

Antiviral therapy for covid-19 in tertiary care hospital – A prospective cross-sectional study

¹Ashita Ajith, VIth Year Pharm D, Department of Pharmacy Practice, Ezhuthachan College of Pharmaceutical Sciences, Neyyattinkara, Trivandrum.

²Swathy Suresh, VIth Year Pharm D, Department of Pharmacy Practice, KVM College of Pharmacy, Kokkothamangalam, Cherthala, Alappuzha.

³Dr. Sr. Romia Rodriguez, Consultant Physician, General Medicine, Lourdes Hospital, Ernakulam.

⁴Dr. Paul Puthuran, Medical Director, General Medicine, Lourdes Hospital, Ernakulam.

Corresponding Author: Ashita Ajith, VIth Year Pharm D, Department of Pharmacy Practice, Ezhuthachan College of Pharmaceutical Sciences, Neyyattinkara, Trivandrum.

Citation this Article: Ashita Ajith, Swathy Suresh, Dr. Sr. Romia Rodriguez, Dr. Paul Puthuran, “Antiviral therapy for covid-19 in tertiary care hospital – A prospective cross-sectional study”, IJMSIR- December - 2021, Vol – 6, Issue - 6, P. No. 218 – 224.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Coronavirus disease 2019 (COVID-19) is caused by SARS-CoV 2, a global health disaster emerged in Wuhan, China, in December 2019. Millions of people have been affected with this disease worldwide. There is an urgent need of effective drugs in treating mild, moderate and severe COVID-19 patients. The usual COVID-19 treatment according to WHO includes Remdesivir, Systemic Corticosteroids, Ivermectin, Lopinavir or Ritonavir, Hydroxy - chloroquine, Interleukin -6 receptor blockers.

Objectives: To find out the effectiveness of antiviral therapy for COVID-19 and to determine its clinical outcomes with respect to categories.

Methodology: A prospective cross-sectional study was conducted on adult COVID-19 patients, who were admitted to a hospital in Ernakulam, Kerala, from October 2020 to June 2021.

Results: A total of 1242 COVID-19 patients who tested positive for TrueNat was enrolled in this study and 200 were excluded due to incomplete data and 24hour admission. In this study the outcome of antiviral therapy in categories B and C of COVID -19 patients were observed and the results illustrates that in category B 97.5% of patients got recovered after antiviral therapy and the mortality rate was found to be 1.78%. While in Category C 88.11% of patients were alive and the death rate was about 11.88%.

Conclusion: The study suggests that majority of patients got recovered after antiviral therapy. More studies are required for evaluating clinical efficacy of antiviral therapy in COVID-19 patients.

Keywords: Covid -19, ARDS, TrueNat

Introduction

Coronavirus disease 2019 (COVID -19) is caused by SARS-CoV 2, a global health disaster emerged in Wuhan, China, in December 2019.⁽¹⁾ The transmission

of virus occurs from symptomatic people to others by close contact through respiratory droplets, by direct contact with infected persons or their contaminated objects.⁽²⁾ Based on the severity the disease can be categorized into mild, moderate and severe cases results in complications such as respiratory failure, acute respiratory distress syndrome (ARDS), sepsis and septic shock, thromboembolism and multiple organ dysfunction.⁽³⁾ The COVID-19 infection can be categorized into Category A, B, and C based on the symptoms. In category A, patients was given only symptomatic and supportive therapy but in patients belonging to category B and C requires antiviral therapy due to disease severity and risk of comorbidities.⁽⁴⁾ The drugs in the treatment of COVID-19 according to treatment guidelines includes, Remdesivir, Systemic Corticosteroids, Ivermectin, Lopinavir or Ritonavir, Hydroxy-chloroquine, Interleukin -6 receptor blockers.⁽⁵⁾ Many trials, and studies have been conducted to prove the efficacy of these drugs in the treatment of Covid-19. ⁽⁶⁻⁹⁾ In this study, we conducted a prospective cross-sectional study on 1242 confirmed COVID-19 patients receiving antiviral therapy including Remdesivir, Favipiravir, Ivermectin, Tofacitinib and investigated its efficacy.

