Analysis of Urea Levels of Banjarmasin Ministry of Health Polytechnic Students Survivors of Covid 19

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Abstract: Corona Virus Disease 2019 (Covid-19) is an infection caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). Drug therapy for Covid-19 patients currently uses broad-spectrum antivirals such as Remdesivir, Favipiravir, and Oseltamivir, which have side effects of impaired kidney function with a marked increase in serum urea levels. The study aims to analyze the relationship between antiviral administration and serum urea levels of Covid-19 survivors with student respondents from the Health Polytechnic of the Ministry of Health, Banjarmasin, Indonesia. The research method is an analytic survey with a case-control design. Samples were taken using the purposive sampling method and obtained from 10 respondents who were confirmed positive for Covid-19 who consumed antivirals, ten respondents who were confirmed positive for Covid-19 did not consume antivirals, and ten respondents who were not confirmed positive for Covid-19. The Urea test method uses the Rayto Chemray 120 Clinical Analyzer. The results showed that the average urea level of respondents who confirmed positive for Covid-19 who consumed antivirals was 37.35 mg/dl, and respondents who confirmed positive for Covid-19 who did not consume antivirals was 30.70 mg/dl. Respondents who were not confirmed for Covid-19 19 are 30.97 mg/dl. The study's conclusion showed a relationship between the administration of antivirals and serum urea levels of Covid-19 survivors. Suggestions for further research are to use different parameters in assessing the kidney function of Covid 19 survivors, such as creatinine and blood urea nitrogen.
Keywords: Antivirus; kidney; students survivor Covid-19; urea levels.

INTRODUCTION

Corona Virus Disease 2019 (Covid-19) is an infection caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). In December 2019, the first cases of Covid-19 were reported in Wuhan, Hubei Province. On March 12, 2020, the World Health Organization (WHO) declared this disease a pandemic. Transmission of this virus occurs through droplets that can come out when coughing and sneezing. Clinical symptoms felt by Covid-19 patients range from asymptomatic, mild symptoms, mild pneumonia, severe pneumonia, acute respiratory distress syndrome (ARDS), to sepsis[1]. Apart from the respiratory implications, Covid-19 can cause many disorders of the digestive system[2], heart[3], and other organs[4,5]

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According to the RI Ministry of Health's report, in August 2022, 6,297,484 people were confirmed with Covid-19, and 157,296 Covid-19 patients died in Indonesia[6]. According to Banjarbaru City Government statistics for August 2022, there were 11,121 positive cases of Covid-19, with a total of 392 patients dying, 10,628 patients recovering, 92 people being monitored, and nine patients being treated[7].

Currently, drug therapy for Covid-19 patients is not specific; the prescribed treatment regimen is a repurposing drug consisting of broad-spectrum antivirals such as Remdesivir, Favipiravir, Oseltamivir and antibiotics such as Azithromycin or Levofloxacin and several additional therapies such as Dexamethasone, Anticoagulants, and Vitamins[8]. Remdesivir is the most powerful antiviral for SARS-CoV-2 infection[9-10], its active metabolite Remdesivir inhibits viral RNA polymerase, the enzyme produced plays a role in the replication of various viruses, including Coronaviridae[11-12].

Most of these drugs are metabolized in the liver and excreted by the kidneys. The kidney is the main organ for removing metabolic waste products that are no longer needed by the body, such as urea, creatinine, uric acid, and bilirubin. An increase in urea levels above the normal value of 10-50 mg/dl in the blood indicates impaired kidney function13. High urea levels can cause additional complications, namely causing, uremic shock, which can lead to death. Therefore it is important to examine the side effects that can be caused by drugs given to patients and drug management[13].

There has been a study on clinical outcome studies of Remdesivir in COVID-19 patients in hospitals, stating that urea levels increased significantly with the average urea level before treatment. 50.4 mg/dl, and the average urea level after treatment is 77.94 mg/dl[14]. Other research is needed to expand data in different communities, so this study aims to analyze the relationship between antiviral administration and serum urea levels of Covid-19 survivors with student respondents at the Health Polytechnic of the Ministry of Health, Banjarmasin, Indonesia.

MATERIALS AND METHODS

The type of research used is an analytical survey with a Case-Control design. The population was all students majoring in Health Analyst at the Poltekkes Kemenkes Banjarmasin, Indonesia. While the sample was determined using a purposive sampling technique which is obtained ten respondents confirmed positive for Covid 19 and consuming antivirals drugs (A group), ten respondents confirmed positive for Covid 19 but not consuming antivirals (B group), and ten respondents never confirmed positive (C group).

The examination was conducted at the Hematology Laboratory, Health Analyst Department, Poltekkes Kemneks Banjarmasin, using the Rayto Chemray 120 Clinic Analyzer and Urea reagent. The data was analyzed with the One-way ANOVA test with a 95% confidence level and a significance (p) of 0.001. because the significance is less than 0.05, so the analysis be continued to the Post Hoc test. Approval for this study was obtained from the Ethics Commission of Sari Mulia University No. 005/KEP-UNISM/IV/2023.

RESULTS AND DISCUSSION

Based on Table 1, the majority of respondents were 21 years old (50%), female sex as many as 21 people (60%), and confirmed with moderate to severe symptoms in as many as 18 people (90%).

