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ORIGINAL ARTICLE

Clinical-epidemiological profile and outcome of patients with COVID-19 in the second wave of the pandemic in Paraná, Brazil

Perfil clínico-epidemiológico e desfecho de pacientes com COVID-19 na segunda onda da pandemia no Paraná, Brasil

Perfil clínico-epidemiológico y evolución de los pacientes con COVID-19 en la segunda ola de la pandemia en Paraná, Brasil

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ABSTRACT

Justification and Objective: knowing the characteristics of patients who were hospitalized due to COVID-19 provides support to healthcare professionals and managers in the construction of strategies to reduce vulnerability and suffering from complications of this disease. Therefore, the objective was to describe the clinical-epidemiological profile and identify outcomes in patients with COVID-19 in the second wave of the pandemic in a public hospital in northern Paraná, Brazil. **Methods:** a sectional and analytical study with 1,467 adult patients admitted and hospitalized with a confirmed diagnosis of COVID-19, according to records from the epidemiology center, Medical Archive and Statistics Service and patients' electronic medical record, from January 1 to March 31 2021, in a hospital in the city of Londrina, Paraná, Brazil. **Results:** it was found that the majority of those infected were male, white, married, aged ≤64, and lived in the city of Londrina. When identifying the outcomes, it was evident that there were more discharges when compared to deaths and transfers. The main signs and symptoms described in the medical records were respiratory, however, the signs and symptoms that were associated with mortality were desaturation, tachypnea, and respiratory effort. **Conclusion:** the results indicated that the majority of those infected were male, aged up to 64 years, with mortality being more frequent among elderly patients and those with comorbidities, mainly pulmonary and nephrological. The research also highlighted that severe

respiratory symptoms, such as desaturation and tachypnea, were associated with a higher risk of death.

Keywords: *COVID-19. COVID-19 Pandemic. Epidemiological Profile. SARS-CoV-2.*

RESUMO

Justificativa e Objetivo: conhecer as características dos pacientes que foram internados por COVID-19 disponibiliza subsídios aos profissionais de saúde e gestores na construção de estratégias para reduzir vulnerabilidade e acometimento por complicações dessa doença. Logo, objetivou-se descrever o perfil clínico-epidemiológico e identificar os desfechos em pacientes com COVID-19 na segunda onda da pandemia em hospital público do norte do Paraná, Brasil. **Métodos:** estudo seccional e analítico, com 1.467 pacientes adultos admitidos e internados com diagnóstico confirmado de COVID-19, conforme registros do núcleo de epidemiologia, Serviço de Arquivo Médico e Estatística e prontuário eletrônico do paciente, no período de 01 de janeiro a 31 de março de 2021, em hospital no município de Londrina, Paraná, Brasil. **Resultados:** constatou-se que a maioria dos infectados era do sexo masculino, de cor branca, casada, com idade ≤64 e pertencia ao município de Londrina. Ao identificar os desfechos, evidenciou-se que houve mais altas quando comparada com óbitos e transferências. Os principais sinais e sintomas descritos nos prontuários foram respiratórios, contudo os sinais e sintomas que foram associados à mortalidade foram dessaturação, taquipneia e esforço respiratório. **Conclusão:** os resultados indicaram que a maioria dos infectados era homem, com idade até 64 anos, sendo a mortalidade mais frequente entre pacientes idosos e aqueles com comorbidades, principalmente pulmonares e nefrológicas. A pesquisa também destacou que sintomas respiratórios graves, como dessaturação e taquipneia, estavam associados a maior risco de óbito.

Descritores: *COVID-19. Pandemia por COVID-19. Perfil Epidemiológico. SARS-CoV-2.*

