International Journal of Scientific Advances
ISSN: 2708-7972
Volume: 5 | Issue: 4 | Jul – Aug 2024 Available Online: www.ijscia.com
DOI: 10.51542/ijscia.v5i4.20

Characteristics, Comorbidities, and Outcomes of 18 – 35 Years Old COVID-19 Patients with Severe Symptoms at Dr. Soetomo Hospital Surabaya

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ABSTRACT

Background: At the end of December 2019, a case of pneumonia with an unknown cause was found in Wuhan City, China, and spread rapidly throughout the world. Until March 2020, WHO defined this disease as Corona Virus Disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and declared this situation as a pandemic. This disease causes high mortality in patients who experience severe/critical symptoms. Several studies were conducted to conduct further research on the elderly which led to a lack of disease information in young adults who are thought to have a greater survival rate. In fact, young adult patients also have the potential to die from COVID-19. Therefore, this study was conducted to obtain a real picture of the clinical manifestations and outcomes of young adult COVID-19 patients so that it can be used by health policymakers to determine more appropriate prevention and management measures in this population. Methods: This study is an observational descriptive study with a retrospective study design using secondary data from medical records of COVID-19 patients at RSUD Dr. Soetomo, Surabaya. Results: In young adult patients, we identified the average age was 30,5 (SD±3,7). From 138 cases included in the inclusion criteria, there were 79,7% of patients discharged and 20,3% deaths. Our findings showed there are more women (56,5%) with 42.3% of them being pregnant than men. Examination of vital signs showed a decrease in oxygen saturation (80±0,19) and heart rate (109,93±24,61) in patients who died. Laboratory examination showed an increase in the number of white blood cells count (11,63±9,61), neutrophils (76,97±13,21), creatinine (1,26±2,98), SGOT (71,29±70,36), SGPT (88,75±103,83), and d-dimer (3.801,74±6.408,12) as well as a decrease in lymphocytes (15,19±9,42). The most comorbidities experienced by patients are obesity (29,7%), liver disease (21,7%), diabetes mellitus (15,9%), and hypertension (13,8%). Conclusion: From the results of the research conducted, we found a profile picture of the characteristics, comorbidities, and outcomes of COVID-19 patients in young adults at Dr. Soetomo Hospital, Surabaya for the period of April 2020 – September 2021.

Keywords: COVID-19; young adult; characteristic; comorbidities; outcomes; mortality

INTRODUCTION

From December 2019 to May 5, 2021, confirmed cases of COVID-19 in the world have reached 153,954,491 cases with 3,221,052 deaths while in Indonesia there have been 1,691,658 confirmed cases with 46,349 deaths [1]. In Indonesia, as many as 24.7% of patients are patients aged 19-30 years and 2.7% of them have died while as many as 11.3% are elderly patients (>60 years) and 50% of them have died [2].

This shows that COVID-19 tends to infect patients of productive age with a relatively high cure rate but in elderly patients confirmed cases are relatively low with a higher risk of death. So, at the beginning of the COVID-19 pandemic, research focused more on elderly patients but information related to young patients and young adults was still limited [3]. In 2020 there were 4,568 literature discussing COVID-19 in old age while in young adult patients only 2,172 literature [1].

This lack of attention to severe symptomatic COVID-19 cases experienced by young adult patients is very important to pay special attention because young adult patients are generally workers who earn to provide for their families, some of them still need further education for a better future and are the next generation of the nation. During the pandemic, there are several negative impacts experienced by young adults, such as declining income, losing a job, difficulty getting an education, tending to experience stress, to having a bad impact when they turn old age [4].

Most previous studies have stated that elderly patients are more susceptible to severe symptoms if infected. As in the study conducted by Sanyaolu et.al 2020 regarding comorbidities and impacts on COVID-19 patients, results were obtained that elderly patients would be more prone to falling to heavier levels [5]. However, research by Rumain et.al, 2021 can refute this by proving a higher prevalence in young adult patients [6]. The severity of the disease in young adults and children tends to be lower due to differences in the number of ACE-2 receptors, comorbidities, and differences in endothelial properties. Elderly patients are more prone to more severe severity because the number of ACE-2 receptors will decrease with age [7]. The existence of comorbidities such as obesity, diabetes, hypertension, heart disease, and COPD is often found in elderly patients and this is related to the expression of ACE-2 so that it can aggravate the patient's disease [8]. Infected patients may get endothelial damage that can worsen the patient's condition but in children, the endothelium is more resistant to damage than adults [9].

