Revista ARACÊ
ISSN: 2358-2472

MEDICATION TREATMENT OF HOSPITALIZED PATIENTS WITH COVID-19: ANALYSIS IN A PUBLIC HOSPITAL IN TOCANTINS

TRATAMENTO MEDICAMENTOSO DE PACIENTES HOSPITALIZADOS COM COVID-19: ANÁLISE EM UM HOSPITAL PÚBLICO DO TOCANTINS

TRATAMIENTO FARMACOLÓGICO DE PACIENTES HOSPITALIZADOS CON COVID-19: ANÁLISIS EN UN HOSPITAL PÚBLICO DE TOCANTINS

https://doi.org/10.56238/arev7n8-096

Submitted on: 07/11/2025 **Publication date:** 08/11/2025

Valéria da Silva Miranda dos Santos[1], Araída Dias Pereira[2], Renata Junqueira Pereira[3], Antônio Hélio Vieira[4], Poliana Guerino Marson[5]

ABSTRACT

Introduction: The Covid-19 pandemic required rapid therapeutic decision-making, often based on limited evidence. In Brazil, public hospitals faced additional challenges in adopting effective protocols. Objective: To evaluate the drug treatment used in hospitalized Covid-19 patients in a public hospital in Tocantins, considering the association between the therapeutic classes administered and clinical outcomes. Method: A quantitative, descriptive, and retrospective study, based on the analysis of 197 medical records of patients with a confirmed diagnosis of Covid-19, hospitalized at the Hospital Geral de Palmas (TO) between April and December 2020. The statistical analysis used Cox Regression and normality tests. Results: Most patients were male (66.5%), with a mean age of 58 years, with a standard deviation of 16. The mean length of hospital stay was 10 days, with a standard deviation of 7. Death occurred in 37.1% of cases. The most used medication classes were antibiotics (98.5%), corticosteroids (85.8%), and anticoagulants (84.8%). Polypharmacy (use of ≥5 classes) was observed in 64% of cases. Conclusion: The widespread use of antibiotics and corticosteroids reflects clinical practices adopted in the early months of the pandemic, with a focus on polypharmacy and its impact on clinical outcomes. Studies like this subsidize the revision of therapeutic protocols and strengthen the rational use of medicines in pandemic contexts.

Keywords: SARS-CoV-2. Drug Treatment. Symptoms.

[1] Master's student in Health Sciences. Universidade Federal do Tocantins (UFT).
E-mail: valeria.miranda@mail.uft.edu.br Lattes: http://lattes.cnpq.br/0569895269708891
Orcid: https://orcid.org/0009-0000-9003-3292
[2] Dr. in Nutrition. Universidade Federal do Tocantins (UFT). E-mail: araida@mail.uft.edu.br
Lattes: http://lattes.cnpq.br/1234791227102807 Orcid: https://orcid.org/0000-0003-3120-9731
[3] Dr. in Food Sciences. Universidade Federal do Tocantins (UFT). E-mail: renatajunqueira@mail.uft.edu.br
Lattes: https://lattes.cnpq.br/4991236691208574 Orcid: https://orcid.org/0000-0001-9487-4013
[4] Dr. in Health Sciences. Escola Tocantinense do Sistema Único de Saúde (ETSUS).
E-mail: helio.ah7@gmail.com Lattes: http://lattes.cnpq.br/3307399926924813
Orcid: https://orcid.org/0009-0001-0851-962X
[5] Dr. in Biotechnology. Universidade Federal do Tocantins (UFT). E-mail: polianamarson@uft.edu.br
Lattes: http://lattes.cnpq.br/6594833349719014 Orcid: https://orcid.org/0000-0002-3560-0749

Revista ARACÊ
ISSN: 2358-2472

RESUMO
Introdução: A pandemia de Covid-19 exigiu rápida tomada de decisões terapêuticas, muitas vezes baseadas em evidências limitadas. No Brasil, hospitais públicos enfrentaram desafios adicionais na adoção de protocolos eficazes. Objetivo: Avaliar o tratamento medicamentoso utilizado em pacientes internados com Covid-19 em um hospital público do Tocantins, considerando a associação entre as classes terapêuticas administradas e os desfechos clínicos. Método: Estudo quantitativo, descritivo e retrospectivo, baseado na análise de 197 prontuários de pacientes com diagnóstico confirmado de Covid-19, internados no Hospital Geral de Palmas (TO) entre abril e dezembro de 2020. A análise estatística utilizou Regressão de Cox e testes de normalidade. Resultados: A maioria dos pacientes era do sexo masculino (66,5%), com idade média de 58 anos, apresentando uma variação de aproximadamente 16 anos em torno dessa média. O tempo médio de internação foi de 10 dias, com uma dispersão de cerca de 7 dias. Ocorreu óbito em 37,1% dos casos. As classes de medicamentos mais utilizadas foram antibióticos (98,5%), corticoides (85,8%) e anticoagulantes (84,8%). A polifarmácia (uso de ≥5 classes) foi observada em 64% dos casos. Conclusão: O uso generalizado de antibióticos e corticosteroides reflete práticas clínicas adotadas nos primeiros meses da pandemia, com destaque para a polifarmácia e seu impacto nos desfechos clínicos. Estudos como este subsidiam a revisão de protocolos terapêuticos e fortalecem o uso racional de medicamentos em contextos pandêmicos.

