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Submission date: 02-Sep-2022 09:48AM (UTC+0100)
Submission ID: 185635205
File name: 690875_Brigita_De_Vega_Yenny_Belinda_Jioe_3502486_1135341819.docx (300.99K)
Word count: 6419
Character count: 38603

Clinical Profile of COVID-19 Patients from March 2020 to March 2021 in Abepura Regional General Hospital (RSUD Abepura), Papua

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Abstract

***Introduction**: SARS-COV-2 infection has widely spread and caused high morbidity and mortality rates. Despite more than one year of the COVID-19 pandemic in Indonesia, there is no scientific report regarding COVID-19 from Papua. This study aims to assess the clinical profile of COVID-19 patients in Abepura Regional General Hospital (RSUD Abepura), Papua.*

***Methods**: We retrospectively recorded patients' age, sex, race, comorbidities, admitting and principal diagnoses, length of stay (LOS), and outcome (deceased/discharged) from the medical records from March 2020 to March 2021. Categorical data were described in frequencies (%), while numerical data were described in mean ± SD/median (IQR). We analyzed the association between independent variables (age, sex, race, comorbidities, and diagnoses) with LOS and mortality rate.*

***Result**: We included 461 patients (58.6% female) with a median age of 36.90 (26.35-49.35) years, who were hospitalized for 17 (12-25) days, in which 5.4% mortality occurred. Overall COVID-19 patients were dominated by non-Papuan race (75%). The most frequent comorbidities were hypertension (19.1%), electrolyte imbalance (10.2%), and diabetes (10.0%). Increased mortality rates were significantly associated with older age (≥65 years), cerebrovascular conditions, hypertension, coronary heart disease, liver disease, diabetes, and electrolyte imbalance (p-values <0.05). Moreover, several comorbidities, such as hypertension, coronary heart disease, diabetes and electrolyte imbalance, and a principal diagnosis of critical COVID-19 were associated with a significantly shorter period of LOS (p-values <0.05).*

***Conclusion**: Mortality and LOS due to COVID-19 in RSUD Abepura, Papua, are influenced by older age and several comorbidities.*

***Keywords**: COVID-19; SARS-COV-2; coronavirus; length of stay; mortality; comorbidity*

***Manuscript type:** ART*

Profil Klinis Pasien COVID-19 pada Maret 2020 hingga Maret 2021 di Rumah Sakit Umum Daerah Abepura (RSUD Abepura), Papua

Abstrak

***Latar belakang:** Infeksi SARS-COV-2 telah tersebar luas dan menyebabkan tingginya angka morbiditas dan mortalitas. Indonesia telah mengalami pandemik selama lebih dari satu tahun, namun tidak ada laporan ilmiah mengenai COVID-19 dari Papua. Penelitian ini bertujuan untuk menilai profil klinis pasien COVID-19 di Rumah Sakit Umum Daerah Abepura (RSUD Abepura), Papua.*

***Metode Penelitian:** Pencatatan dilakukan secara retrospektif terhadap usia, jenis kelamin, ras, komorbiditas pasien, diagnosis masuk dan diagnosis utama, lama rawat, serta keluaran (meninggal/sembuh) berdasarkan rekam medis pada Maret 2020 hingga Maret 2021. Data kategorik dinyatakan dalam frekuensi (%), sementara data numerik dinyatakan dalam rerata ± standard deviasi (SD)/median dan jangkauan interkuartil (IQR). Studi ini menganalisa hubungan antara variabel independen (usia, jenis kelamin, ras, komorbiditas, dan diagnosis) terhadap lama rawat dan mortalitas.*

***Hasil:** Penelitian ini melibatkan 461 pasien (perempuan sebanyak 58,6%) dengan median usia yaitu 36,90 (26.35-49.35) tahun, yang dirawat di rumah sakit selama 17 (12-25) hari, dengan persentase mortalitas 5,4%. Komorbiditas tersering adalah hipertensi (19,1%), gangguan elektrolit (10,2%), dan diabetes (10,0%). Peningkatan angka mortalitas memiliki hubungan yang signifikan terhadap usia tua (≥65 tahun), penyakit serebrovaskular, hipertensi, penyakit jantung koroner, penyakit hati, diabetes dan gangguan elektrolit (p <0,05). Kemudian beberapa komorbiditas, seperti hipertensi, penyakit jantung coroner, diabetes dan gangguan elektrolit, serta derajat kritis COVID-19 sebagai diagnosis utama secara signifikan berhubungan dengan lama rawat yang lebih singkat (p <0.05).*

***Kesimpulan:** Mortalitas dan lama rawat disebabkan COVID-19 di RSUD Abepura, Papua, dipengaruhi oleh usia tua dan beberapa komorbiditas.*

***Kata Kunci:** COVID-19; SARS-COV-2; virus corona; lama rawat; mortalitas; komorbiditas*

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Presented at the 16th National Congress of the Indonesian Society of Respirology