METHODS

This research is an observational descriptive study with a retrospective study design using secondary data from COVID-19 patients in Dr. Soetomo Hospital Surabaya. The study was conducted by describing the characteristics, comorbidities, and *outcomes* of COVID-19 patients aged 18 to 35 years with severe symptoms. The study population includes medical records of patients confirmed with COVID-19 at Dr. Soetomo Hospital, Surabaya for the period of April 2020 to September 2021. The research sample includes all medical record data of confirmed COVID-19 patients aged 18 to 35 years at Dr. Soetomo Hospital who have completed treatment (have *outcomes*). This study used *a total sampling* technique.

RESULT

This study has a total sample of 879, consisting of COVID-19 patients aged 18–35 years during the period from April 2020 to September 2021 at Dr. Soetomo Regional Public Hospital in Surabaya. Out of these 879 samples, 138 samples met the inclusion criteria for this study.

TABLE 1: Frequency Distribution of COVID-19 Patients Aged 18 – 35 Years Based on Severity.

Severity	Recovered	Died	Total
Asymptomatic	136 (15,5)	2 (0,2)	138 (15,7)
Mild	179 (20,3)	7 (0,8)	186 (21,1)
Moderate	227 (25,8)	18 (2,1)	245 (27,9)
Severe	195 (22,2)	59 (6,7)	254 (28,9)
Critical	9 (1,1)	47 (5,3)	56 (6,4)
Total	**746 (84,9)**	**133 (15,1)**	**879 (100)**

A total of 879 COVID-19 patients aged 18–35 years were grouped based on the severity of the disease they experienced. According to Table 1, 15.7% of the patients had asymptomatic or no symptoms, 21.1% had mild symptoms, 27.9% had moderate symptoms, and 35.3% had severe/critical symptoms. Table 1 also shows that 84.9% of the patients recovered and 15.1% of the patients died. Among the recovered patients, the highest percentage was found in those with moderate symptoms, at 25.8%, while the highest percentage of deaths was among those with severe/critical symptoms, at 12%.

TABLE 2: Characteristics of COVID-19 Patients Aged 18 – 35 Years with Severe Symptoms by the Outcomes.

	Recovered	Died	Total
Number of Patients	110 (79,7)	28 (20,3)	138 (100)
Gender			
Male	52 (37,7)	8 (5,8)	60 (43,5)
Female	58 (42,0)	20 (14,5)	78 (56,5)
Pregnant	22 (66,7)	11 (33,3)	33 (100)
BMI			
Underweight	6 (4,3)	4 (2,9)	10 (7,2)
Normal Weight	56 (40,6)	8 (5,8)	64 (46,4)
Overweight	8 (5,8)	3 (2,2)	11 (8,0)
Obesity	36 (26,1)	5 (3,6)	41 (29,7)
Uncounted	4 (2,9)	8 (5,8)	12 (8,7)

Based on Table 2, 79.7% of patients recovered and 20.3% died. The death rate was higher among female patients (14.5%) compared to male patients (5.8%) and more common among patients with a normal BMI (5.8%). On the other hand, recovery was more common among female patients (42%) compared to male patients (37.7%) and more prevalent among patients with a normal BMI (49.3%). The sample had an average age of 30.5 years (SD ± 3.7) and was more commonly female (56.5%) compared to male (43.5%). Of the patients, 46.4% had a normal body mass index (BMI), 7.2% were underweight, 8% were overweight, 29.7% were obese, and 8.7% did not have their BMI measured. Among the 33 (23.9%) patients who were pregnant, 11 (33.3%) died and 22 (66.7%) recovered.

TABLE 3: Comorbidities of COVID-19 Patients Aged 18 – 35 Years with Severe Symptoms by the Outcomes .