Materials and Methods

We conducted a prospective cross-sectional study on adult patients, who were admitted to a hospital in Ernakulam, Kerala, from October 2020 to June 2021.

Table 1: Age with Categories

| Age (Years) | Category A (n = 94) | Category B (n = 543) | Category C (n = 405) | Total (n = 1042) |
|-------------|---------------------|----------------------|----------------------|------------------|
| < 20 | 9 (10%) | 31 (6%) | 4 (1%) | 44 (4%) |
| 21 – 30 | 29 (31%) | 65 (12%) | 8 (2%) | 102 (10%) |
| 31 – 40 | 24 (26%) | 75 (14%) | 52 (13%) | 151 (14%) |
| 41 – 50 | 13 (14%) | 82 (15%) | 64 (16%) | 159 (15%) |

All COVID-19 patients who tested positive for TrueNat receiving antiviral therapy were enrolled in the study. The patients were evaluated based on the clinical presentation, oxygen saturation level, laboratory parameters and imaging techniques. These patients were categorized based on these parameters and treatment regimen for each patients were designed. The patients mainly received the antiviral drugs such as Remdesivir, Favipiravir, Ivermectin, Tofacitinib.

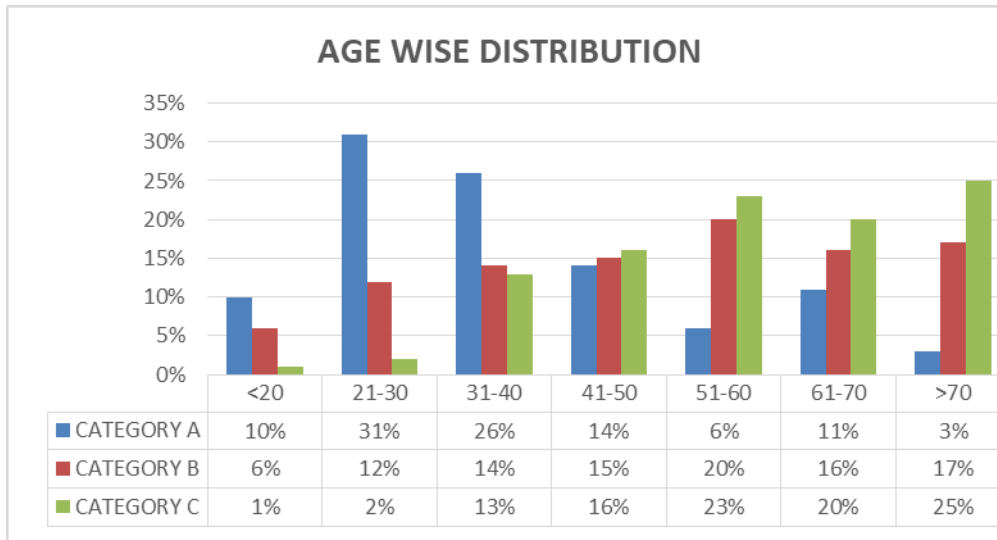
A total of 1242 COVID-19 patients who tested positive for TrueNat was enrolled in this study 200 were excluded due to incomplete data and 24hour admission. Along with Pediatrics, pregnant and lactating population was also excluded from the study.

Result

A total of 1042 patients, 4% belong to the age group < 20 years and 10% belong to the group 21-30 years. 14% of the cases belong to the age group 31-40 years and 15% of the cases belong to the group 41-50 years. 20% of the cases belong to the age group 51-60 years and 17% of the cases belong to the group 61-70 years. 19% cases with age more than 70 years were also noted. The average age was 52.0 years with standard deviation 19.1.

