

Utilization of Antiviral Medications in COVID-19 Patients with Chronic Kidney Disease in Hospital

Yuneka Saristiana¹, Fendy Prasetyawan^{2*}, Faisal Akhmal Muslikh³, Anis Akhwan Dhafin⁴, Ratna Mildawati⁵, Elsa Mahardika Putri⁶, Susilo Margining Raharjo⁷

^{1,2,4,6,7},Universitas Kadiri, Indonesia, ³Bhakti Wiyata Institute of Health Sciences, Indonesia, ⁵Stikes Ganesha Husada, Indonesia

Corresponding Author: Fendy Prasetyawan fendy.pra@gmail.com

ARTICLE INFO

Keywords: Maximum five keywords here, separated by a comma

Received : 2 December

Revised : 16 December

Accepted: 29 December

©2023 Saristiana, Prasetyawan, Muslikh, Dhafin, Mildawati, Putri, Raharjo : This is an open-access article distributed under the terms of the [Creative Commons Attribution 4.0 International](https://creativecommons.org/licenses/by/4.0/).



ABSTRACT

The COVID-19 pandemic has presented a substantial global health challenge, affecting diverse patient populations, particularly those with chronic kidney disease. Hospitals are presently dependent on two antiviral medications, favipiravir and remdesivir, to mitigate the impact of this disease on patients with chronic kidney disease. This study aims to evaluate the utilization of favipiravir and remdesivir in COVID-19 patients with chronic kidney disease in a hospital setting. This research will employ a retrospective approach to gather data from the medical records of COVID-19 patients with chronic kidney disease who received treatment with favipiravir or remdesivir in the hospital. Considering the prevalence of favipiravir usage at 64% and remdesivir at 36%, this research aims to provide a comprehensive understanding of the effectiveness and associated risks of toxicity linked to these two medications in COVID-19 patients with chronic kidney disease

INTRODUCTION

In 2020, the global community faced a significant challenge with the emergence of a novel virus known as SARS-CoV-2, leading to the onset of the COVID-19 pandemic. Recognized as a serious health crisis, the control of COVID-19 has become a matter of utmost importance (Prasetyawn, F. *et al.* 2023).

By December 19, 2021, the worldwide tally surpassed 273 million confirmed cases of COVID-19, with a tragic toll of over 5.3 million lives lost. Indonesia reported its initial COVID-19 case on March 2, 2020, approximately four months after the virus's first detection in Wuhan, China. Since then, the number of cases in Indonesia has steadily risen, warranting considerable attention. Moreover, the identification of various virus variants circulating in different regions of Indonesia has heightened the risk of infection and posed challenges to vaccine effectiveness (Prasetyawn, F. *et al.* 2023).

While COVID-19 can affect individuals of all age groups, its clinical impact on children is generally milder compared to adults. As the pandemic unfolds, variations in infection rates, hospitalization rates, and mortality rates across countries and regions prompt inquiries into risk factors and protective measures against COVID-19. Key determinants influencing the severity and mortality of COVID-19 include laboratory values, proinflammatory cytokine levels, and the presence of other comorbidities (Yıldırım *et al.*, 2022).

The classification of COVID-19 severity encompasses asymptomatic, mild, moderate, severe, and critical categories. Chronic kidney disease stands out as a complicating factor that renders the immune system more vulnerable, thereby exacerbating the impact of COVID-19. Consequently, the COVID-19 pandemic demands serious attention due to its potential to significantly elevate global mortality rates (Sherina *et al.*, 2023).

Individuals with chronic kidney failure face an elevated risk of severe COVID-19 infection. Consequently, stringent preventive measures are recommended for this population to minimize the risk of contracting the virus. To mitigate the spread of COVID-19, chronic kidney failure patients exposed to the virus must undergo hemodialysis following stricter protocols (Rudiansyah *et al.*, 2020).

Presently, no specific recommendations exist for the prevention or treatment of COVID-19. Treatment protocols are primarily informed by in-vivo, in-vitro, and randomized controlled trial outcomes. Broad-spectrum antiviral drugs, including nucleoside analogs, neuraminidase inhibitors, SARS-CoV-2 RNA polymerase analog nucleotide inhibitors, RNA-dependent RNA polymerase (RdRp) inhibitors, and HIV protease inhibitors, are employed until specific antivirals become available.