	Recovered (n = 110)	Died (n = 28)	Total (n = 138)
Comorbidities			
Without	31 (22,5)	6 (4,3)	37 (26,8)
With	79 (57,2)	22 (16,0)	101 (73,2)
Hypertension			
Yes	15 (10,9)	4 (2,9)	19 (13,8)
No	95 (68,8)	24 (17,4)	119 (86,2)
Obesity			
Yes	36 (26,1)	5 (3,6)	41 (29,7)
No	74 (53,6)	23 (16,7)	97 (70,3)
Respiratory Disease			
Yes	7 (5,1)	5 (3,6)	12 (8,7)
No	103 (74,6)	23 (16,7)	126 (91,3)
Diabetes Mellitus			
Yes	18 (13,0)	4 (2,9)	22 (15,9)
No	92 (66,7)	24 (17,4)	116 (84,1)
Cardiovascular Disease			
Yes	8 (5,8)	2 (1,4)	10 (7,2)
No	102 (73,9)	26 (18,8)	128 (92,7)
Renal Disease			
Yes	7 (5,1)	7 (5,1)	14 (10,2)
No	103 (74,6)	21 (15,2)	124 (89,8)
Liver Disease			
Yes	26 (18,8)	4 (2,9)	30 (21,7)
No	84 (60,9)	24 (17,4)	108 (78,3)
Malignancy			
Yes	2 (1,5)	3 (2,1)	5 (3,6)
No	108 (78,3)	25 (18,1)	133 (96,4)
Immunocompromised			
Yes	7 (5,1)	2 (1,5)	9 (6,5)
No	103 (74,7)	26 (18,8)	129 (93,5)

Based on Table 3 above, there were 101 (73.2%) patients with comorbidities and 37 (26.8%) patients without comorbidities. Among the patients without comorbidities, 6 (4.3%) experienced death, and 31 (22.5%) recovered. Among patients with comorbidities, 22 (16%) experienced death, and 79 (57.2%) recovered. Among the patients with comorbidities, there were 41 (29.7%) with obesity, 30 (21.7%) with liver disease, 22 (15.9%) with diabetes mellitus, 19 (13.8%) with hypertension, 14 (10.2%) with renal disease, 12 (8.7%) with respiratory disease, 10 (7.2%) with cardiovascular disease, 7 (6.5%) with immunocompromised conditions, and 5 (3.6%) with malignancy.

TABLE 4: Characteristics of Vital Sign COVID-19 Patients Aged 18 – 35 Years with Severe Symptoms by the Outcomes.

	Normal Range	Recovered	Died	Total
Blood Pressure	90/60 – 120/80	36,49 (±0,41)	36,82 (±0,85)	36,56 (±0,54)
Heart Rate	60 – 100	91,55 (±16,13)	109,93 (±24,61)	95,28 (±19,53)
SpO2	94 – 100	80 (±0,17)	80 (±0,19)	80 (±0,17)
Temp	36.5 – 37.5	123/77 (±13,94/12,20)	121/74 (±25,66/14,74)	122/76 (±16,88/12,7)

Based on Table 4, the average temperature of patients with both recovery and death outcomes remains within normal limits. The average heart rate of patients with recovery outcomes is still within normal limits, but there is a slight increase in heart rate among patients with death outcomes. The average oxygen saturation of patients has decreased for both outcomes. The average blood pressure of patients is within normal limits for both outcomes.

TABLE 5: Characteristics of Laboratory Examination COVID-19 Patients Aged 18 – 35 Years with Severe Symptoms by the Outcomes.

	Normal Range	Recovered	Died	Total
WBC count (x10^3)	3,37 – 10,0	10,98 (±8,96)	14,21 (±11,66)	11,63 (±9,61)
Neutrophil (%)	39,8 – 70,5	75,41 (±13,44)	86,64 (±5,92)	76,97 (±13,21)
Lymphocyte (%)	23,1 – 49,9	16,99 (±9,57)	8,15 (±3,98)	15,19 (±9,42)
Creatine (mg/dL)	0.8 – 1.2	0,89 (±1,32)	2,71 (±5,95)	1,26 (±2,98)
Glucose (mg/dL)	<200	130,19 (±64,08)	114,86 (±35,96)	127,08 (±59,67)
SGOT (U/L)	5 – 40	65,35 (±50,06)	94,61 (±119,58)	71,29 (±70,36)
SGPT (U/L)	7 – 56	94,49 (±107,56)	66,18 (±85,68)	88,75 (±103,83)
D-dimer (µg/mL)	<0.5	3.313,18 (±5.673,94)	5.721,07 (±8.579,17)	3.801,74 (±6.408,12)
C-reactive protein (mg/L)	<10	5,23 (±5,63)	9,06 (±6,06)	6,01 (±5,9)