RESUMEN

Justificación y Objetivo: conocer las características de los pacientes que fueron hospitalizados a causa de COVID-19 brinda apoyo a los profesionales y gestores de la salud en la construcción de estrategias para reducir la vulnerabilidad y el padecimiento de las complicaciones de esta enfermedad. Por lo tanto, el objetivo fue describir el perfil clínico-epidemiológico e identificar resultados en pacientes con COVID-19 en la segunda ola de la pandemia en un hospital público del norte de Paraná, Brasil. **Métodos:** estudio seccional y analítico, con 1.467 pacientes adultos ingresados y hospitalizados con diagnóstico confirmado de COVID-19, según registros del centro de epidemiología, Servicio de Archivo y Estadística Médica y la historia clínica electrónica del paciente, del 1 de enero al 31 de marzo de 2021, en un hospital de la ciudad de Londrina, Paraná, Brasil. **Resultados:** se constató que la mayoría de los infectados eran hombres, blancos, casados, con edad ≤64 años y pertenecían al municipio de Londrina. Al identificar los resultados, se evidenció que hubo más altas que muertes y traslados. Los principales signos y síntomas descritos en las historias clínicas fueron respiratorios, pero los signos y síntomas que se asociaron con la mortalidad fueron desaturación, taquipnea y esfuerzo respiratorio. **Conclusión:** los resultados indicaron que la mayoría de los infectados fueron hombres, con edades hasta 64 años, siendo la mortalidad más frecuente entre los pacientes ancianos y con comorbilidades, principalmente pulmonares y nefrológicas. La investigación también destacó que los síntomas respiratorios graves, como la desaturación y la taquipnea, se asociaron con un mayor riesgo de muerte.

Palabras Clave: *COVID-19. Pandemia de COVID-19. Perfil Epidemiológico. SARS-CoV-2.*

INTRODUCTION

The pandemic caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) has exposed the importance of global health. On January 30, 2020, the World Health Organization declared and emphasized that the outbreak of the new coronavirus constituted a Public Health Emergency of International Concern.[1] This virus began in the city of Wuhan, Hubei province, in the People's Republic of China, and spread rapidly to other countries, causing a crisis in the global health system.[2]

In mid-March 2020, community transmission of Coronavirus Disease 2019 (COVID-19) was declared throughout the national territory.[3] Since the beginning of the pandemic in Brazil, until October 26, 2022, there have been more than 34 million cases and 687,907 deaths, being considered one of the countries with the highest number of deaths in the world, and in Londrina there were until October 21, 2022, 148,994 cases and 2,617 deaths.[4-6]

The second wave of the pandemic began to manifest itself clearly in several countries. In Brazil, the second wave, longer and more lethal, occurred between November 8, 2020 and April 10, 2021, which ended with three times as many deaths.[7] In 2021, with the alarming increase, the measures were only tightened when the number of cases and deaths had already reached very high levels.[8]

With the exponential rise in the number of people infected and killed by SARS-CoV-2 in Brazil[9], public and private hospitals in the country experienced situations of overcrowding, shortages of medications used to intubate and/or sedate patients, associated with waiting lists for highly complex beds in Intensive Care Units (ICUs).[10] It is known that mortality from COVID-19 can be nine times higher among people with some chronic disease, when compared to patients without pre-existing pathologies.[11]

Studies carried out at the beginning of the pandemic emphasized the need to pay attention to patients with comorbidities in COVID-19 treatment, since patients who become seriously ill have evidence of underlying diseases, such as cardiovascular diseases, liver diseases, kidney diseases or malignant tumors.[12-14] These patients usually died due to exacerbation of their underlying diseases.

In a retrospective, multicenter cohort study conducted at a hospital in Wuhan, China, of the 191 patients who were included in the study, 137 were discharged and 54 died in

hospitals, of which 91 (48%) had comorbidities, including hypertension, diabetes mellitus, and coronary heart disease.[14]

It is known that there is a gap in the clinical-epidemiological profile of patients affected by COVID-19 in the second wave of the pandemic. In this regard, the analysis of patient characteristics and clinical outcomes in the second wave contributes to identifying risk factors, vulnerabilities and changes in disease behavior that can guide future public health policies and management strategies in possible new waves or other health emergencies.

Based on this premise, knowing the characteristics of patients who were hospitalized for COVID-19 provides support for healthcare professionals and managers in developing strategies to reduce vulnerability and incidence of complications from this disease. Therefore, the following research question emerged: what are the clinical-epidemiological characteristics and outcomes of patients with COVID-19 in the second wave of the pandemic? Therefore, the objective was to describe the clinical-epidemiological profile and identify the outcomes in patients with COVID-19 in the second wave of the pandemic in a public hospital in northern Paraná, Brazil.