| | | | | |
|------------------|-------------|-------------|-------------|-------------|
| 51 – 60 | 6 (6%) | 110 (20%) | 94 (23%) | 210 (20%) |
| 61 – 70 | 10 (11%) | 89 (16%) | 83 (20%) | 182 (17%) |
| > 70 | 3 (3%) | 91 (17%) | 100 (25%) | 194 (19%) |
| Mean ± SD | 36.4 ± 17.4 | 50.3 ± 19.6 | 57.8 ± 16.1 | 52.0 ± 19.1 |

Figure 1: Age wise distribution with categories



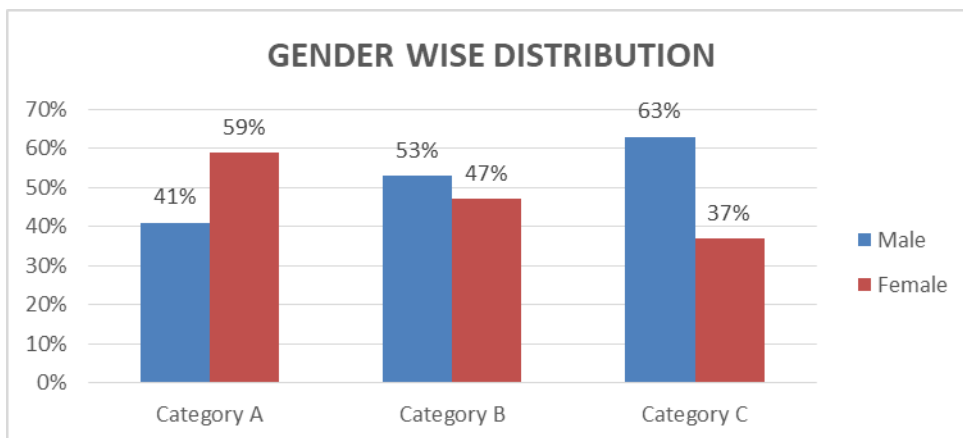
In this study, 56% of the cases were male and 44% of the cases were female. The average age of male was 51.99 years with standard deviation 18.94.

The average age of female cases was 52.02 years with standard deviation 19.31.

Table 2: Gender with Categories

| Sex | Category A (n = 94) | Category B (n = 543) | Category C (n = 405) | Total (n = 1042) |
|--------|---------------------|----------------------|----------------------|------------------|
| Male | 39 (41%) | 288 (53%) | 255 (63%) | 582 (56%) |
| Female | 55 (59%) | 255 (47%) | 150 (37%) | 460 (44%) |

Figure 2: Gender Wise Distribution With Categories



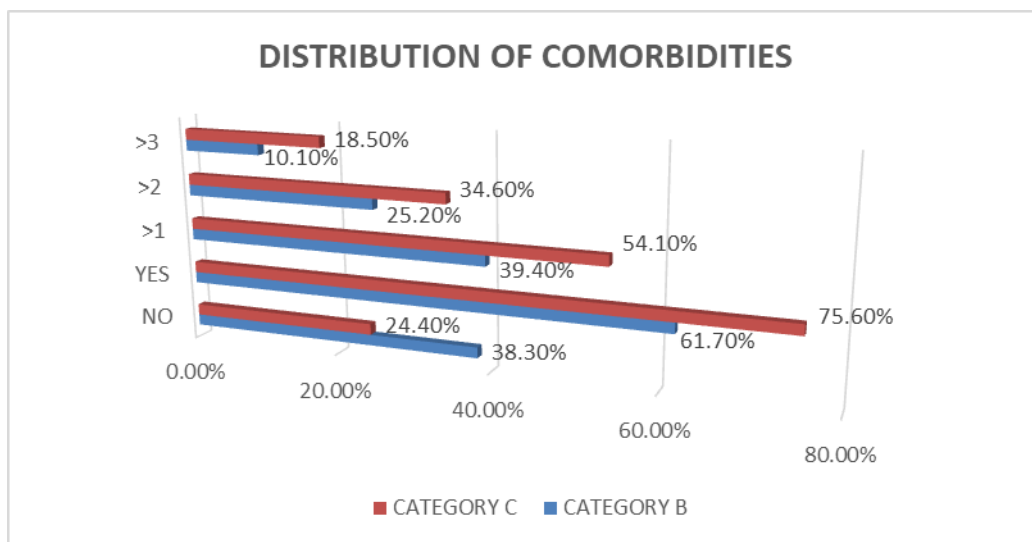
In this study out of 1042 patients, the risk of comorbidities was observed in 641 patients. Among

them, 335 patients belongs to category B(61.7%) and remaining 306 belongs to category C(75.6%).