Based on Table 5 above, the average white blood cell count, neutrophils, SGOT, SGPT, and D-dimer levels increased in both outcomes. The average lymphocyte count decreased in patients who died and remained normal in patients who recovered. The average creatinine levels were normal in patients with recovery outcomes and increased in patients with death outcomes. The average measurements of random blood sugar and CRP were normal for both outcomes.

DISCUSSION

Prevalence of COVID-19 Patients Aged 18 – 35 Years with Severe Symptoms

Data for this study was collected from medical records of COVID-19 patients aged 18–35 years from April 2020 to September 2021 at Dr. Soetomo Regional Public Hospital in Surabaya. The number of samples meeting the inclusion criteria was 138 out of 879 COVID-19 suspects aged 18–35 years. Among the 879 suspects, 746 (84.9%) recovered and 133 (15.1%) died. This study found that the majority of hospitalized COVID-19 patients aged 18–35 years had a recovery outcome (79.7%). This is also reflected in the study by Cunningham et al. (2021), which showed that out of 3,222 young adult COVID-19 patients, 89.4% recovered and 10.6% died [10].

The researchers also categorized the 879 suspects based on the severity of the disease, finding that 310 (35.3%) had severe symptoms, 245 (27.9%) had moderate symptoms, 186 (21.1%) had mild symptoms, and 138 (15.7%) were asymptomatic. Although the majority of patients recovered, patients with severe symptoms still represented the largest case group [10]. In a study by Sandoval et al. (2021), it was reported that out of 1,853 young adult COVID-19 patients, only 17% had moderate severity, and 8% were in critical condition [11]. An observational study by Nazar et al. (2021) also described similar findings, where out of 445 young adult COVID-19 suspects, 324 (72.8%) had mild symptoms, 73 (16.4%) had moderate symptoms, and 48 (10.8%) had severe symptoms [12]. The difference in findings between this study and others may be due to the classification of patients based on severity in this study, which included asymptomatic (no symptoms), mild, moderate, and severe/critical categories. In contrast, other studies categorized patients into only mild, moderate, and severe, which could lead to a different picture, showing more severe cases in this study compared to other studies where severe cases were fewer.

Characteristics of COVID-19 Patients Aged 18 – 35 Years with Severe Symptoms

The sample, with an average age of 30.5 years (SD ± 3.7), had the following characteristics: the majority were female (56.5%), with 33 (23.9%) of them being pregnant. Additionally, 55.1% of the patients had a normal body mass index (BMI), 8% were underweight, 15.9% were overweight, and 12.3% were obese.

Age

The age range selected for this study was young adults aged 18–35 years, with an average age of 30.5 years (SD ± 3.7). Young adulthood is the stage after adolescence (10–17 years) and before middle adulthood (>40 years).

The vulnerability in the later part of young adulthood is also reflected in a study by Kim et al. (2020), which showed that the age group 20–24 years had the highest number of patients, with 1,352 (14.8%) patients, followed by the 25–29 years age group among a total of 9,148 patients [13]. A case-control study of 158 hospitalized COVID-19 patients with severe symptoms found a median age of 43 years, with 50% (79 patients) having an average age of 30 years. This is related to previous studies indicating that immune function declines and vulnerability to viruses increases with age [14].

Gender

In this study, young adult COVID-19 patients with severe symptoms were more frequently female (56.5%) compared to male patients (43.5%). Similar results were found in a study by Sandoval et al. (2021), which indicated a predominance of female patients (62%) among young adult COVID-19 cases [11]. Other literature reports that young adult COVID-19 cases are 52% more common in females than in males [15]. Additionally, research by Umeh et al. (2022) showed that the prevalence of COVID-19 in young adult females was higher (51.3%) compared to males (48.7%) [16]. However, some literature indicates that young adult COVID-19 prevalence is more common in males than females. One study found that 55.6% of 5,390 young adult COVID-19 patients were male, while another reported that 73.7% of 513 young adult COVID-19 patients were male [17, 18].