METHODS

This is a sectional and analytical study that followed the Strengthening the Reporting of Observational Studies in Epidemiology recommendations.[15] The study population consisted of 1,467 adult participants with COVID-19, admitted to a public hospital in northern Paraná, from January 1 to March 31, 2021. The present study was carried out at the university hospital (UH), a supplementary body of the *Universidade Estadual de Londrina* (UEL). Since the beginning of the pandemic, UEL-UH has been part of the Sentinel Hospital Network, according to the Brazilian National Health Regulatory Agency, and is a tertiary reference for the care of moderate and severe cases of COVID-19.

Participant data were obtained from records in medical records available at the Medical Archive and Statistics Service (In Portuguese, *Serviço de Arquivo Médico e Estatística* - SAME), Internal Epidemiology Center (In Portuguese, *Núcleo Interno de Epidemiologia* - NIE), Electronic Patient Record in MedView software, consolidated through an instrument designed by the researchers and transcribed in the Microsoft Excel 97® program. It is also worth noting that there was no need for an Informed Consent Form, since the data were obtained indirectly; however, a Confidentiality and Confidentiality Agreement was used.

Inclusion criteria comprised hospitalized adult patients, aged ≥ 18 years, with a confirmed diagnosis of COVID-19 and a positive result for real-time reverse transcriptase polymerase chain reaction for SARS-CoV-2 in respiratory samples (nasopharyngeal and/or oropharyngeal swab).[3] Exclusion criteria comprised incomplete medical records and patients suspected of having COVID-19 who did not have a confirmed diagnosis during hospitalization.

The data from medical records were completed by healthcare professionals from the aforementioned institution who provided direct care to patients. This information was forwarded by SAME and NIE, and the missing data were collected from medical records and recorded in the instrument designed and previously tested by the research team, composed of a nursing resident, a doctoral degree holder and a doctoral student in nursing. Data collection took place from January to March 2022.

The instrument included several variables, highlighting sociodemographic characteristics, clinical conditions such as previous symptoms, comorbidities, risk factors and disease outcome. The hospitalization outcome was defined as discharge, transfer and death, as defined in the electronic medical record system itself. Independent variables of social characterization were sex (male and female), age (≤64 and ≥65 years), race (yellow, white, brown/black), marital status (married, single, widowed, divorced and not informed) and origin (Londrina or another city). The variable education level was not used due to the lack of its respective record.

Categorical variables were analyzed descriptively using absolute and relative frequency, while continuous age was assessed using mean and standard deviation. The association between clinical outcome and exposure variables was verified using the chi-square test to compare frequency and odds ratio. For data that did not follow a normal distribution, the Kolmogorov-Smirnov test and Bonferroni post-test were used.

Variables related to symptoms, comorbidities and risk factors that presented statistical significance in bivariate analysis were subjected to multinomial regression adjusted for sex, age (continuous) and municipality of origin, in addition to the other variables in the chunk. A significance level of 5% was adopted. The Statistical Package for the Social Sciences for Windows® software was used for data analysis.

The research was based on standards and guidelines that regulate research involving human beings according to Resolutions 466/2012 and 510/2016 of the Brazilian National Health Council. The study was approved on April 25, 2022 by the UEL Research Ethics

Committee, under Opinion 5.365.229 and Certificate of Presentation for Ethical Consideration 56710722.9.0000.5231, authorized by the institution.

RESULTS

Between January and March 2021, 1,476 patients diagnosed with COVID-19 were admitted to the study site. Of these, nine were excluded based on established criteria (four had incomplete medical records and five had no confirmation of the COVID-19 test).

Considering clinical-epidemiological characteristics, it was observed that most cases occurred in males (811; 55.3%), aged ≤64 (806; 54.9%), white (1,199; 81.7%), married (686; 46.8%) and residents of Londrina (762; 51.9%). When assessing the outcome characteristics, the analyses showed that there were higher rates (783; 53.4%) in relation to deaths and transfers, as shown in Table 1.