INTRODUCTION

The formerly named "2019 novel coronavirus" (2019-nCoV), which was initially identified in Wuhan, China, in December 2019, spread rapidly worldwide and became a pandemic by January 2020 when the World Health Organization (WHO) declared a global health emergency towards it.[1,2] On February 11, 2020, WHO issued the official name of the 2019-nCoV as Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-COV-2), which manifested as COVID-19. The clinical manifestations of COVID-19 range from a mild flu-like illness to severe acute respiratory distress syndrome (ARDS) and multi-organ failure.[2–4]

As of March 5, 2021, there were 115,289,961 confirmed cases of COVID-19 in 222 countries, which were responsible for 2,564,560 deaths (case fatality rate/CFR of 2.2%) globally. Indonesia was responsible for 1,368,069 confirmed COVID-19 cases with 37,026 deaths (CFR 2.7%). Moreover, at the beginning of July 2021, new cases surged to 2,313,829 cases, and 61,140 deaths were reported.[5] However, the scarcity of tracking and tracing in Indonesia's COVID-19 management system resulted in an enormous underreporting of COVID-19 cases.

Besides affecting the people's health, COVID-19 has severely affected Indonesia's economic stability. An analysis involving more than 12,000 representative households across all 34 provinces in Indonesia held by UNICEF in May 2021 revealed that 74.3% of the participants experienced decreased earnings due to the unprecedented pandemic. The study also concluded that one in ten people in Indonesia live below the national poverty line.[6] This problem is even more evident in Papua, the country's most underdeveloped and impoverished area.[7]

In order to solve the burden of COVID-19, treating this highly contagious infection requires proper medical management, medication, and diagnostic equipment. However, these facilities are not always accessible in rural areas such as Papua. Limited diagnostic centers and capacity, challenging geographical conditions, and transportation costs hinder adequate COVID-19 management in Papua. The limitation of decent health facilities and low resources in Papua also contributes to undetected chronic comorbidities and worsens COVID-19 outcomes.[8]

In addition to those limitations, the COVID-19 pandemic has increased the healthcare system burden as Papua has long struggled with controlling various infectious diseases. According to the Health Ministry Annual Report, Papua has 86,022 active cases of malaria (2021), approximately 842,000 cases of tuberculosis (2017), and 3,753 cases of HIV (2019).[9–11] Additionally, non-infectious diseases (cardiovascular disease, chronic pulmonary disease, diabetes, and others) accounted for 73% of mortality.[12] Related to COVID-19 pandemic, there is no current scientific report on the COVID-19 research in Papua. Thus, this study aims to report the demographics, clinical manifestations, and comorbidities of COVID-19 patients from March 2020 to March 2021 in Abepura Regional General Hospital, Papua.

METHODS

Study design and eligibility criteria

In this retrospective cohort study, we observed and analyzed COVID-19 patients admitted to Abepura Regional General Hospital (RSUD Abepura), Papua, Indonesia, between March 2020 and March 2021. We conducted a descriptive and analytical study focusing on the association of clinical profile (demographic, comorbidities, and diagnoses) with mortality and length of stay (LOS). The diagnoses of

COVID-19 complied with Indonesia's national COVID-19 guidelines during the study period.[13] We included all patients who were hospitalized due to COVID-19 with the following criteria: (1) asymptomatic or symptomatic patients who tested positive for SARS-COV-2 reverse transcription polymerase chain reaction (RT-PCR) (first RT-PCR and/or second RT-PCR), or (2) symptomatic patients (presenting with upper respiratory or pneumonia manifestations) who tested positive for SARS-COV-2 rapid antigen. However, we excluded suspected/probable COVID-19 patients who tested negative in two consecutive RT-PCR.

Data collection

Data such as patient ID, age, sex, race, comorbidities, admitting and principal diagnoses (i.e., mild, moderate, severe, and critically ill), length of stay (LOS), and outcomes (discharged or deceased), were obtained from medical records and recorded using Microsoft Excel (Microsoft, USA) by the research team. Patient ID was recorded as initials to ensure anonymity; comorbidities were obtained from history taking, physical examination, laboratory, and radiology tests; admitting diagnoses were recorded at admission by doctors on duty; the attending pulmonologist established principal diagnoses; length of stay was calculated from the admission day until deceased/discharged. The ethical clearance for this study was exempted by the Medical and Ethics Committee of Abepura Regional General Hospital (RSUD Abepura), Papua, Indonesia.

Data analysis and interpretation

Descriptive statistics included frequencies (n) and percentages (%) for each categorical data. We presented normally distributed numerical data in mean ± SD, while median and interquartile range (IQR) to present skewed numerical data. The descriptive study was explained in tables and graphs. Analytical statistics included a normality test followed by a comparison/association test. When the Kolmogorov-Smirnov normality test showed a skewed distribution, we utilized Mann-Whitney or Kruskal-Wallis test (followed by a post hoc test with Bonferroni correction when necessary) to analyze the association between independent variables (age, sex, race, comorbidities, admitting and principal diagnoses) and LOS. We used the t-independent or ANOVA test when the data showed normally distributed. We used the Chi-square test to analyze the association between independent variables with mortality when the independent variables consisted of two groups; otherwise, Fisher's exact test was used. Moreover, the significance value was set to $p<0.05$. All analyses were conducted in SPSS (IBM, USA).