Palavras-chave: SARS-CoV-2. Tratamento Medicamentoso. Sintomas.

RESUMEN
Introducción: La pandemia de Covid-19 exigió una rápida toma de decisiones terapéuticas, a menudo basadas en evidencia limitada. En Brasil, los hospitales públicos enfrentaron desafíos adicionales en la adopción de protocolos eficaces. Objetivo: Evaluar el tratamiento farmacológico utilizado en pacientes hospitalizados con Covid-19 en un hospital público de Tocantins, considerando la asociación entre las clases terapéuticas administradas y los resultados clínicos. Método: Estudio cuantitativo, descriptivo y retrospectivo, basado en el análisis de 197 expedientes médicos de pacientes con diagnóstico confirmado de Covid-19, hospitalizados en el Hospital Geral de Palmas (TO) entre abril y diciembre de 2020. El análisis estadístico utilizó la Regresión de Cox y pruebas de normalidad. Resultados: La mayoría de los pacientes eran del sexo masculino (66,5%), con una edad media de 58 años, con una desviación estándar de 16. La duración media de la estancia hospitalaria fue de 10 días, con una desviación estándar de 7. El fallecimiento ocurrió en el 37,1% de los casos. Las clases de medicamentos más utilizadas fueron antibióticos (98,5%), corticosteroides (85,8%) y anticoagulantes (84,8%). La polifarmacia (uso de ≥5 clases) se observó en el 64% de los casos. Conclusión: El uso generalizado de antibióticos y corticosteroides refleja las prácticas clínicas adoptadas en los primeros meses de la pandemia, con énfasis en la polifarmacia y su impacto en los resultados clínicos. Estudios como este subsidian la revisión de protocolos terapéuticos y fortalecen el uso racional de medicamentos en contextos de pandemia.

Palabras clave: SARS-CoV-2. Tratamiento Farmacológico. Síntomas.

Revista ARACÊ
ISSN: 2358-2472

1 INTRODUCTION

Covid-19 coronavirus disease is caused by severe *acute respiratory syndrome-coronavirus-2* (SARSCoV-2) virus (Pascarella *et al.*, 2020).

In these circumstances, the medical decision-making process, which is usually guided by a rational approach based on scientific evidence, has become more emotional and influenced by the humanitarian context of the pandemic. Although understandable from a social point of view, this change may have contributed to the excessive or inappropriate use of medications, increasing the risk of adverse effects. In view of this, the development of clinical guidelines based on the best available evidence has proven to be essential to support health professionals in making safe and effective decisions (Falavigna *et al.*, 2022).

In view of the fragility of the available evidence and the importance of the topic, the Ministry of Health, together with some medical societies, prepared a joint position with comprehensive recommendations, taking into account different specialties. It is important to highlight that, due to the constant emergence of new therapies for the treatment of Covid-19, these recommendations should be updated periodically, as new evidence is published (Brasil, 2022).

Given this scenario, this study seeks to identify the association between the classes of drugs administered and clinical outcomes (discharge or death) in patients hospitalized with Covid-19 in a public hospital in Tocantins during the first months of the pandemic.

The objective of this study was to evaluate the drug treatment used in patients hospitalized with SARS-CoV-2 infection at the beginning of the pandemic (2020), in a public hospital in the State of Tocantins, considering the relationship between the therapeutic classes administered and clinical outcomes. And also to identify the classes of drugs used in the treatment, including the time of administration and possible therapeutic combinations, as well as to analyze the association between the clinical outcome of patients and the drugs administered during hospitalization.

These data can contribute to improving clinical protocols, support decision-making by health professionals, and foster new research in the area. Thus, the study has the potential to positively impact society, providing valuable information for the fight against Covid-19 and for future public health emergencies.

Revista ARACÊ
ISSN: 2358-2472

2 METHODOLOGY

This is an observational, descriptive study with a quantitative approach and retrospective design (Gil, 2019; Minayo, 2014), carried out based on the analysis of medical records of hospitalized patients with a confirmed diagnosis of Covid-19. The research was conducted at the Hospital Geral de Palmas (HGP), a high-complexity public health unit located in the state of Tocantins, Brazil.