Table 1. Sociodemographic data of patients hospitalized (n=1,467) for COVID-19 according to sociodemographic characteristics in a public hospital. Londrina, Paraná, Brazil, 2022

		Outcome			
Variables, n (%)	**Total**	**Death**	**Transfer**	**High***	**p-value****
Sex					**0.004**
Male	811 (55.3%)	297 (36.7%)	113 (13.9%)	401 (49.4%)	
Female	656 (44.7%)	197 (30.0%)	77 (11.7%)	382 (58.3%)	
Age (in years)					**<0.001**
≤64	806 (54.9%)	190 (23.6%)	97 (12.0%)	519 (64.4%)	
≥65	661 (45.1%)	304 (46.0%)	93 (14.1%)	264 (39.9%)	
Race					0.240
White	1199 (81.7%)	404 (33.7%)	158 (13.2%)	637 (53.1%)	
Brown or black	161 (11.0%)	53 (32.9%)	18 (11.2%)	90 (55.9%)	
Yellow	26 (1.8%)	10 (38.5%)	7 (26.9%)	9 (34.6%)	
Data not provided	81 (5.5%)	27 (33.3%)	7 (8.6%)	47 (58.1%)	
Marital status					0.179
Married	686 (46.8%)	229 (33.4%)	83 (12.1%)	374 (54.5%)	
Single	229 (15.6%)	81 (35.4%)	27 (11.8%)	121 (52.8%)	
Widowed	112 (7.6%)	45 (40.2%)	12 (10.7%)	55 (49.1%)	
Divorced	71 (4.8%)	27 (38.0%)	15 (21.1%)	29 (40.9%)	
Other	369 (25.2%)	112 (30.4%)	53 (14.3%)	204 (55.3%)	
Municipality of origin					**<0.001**
Londrina	762 (51.9%)	227 (29.8%)	133 (17.4)	402 (52.8)	
Another municipality	705 (48.1%)	367 (37.9%)	57 (8.1)	381 (54.0)	
Total	**1467 (100%)**	**494 (33.6%)**	**190 (13.0%)**	**783 (53.4%)**	

Legend: X = mean; SD = standard deviation; *discharge by cure, discharge on request and discharge by evasion; ** chi-square test.

The main signs and symptoms described in medical records were respiratory, such as desaturation (640; 43.6%) and dyspnea (594; 40.5%), followed by cough (362; 24.7%), fever (245; 16.7%) and asthenia (153; 10.4%), as shown in Table 2.

Table 2. Signs and symptoms associated with outcome in hospitalized patients (n=1,467) with COVID-19 according to symptoms in a public hospital. Londrina, Paraná, Brazil, 2022

Variables, n (%)	**Total**	**Death**	**Transfer**	**Discharge***	**p-value****

Desaturation					**0.003**
Yes	640 (43.6%)	225 (35.2%)	101 (15.7%)	314 (49.1%)	
No	827 (56.4%)	269 (32.5%)	89 (10.8%)	469 (56.7%)	
Dyspnea					**0.001**
Yes	594 (40.5%)	178 (30.0%)	98 (16.5%)	318 (53.5%)	
No	873 (59.5%)	316 (36.2%)	92 (10.5%)	465 (53.3%)	
Cough					**0.003**
Yes	362 (24.7%)	98 (27.1%)	59 (16.3%)	205 (56.6%)	
No	1105 (75.3%)	396 (35.8%)	131 (11.9%)	578 (52.3%)	
Fever					0.407
Yes	245 (16.7%)	71 (29.0%)	32 (13.0%)	142 (58.0%)	
No	1221 (83.3%)	423 (34.6%)	158 (12.9%)	641 (52.5%)	
Asthenia					0.224
Yes	153 (10.4%)	42 (27.5%)	21 (13.7%)	90 (58.8%)	
No	1314 (89.6%)	452 (34.4%)	169 (12.9%)	693 (52.7%)	
Myalgia					**<0.001**
Yes	147 (10.0%)	27 (18.4%)	35 (23.8%)	85 (57.8%)	
No	1320 (90.0%)	467 (35.4%)	155 (11.7%)	698 (52.9%)	
Headache					**0.002**
Yes	123 (8.4%)	24 (19.5%)	20 (16.3%)	79 (64.2%)	
No	1344 (91.6%)	470 (35.0%)	170 (12.6%)	704 (52.4%)	
Tachypnea					**0.001**
Yes	104 (7.1%)	47 (45.2%)	20 (19.2%)	37 (35.6%)	
No	1363 (92.9%)	447 (32.8%)	170 (12.5%)	746 (54.7%)	
Respiratory effort					**0.007**
Yes	100 (6.8%)	47 (47.0%)	14 (14.0%)	39 (39.0%)	
No	1367 (93.2%)	447 (32.7)	176 (12.9%)	744 (54.4%)	
Hyporexia					**0.027**
Yes	62 (4.2%)	18 (29.0%)	15 (24.2%)	29 (46.8%)	
No	1411 (96.2%)	483 (34.2%)	179 (12.7%)	749 (53.1%)	
Lack of appetite					**0.038**
Yes	54 (3.7%)	12 (22.2%)	4 (7.4%)	38 (70.4%)	
No	1413 (96.3%)	482 (34.1%)	186 (13.2%)	745 (52.7%)	
Nausea					**0.005**
Yes	56 (3.8%)	8 (14.3%)	7 (12.5%)	41 (73.2%)	
No	1411 (96.2%)	486 (34.4%)	183 (13.0%)	742 (52.6%)	
Ageusia					**0.040**
Yes	40 (2.7%)	7 (17.5%)	9 (22.5%)	24 (60.0%)	
No	1427 (97.3%)	487 (34.1%)	181 (12.7%)	759 (53.2%)	
Others*					0.090
Yes	326 (22.2%)	126 (38.7%)	37 (11.3%)	163 (50.0%)	
No	1141 (77.8%)	368 (32.3%)	153 (13.4%)	620 (54.3%)	
Total	**1467 (100%)**	**494 (33.6%)**	**190 (13.0%)**	**783 (53.4%)**	

