Others	3 (2.7)	2 (2.9)	0 (0)

The high spread of this virus, either symptomatic or asymptomatic, is due to the very high level of virulence from human to human, which exceeds the MERS and SARS pandemics (10).

Earlier of the COVID-19 outbreak, by the variation of symptoms and other clinical findings has been a challenge in diagnosing COVID-19 (9). This study provides information on the clinical characteristics, severity and mortality rates of COVID-19 patients at Sebelas Maret University Hospital from June to December 2020.

COVID-19 cases were dominated by patients of productive age (19-39 years) at the Sebelas Maret University Hospital as much as 43.4%. Adults are actively working and involved in many daily activities. As a result, they are easily infected if they do not strictly adhere to the SARS-CoV-2 control protocol (11). Cases of COVID-19 are also not uncommon in the elderly group, where with increasing age various certain kinds of conditions that affect the severity of the disease (12). Cough and (current or historical) fever were the most frequently complained of symptoms among the confirmed cases of SARS-COV-2 which is consistent with previous studies (13). The SARS-CoV-2 virus affects many organ systems. Symptoms related to lower respiratory tract infections were reported in the initial case series from Wuhan, China (14). Apart from cough, fever, and shortness of breath, some other symptoms were also found in SARS-CoV-2 cases including nausea and vomiting and diarrhea (15).

Research on the pathophysiology of SARS-CoV-2 is proceeding and has many unsolved inquiry regarding the variety of manifestations found in SARS-CoV-2 cases. As we know, at the stage the virus replicates, it causes the appearance of mild influenza-like symptoms as a result of the cytopathic effect from the virus. Furthermore, in the adaptive immune phase, the level in virulence decreases because the immune system plays a dominant role, but at the same time there is a mechanism that creates a storm of inflammatory cytokines, this causes tissue damage and resulting in worsen clinical condition - describing which patients remained healthy initially before suddenly worsening. The implications for the advance in antiviral therapy for better results and the use of immunosuppressive therapy in the adaptive immune phase (16)(17).

Various comorbidities might aggravate the seriousness of SARS-CoV-2 symptoms. Patients with comorbid or uncontrolled chronic diseases such as diabetes, hypertension, cancer, pulmonary, lever and kidney diseases and other immunocompromised conditions are more likely to contract the virus and become moderate-to-severely ill (18). Researches about comorbid among SARS-CoV-2 cases show that the risk of having moderate to severe symptoms is greater in the patients group with comorbid such as cardiovascular disease particularly hypertension, and chronic obstructive pulmonary disease (COPD), compared to patients group without comorbidity (19).

We found that hypertension became the most comorbid in this study followed by diabetes mellitus and pulmonary diseases (asthma and bronchitis). Hypertension and SARS-CoV-2 are linked by the main component in binding with ACE2, which ultimately results in an increased affinity for binding human ACE2 to SARS-CoV-2. There is sufficient proof to believe that

zoonotic SARS-CoV-2 completely relies ACE2 as a receptor to enter, so it has a high potential for replication in human cells. Thus, patients taking RAAS blockers (either ARB or ACEi) may have risk of contracting SARS-CoV-2, and progressively they ought to switch to other antihypertensive agents (20). In a meta-analysis study of comorbid in COVID-19 patients, there was found that in addition to cardiovascular disease and hypertension, COVID-19 patients with comorbid COPD also showed changes in genes that regulate ACE2 expression in the lungs (21).

The greatest comorbidity of COVID-19 patients was followed by diabetes mellitus. This is similar to the correlation of hypertension as an aggravating factor in mortality of COVID-19 patients. Dysfunction of the pro-inflammatory cytokine response in diabetic patients might also be the cause of increased mortality of COVID-19 patients (22). There were observed that the pro-inflammatory cytokines levels, particularly tumor necrosis factor (TNF)–α, IL-1, and IL-1 were increased in diabetic patients. (23). Thus, this condition might exacerbate the cytokine storm in COVID-19 which might resulting to a more severe illness (22)(23).

Our study found that there were more male COVID-19 patients than female ones. This is in accordance with several previous studies that men are more susceptive to have COVID-19 compared to women (24). The number of mortality prevalence for men is greater than women. This might be because women have a functional mosaic of X-linked genes, and X chromosome and estrogen genes are associated with high immunity. Therefore, women generally have the innate and adaptive immune response that is stronger than men (24). Men and women have different levels of ACE2 activity. The gender difference shows that women who have higher levels of ACE2 considered a protective factor of more severe illness (25).

The limitations of this study are the insufficent sample size, and this study was only conducted in one hospital, which may not be representative of local conditions.

CONCLUSION

Clinical characteristics of confirmed SARS-COV-2 patients found at UNS Hospital still vary widely, with mild to severe symptoms. The initial clinical symptoms most often complained by patients on admission are respiratory symptoms. The mortality rate for SARS-COV-2 patients is dominated by the elderly, as well as comorbid diseases such as diabetes mellitus and hypertension.

ACKNOWLEDGMENT

We would like to thank the entire team for their hard work so that this study has been conducted completely. We also thank all health workers at Sebelas Maret University Hospital for their dedication and commitment in taking care of patients, especially during this pandemic.