The use of antivirals for COVID-19 patients in Indonesia is contingent upon the severity of symptoms. Commonly used antivirals for COVID-19 in various countries include lopinavir or ritonavir, remdesivir, Oseltamivir, chloroquine, hydroxychloroquine, and Favipiravir (Zhong *et al.*, 2020).

LITERATURE REVIEW

This investigation represents a cross-sectional, non-experimental study employing a purposive sampling method to select participants. Primary data were derived from the medical records of patients, specifically in the retrospective format. The research focused on individuals with both COVID-19 and Chronic Kidney Disease (CKD) who underwent antiviral therapy. The objectives encompassed evaluating the decrease in disease severity post-antiviral treatment, determining the duration of treatment for this cohort, assessing the mortality rate, and examining potential side effects associated with antiviral drugs among COVID-19 patients with CKD.

METHODOLOGY

This study involves a cross-sectional examination without experimental intervention, employing a purposeful selection approach based on the medical records of individuals with both COVID-19 and Chronic Kidney Disease (CKD). The primary objective is to comprehend the decrease in disease severity, treatment durations, mortality rates, and potential side effects of antiviral medications on individuals with this dual condition following treatment.

The investigation was carried out at RSUD Dr. Soedomo Trenggalek, situated at Jl. dr. Sutomo No.2, Cengkong, Tamanan, Kec. Trenggalek, Kabupaten Trenggalek, East Java 66311, during the month of August 2023. Data collection involved various instruments from Medical Records, including patient demographic information, antiviral drug usage records, results of oxygen saturation examinations, CrCl examinations, and COVID-19 tests.

The data analysis comprises two segments: Descriptive and Inferential. Descriptive analysis utilizes percentages to elucidate variables related to antiviral drugs (independent) and COVID-19 patients with chronic kidney disease. Univariate analysis employs descriptive methods to portray the independent variable of antiviral drugs and the dependent variable of COVID-19 patients with chronic kidney disease. Throughout this data analysis, percentages are applied as a descriptive tool, employing the percentage formula to convey information about the correlation between antiviral drug variables and the condition of COVID-19 patients with chronic kidney disease.

$$P = \frac{n}{\text{Total Sampel}} \times 100\%$$

P" stands for percentage, "n" represents the number of parts, and these values are incorporated into the criteria for calculating the percentage.

RESULT

In the year 2022, RSUD dr. Soedomo attended to 50 patients diagnosed with Coronavirus Disease 2019 (COVID-19) and concurrently experiencing chronic kidney disease. Details regarding the demographic characteristics of these patients are provided below:

Table 1. Characteristics of Respondents COVID-19 with CKD

Characteristics of Respondents	Total	
	Frekuensi	Persentase (%)
Age		
<15 year	4	8
16-35 year	7	14
36- 50 year	9	18
> 50 year	30	60
Gender		
Man	37	74
Woman	13	26
length of hospital stay		
<3 days	12	24
4-7 days	36	72
>7 days	2	4
Outcome		
Recovered	36	72
Died	14	28
Total	50	100

Analyzing the demographic information of confirmed COVID-19 patients with chronic kidney disease at RSUD dr. Soedomo Trenggalek, it is evident that the majority, constituting 60%, are aged 50 and above. Males predominate at 74%, and the average hospitalization duration falls between 4 to 7 days, accounting for 72% of cases. Notably, the recovery rate is also 72%. Factors influencing the severity of COVID-19 are linked to demographics such as age and gender. Older individuals, who often experience a decline in physiological functions including the immune system governed by B and T cells (Fitriani, NI. 2020), tend to be more susceptible to various diseases.

Gender differences in the expression of ACE2 and TMPRSS2 receptors may contribute to variations in the severity and mortality rates of COVID-19 (Di Gennaro et al., 2020). The recovery of patients is attributed to their emergence from the critical period after undergoing treatment for 4 to 7 days, significantly lowering the risk of mortality. Among patients with kidney disease, the risk of contracting COVID-19 is three times higher compared to those without chronic kidney disease. This heightened risk is attributed to a compromised immune system and the routine hospital visits for hemodialysis, which elevate the transmission risk unless strict adherence to health protocols during hospital treatment is ensured.