Table 1. Frequency Distribution of Respondents by Individual Characteristic

Age (years)	Frequency	Percentage
18	2	6,7
19	3	10
20	1	3,3
21	15	50
22	9	30
total	30	100
Gender	Frequency	Percentage
Male	9	30
Female	21	60
total	30	100
Comorbid	Frequency	Percentage
Asthma	1	3,3
Without comorbid	29	96,7
total	30	100
Symptom of the + confirmed	Frequency	Percentage
Mild	9	45
Moderate	9	45
Severe	2	10
total	20	100
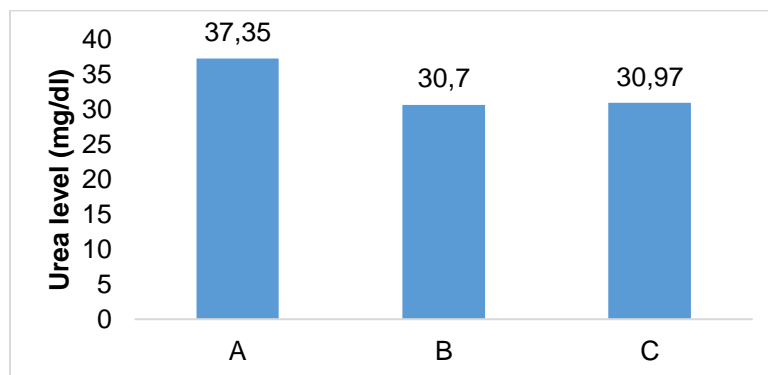
Picture 1 . Graph of Average Urea Level Based on Respondents' Categories A (Confirmed Positive Covid 19 and Consuming Antivirals), B (Confirmed Positive Covid 19 but Not Consuming Antivirals), and C (Not Confirmed Positive and Not Consuming Antivirals).

The test results for the urea level average did not exceed the normal value, where the normal values were 10 – 50 mg/dl. Still, the urea level of respondent A was higher

than respondents B and C. Urea level of B was a little higher than C. After that, the data was analyzed for normality, homogeneity, and the difference in average Urea level with One ANOVA and Post Hoc test.

Table 2. Statistic Test in Confidence Level 95%

	P
Normality test	0,299[a]
Homogeneity test	0.847[a]
Oneway Anova test	0.000[b]
Post Hoc test A-B	0.000[b]
A-C	0.000[b]
B-C	0,635

[a]sig ($\alpha \geq 0.05$). mean the data is normal and the variance is homogen. [b]sig($\alpha \leq 0.05$) mean hypothese received

The statistical test results obtained were normally distributed data with a homogeneous variance. So that it can be continued with the Oneway Anova test, and the result was there were differences in urea levels between the three groups. There were differences between groups A - B and A - C, but B - C was not different.

Antiviral drugs administered shortly after symptom onset can reduce infectiousness to others by reducing viral shedding in the respiratory secretions of patients (SARS-CoV-2 viral load in sputum peaks at around 5–6 days after symptom onset and lasts up to 14 days), and targeted prophylactic treatment of contacts could reduce their risk of becoming infected[15]. The main target of antiviral drugs is to inhibit the viral replication cycle at one of the stages of its development. Early administration of antivirals, namely when symptoms have just appeared, will reduce the severity by reducing the viral load around 5-6 days after the onset of symptoms, which lasts up to 14 days[16].

Based on the Emergency Use Authorization (EUA) for Covid-19, the recommended dose of Antiviral Favipiravir for patients with mild to moderate severity is 1600 mg twice daily on day one and then 600 mg twice daily for up to 7 to 14 days of treatment based on clinical considerations. Favipiravir antiviral should not be given more than 14 days[17]. The recommended dose of Antiviral Remdesivir for patients aged 12 years and over and weighing 40 kg or more with moderate to severe symptoms is 200 mg on day one and 100 mg on day two. Treatment using Remdesivir for at least five days and no more than ten days. The higher and longer the dose of a substance given, the higher the damage to the kidneys[17].

Figure 1 shows the results of respondents who consumed the Covid-19 antiviral, on average having higher urea levels than respondents who did not consume the Covid-19 antiviral. In line with the study of Fatima F et al. (2022), which stated that in COVID-19 patients at the hospital receiving Remdesivir, urea levels increased significantly with urea levels before treatment of 50.4 mg/dl and after treatment of 77.94 mg/dl[14]. In another study on Covid 19 patients, the highest average urea level was at the age of 58-73 years, namely 51.50 mg/dL, and the highest average creatinine level at 26-41 years, 1.63 mg/dL[18]. Another study of patients who were given Fanvipravir showed an increase in the values of the body's biochemical parameters, such as urea and creatinine levels[19].

The limitation of this research is that the number of respondents is still small, so further research requires a larger number of respondents. Other body biochemical parameters such as creatinine and blood urea nitrogen. needed to assess kidney function of Covid-19 survivors.

CONCLUSION

The average age of research respondents was 20 years, and the majority were women. Respondents with comorbidities were 3.3%, and 10% of confirmed positive respondents had severe symptoms. The average urea level of all respondents was still normal. However, there were differences in urea levels between Covid-19 survivors taking antivirals (37.35 mg/dl) and Covid-19 survivors without taking antivirals (30.70 mg/dl), and there were differences in urea levels between survivors. Covid 19 with antiviral consumption (37.35 mg/dl) with respondents not confirmed for Covid 19 (30.97 mg/dl). Future research is expected to use different parameters to assess the kidney function of Covid 19 survivors, such as creatinine and blood urea nitrogen.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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