RESULT

Descriptive study

A total of 461 patients comprising 270 females (58.6%) and 191 males (49.4%) with a median age of 36.90 years old (IQR 26.35-49.35) were included in this study (Figure 1). According to the age group (Figure 1), most of the included patients were between 19 and 44 years old (60.5%), followed by the age group of 45 to 64 years old (28.0%), 0 to 18 years old (6.5%) and ≥65 years old (5.0%). Regarding race, we recorded that overall COVID-19 patients were dominated by non-Papuan (75%) than Papuan (25%). Figure 2 shows that the most prevalent comorbidities were hypertension, electrolyte imbalance, and diabetes. Most patients (231/50.1%) were diagnosed with confirmed COVID-19 with mild manifestation at admission. However, after a complete examination, the study revealed that

53.6% of the patients were diagnosed with mild manifestation, 32.1% were moderate, 6.1% were severe, and 4.6% were critically ill (Table 1). These patients were hospitalized for a median of 17 days (IQR 12-25), ranging from 1 to 72 days (Figure 2), in which 25 deaths occurred (mortality rate 5.4%). Moreover, figure 3 demonstrates that deceased cases were higher among the ≥65 years old group and patients with cerebrovascular conditions.

Analytical study

Table 1 presents the association between all independent variables (age, sex, race, comorbidities, admitting and principal diagnoses) with mortality and LOS. Our analyses showed that all deceased patients were ≥45 years old, with patients ≥65 years old having a significantly higher risk of mortality compared to <65 years old (OR 13.21 [95% CI 4.93, 35.39], p=0.000). Moreover, a significant increase of mortality was found in patients presenting with cerebrovascular conditions (OR 19.68 [95% CI 3.76, 103.17], p=0.003), hypertension (OR 8.99 [95% CI 3.82, 21.13], p=0.000), coronary heart disease (OR 7.54

[95% CI2.47, 22.99), p=0.002), liver disease OR 6.37 [95% CI 2.54, 15.96], p=0.000), diabetes (OR 9.00 [95% CI 3.80, 21.32], p=0.000), and electrolyte imbalance (OR 3.04 [95% CI 1.12, 8.05], p=0.032). However, we could not analyse the association between admitting and principal diagnoses with mortality due to the small sample size for logistic regression.

As for the LOS, we found that Papuan patients have a significantly shorter LOS than non-Papuan (a median of 15 days vs 18 days, p=0.007). Similarly, the patients with cerebrovascular conditions had a significantly shorter LOS than those without cerebrovascular conditions (a median of 9 days vs 18 days, respectively, p=0.021). However, our further analyses demonstrated no significant LOS difference between deceased and discharged patients who presented with cerebrovascular conditions (Table 2). In contrast, among COVID-19 patients with hypertension (a median of 3.50 days vs 20.50 days), coronary heart disease (a mean of 8.40 days vs 24.43 days), diabetes (a mean of 4.73 days vs 21.94 days), and electrolyte imbalance (a median of 8 days vs 19 days) exhibited significantly shorter LOS in deceased patients. Likewise, patients with a principal diagnosis of critical COVID-19 were hospitalized for a significantly shorter LOS than those with mild, moderate, and severe COVID-19 (p=0.000, p=0.000, p=0.024). Other independent variables showed no significant differences in terms of LOS.

DISCUSSION

Patient demographics (age, sex, and race)

Our study revealed that most confirmed COVID-19 cases in RSUD Abepura, Papua, from March 2020 to March 2021, were among young adults and the middle age group (19 to 44 years old) at about 61% of total cases. A previous epidemiological study in Jakarta also demonstrated that patients aged 20 to 49 dominated the COVID-19 cases with a proportion of 51.2%, followed by the 50 to 59 years old group (37.6%).[14] Regarding patients' sex, we found more female patients than males in our study (59% vs 41%, respectively). Several studies reported the COVID-19 incidence varied; some found the COVID-19 incidence was higher among males,[15,16] while other studies found that females were counted higher.[17,18] However, there were similarities in multiple studies that showed males are prone to progress into severe conditions.[16,19]

A study by Biswas et al. showed that males were prone to SARS-COV-2 infection and associated with a significantly increased

mortality risk than females because of the higher expression of angiotensin-converting enzyme 2 (ACE2) in males.[20] In addition, Ciarambino et al. found that males tend to have two times higher risk of mortality as androgen hormones were associated with immunosuppressive effect by reducing pro-inflammatory cytokines, such as interleukine-6 (IL-6) expression. On the contrary, estrogen plays a role in immune stimulation and responses, such as managing cytokines activity (IL-1, IL-10, and interferon-gamma).[21]

Moreover, our study also recorded two different races of COVID-19 patients in RSUD Abepura. The dominating race, non-Papuan patients, accounted for three-fold higher than Papuan (indigenous or mixed) patients. We assume that Papuan tend to settle in their homeland for living and working purposes rather than moving to other cities. Most non-Papuans travel for business from Papua to their residential city, particularly in the annual / "Hari Raya" exodus. Interestingly, the unequal distribution of COVID-19 testing in rural Indonesia occurs as the moderate to low-income residents cannot afford it. Thus, it may be that many undiscovered cases of COVID-19 in Papua.