The study population consisted of patients over 18 years of age, hospitalized at the HGP between April and December 2020, with a confirmed diagnosis of SARS-CoV-2 infection through RT-PCR examination or rapid antigen test. Medical records with complete information on clinical evolution, drug treatment, and outcome (discharge or death) were included. Medical records with incomplete data, hospitalizations of less than 24 hours, mild cases without the need for hospitalization, and records without laboratory confirmation of Covid-19 were excluded from the sample.

The final sample consisted of 197 medical records that met the inclusion criteria. Data were collected using a structured form, developed specifically for the research, containing sociodemographic (gender and age), clinical (length of stay, evolution and outcome), and therapeutic (quantity and classes of medications used) variables. The drug classes analyzed included antibiotics, corticosteroids, anticoagulants, mucolytics, antiparasitics, antivirals, analgesics, sedatives, immunomodulators, among others.

The dependent variable of the study was the patient's clinical outcome (discharge or death). The independent variables were the classes of drugs used and the occurrence of polypharmacy, defined as the concomitant use of five or more drug classes during the hospitalization period.

The data were entered and analyzed with the aid of the Statistical *Product and Service Solutions software*, version 22.0. Initially, descriptive analyses were performed, with calculation of absolute and relative frequencies, measures of central tendency (mean) and dispersion (standard deviation). To assess the normality of the quantitative variables, the Kolmogorov-Smirnov and Shapiro-Wilk tests were used.

In the inferential analysis, Cox regression was applied with hazard ratio measure and respective 95% confidence intervals (95%CI) to verify possible associations between the occurrence of death and the therapeutic variables analyzed. The level of significance adopted was 5% ($p<0.05$).

Revista ARACÊ
ISSN: 2358-2472

The research was approved by the Research Ethics Committee of the Federal University of Tocantins, under opinion No. 5,869,572, and complied with all the ethical principles recommended by Resolution No. 466/2012 of the National Health Council. The data was treated confidentially, ensuring the confidentiality and anonymity of the participants.

3 RESULTS

Of the total number of patients analyzed, 131 (66.5%) were male and 66 (33.5%) were female. Regarding the age group, most patients were between 40 and 59 years old (77 patients; 39.1%), followed by the 60 to 79 year old group (73 patients; 37.1%). The mean age was 58 ± 16 years, with a median of 58 years. The mean length of hospital stay was 10 days, ranging from 1 day to 48 days. Regarding clinical outcomes, 122 patients (61.9%) were discharged from the hospital or transferred. Seventy-three patients (37.1%) died.

Regarding pharmacological treatment, 10 distinct pharmacological classes were identified (Table 1). It was observed that 64% of the patients were administered five or more drug classes (polypharmacy).

Table 1

Number of therapeutic classes used in patients admitted to the Palmas General Hospital between April and December 2020

Number of pharmacological classes used	Frequency (n = 197)	%
5 or more drug classes	127	64,0
4 classes of medicines	54	27,4
3 classes of medicines	9	4,6
2 classes of medicines	5	2,0
1 class	2	1,0
No class of drugs	2	1,0

Source: Survey data (2020).

Table 2 shows the frequency of use of drug classes in patients admitted to the Palmas General Hospital between April and December 2020.

Table 2

Frequency of use of drug classes in patients admitted to the Palmas General Hospital between April and December 2020

Drug Class	Yes		No	
	Frequency	%	Frequency	%
Antibiotics	194	98,5	3	1,5

Revista ARACÊ
ISSN: 2358-2472

Steroids	169	85,8	28	14,2
Anticoagulants	167	84,8	30	15,2
Mucolytics	123	62,4	74	37,6
Antiparasitics	95	48,2	102	51,8
Bronchodilators	75	38,1	122	61,9
Opioid Analgesics	59	29,9	138	70,1
Vasoactive Drugs	56	28,4	141	71,6
Sedatives	41	20,8	156	79,2
Antivirals	24	12,2	173	87,8

Source: Survey data (2020).

The mean time of antibiotic use was 15 ± 9 days (Table 3), being the longest among the classes. Analgesics, antiparasitics, antivirals, bronchodilators, vasoactive drugs, and sedatives (median of 0 days), suggesting punctual use.

Table 3

Time of use of drug classes in patients hospitalized at the Palmas General Hospital between April and December 2020

Type of Medication	Mean ±Standard Deviation (days)	Median (days)	Minimum and Maximum
Painkillers	1 ± 3	0	0 – 16
Antibiotics	15 ± 9	15	0 – 66
Anticoagulants	6 ± 5	6	0 – 26
Antiparasitics	1 ± 2	0,0	0 – 17
Antivirals	0 ± 1	0,0	0 – 7
Bronchodilators	1 ± 3	0,0	0 – 17
Steroids	6 ± 4	6,0	1 – 24
Vasoactive Drugs	1 ± 3	0,0	0 – 19
Mucolytics	4 ± 5	4,0	0 – 28
Sedatives	1 ± 3	0,0	0 – 33

Source: Survey data (2020).