Legend: **discharge due to cure, discharge on request and discharge due to evasion; **chi-square test; *others <100: diarrhea, emesis, chest pain, anosmia, prostration and odynophagia.

After adjustments for the main symptoms described, it was found that patients who presented tachypnea (OR: 1.71; 95% CI: 1.02-2.85; p: 0.042), respiratory effort (OR: 1.98; 95% CI: 1.20-3.27; p: 0.007) and desaturation (OR: 1.35; 95% CI: 0.98-1.83; p: 0.063) were more likely to die in relation to other symptoms. Those who presented hyporexia (OR: 1.91; 95% CI: 0.95-3.84; p: 0.071), myalgia (OR: 1.83; 95% CI: 1.12-3.00; p: 0.016) and tachypnea (OR: 1.77; 95% CI: 0.95-3.31; p: 0.073) were more likely to be transferred to another service due to the need for lower complexity beds, because they were patients with limited therapeutic support,

post-COVID patients with significant sequelae and need for prolonged hospitalization, and because of the location of family members for monitoring, as shown in Table 3.

Table 3. Risk of symptoms related to the outcome of death and transfer in patients with COVID-19 (n=1,467). Londrina, Paraná, Brazil, 2022

	Death			Transfer		
Presence of	**Odds Ratio***	**95% CI**	**p-value****	**Odds Ratio***	**95% CI**	**p-value****
Desaturation	1.35	0.98-1.83	0.063	1.17	0.79-1.74	0.435
Dyspnea	0.78	0.57-1.06	0.117	1.24	0.83-1.84	0.297
Cough	0.74	0.53-1.03	0.070	0.93	0.62-1.38	0.705
Myalgia	0.68	0.41-1.13	0.137	1.83	1.12-3.00	0.016
Headache	0.76	0.44-1.30	0.314	0.92	0.51-1.65	0.772
Tachypnea	1.71	1.02-2.85	0.042	1.77	0.95-3.31	0.073
Respiratory effort	1.98	1.20-3.27	0.007	1.29	0.66-2.54	0.454
Hyporexia	1.16	0.60-2.24	0.654	1.91	0.95-3.84	0.071
Inappetence	0.45	0.22-0.92	0.028	0.33	0.11-0.96	0.042
Nausea	0.47	0.21-1.06	0.070	0.69	0.29-1.64	0.398
Ageusia	0.51	0.21-1.27	0.150	1.32	0.56-3.09	0.526

Legend: *model adjusted for sex, age (continuous), municipality of origin, desaturation, dyspnea, cough, myalgia, headache, tachypnea, respiratory effort, hyporexia, loss of appetite, nausea and ageusia; CI – Confidence Interval.

Of the total number of patients treated at the hospital, approximately 1,008 (69.7%) had some type of previous comorbidity and 439 (30.3%) did not. Of the patients who had some comorbidity, 494 (36.3%) died.