The association of demographic factors with mortality

We recorded the overall mortality rate of 5.4% and compared it between the age group of ≥65 years old and <65 years old, which showed that the age group of ≥65 was associated with a higher rate of mortality (Table 1). A research article by Hazeldine and Lord explained that the physiological aging of the immune system, occurring as rising C-reactive protein levels and some pro-inflammatory cytokines (e.g., TNF-α, IL-6, and IL-8), is associated with a chronically increased basal inflammation in healthy elderly that contributes to infection susceptibility.[21,22] Thus, inflammatory response to SARS-COV-2 can lead to extensive inflammation and tissue injury in severe conditions.[22,23]

The deceased case in our study was reported to be higher in non-Papuan patients, but it showed no difference between those two races regarding mortality. There was limited research on Indonesia's race and ethnicity towards COVID-19. However, some studies elucidated several factors that associated race and ethnicity with mortality, such as culture, behaviors, and socioeconomic status.[24] Another systematic review in the USA found that worse outcome of the race and ethnicity-related COVID-19 was associated with lower socioeconomic status and poverty, which increased difficulty in accessing medical care (diagnostic testing and treatment); hence those factors contributed to higher mortality rates.[25]

Comorbidity-related COVID-19 outcomes

Our study showed that cerebrovascular conditions (cerebral infarction or haemorrhagic stroke) constituted the most prominent comorbidity associated with mortality. The mortality risk in patients with cerebrovascular conditions was around 19 times higher than in COVID-19 patients without this comorbidity. The sustained hypoxia in the central nervous system, which results from alveolar gas exchange disturbance, leads to the insufficient cerebral circulation. Besides, cytokine cascades and coagulopathy, which can appear in COVID-19, may trigger the acute cerebrovascular disease.[26] Through this mechanism, COVID-19 patients with cerebrovascular comorbidity may develop exacerbation of cerebral infarction and intracranial bleeding.[27] Thus, the incidence of severe infection and mortality is higher in this population.

Furthermore, hypertension remained the most significant proportion of comorbidities and was related to mortality in SARS-CoV-2 infection. The prevalence of hypertension was higher among older age with diabetes and kidney disease.[28] Rozaliyani et al. reported that hypertension is the most frequent comorbidity of lethal outcomes among patients. They reported diabetes and heart disease as the second most common pre-existing condition among COVID-19 patients.[14] Likewise, our study recorded hypertension (19.1%) as the most significant proportion of comorbidities among COVID-19 patients, followed by electrolyte imbalance (10.2%), diabetes (10%), liver disease (8.2%) and coronary heart disease (4.1%). Patients with hypertension were significantly associated with mortality, showing a nine-time higher mortality risk. Likewise, a previous study by Pranata et al. demonstrated that hypertension comorbidity resulted in lethal outcomes.[29]

Some studies explained that the virus' capability to bind with angiotensin-converting enzyme 2 (ACE-2) receptor in the surface epithelial cells to enter human pneumocytes and starts the replication process impacts the activation of angiotensin 2 through type 1 receptors (ATR1).[30] Constant activation of the renin-angiotensin-aldosterone system (RAAS) can adversely increase blood pressure, and patients tend to fall into ARDS during SARS-COV-2 infection.[31,32] Moreover, hypertensive patients will be more severely affected by COVID-19 because of the upregulation of angiotensin 2 through ATR1, which leads to vasoconstriction, increased ROS production and expression of pro-inflammatory cytokines (interleukin 6).[29,30,33]

The pre-existing cardiovascular condition we recorded in our study was coronary heart disease (CHD), demonstrating a strong association with mortality at around seven times more than patients without CHD. Kang et al. found that COVID-19 patients with cardiovascular comorbidity had a higher tendency to have a cardiac injury than patients without cardiovascular comorbidity. The ACE-2 expression in humans' myocardial cells explained SARS-COV-2 infection-induced myocardial damage by several events, such as a hyperinflammation state that progresses to vascular inflammation, myocardial injury, unstable plaque and hyper-coagulability.[34] In addition, heart damage worsened because of the imbalance between the demand and supply of oxygen to myocardial cells due to systemic consequences of COVID-19.[35]