The discrepancy between the findings of this study and other research remains unexplained and warrants further investigation into the susceptibility of female patients to severe COVID-19 symptoms. The predominance of males among COVID-19 patients has been noted in many studies, attributed to factors such as higher ACE-2 gene expression, immune responses related to sex hormones, and socio-cultural practices as well as religious activities [19, 20]. The differences in findings may be due to variations in factors such as social status, race, occupation, mobility levels, or healthy lifestyle behaviors between female and male patients [11].

Pregnancy

Among the 78 female patients in this study, 33 were pregnant. Of these, 22 (66.7%) recovered and 11 (33.3%) died. A study by Murison et al. (2022) found that non-pregnant women had a higher risk of COVID-19 infection (SMR 1.28) compared to pregnant women (SMR 0.43) [21]. However, pregnant women tend to experience more severe symptoms, requiring hospitalization or intensive care. The link between pregnancy and the risk and severity of COVID-19 can be explained by several factors. Pregnant women undergo numerous physiological changes, including hormonal, cardiovascular, respiratory, and immune system alterations, which can exacerbate the severity of the disease [21].

Body Mass Index

The classification of body mass index (BMI) is defined as underweight if BMI <18.5, normal if BMI is 18.5 – 22.9, overweight if BMI is 23 – 24.9, and obese if BMI ≥ 30 [22]. In this study, BMI measurements revealed that 46.4% of patients had a normal BMI, 7.2% were underweight, 8% were overweight, 29.7% were obese, and 8.7% did not have their BMI measured.

One study reported that 51.2% of 1,013 young adult COVID-19 patients (aged 18–39 years) were obese, with mortality rates increasing by 20% for each additional point on the Charlson Comorbidity Index (CCI). The association between obesity and mortality can be explained by the fact that obesity is often linked to several chronic health issues such as diabetes and chronic kidney failure. Additionally, diabetic patients are known to be prone to hypoventilation and reduced lung volume, which increases the risk of complications in respiratory diseases [15, 23]. High BMI is a risk factor for the severity of COVID-19. Moreover, obesity also leads to inflammation, such as the secretion of cytokines, adipokines, and interferon sequences as an immune response [24].

Although the number of patients with obesity in this study was not dominant, it was significant and warrants further attention, as obesity can exacerbate the disease and increase the risk of mortality.

Characteristics of Vital Sign COVID-19 Patients Aged 18 – 35 Years with Severe Symptoms

Vital sign monitoring is a routine examination for patients and can provide an initial indication of which COVID-19 patients may require intensive care in the hospital. The normal values for body temperature are 36.5 – 37.3°C, for heart rate are 60 – 100 beats per minute, for oxygen saturation are 94 – 100%, and for blood pressure are 90/60 – 120/80 mmHg. In this study, the average measurements for body temperature, heart rate, and blood pressure were within normal limits, but oxygen saturation was decreased in both outcomes.

A decrease in oxygen saturation in both outcomes, with an average measurement of 80% (SD ± 0.17), was observed in this study. This finding aligns with a study that predicted COVID-19 mortality based on vital signs, where the average oxygen saturation was found to be 87% (IQR 78 – 95) and diastolic blood pressure was 70.79 mmHg. This study reported that decreased oxygen saturation and diastolic blood pressure were correlated with COVID-19 mortality [25]. This study also found an increase in heart rate in patients who died. Literature indicates a correlation between increased heart rate (tachycardia) and COVID-19 mortality, with tachycardia often associated as a prognostic factor in pneumonia cases [26].

Characteristics of Laboratory Examination COVID-19 Patients Aged 18 – 35 Years with Severe Symptoms

Laboratory tests are advanced examinations used to diagnose diseases using samples such as urine, blood, stool, sputum, and others. The parameters used in this study include white blood cell count (WBC), neutrophils, lymphocytes, creatinine, random glucose, SGOT, SGPT, D-dimer, and CRP. This study found that the average levels of WBC count, neutrophils, lymphocytes, SGOT, SGPT, and D-dimer increased in both outcomes. The average creatinine level increased in patients who died.