Table 2. Frequency of Drug Antiviral

Name drug	Frekuensi (n)	Persentase (%)
Favipirafir	32	64
Remdesivir	18	36
Total	50	100

In Dr. Soetomo Hospital, two types of antiviral drugs are utilized, namely favipiravir and remdesivir. The usage of favipiravir constitutes 64%, while remdesivir is employed at 36%. Favipiravir, as a broad-spectrum antiviral drug, has demonstrated effectiveness in clinical trials among COVID-19 patients. The valid maintenance dose for favipiravir ranges from 200 to 600 mg, administered twice a day, over a period of 10 to 14 days, with initial doses varying between 1600, 1800, and 2400 mg. In patients with chronic kidney disease, monitoring the administration of favipiravir is necessary as it can accumulate, increasing the potential risk of toxicity.

DISCUSSION

The importance of precise dosage and continuous monitoring is key in responding to the use of favipiravir. In cases of patients with specific health conditions, such as chronic kidney disease, a more cautious approach is required to avoid undesirable complications.

The consideration of remdesivir as an alternative also needs to be approached carefully, especially in patients who may have sensitivity or contraindications to favipiravir. Decisions regarding the type of antiviral to be used should be based on a comprehensive evaluation of the patient's health conditions and the response to treatment.

CONCLUSION

In conclusion, ensuring accurate dosage and consistent monitoring is crucial when utilizing favipiravir. Patients with specific health conditions, like chronic kidney disease, warrant a cautious approach to prevent potential complications. Evaluating remdesivir as an alternative requires careful consideration, particularly for individuals with sensitivity or contraindications to favipiravir. Ultimately, decisions regarding antiviral selection should be made through a thorough assessment of the patient's health status and treatment response.

REFERENCES

- Chen, N., Zhou, M., Dong, X., Qu, J., Gong, F., Han, Y., Qiu, Y., Wang, J., Liu, Y., Wei, Y., Xia, J., Yu, T., Zhang, X., & Zhang, L. (2020). Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet (London, England)*, 395(10223), 507–513. [https://doi.org/10.1016/S0140-6736\(20\)30211-7](https://doi.org/10.1016/S0140-6736(20)30211-7).
- Di Gennaro, F., Pizzol, D., Marotta, C., Antunes, M., Racalbutto, V., Veronese, N., & Smith, L. (2020). Coronavirus diseases (COVID-19) current status and future perspectives: A narrative review. *International Journal of Environmental Research and Public Health*, 17(8). <https://doi.org/10.3390/ijerph17082690>.
- Prasetyawan, F., & Saristana, Y. (2023). CORONAVIRUS DESEASE 2019 (COVID-19) DAN PENYAKIT GINJAL KRONIS (PGK): Tinjauan

Prevalensi, Faktor Risiko dan Pengobatan Pertama. DEWA Publising.

- Rudiansyah, M., Nur' Amin, H. W., Lubis, L., Bandiara, R., Roesli, R. M. A., & Rachmadi, D. (2020). COVID-19 and kidney diseases in Indonesia. *Systematic Reviews in Pharmacy*, 11(7), 435–442. <https://doi.org/10.31838/srp.2020.7.63>
- Sherina, T., Andriane, Y., & Achmad, S. (2023). Hubungan Penyakit Ginjal Kronik dengan Derajat Klinis Covid-19 di Ruang Rawat Inap RSUD Al- Ihsan Bandung Tahun 2021. *Bandung Conference Series: Medical Science*, 3(1), 848–852. <https://doi.org/10.29313/bcsms.v3i1.6710>.
- Yıldırım, M., Akgül, Ö., & Geçer, E. (2022). The Effect of COVID-19 Anxiety on General Health: the Role of COVID-19 Coping. *International Journal of Mental Health and Addiction*, 20(2), 1110–1121. <https://doi.org/10.1007/s11469-020-00429-3>.
- Zhong, B.-L., Luo, W., Li, H.-M., Zhang, Q.-Q., Liu, X.-G., Li, W.-T., & Li, Y. (2020). Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. *International Journal of Biological Sciences*, 16(10), 1745–1752. <https://doi.org/10.7150/ijbs.45221>.