Type 2 diabetes was another pre-existing condition related to mortality (Table 1). In a previous study, diabetes was one of the cardiovascular risk factors that related to the severity and poor outcome in COVID-19 patients.[36] Managing the symptoms was challenging as diabetic patients had a greater incidence of acute respiratory distress syndrome, acute heart injury, acute kidney injury, septic shock, and disseminated intravascular coagulation (DIC).[37] Direct destruction of beta cells in pancreatic islets and uncontrolled inflammation play a role in systemic insulin resistance and downregulation of insulin production. Thus, diabetic patients were prone to uncontrolled blood glucose, resulting in poor outcomes such as ARDS or death.[38,39]

The mortality risk was also associated with the liver disease among hospitalized patients, including hepatitis B or C and increased liver enzymes, such as aspartate aminotransferase (AST) and alanine aminotransferase (ALT). A study by Sharma et al. supported our findings that patients with elevated AST were three times at risk of adverse outcomes. Likewise, the tendency of mortality was two-fold higher among patients with elevated ALT.[40] According to Weber et al., patients recorded with a high level of AST and ALT during hospital admission were strongly associated with ICU admission

and mechanical ventilator utilization.[41] Moreover, severe cases in China were also associated with hepatitis B infection.[42] The poor outcome in patients with liver disease is direct liver damage because hepatocytes also express ACE-2.[43]

Similarly, ACE-2 expression and inappropriate RAAS activation induced excessive excretion of electrolytes by the kidneys contributed to higher mortality in COVID-19 patients with electrolyte imbalance.[44,45] Electrolyte imbalance was described as increased or decreased levels of sodium, potassium, and chloride recorded prior to COVID-19 or at patient admission to our hospital. Additionally, gastrointestinal symptoms in COVID-19 patients, such as diarrhea and nausea, resulted in electrolyte disturbance.[44] Lippi et al. recorded that sodium and potassium levels in severe COVID-19 were significantly lower than in non-severe COVID-19, particularly hypokalemia may worsen ARDS and cardiac injury.[46]

Length of stay and COVID-19 manifestation

Our descriptive study showed that the overall median (IQR) LOS was 17 days (12-25 days). Most cases in our study manifested as mild-moderate clinical symptoms on both the admitting and principal diagnoses, prone to longer hospitalization days. Severe-critical manifestations exhibited less than 10% of overall positive cases and a shorter period of LOS. Rees et al. found a shorter period of LOS among deceased (4-21 days) than discharged cases (4-53 days).[47] This supports our finding that all deceased patients were hospitalized with severe-critically ill manifestations (median 15 days and 5 days, respectively). We assumed severe-critical conditions contributed to a shorter period of hospitalization due to multiorgan failure and early death.

Regarding race, our study found that Papuan patients (15 days) had shorter LOS than non-Papuan patients (18 days). Further observation is essential to discover whether the shorter LOS is associated with poor outcomes or not based on the association of race with other parameters (e.g., demographics, comorbidities, and diagnoses). In terms of comorbidity, patients with cerebrovascular conditions showed a shorter period of hospitalization than those without this comorbidity. We further analyzed the association of COVID-19 outcomes with LOS among patients with comorbidities. Our analyses demonstrated no significant LOS difference between deceased and discharged cerebrovascular-conditions-presenting patients (Table 2).

In contrast, other comorbidities, such as hypertension, coronary heart disease, type 2 diabetes, and electrolyte imbalance, significantly differed in a shorter period of LOS between deceased and fully recovered patients presenting with those comorbidities. In our study, a shorter period of LOS was predicted to be associated with severe illness and higher mortality risk. Zaenab et al. also found that some comorbidities, such as hypertension, diabetes, and cardiovascular disease, tended to have worse outcomes (e.g., respiratory failure and mortality).[48]

LIMITATION

The retrospective cohort study in RSUD Abepura can be the closest reflection of COVID-19 incidence on behalf of the pandemic phenomenon in Papua, Indonesia. However, independent variables should be followed up continually, particularly with small samples and the association of race with other variables, to observe the correlation with COVID-19 outcomes. It is essential to add clinical symptoms to make the diagnoses more precisely analyzed in association with outcomes, which we only summarized as mild,

moderate, severe, and critical ill manifestation. Hopefully, this research will proceed to the second year of the COVID-19 pandemic, guided by the national guideline following the pandemic period. Thus, we can observe the COVID-19 pandemic progression in Papua, Indonesia.

CONCLUSION

In conclusion, COVID-19 patients from March 2020 to March 2021 in RSUD Abepura, Jayapura, Papua, are predominantly aged 19 to 44. The higher incidence of mortality was influenced by older age (≥65 years old) and comorbidities. Cerebrovascular conditions, hypertension, diabetes, and cardiovascular disease were the main concerns related to higher mortality associated with SARS-COV-2 infection. In terms of LOS, severe to critical manifestation and deceased cases showed a shorter period of hospitalization. In addition, a shorter period of LOS was also shown among deceased or discharged patients presenting with hypertension, coronary heart disease, type 2 diabetes, and electrolyte imbalance, as those conditions were strongly associated with mortality. Delay in medical treatment and hospitalization may contribute to higher mortality in Jayapura. Accordingly, stakeholders' involvement is crucial to repeatedly promoting public awareness of the disease.