The analysis of the correlations between the length of hospital stay and the different classes of medications (Table 4) revealed that analgesics ($r=-0.212$; $p=0.003$), bronchodilators ($r=-0.202$; $p=0.004$), and antiparasitics ($r=-0.178$; $p=0.012$) showed negative and statistically significant correlations, indicating a possible association between the use of these medications and a shorter length of hospitalization. No statistically significant correlations were observed between the length of hospital stay and the use of antibiotics, anticoagulants, antivirals, corticosteroids, vasoactive drugs, mucolytics, or sedatives.

Revista ARACÊ
ISSN: 2358-2472

Table 4

Correlation between length of hospital stay and drug classes administered to patients admitted to the Palmas General Hospital between April and December 2020

Drug Class	Pearson's correlation (r)	p-value	Spearman's correlation (ρ)	p-value
Painkillers	-0,212	0,003	-0,282	0,000
Antibiotics	-0,034	0,639	0,002	0,980
Anticoagulants	-0,033	0,646	0,016	0,821
Antiparasitics	-0,178	0,012	-0,149	0,037
Antivirals	-0,109	0,127	-0,094	0,191
Bronchodilators	-0,202	0,004	-0,216	0,002
Steroids	0,080	0,261	0,077	0,282
Vasoactive Drugs	0,109	0,129	0,104	0,144
Mucolytics	0,077	0,283	0,080	0,266
Sedatives	0,091	0,203	0,054	0,451

Source: Survey data (2020).

Regarding the association between drug classes and clinical outcomes (Table 5), vasoactive drugs and sedatives showed a strong association with the outcome death. For vasoactive drugs, 51 patients (91.1%) who used them died, compared to 15.6% among those who did not ($p < 0.001$). Similarly, 38 (92.7%) patients who used sedatives died, in contrast to 22.4% of those who did not ($p < 0.001$). Regarding bronchodilators, the number of deaths was 34 (45.3%) among users, considerably higher than the 39 (32.0%) among those who did not use them ($p=0.024$).

Table 5

Association of therapeutic classes with clinical outcome of patients admitted to a public hospital in the state of Tocantins between April and December 2020

Drug	Denouement	Yes – n (%)	No – n (%)	Total (n=197)	p-value	V for Cramer
Bronchodilators	Discharge/Transfer	39 (52,0%)	83 (68,0%)	122 (61,9%)		
	Death	34 (45,3%)	39 (32,0%)	73 (37,2%)	0,024	0,194
	No information	2 (2,7%)	0 (0,0%)	2 (1,0%)		
Vasoactive Drugs	Discharge/Transfer	5 (8,9%)	117 (83,0%)	122 (61,9%)		
	Death	51 (91,1%)	22 (15,6%)	73 (37,2%)	<0.001	0,705
	No information	0 (0,0%)	2 (1,4%)	2 (1,0%)		
Sedatives	Discharge/Transfer	3 (7,3%)	119 (76,3%)	122 (61,9%)		
	Death	38 (92,7%)	35 (22,4%)	73 (37,2%)	<0.001	0,591
	No information	0 (0,0%)	2 (1,3%)	2 (1,0%)		

Source: Survey data (2020).

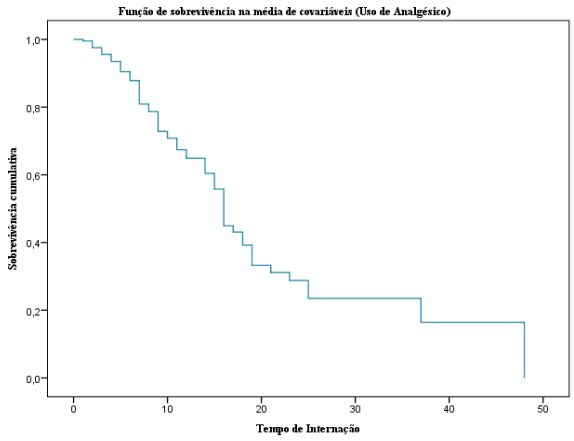
Revista ARACÊ
ISSN: 2358-2472

Cox regression (Figure 1), adjusted by the *Forward Stepwise* method, indicated that the use of analgesics was statistically significant for predicting the risk of death (Exp(B) = 0.530; p = 0.015), suggesting a reduction of approximately 47% in the risk of death. The use of bronchodilators was associated with a lower risk of death (Exp(B) = 0.435; p = 0.001), with a reduction of approximately 56.5% in the risk of death. Vasoactive drugs showed a strongly significant association with a lower risk of death (Exp(B) = 0.219; p < 0.001), indicating a reduction of about 78.1% in the risk of death. The use of sedatives was strongly associated with survival (Exp(B) = 0.306; p < 0.001), with a reduction of approximately 69.4% in the risk of death. On the other hand, the analysis for mucolytics showed an inverse association (Exp(B) = 2.131; p = 0.001), suggesting that patients who used mucolytics had more than twice the risk of death. The other classes evaluated — antibiotics, anticoagulants, antivirals, and corticosteroids — did not show a statistically significant association with mortality risk