It is worth noting that 593 (57.5%) had two or more comorbidities. Of these, 224 (37.8%) died; 78 (13.1%) were transferred; and 291 (49.1%) were discharged. The main diseases were cardiovascular (795; 54.2%), endocrine (484; 33.0%), neurological (191; 13.0%), pulmonary (116; 7.9%), renal (63; 4.3%) and gastrointestinal (38; 2.6%), according to Table 4.

Table 4. Outcomes of patients hospitalized (n=1,467) for COVID-19 according to comorbidities in a public hospital in Londrina. Londrina, Paraná, Brazil, 2022

Variables, n (%)	**Total**	**Death**	**Transfer**	**Discharge***	**p-value****
Cardiovascular					**<0.001**
Yes	795 (54.2%)	302 (38.0%)	111 (14.0%)	382 (48.0%)	
No	672 (45.8%)	192 (28.6%)	79 (11.7%)	401 (59.7%)	
Endocrine					0.330
Yes	484 (33.0%)	172 (35.5%)	67 (13.8%)	245 (50.7%)	
No	983 (67.0%)	322 (32.8%)	123 (12.5%)	538 (54.7%)	
Neurological					0.815
Yes	191 (13.0%)	65 (34.0%)	22 (11.5%)	104 (54.5%)	
No	1275 (87.0%)	429 (33.6%)	168 (13.2%)	678 (53.2%)	
Pulmonary					**0.002**
Yes	116 (7.9%)	56 (48.3%)	11 (9.5%)	49 (42.2%)	
No	1351 (92.1%)	438 (32.4%)	179 (13.2%)	734 (54.4%)	
Renal					**0.028**
Yes	63 (4.3%)	31 (49.2%)	6 (9.5%)	26 (41.3%)	
No	1404 (95.7%)	463 (33.0%)	184 (13.1%)	757 (53.9%)	
Gastrointestinal					0.996
Yes	38 (2.6%)	13 (34.2%)	5 (13.2%)	20 (52.6%)	
No	1429 (97.4%)	481 (33.7%)	185 (12.9%)	763 (53.4%)	
Total	**1467 (100%)**	**494 (33.6%)**	**190 (13.0%)**	**783 (53.4%)**	

Legend: **discharge by cure, discharge on request and discharge by evasion; **chi-square test.

As for the presence of risk factors, 449 (30.6%) had at least one risk factor and 1,018 (69.4%) did not. Of these, 148 (33.0%) died; 62 (13.8%) were transferred; and 239 (53.2%) were discharged. The main risk factors were obesity (227; 15.5%), smoking (55; 3.7%), alcoholism (30; 2%), being a former smoker (183; 12.5%) and being a former alcoholic (21; 1.4%).

The chance of death in the population ≥65 years old was higher in relation to those under 64 years old. Those who had some nephrological (OR: 1.55; 95% CI: 0.86-2.79; p: 0.144) and pulmonary (OR: 1.53; 95% CI: 0.98-2.40; p: 0.064) comorbidity had a greater chance of dying, as shown in Table 5.

Table 5. Association of the presence of comorbidities with the outcome of death and transfer in patients with COVID-19 (n=1,467). Londrina, Paraná, Brazil, 2022

	Death			Transfer		
Comorbidities	**Odds Ratio***	**95% CI**	**p-value****	**Odds Ratio***	**95% CI**	**p-value****
Presence of comorbidity	0.89	0.59-1.33	0.568	0.68	0.39-1.18	0.166
Cardiovascular	1.10	0.77-1.57	0.592	1.49	0.89-2.50	0.122
Pulmonary	1.53	0.98-2.40	0.064	0.84	0.42-1.70	0.631
Nephrological	1.55	0.86-2.79	0.144	0.83	0.33-2.10	0.693

Legend: *model adjusted for sex, age (continuous), municipality of origin, presence of cardiovascular, pulmonary and nephrological comorbidity; CI - Confidence Interval.

DISCUSSION

According to the Government of the State of Paraná (2021), more than 15 thousand people were treated during the new coronavirus pandemic at UEL-UH and around 33% required hospitalization in high complexity beds, 96 in wards, 106 in adult ICU and 11 in pediatric ICU, receiving the mark of one of the main treatment and rehabilitation centers against COVID-19 in the State.[16]

This study portrayed the first months of the second wave of the COVID-19 pandemic, in order to explore the clinical and epidemiological characteristics and outcomes in a referral hospital for this disease in the city of Londrina. The pandemic had already affected and led to the death of many people around the world, and in Brazil, not unlike other countries, the pandemic gained strength with each passing day and showed no signs of remission.