ACKNOWLEDGEMENTS

We thank the Department of Pulmonology and Respiratory Medicine, Abepura Regional General Hospital (RSUD Abepura), Papua, for continuing support for this study and Wiliam Alexander Matulessy (COVID-19 Surveillance staff of RSUD Abepura, Papua) for assisting the data collection. We also thank Brigita De Vega, MD, MSc (University College London, United Kingdom), for her editing assistance in preparing the manuscript.

CONFLICT OF INTEREST

None.

FUNDING

None.

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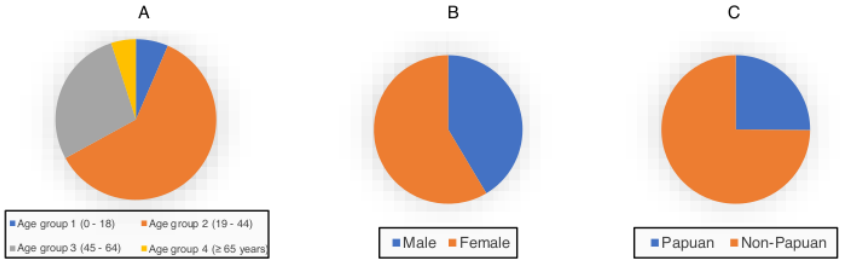
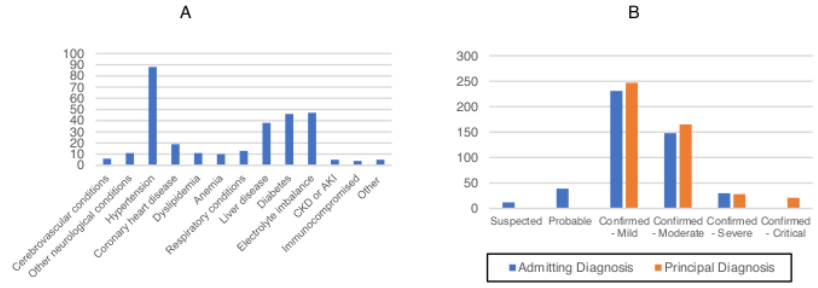


Fig. 1. Proportion of COVID-19 patient based on age group (A), sex (B), and race/ethnicity (C)



Note:
CKD= chronic kidney disease
AKI= acute kidney injury
Other= musculoskeletal condition, hyperuricemia, benign prostatic hyperplasia (BPH)

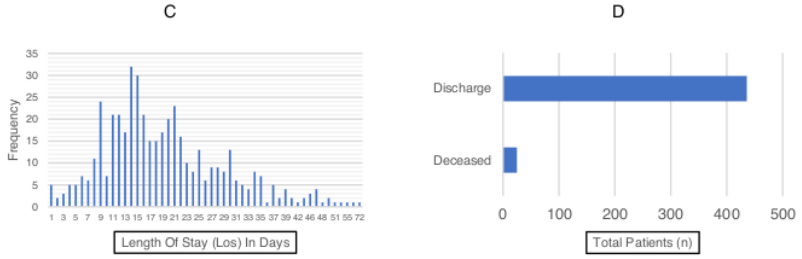


Fig. 2. The proportion of pre-exisiting comorbidities (A), admitting and principal diagnoses (B), length of stay (C), and outcomes in COVID-19 patients.

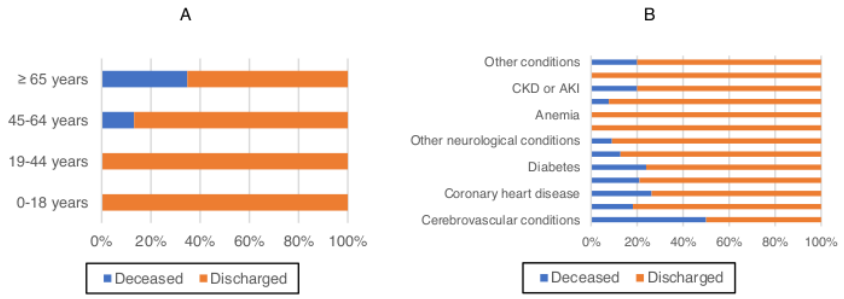


Fig. 3. The outcomes of hospitalized COVID-19 patients based on age groups (A) and comorbidities (B).

Table 1. Characteristic of demographic, comorbidities, diagnoses, outcomes, and LOS in COVID-19 patients in RSUD Abepura.