Table 3: Comorbidities and Category

| Comorbidities | Category B (n=543) | Category C (n=405) | P Value |
|---------------|--------------------|--------------------|---------|
| NO | 208(38.3%) | 99(24.4%) | 0.000 |
| YES | 335(61.7%) | 306(75.6%) | |
| >1 | 214(39.4%) | 219(54.1%) | 0.000 |
| >2 | 137(25.2%) | 140(34.6%) | 0.002 |
| >3 | 55(10.1%) | 75(18.5%) | 0.000 |

Figure 3: Distribution of Cormorbidities with Categories



Out of 1042 patients enrolled in the study, 583 patients received antiviral therapy. The antiviral drugs mainly used in the treatment of COVID-19 includes Remdesivir, Favipiravir, Ivermectin, Tofacitinib. The main choice of antiviral drug was Remdesivir and in majority of patients belonging to category C was administered with it. A total of 280 patients received antiviral therapy in Category B. Among them 103

patients, received Remdesivir and Ivermectin as single therapy. And the remaining 69 received Favipiravir, and 5 received Tofacitinib respectively.

In category C patients, Remdesivir were received by 204, 59 patients received Ivermectin and the rest of 28 patients were treated with Favipiravir and 12 patients received Tofacitinib.

Table 4: Antivirals Received Based On Categories

| Category | Antivirals | Total (N=583) |
|----------|-------------|---------------|
| B | Remdesivir | 103 |
| | Favipiravir | 69 |
| | Ivermectin | 103 |

| | | |
|---|-------------|-----|
| | Tofacitinib | 5 |
| C | Remdesivir | 204 |
| | Favipiravir | 28 |
| | Ivermectin | 59 |
| | Tofacitinib | 12 |