REFERENCES

1. RI KK. Pedoman Pencegahan dan Pengendalian Corona Virus deases (Covid-19). Kementrian Kesehat. 2020;5:178.
2. WHO. WHO Coronavirus Disease (COVID-19) Dashboard [Internet]. 2021 [cited 2021 Jan 24]. Available from: https://covid19.who.int/
3. Communication Team of The Committee for The Handling of COVID-19 and National Economic Recovery. Cured Patients Increased to 798,810 People [Internet]. 2021 [cited 2021 Jan 24]. Available from: https://covid19.go.id/p/berita/pasien-sembuh-meningkat-menjadi-798810-orang
4. Biswas M, Rahaman S, Biswas TK, Haque Z, Ibrahim B. Association of Sex, Age, and Comorbidities with Mortality in COVID-19 Patients: A Systematic Review and Meta-Analysis. Intervirology. 2021;64(1):36–47.
5. Vollono C, Rollo E, Romozzi M, Frisullo G, Servidei S, Borghetti A, et al. Focal status epilepticus as unique clinical feature of COVID-19: A case report. Seizure. 2020 May;78(April):109–12.
6. Ali J, Ali Q, Hafeez MM, Malik A. Clinical features, diagnosis and treatment of COVID-19. Biol Clin Sci Res J. 2020;2020:e032.p.1-22.
7. Brann DH, Tsukahara T, Weinreb C, Lipovsek M, Van den Berge K, Gong B, et al. Non-neuronal expression of SARS-CoV-2 entry genes in the olfactory system suggests mechanisms underlying COVID-19-associated anosmia. Sci Adv. 2020 Jul 31;6(31):eabc5801.
8. Sigit Prakoeswa FR. Dasamuka Covid-19. Medica Hosp J Clin Med. 2020 Aug 28;7(1A):231–40.
9. Guan W, Ni Z, Hu Y, Liang W, Ou C, He J, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. N Engl J Med [Internet]. 2020 Apr 30;382(18):1708–20. Available from: http://www.nejm.org/doi/10.1056/NEJMoa2002032
10. Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. J Autoimmun. 2020 May;109(February):102433.
11. Kraemer MUG, Yang C-H, Gutierrez B, Wu C-H, Klein B, Pigott DM, et al. The effect of human mobility and control measures on the COVID-19 epidemic in China. Science (80-). 2020 May 1;368(6490):493–7.
12. Nanda A, Vura NVRK, Gravenstein S. COVID-19 in older adults. Aging Clin Exp Res. 2020 Jul 10;32(7):1199–202.
13. Niu S, Tian S, Lou J, Kang X, Zhang L, Lian H, et al. Clinical characteristics of older patients infected with COVID-19: A descriptive study. Arch Gerontol Geriatr. 2020 Jul;89(March):104058.

14. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020 Feb;395(10223):497–506.
15. Matangila JR, Nyembu RK, Telo GM, Ngoy CD, Sakobo TM, Massolo JM, et al. Clinical characteristics of COVID-19 patients hospitalized at Clinique Ngaliema, a public hospital in Kinshasa, in the Democratic Republic of Congo: A retrospective cohort study. Serra R, editor. PLoS One. 2020 Dec 18;15(12):e0244272.
16. Sharma R, Agarwal M, Gupta M, Somendra S, Saxena SK. Clinical Characteristics and Differential Clinical Diagnosis of Novel Coronavirus Disease 2019 (COVID-19). In 2020. p. 55–70.
17. Yuki K, Fujiogi M, Koutsogiannaki S. COVID-19 pathophysiology: A review. Clin Immunol. 2020 Jun;215(April):108427.
18. Sanyaolu A, Okorie C, Marinkovic A, Patidar R, Younis K, Desai P, et al. Comorbidity and its Impact on Patients with COVID-19. SN Compr Clin Med. 2020 Aug 25;2(8):1069–76.
19. Yang J, Zheng Y, Gou X, Pu K, Chen Z, Guo Q, et al. Prevalence of comorbidities and its effects in patients infected with SARS-CoV-2: a systematic review and meta-analysis. Int J Infect Dis. 2020 May;94:91–5.
20. Singh Y, Gupta G, Satija S, Negi P, Chellappan DK, Dua K. RAAS blockers in hypertension posing a higher risk toward the COVID-19. Dermatol Ther. 2020 Jul 16;33(4):3–7.
21. Pinto BGG, Oliveira AER, Singh Y, Jimenez L, Gonɜalves ANA, Ogava RLT, et al. ACE2 Expression Is Increased in the Lungs of Patients With Comorbidities Associated With Severe COVID-19. J Infect Dis. 2020 Jul 23;222(4):556–63.
22. Pal R, Bhansali A. COVID-19, diabetes mellitus and ACE2: The conundrum. Diabetes Res Clin Pract. 2020 Apr;162:108132.
23. Geerlings S. Immune dysfunction in patients with diabetes mellitus (DM). FEMS Immunol Med Microbiol. 1999 Dec;26(3–4):259–65.
24. Schurz H, Salie M, Tromp G, Hoal EG, Kinnear CJ, Mɯller M. The X chromosome and sex-specific effects in infectious disease susceptibility. Hum Genomics. 2019 Dec 8;13(1):2.
25. Bhatia K, Zimmerman MA, Sullivan JC. Sex Differences in Angiotensin-Converting Enzyme Modulation of Ang (1-7) Levels in Normotensive WKY Rats. Am J Hypertens. 2013 May 1;26(5):591–8.