Parameter	Total (%) N= 461	Discharged (n=436)	Deceased (n=25)				LOS (days)	
			N	p-value	Effect size (Phi)	OR (95% CI)	Median (IQR)	p-value
LOS	17 (12-25)							
Age	36.90(26.35-49.35)							
Age group								
0-18 years	30 (6.5%)	30 (6.5%)	0				15 (11-22)	
19-44 years	279 (60.5%)	279 (60.5%)	0	0.000*[g]	0.297[g]	13.21 (4.93, 35.39)[g]	18 (14-25)	0.193[a]
45-64 years	129 (28.0%)	112 (24.3%)	17 (3.7%)				18 (12-24.5)	
≥65 years	23 (5.0%)	15 (3.3%)	8 (1.7%)				13 (6-25)	
Sex								
Male	191 (41.4%)	177 (38.4%)	14 (3.0%)	0.128[b]	0.071	1.86 (0.83, 4.20)	16 (12-24)	0.314
Female	270 (58.6%)	259 (56.2%)	11 (2.4%)				18 (13-26.25)	
Race								
Papuan	116 (25%)	106 (22.8%)	10 (2.2%)	0.079[b]	0.082	0.482 (0.210, 1.104)	15 (12-21)	0.007†*
Non-Papuan	345 (75%)	330 (71.8%)	15 (3.2%)				18 (13-27)	
Comorbidity								
Cerebrovascular conditions (Ischemic stroke and haemorrhagic stroke)								
Present	6 (1.4%)	3 (0.7%)	3 (0.7%)	0.003*	0.226	19.68 (3.76, 103.17)	9 (1.75-16.75)	0.021*
Absent	455 (98.6%)	433 (93.9%)	22 (4.7%)				18 (13-25)	
Other neurological conditions (Tuberculoma, toxoplasmosis, cephalgia and SOL)								
Present	11 (2.4%)	10 (2.2%)	1 (0.2%)	0.462	0.025	1.78 (0.22, 14.44)	16 (9-24)	0.488
Absent	450 (97.6%)	426 (92.4%)	24 (5.2%)				17 (12-25)	
Hypertension								
Present	88 (19.1%)	72 (15.6%)	16 (3.5%)	0.000*	0.274	8.99 (3.82, 21.13)	20 (11.25-23)	0.949
Absent	373 (80.9%)	364 (79.0%)	9 (2.0%)				17 (12.5-25)	
Coronary heart disease								
Present	19 (4.1%)	14 (3.0%)	5 (1.1%)	0.002*	0.191	7.54 (2.47, 22.99)	13 (8.25-22.50)	0.103
Absent	442 (95.9%)	422 (91.5%)	20 (4.3%)				18 (13-25)	
Diabetes								
Present	46 (10.0%)	35 (7.6%)	11 (2.4%)	0.000*	0.272	9.00 (3.80, 21.32)	17 (9-23.25)	0.298
Absent	415 (90.0%)	401 (87.0%)	14 (3.0%)				17 (13-25)	
Dyslipidemia								
Present	11 (2.4%)	11 (2.4%)	0	1.000	0.037	1.06 (1.04, 1.08)	21 (17-28)	0.278
Absent	450 (97.6%)	425 (92.2%)	25 (5.4%)				17 (12-25)	
Anemia								
Present	10 (2.2%)	10 (2.2%)	0	1.000	0.036	1.06 (1.04, 1.08)	15 (12.5-17)	0.149
Absent	451 (97.8%)	426 (92.4%)	25 (5.4%)				18 (12-25)	
Respiratory conditions (Pulmonary tuberculosis, asthma, and COPD)								
Present	13 (2.8%)	12 (2.6%)	1 (0.2%)	0.520	0.017	1.47 (0.18, 11.80)	22 (13-34.5)	0.264
Absent	448 (97.2%)	424 (92.0%)	24 (5.2%)				17 (12-25)	
Liver disease (Hepatitis B or C, cirrhosis, and unexplained elevated liver enzyme)								
Present	38 (8.2%)	30 (6.5%)	8 (1.7%)	0.000*	0.207	6.37 (2.54, 15.96)	19 (13.5-25.25)	0.540
Absent	423 (91.8%)	406 (88.1%)	17 (3.7%)				17 (12-25)	
Electrolyte imbalance								
Present	47 (10.2%)	41 (8.9%)	6 (1.3%)	0.032*	0.109	3.04 (1.12, 8.05)	18 (12-21)	0.555
Absent	414 (89.9%)	395 (85.7%)	19 (4.1%)				17 (12-25)	
CKD or AKI								
Present	5 (1.1%)	4 (0.9%)	1 (0.2%)	0.244	0.067	4.5 (0.48, 41.83)	23 (10.5-25.5)	0.894
Absent	456 (98.9%)	432 (93.7%)	24 (5.2%)				17 (12-25)	
Immunocompromised condition (HIV/AIDS or cancer)								
Present	4 (0.9%)	4 (0.9%)	0	1.000	0.022	1.06 (1.04, 1.08)	21.5 (12-41.5)	0.532
Absent	457 (99.1%)	432 (93.7%)	25 (5.4%)				17 (12-25)	
Other (Musculoskeletal condition, hyperuricemia, benign prostatic hyperplasia)								
Present	5 (1.1%)	4 (0.9%)	1 (0.2%)	0.244	0.067	4.5 (0.48, 41.83)	18 (11.5-26)	0.981
Absent	456 (98.9%)	432 (93.7%)	24 (5.2%)				17 (12-25)	
Admitting Diagnosis								
Suspected	12 (2.6%)	12 (2.6%)	0				13 (8.25-18.75)	
Probable	39 (8.5%)	29 (6.3%)	10 (2.2%)				15 (11-24)	
Confirmed Mild	231 (50.1%)	231 (50.1%)	0			N/A[h]	17 (13-27)	0.004[a,f]
Confirmed Moderate	148 (32.1%)	147 (31.9%)	1 (0.2%)				19 (14-23.75)	
Confirmed Severe	30 (6.5%)	17 (3.7%)	13 (2.8%)				14 (6.75-21)	
Confirmed Critical	1 (0.2%)	0	1 (0.2%)				-	
Principal Diagnosis								
Confirmed Mild	247 (53.6%)	247 (53.6%)	0				17 (13-27)[c]	
Confirmed Moderate	165 (35.8%)	165 (35.8%)	0			N/A[h]	19 (14-23.5)[d]	0.000[a*]
Confirmed Severe	28 (6.1%)	22 (4.8%)	6 (1.3%)				15.5 (9.5-23)[e]	
Confirmed Critical	21 (4.6%)	2 (0.4%)	19 (4.1%)				5 (2.5-14.5)[c,d,e]	