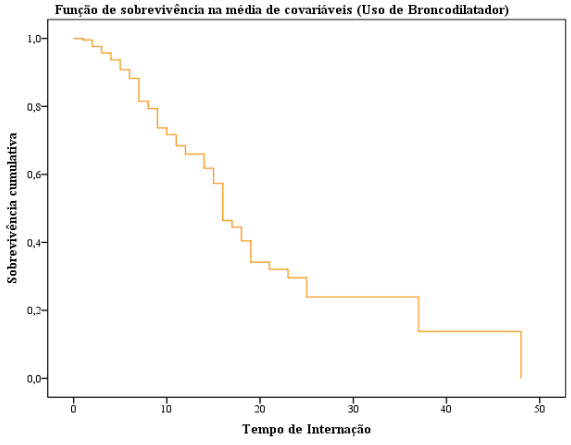
Figure 1

Survival analysis with Cox regression: Relationship between the use of drug classes and time to death in patients admitted to the Palmas General Hospital between April and December 2020

a) Analgesics



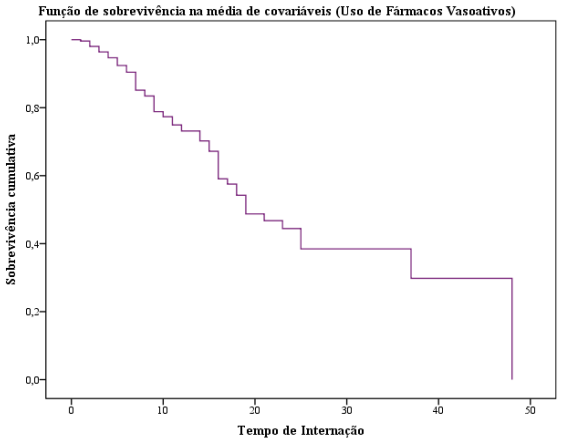
b) Bronchodilators



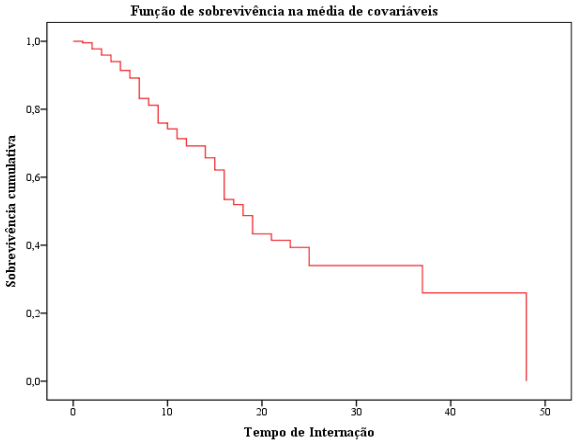
c) Vasoactive Drugs

d) Sedatives

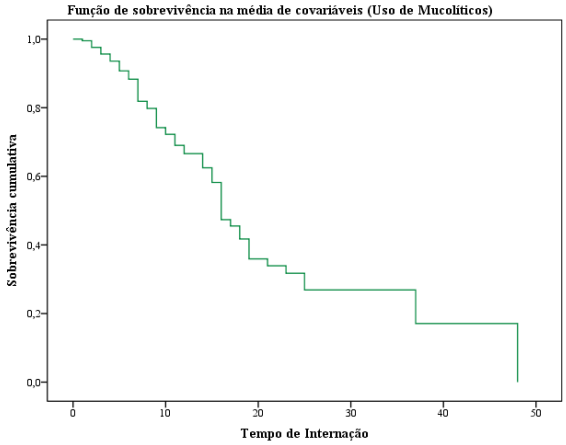
Revista ARACÊ
ISSN: 2358-2472



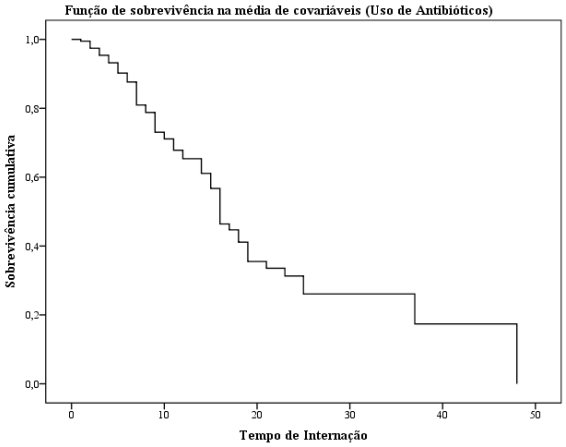
e) Mucolytics



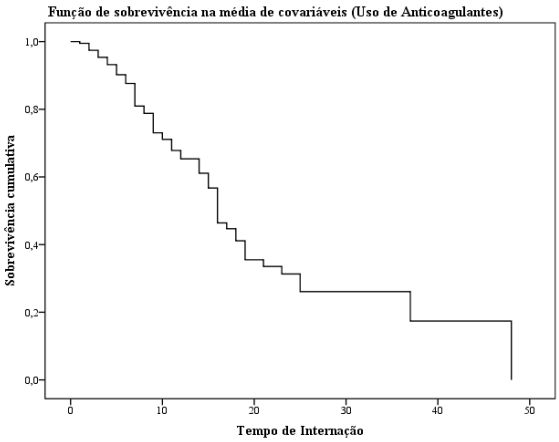
f) Antibiotics



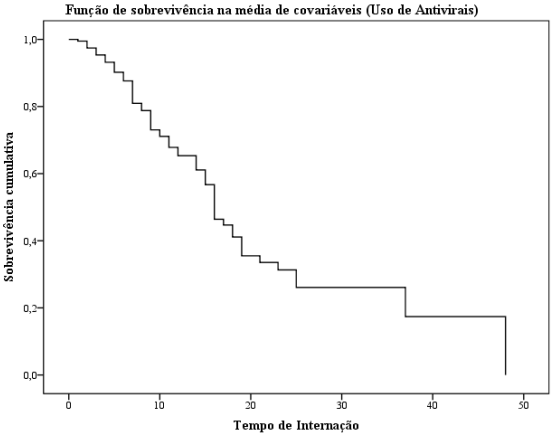
g) Anticoagulants



h) Antivirals

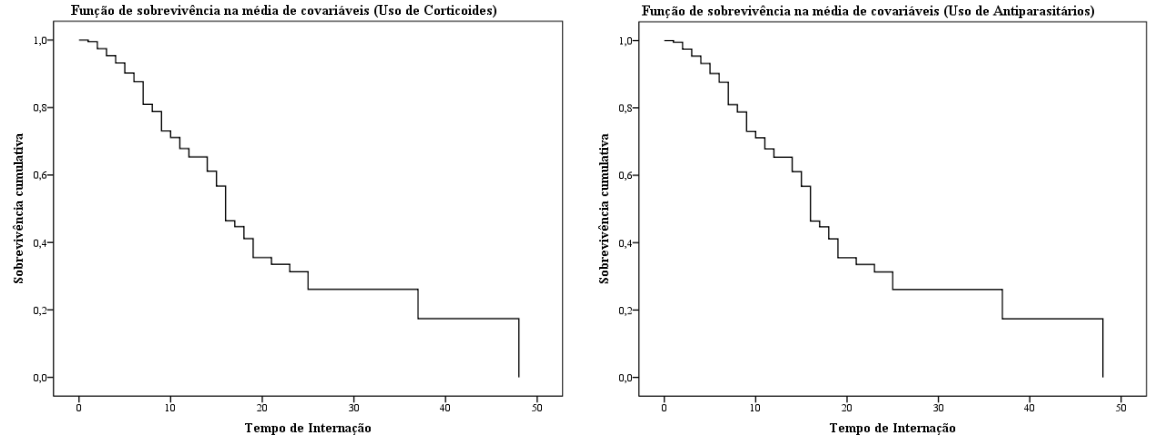


i) Corticosteroids



j) Antiparasitic

Revista ARACÊ
ISSN: 2358-2472



Source: Survey data (2020).

Among the most used drugs, Azithromycin (74.1%) and Ceftriaxone (77.2%) stand out, confirming the wide use of antibiotics. Enoxaparin sodium (84.8%), Dexamethasone (71.6%) and Acetylcysteine (61.9%) were also prominent. In the Cox regression for specific medications, the use of terbutaline was associated with a reduction of about 56.5% in the risk in relation to length of hospital stay (Exp(B) = 0.435; $p < 0.001$). The use of acetylcysteine showed a statistically significant association with an increase in the length of hospital stay (Exp(B) = 2.131; $p = 0.001$), suggesting a risk of prolonging the time to death of about 2.1 times greater. Enoxaparin sodium, ceftriaxone, and azithromycin did not show a statistically significant association with mortality risk.

4 DISCUSSION

The high prevalence of polypharmacy observed (64% of patients with five or more classes) corroborates the findings of other systematic reviews, such as the one conducted by Ghasemi *et al.* (2022), which point out that polypharmacy in patients with Covid-19 may be associated with higher mortality, prolonged hospital stay, and increased use of hospital resources. Other studies, such as the one by Durmus *et al*. (2021), reinforce that polypharmacy represents a significant clinical risk factor, contributing to adverse drug reactions and worsening of the clinical condition.