Figure 4: Antivirals Received In Category B

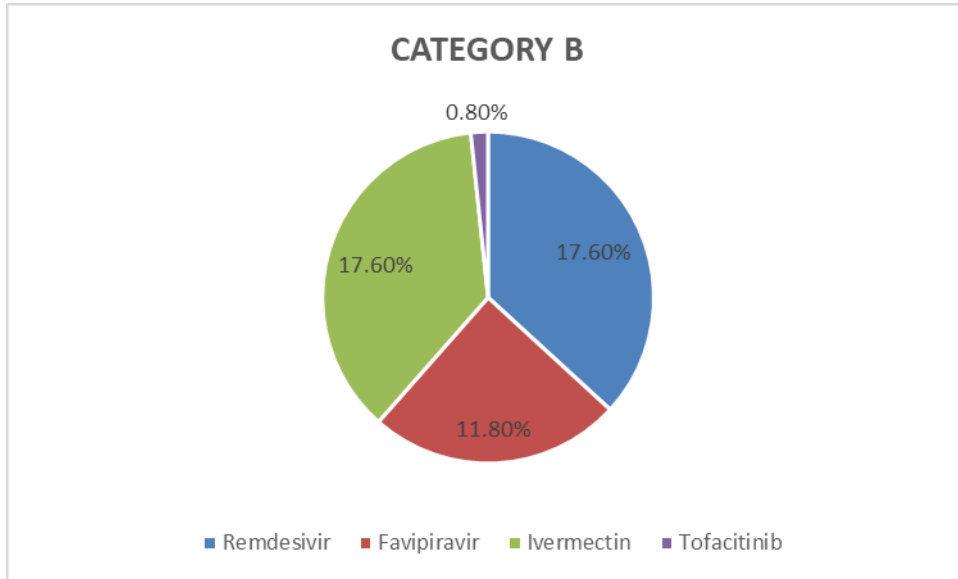
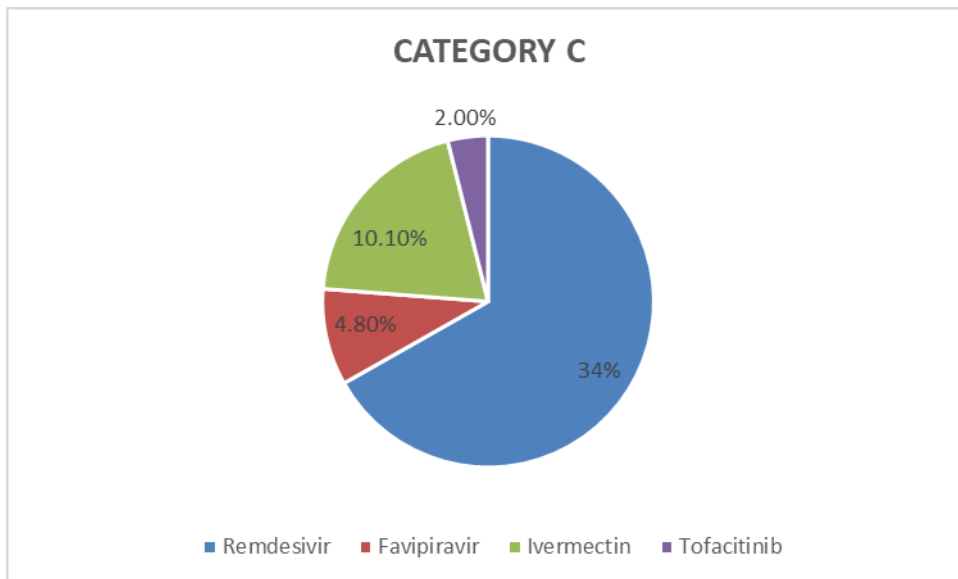


Figure 5: Antivirals Received In Category C



In this study the outcome of antiviral therapy based on categories in COVID -19 patients observed and the results illustrates that, 97.5% of patients recovered from COVID-19 after antiviral therapy in Category B and the

mortality rate was found to be 1.78% only. And while in Category C we observed that 88.11% of patients was alive after receiving antiviral therapy and the death rate was 11.88%.

Table 5: Outcome of antiviral therapy based on categories in COVID -19

| Category | Antivirals | Outcome | | Total |
|----------|-------------|------------|-----------|-------|
| | | Alive | Expired | |
| B | Remdesivir | 100(97.1%) | 3(2.9%) | 103 |
| | Favipiravir | 69(100.0%) | 0(0.0%) | 69 |
| | Ivermectin | 101(98.1%) | 2(1.9%) | 103 |
| | Tofacitinib | 4(80.0%) | 1(20.0%) | 5 |
| C | Remdesivir | 177(86.8%) | 27(13.2%) | 204 |
| | Favipiravir | 27(96.4%) | 1(3.6%) | 28 |
| | Ivermectin | 52(88.1%) | 7(11.9%) | 59 |
| | Tofacitinib | 11(91.7%) | 1(8.3%) | 12 |

Discussion

In this study 1042 COVID-19 patients were evaluated based on the antiviral therapy they received with respect to their categorization. From Table: 1 we can observe that in category A 26% of COVID-19 patients belonged to age group 31-40 years. Whereas in category B 20% of them occupied age group 51-60 years and in category C 25% of patients were under, greater than 70 years. There is no clear trends in diagnosing COVID-19 and it can be confirmed by performing laboratory test. Worldwide, there is approximately the same number of cases among men and women but there is no proof for this data that men are more likely than women.⁽¹⁰⁾

Based on table:-2 it can be seen that 59% of patients in category A were females while in category B 53% patients were males and in category C 63% of patients were males. Table:-3 suggest that, 948 patients were under the risk of comorbidities. The majority of patients with comorbidities belonged to category B and C. Among them 75.6% were category C patients and 61.7% of patients were under category B. Comorbidities are correlated with the category of COVID-19, patients with a P-value of 0.000 <0.05.