Note:
* Statistically significant (p<0.05)
†Analyzed with Mann-Whitney test
[a] Analyzed with Kruskal-Wallis test
[b] Analyzed with Chi-square

[c] Post hoc test showed significant difference (p=0.000)
[d] Post hoc test showed significant difference (p=0.000)
[e] Post hoc test showed significant difference (p=0.024)
[f] False-positive significance due to multiple comparison tests (post hoc test showed insignificant difference)
[g] Comparison was between ≥65 years old and <65 years old
[h] Logistic regression test could not be performed due to the small sample size
N/A= data not available

Table 2. The association between the outcome in COVID-19 patients presenting with comorbidities with LOS

Comorbidities (n)	LOS (mean ± SD or median (IQR))	p-value
Cerebrovascular conditions		
Deceased (3)	4.67 ± 5.51	0.207[a]
Discharged (3)	16.67 ± 12.66	
Hypertension		
Deceased (16)	3.50 (1.25-11)	<0.001*[b]
Discharged (72)	20.50 (16.25-24.75)	
Coronary heart disease		
Deceased (5)	8.40 ± 10.14	0.021*[a]
Discharged (14)	24.43 ± 12.58	
Liver diseases		
Deceased (8)	15 (6-24)	0.195[b]
Discharged (30)	19 (14-26.5)	
Diabetes		
Deceased (11)	4.73 ± 3.58	<0.001*[a]
Discharged (35)	21.94 ± 10.11	
Electrolyte imbalance		
Deceased (6)	8 (3.75-18.75)	0.029*[b]
Discharged (41)	19 (13-22)	
Other neurological conditions		
Deceased (1)	9.00	N/A[c]
Discharged (10)	18.90 ± 10.87	
Dyslipidemia		
Deceased (0)	N/A[c]	N/A[c]
Discharged (11)	20.91 ± 7.04	
Anemia		
Deceased (0)	N/A[c]	N/A[c]
Discharged (10)	14.60 ± 3.20	
Respiratory conditions		
Deceased (1)	1.00	N/A[c]
Discharged (12)	25.75 ± 14.25	
CKD or AKI		
Deceased (1)	12.00	N/A[c]
Discharged (4)	20.75 ± 8.18	
Immunocompromised condition		
Deceased (0)	N/A[c]	N/A[c]
Discharged (4)	25.00 ± 15.77	
Other		
Deceased (1)	11.00	N/A[c]
Discharged (4)	20.50 ± 6.81	

Note:
* Statistically significant (p<0.05)
[a] Analyzed using T-independent test
[b] Analyzed using Mann-Whitney
[c] Statistic test could not be performed due to the small sample size
N/A= data not available

Metadata

Academic discipline and sub-discipline	: Medicine; pulmonology; respiratory medicine; lung infection
Keywords	: COVID-19; SARS-COV-2; coronavirus; length of stay; mortality; comorbidity
Geo-spatial coverage	: Abepura; Papua; Indonesia
Research type, method, or approach	: Original research article; retrospective; cohort

Metadata

Disiplin dan subdisiplin akademik	: Kedokteran; pulmonologi; ilmu kedokteran respirasi; infeksi paru
Kata kunci	: COVID-19; SARS-COV-2; virus corona; lama rawat; mortalitas; komorbiditas
Cakupan geo-spasial	: Abepura; Papua; Indonesia
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