The widespread use of antibiotics (98.5% of patients) and the average time of prolonged use (15 days) reflects a common practice at the beginning of the pandemic. Systematic review and meta-analysis studies, such as the one by Rabbi *et al*. (2023), point out that 67% of patients hospitalized with Covid-19 received antibiotics, and 80% of these prescriptions occurred in patients without confirmed bacterial co-infections. Similarly,

Revista ARACÊ
ISSN: 2358-2472

Granata *et al*. (2022) observed that, although the prevalence of bacterial co-infections was low, antibiotic therapy was applied in up to 98% of cases.

The wide use of anticoagulants (84.8%) and corticosteroids (85.8%) is in line with emerging scientific evidence during the pandemic. Systematic reviews, such as the one by Batista *et al.* (2023), indicated that prophylactic or therapeutic anticoagulation was associated with reduced mortality and less need for mechanical ventilation. The use of corticosteroids demonstrates the rapid incorporation of scientific evidence, especially after the Recovery trial (Group Recovery, 2021), which established the benefit of some corticosteroids in reducing mortality in hospitalized patients with Covid-19 who required respiratory support. A prospective meta-analysis study (Sterne *et al*., 2020) showed a reduction of about 34% in mortality at 28 days. Morsali *et al*. (2023) indicated that the combination of corticosteroids with usual care reduced the risk of death in 35% of cases. However, the indiscriminate use of corticosteroids may be associated with a higher mortality rate when used in early stages or in mild patients (Patel et al., 2022).

The negative correlation between the use of analgesics, bronchodilators, and antiparasitics with shorter hospital stays suggests that these drugs may have been administered in less severe cases or for symptomatic relief, resulting in faster discharges. Joshi *et al*. (2021) point out that the rational administration of analgesics in patients with Covid-19 is more related to symptomatic management than to the treatment of the infection itself. Yu *et al*. (2023) demonstrated that, although bronchodilators can be used as respiratory support in patients with COVID-19 and respiratory comorbidities, they are not directly associated with improved prognosis or reduced mortality, and their application is generally restricted to short-term interventions. For antiparasitics, the result may reflect the common practice at the beginning of the pandemic of empirical prescription in patients with mild clinical conditions (Popp *et al*., 2021), despite the absence of proven efficacy in clinical studies. The absence of a significant correlation between antibiotics, anticoagulants, antivirals, and corticosteroids and length of hospital stay may indicate their use in both moderate and severe cases, reflecting the complexity of the disease.

The Cox regression findings, which indicated a reduction in the risk of death for analgesics, bronchodilators, vasoactive drugs, and sedatives, contrast with the bivariate analysis that associated vasoactive drugs, bronchodilators, and sedatives with a higher proportion of deaths. This apparent discrepancy is justified by the nature of the analyses. The bivariate analysis reflects that more severe patients (who would naturally have a higher

Revista ARACÊ
ISSN: 2358-2472

risk of death) need these interventions. Cox regression, in turn, by controlling for other confounding variables, seeks to isolate the independent effect of the treatment, suggesting that the use of these drugs may have contributed to prolonging survival or mitigating the additional risk of death that would arise from the severe unmanaged condition. In the literature, the study by Moreno *et al*. (2021) also identified a similar discrepancy when performing bivariate analysis and Cox regression between medication use and death outcome.

The increased risk of death associated with the use of mucolytics in the Cox model is a finding that deserves attention. Although preclinical studies (Bianco *et al*., 2022) suggest benefits of mucolytics, and some clinical trials (Panahi *et al*., 2022) have reported a reduction in severe respiratory failure, this result may indicate that mucolytics were used in patients with more complex respiratory conditions and, consequently, with a worse prognosis.

5 CONCLUSION

This study allowed us to draw a detailed overview of the drug treatment adopted in hospitalized patients diagnosed with COVID-19 at the Palmas General Hospital, the main referral unit in the state of Tocantins, during the first months of the pandemic. The analysis of the 197 medical records revealed a scenario of polypharmacy, with a predominance of the use of antibiotics, anticoagulants, and corticosteroids, reflecting the therapeutic approaches adopted in a context marked by scientific uncertainties and the need for rapid clinical responses.

Among the main findings, the negative and statistically significant correlations between length of hospital stay and the use of analgesics, bronchodilators, and antiparasitics stand out, suggesting that these classes of drugs may be associated with shorter hospitalizations. On the other hand, other widely used classes, such as antibiotics and corticosteroids, have not shown a direct association with the length of hospital stay, although their use is supported by scientific evidence regarding the reduction of mortality in patients with moderate to severe clinical conditions. The results obtained contribute to the understanding of the therapeutic profile adopted at the beginning of the pandemic, evidencing both practices supported by national and international guidelines and the adoption of empirical conducts, often influenced by contextual factors and the scarcity of consolidated evidence at the time. In addition, they reinforce the importance of the rational

Revista ARACÊ
ISSN: 2358-2472

use of medicines, especially in emergency situations, in which decision-making must balance the urgency of care with the principles of evidence-based medicine.