The measurement of WBC count and neutrophils showed increased average levels in both outcomes. However, lymphocyte measurements revealed a decreased average in patients who died. An evaluation of WBC count, neutrophils, and lymphocytes in both deceased and recovered patients did not show a significant correlation [3]. Increased WBC count in patients is indicative of excessive inflammation, similar to the increase in CRP observed in severe cases [14]. Elevated neutrophil counts in COVID-19 patients can produce numerous cytokines that cause immune resistance and systemic inflammation, which can be fatal [26]. Lymphocytes are immune cells that play a specific role in fighting diseases. A decrease in lymphocytes in COVID-19 patients occurs as these cells migrate to sites of inflammation. Previous studies have shown that SARS-CoV-2 destroys immune cells and reduces cellular immune function, leading to a decrease in lymphocytes, which is a sign of worsening patient condition [14].

Creatinine, SGOT, and SGPT measurements showed increased values in deceased patients, with average creatinine levels at 2.71 mg/dL (SD ± 5.95), SGOT at 94.61 U/L (SD ± 119.58), and SGPT at 66.18 U/L (SD ± 85.68). These findings align with research by Li et al. (2020), which reported increased creatinine in 48% of patients and elevated SGOT/SGPT in 20% of patients. Increases in these three parameters may indicate kidney and liver dysfunction, possibly as a direct result of the viral infection triggering a cytokine storm [27]. Patients showing increased serum creatinine at the start of treatment are at high risk of experiencing more severe conditions, requiring intensive care (ICU) and ventilatory support [28].

Random blood glucose measurements were within normal limits for both outcomes. However, one study found that random blood glucose was higher in deceased patients compared to those who recovered. This may be due to hyperglycemia, which is associated with increased binding of SARS-CoV-2 to human tissues via glycosylation of the ACE-2 receptor. Additionally, hyperglycemia is linked to disease mortality due to increased energy demands of the virus and insulin resistance [29]. The mechanism connecting blood glucose levels with infectious diseases is not fully understood, but abnormal glucose levels can impair immune responses, particularly in diabetic patients [14].

The average D-dimer levels were 3,313.18 (SD ± 5,673.94) in recovered patients and 5,721.07 (SD ± 8,579.17) in deceased patients. Both results indicate elevated D-dimer levels in both recovered and deceased patients. Increased D-dimer levels correlate with mortality and poor prognosis in COVID-19 patients [30]. D-dimer is a product of fibrinolysis and reflects the effects of COVID-19 on coagulation changes [31].

The average CRP levels were 5.23 (SD ± 5.63) in recovered patients and 9.06 (SD ± 6.06) in deceased patients. When compared to the normal CRP values, both outcomes had normal CRP levels, although slightly higher in deceased patients. Elevated CRP is considered to correlate with the severity of COVID-19 infection and serves as a marker of acute lung damage, as CRP is an important indicator of systemic inflammation in infections or tissue damage [14].

Comorbidities of COVID-19 Patients Aged 18 – 35 Years with Severe Symptoms

In a study involving 138 samples, 101 patients (73.2%) had comorbidities, while 37 patients (26.8%) did not. The four most common comorbidities among patients in this study were obesity (29.7%), liver disease (21.7%), diabetes mellitus (15.9%), and hypertension (13.8%). This was followed by other comorbidities found in patients, including renal disease (10.2%), respiratory disease (8.7%), cardiovascular disease (7.2%), immunocompromised status (6.5%), and malignancy (3.6%).

These findings align with a study by Richardson et al. (2021) on young adult COVID-19 patients, which identified the most frequent comorbidities as obesity (56.2%), diabetes mellitus (31.4%), and hypertension (25.7%) [15]. Other research has also found that among young adult patients, the most common comorbidities were obesity (36.8%), diabetes (18.2%), and hypertension (16.1%) [10]. Additionally, a study by Lu et al. (2021) identified the main comorbidities in young adult patients as 34% with hypertension and 12% with diabetes [30].

Liver Disease

Liver disease has been identified as a common comorbidity among young adult COVID-19 patients. About 21.7% of patients experienced liver disease, and 4 of these patients died. The liver disease predominantly involves hepatitis. The high incidence of liver disease among COVID-19 patients can be explained by several factors. For instance, Indonesia is categorized as an endemic country for hepatitis, with a significant portion of its population having hepatitis. Additionally, there may be an association between liver secretion interacting with SARS-CoV-2, increasing the risk of infection or death, or complications from COVID-19 that lead to liver disease.