Usually, the high risk of comorbidities can increase the mortality rate in COVID-19 patients. Several reports indicated that serious and fata pneumonia can be caused by COVID-19 and half of COVID-19 patients had chronic underlying diseases, particularly, cardiovascular diseases, cerebrovascular diseases, kidney disease and diabetes.⁽¹¹⁻¹²⁾ Based on the reports from Chinese Centers for Disease Control and Prevention, there is an increased risk of death in COVID-19 associated with hypertension, diabetes, cardiovascular disease, respiratory disease, and cancer.⁽¹³⁾

As shown in Table-4, 583 patients received antiviral therapy, in category B Remdesivir and ivermectin were mostly administered, and in category C Remedesivir. Table 4 also showed the outcome of antiviral therapy based on categories in COVID -19. Among 280 category B, 274 were healed and 6 died. Among 303 category C patients, 267 were healed and 36 died. An increased risk of death was associated with older age and it can be due to weaker immunity and the presence of comorbidities⁽¹⁴⁾.

Conclusion

The efficacy of antiviral drugs, Remdesivir, Favipiravir, Ivermectin and Tofacitinib in COVID-19 patients were evaluated based on mortality rate in the respective categories. The study suggested that majority of patients got recovered after antiviral therapy. More studies are required for evaluating clinical efficacy of antiviral therapy in COVID-19 patients.

Acknowledgement

The authors are thankful to our clinical guide, Dr. Sr. Romia Rodriguez and Dr. Paul Puthuran, consultant, Dept. General Medicine, Lourdes Hospital, Pachalam, Ernakulam, for their constant guidance, support, motivation and untiring help during the course of the project.

References

1. WHO Clinical management COVID-19 Interim guidance; WHO/2019-nCoV/clinical/2020.5.
2. Liu Y, Yan LM, Wan L, Xiang TX, Le A, Liu JM, et al. Viral dynamics in mild and severe cases of COVID-19. *Lancet Infect Dis*. 2020.
3. Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. Vital surveillances: the epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) – China. *China CDC Weekly*. 2020;2(8):113-22.
4. Serap Simsek Yavuz, Serhat Unal. Antiviral treatment of COVID-19. *Tur J Med Sci* 2020(50):611-619.
5. COVID-19 Virus outbreak control and prevention State Cell Health and Family Welfare Department, Government of Kerala.2020.
6. Chen, C. et al. Favipiravir versus Arbidol for COVID-19: A Randomized Clinical Trial. 2020.
7. Cai, Q. et al. Experimental Treatment with Favipiravir for COVID-19: An Open-Label Control Study. *Engineering*. 2020: 0–6.
8. Fadel, Raef, A. M. Early Short Course Corticosteroids in Hospitalized Patients with COVID-19. 2020.
9. Wu, J. et al. Systemic corticosteroids show no benefit in severe and critical COVID-19 patients in Wuhan, China: A retrospective cohort study. 2020:1–24.
10. Global Health 5050. Men, Sex, Gender, and COVID-19; 2020.
11. Badawi A, Ryoo SG. Prevalence of comorbidities in the Middle East respiratory syndrome coronavirus (MERS-CoV): A systematic review and meta-analysis. *Int J Infect Dis*. 2016;49:129–133.
12. Salinas-Escudero G., Carrillo-Vega M.F., Granados-García V. et al. A survival analysis of COVID-19 in the Mexican population. *BMC Public Health* 20, 1616 (2020).
13. Deng G, Yin M, Chen X, Zeng F. Clinical determinants for fatality of 44,672 patients with COVID-19. *Crit Care*. 2020;24(1):179.
14. Zhou F, et al. Clinical Course and Risk Factors for Mortality of Adult Inpatients With COVID-19 in Wuhan, China: A Retrospective Cohort Study. *Lancet*. 2020 03 28;395(10229):1054–1062.