The sociodemographic profile showed that the majority of patients infected with COVID-19 in the second wave were male, married, white, aged ≤64, and residents of Londrina. A multicenter international study conducted in the first wave of the pandemic revealed that the predominance of infected patients supports this study, which was male and white, but it differs

in the age variable, with the most affected being older, 50-74 years old, with a median of 59 years. [17] A large national study also showed a higher frequency of infections in patients over 60 years old, male, with an equal percentage for white and black/brown people.[18]

When assessing the characteristics with the outcome, the analyses showed that there were more discharges when compared with deaths and transfers, supporting the findings of a national study, where general hospital mortality was lower than the other outcomes.[18]

A variety of symptoms can be presented by patients with COVID-19, from mild complaints, such as fever and cough, to more severe symptoms associated with dyspnea, as presented in this study.[19] According to the Pan American Health Organization and the Ministry of Health (MoH), milder symptoms include fever, fatigue, dry cough, loss of taste or smell, nasal congestion, sore throat, headache, myalgia, nausea, vomiting, among others. Severe symptoms include dyspnea, loss of appetite, confusion, persistent pain or pressure in the chest and hyperthermia.[20-21]

This study showed a higher frequency of symptoms related to the respiratory system, with desaturation (35.2%), tachypnea (45.2%) and respiratory effort (47.0%) having significance regarding the outcome of death in relation to the other signs and symptoms. Findings from a retrospective cohort study conducted in New York revealed that, among the factors associated with hospital mortality, tachypnea and peripheral oxygen saturation below 92% increased the risk of in-hospital mortality, in agreement with the present study.[17]

The MoH considers the elderly, pregnant and postpartum women, children, and people with risk factors or chronic conditions, regardless of age, such as smokers and/or ex-smokers, hypertensive patients, cardiomyopathies of different etiologies, diabetics, obese patients, chronic kidney disease, among others, to be at risk for developing severe forms of COVID-19.[22] The results of this study showed that 57.5% of hospitalized patients had two or more comorbidities, with emphasis on cardiovascular, endocrine, neurological, and pulmonary diseases. The mortality rate in this study was 33.6%, in which older adults with comorbidities, especially pulmonary and renal, had a higher chance of death.

A cohort study carried out in Acre in 2020, which aimed to analyze risk factors for death in individuals with COVID-19, showed that the presence of cardiovascular and endocrine diseases was a characteristic associated with death from COVID-19, showing a difference with this study in which the Odds Ratio of death was higher in patients with pulmonary and nephrological comorbidities.[23] However, another study carried out in southern Brazil identified

the prevalence of cardiovascular, pulmonary and endocrine diseases, confirming the findings of this study.[24]

As a limitation of this study, the lack of the variable education level was considered due to the absence of its respective record. This data is of utmost importance, since having a high level of education influences the lower probability of having diseases, such as cardiovascular, endocrine, pulmonary and nephrological.[25] Another limitation was working with data from medical records, which, in turn, are limited to access to the internet and because their collection is only in-hospital. On the other hand, the advantage is to bring more agility, security and loyalty to their clinic.

In short, the research conducted addressed the second wave of the COVID-19 pandemic and its implications in a referral hospital in northern Paraná, highlighting the sociodemographic and clinical characteristics of hospitalized patients. The results indicated that the majority of infected individuals were men, aged up to 64 years, with mortality being more frequent among elderly patients and those with comorbidities, mainly pulmonary and nephrological. The research also highlighted that severe respiratory symptoms, such as desaturation and tachypnea, were associated with a higher risk of death. It is concluded that the second wave of COVID-19 was as devastating as the first wave, but there was a change in the age profile of those infected. These findings contribute to understanding the evolution of COVID-19 and reinforce the need for intervention strategies aimed at the most vulnerable groups, especially those with multiple comorbidities. Therefore, this and future studies will make it possible to highlight the profile of patients affected by COVID-19 and will help in facing major pandemics such as this one. It is suggested that studies be carried out that incorporate, for instance, the impact of vaccination on the various outcomes of the disease, in order to confirm the effectiveness of vaccines as well as the reduction in mortality in patients with COVID-19 and associated factors.

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