REFERENCES

Batista, D. R., et al. (2023). Use of anticoagulants in patients with COVID-19: A living systematic review and meta-analysis. Jornal Brasileiro de Pneumologia, 49(3), e20230095. https://doi.org/10.36416/1806-3756/e20230095

Bianco, A., et al. (2022). Mucolytic and antioxidant properties of carbocysteine as a strategy in COVID-19 therapy. Life, 12(11), 1824. https://doi.org/10.3390/life12111824

Brasil, Ministério da Saúde. (2022). Diretrizes Brasileiras para o Tratamento Hospitalar do Paciente com COVID-19. Ministério da Saúde.

Durmus, E., et al. (2021). Polypharmacy and its association with clinical outcomes in hospitalized patients with COVID-19. Journal of Infection and Public Health, 14(10), 1333–1339. https://doi.org/10.1016/j.jiph.2021.07.018

Falavigna, M., et al. (2022). Diretrizes para o tratamento farmacológico da Covid-19: Posicionamento da Associação de Medicina Intensiva Brasileira, da Sociedade Brasileira de Infectologia e da Sociedade Brasileira de Pneumologia e Tisiologia. Revista Brasileira de Terapia Intensiva, 34(2), 195–216. https://doi.org/10.5935/0103-507X.20220030-pt

Ghasemi, M., et al. (2022). Global prevalence and consequences of polypharmacy in COVID-19: A systematic review and meta-analysis. Frontiers in Pharmacology, 13, 937472. https://doi.org/10.3389/fphar.2022.937472

Gil, A. C. (2019). Métodos e técnicas de pesquisa social (7th ed.). Atlas.

Granata, G., et al. (2022). Antibiotics use in COVID-19 patients: A systematic literature review. Journal of Clinical Medicine, 11(23), 7207. https://doi.org/10.3390/jcm11237207

Joshi, S., et al. (2021). Role of favipiravir in the treatment of COVID-19. International Journal of Infectious Diseases, 102, 501–508. https://doi.org/10.1016/j.ijid.2020.10.069

Minayo, M. C. de S. (2014). O desafio do conhecimento: Pesquisa qualitativa em saúde (14th ed.). Hucitec.

Moreno, G., et al. (2021). Corticosteroid treatment and mortality in mechanically ventilated COVID-19-associated acute respiratory distress syndrome (ARDS) patients: A multicentre cohort study. Annals of Intensive Care, 11, 159. https://doi.org/10.1186/s13613-021-00944-7

Morsali, A., et al. (2023). Corticosteroid-based combination therapies for COVID-19: A systematic review and network meta-analysis. Journal of Clinical Pharmacy and Therapeutics, 48(2), 288–299. https://doi.org/10.1111/jcpt.13783

Revista ARACÊ
ISSN: 2358-2472

Panahi, Y., et al. (2023). Evaluation the efficacy and safety of N-acetylcysteine inhalation spray in controlling the symptoms of patients with COVID-19: An open-label randomized controlled clinical trial. Journal of Medical Virology, 95(1), e28393. https://doi.org/10.1002/jmv.28393

Pascarella, A., et al. (2020). COVID-19: A systematic review and meta-analysis of observational studies. Frontiers in Pharmacology, 11, 1109. https://doi.org/10.3389/fphar.2020.01109

Patel, C., et al. (2022). Effect of corticosteroid therapy on mortality in COVID-19 patients—A systematic review and meta-analysis. Reviews in Medical Virology, 32(5), e2386. https://doi.org/10.1002/rmv.2386

Popp, M., et al. (2021). Ivermectin for preventing and treating COVID-19. Cochrane Database of Systematic Reviews, (7), CD015017. https://doi.org/10.1002/14651858.CD015017.pub2

Rabbi, F., et al. (2023). Overprescription of antibiotics for treating hospitalized COVID-19 patients: A systematic review & meta-analysis. Heliyon, 9(10), e20563. https://doi.org/10.1016/j.heliyon.2023.e20563

RECOVERY Collaborative Group. (2020). Dexamethasone in hospitalized patients with Covid-19—Preliminary report. New England Journal of Medicine, 384(8), 693–704. https://doi.org/10.1056/NEJMoa2021436

Sterne, J. A. C., et al. (2020). Association between administration of systemic corticosteroids and mortality among critically ill patients with COVID-19: A meta-analysis. JAMA, 324(13), 1330–1341. https://doi.org/10.1001/jama.2020.17023

Yu, Y., et al. (2023). One stone two birds: Anti-inflammatory bronchodilators as a potential pharmacological strategy for COVID-19. Frontiers in Pharmacology, 14, 1185076. https://doi.org/10.3389/fphar.2023.1185076