Indonesia is classified as a country with moderate to high endemic levels of hepatitis B virus (HBV), with an average prevalence of 9.4% [32]. Patients with severe or critical symptoms may be at higher risk for liver failure. A study by Zhang et al. (2020) found that approximately 11% of COVID-19 patients had comorbid liver disease, and 14% to 53% of cases showed increased SGOT and SGPT values during disease progression [33]. The findings of liver disease in this study align with laboratory results showing increased SGOT and SGPT levels in patients. The expression of ACE-2 receptors in the liver allows the virus to cause damage to target organs and trigger immune cells to produce a cytokine storm, leading to organ failure [27].

An increase in SGOT and SGPT levels indicates liver damage; however, there is no definitive evidence that SARS-CoV-2 directly correlates with liver cell damage. Nonetheless, the mechanism of liver damage in SARS-CoV-2 infection can be explained by systemic inflammatory responses, physiological stress, drug toxicity, and pre-existing liver disease [34].

Diabetes Mellitus

About 15.9% of patients experienced diabetes mellitus, with 4 of these patients having died. A study by Bhatraju et al. (2020) found that 58% of COVID-19 patients had diabetes mellitus [35]. Other literature indicates a positive correlation between pre-existing diabetes in COVID-19 patients and mortality [36].

Research by Harbuwono et al. (2021) on 705 COVID-19 patients with diabetes mellitus found that those with diabetes were more symptomatic compared to patients without diabetes, with a mortality rate of 21.28% among those with diabetes mellitus [37]. Several mechanisms explain how diabetes mellitus can increase mortality, including the expression of ACE-2, T-cell dysfunction, and increased production of interleukin-6 (IL-6) [34]. Additionally, delays in diagnosing diabetes mellitus can lead to chronic diabetes complications 37].

Hypertension

In this study, 13.8% of patients were found to have hypertension as a comorbidity. Of these, 4 patients (2.9%) died, and 15 patients (10.9%) recovered. Patients with hypertension in this study included those with essential hypertension and preeclampsia. Hypertension was not among the top three most common comorbidities found in the sample, likely because this study focused on younger patients, where hypertension is less frequently observed.

According to the literature, hypertension is one of the most common comorbidities in COVID-19 patients [38]. Research by Faustine et al. (2021) found that 15% of 185 patients aged 18-39 had hypertension [39].

There is a correlation between hypertension and increased adverse outcomes, including higher mortality and severity of the disease [40]. Hypertension patients need to manage their blood pressure to achieve normal levels, often using antihypertensive medications such as ACE inhibitors or angiotensin receptor blockers (ARBs).

These medications are significantly associated with the severity of COVID-19. High doses of these medications can increase the expression of ACE-2 receptors, which in turn enhances susceptibility to SARS-CoV-2 infection [34].

CONCLUSIONS

An 18 – 35-year-old COVID-19 patient with Severe Symptoms at Dr. Soetomo Hospital, Surabaya has the following characteristics. The average age of patients was 30.5 (SD± 3.7) years old and the patients were female (56.5%) with 42.3% of them pregnant. Most patients with normal BMI (46.4%). The patient's vital signs were normal (temperature, heart rate, and blood pressure) but with a decrease in oxygen saturation. However, in patients with a fatal outcome, a decrease in oxygen saturation and heart rate was obtained. In the laboratory examinations, we found an increase in WBC count, neutrophils, creatinine, SGOT, SGPT, and D-dimers, a decrease in lymphocytes, as well as normal glucose and CRP levels.

The most common comorbidities found in patients are 29.7% of patients with obesity, 21.7% of patients with *liver disease*, 15.9% of patients with diabetes mellitus, and 13.8% of patients with hypertension.

In this study, more patients recovered (79.7%) than patients died (20.3%).

ACKNOWLEDGMENT

The author would like to thank the Faculty of Medicine, Airlangga University, for supporting the research completion. This research was ethically approved by the Ethics Committee of Dr Soetomo Hospital (KEPK RSDS) with number 0764/LOE/301.4.2/I/2022)

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