Hospitalization for COVID-19 in the municipality of Canoas/RS: Delineation of the population profile

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Miria Elisabete Bairros de Camargo
Universidade Luterana do Brasil- ULBRA, Canoas, RS, Brasil.
E-mail: miria.camargo@ulbra.br

Carlos Eduardo Gasparetto
Universidade Luterana do Brasil- ULBRA, Canoas, RS, Brasil.
E-mail: carlosgasparetto@rede.ulbra.br

Lana Caroline Palaver Dall'Ago
Universidade Luterana do Brasil- ULBRA, Canoas, RS, Brasil.
E-mail: lanadallago@rede.ulbra.br

Liara Eickhoff Coppetti
Universidade Luterana do Brasil- ULBRA, Canoas, RS, Brasil.
E-mail: liaracoppetti00@gmail.com

Paula Loredo
Universidade Luterana do Brasil- ULBRA, Canoas, RS, Brasil.
E-mail: paula.sloredo@gmail.com

Maria Renita Burg
Universidade Luterana do Brasil- ULBRA, Canoas, RS, Brasil.
E-mail: maria.burg@ulbra.br

ABSTRACT
Introduction: The COVID-19 pandemic started in March 2020 and is marked by a high number of infected. The symptoms of the disease are variable and the most severe cases occurred mainly in elderly patients and those with previous comorbidities. Objectives: To profile infected patients in the city of Canoas/RS, who required hospitalization for COVID-19; whose hospital discharge happened in January 2021. Method: This is a descriptive, exploratory, retrospective and documentary study, with a quantitative approach, where 51 medical records of patients living in Canoas/RS were analyzed, and had the hospital discharge in January 2021 with a positive diagnosis for the COVID-19 virus, at the city´s benchmark hospital. Results: The profile that was found: male, with an average age of 55,6 years old, white and single. The average hospitalization was 6,8 days. About the medications, the most frequently used was dexamethasone and, among other care prescribed after hospital discharge, the most known was the follow-up at the Basic Health Unit. Approximately 34 patients had some comorbidity and, also, more than half had previously used continuous medications. Only three patients in the study responded affirmatively about exposure to COVID-19 and the main symptoms presented by patients in general were dyspnea, cough and fever. Final considerations: The study shows that patients with advanced age and with chronic diseases are at greater risk of developing the severe form of COVID-19. The high rate of transmissibility can be observed by the absence of information regarding the natural history of the disease.

Keywords: SARS-CoV-2, COVID-19 Pandemics, Delivery of health care.

1 INTRODUCTION

COVID-19 is an acute respiratory infection caused by the SARS-CoV-2 coronavirus. The first case of the disease was diagnosed in November 2019 in Wuhan, China. From this, a high growth in the number of cases around the world was obtained, having been the first recorded in Brazil in February 2020[1].

The World Health Organization (WHO) declared an international public health emergency on January 30, 2020, and in March of the same year, the COVID-19 pandemic was announced. This is considered a highly transmissible disease, which occurs mainly by droplets from infected people, by contact with contaminated surfaces, by fecal-oral route, in addition to being transmitted by asymptomatic people, with mild symptoms or during the incubation period of the disease - considered on average 5 to 6 days, but it is variable according to the strain of the virus2. Therefore, the growth of cases has occurred exponentially in the last two years. Thus, currently in June 2022, Brazil has a cumulative total of 31,125,118 positive cases for COVID-19 and 667,041 deaths caused by the disease3.

In this context, the regions with the highest numbers of cases and deaths are, respectively, the Southeast, the South and the Northeast of Brazil3. In relation to the southern region of Brazil, the state of Rio Grande do Sul occupies the second place with the highest number of cases in the locality, and referring to its municipalities, Porto Alegre, Caxias do Sul, Pelotas and Canoas compose, respectively, the ranking of cities with the highest incidence of the virus4. The city of Canoas, belonging to the metropolitan region of Porto Alegre/RS, has 349,728 inhabitants - according to the projection made by the IBGE for 20215 and currently accounts for an incidence of 22859.6 cases per thousand inhabitants4.

On April 22, 2022, Brazil declared the end of the Public Health Emergency of National Importance (ESPIN) caused by COVID-19 in the country, which had been implemented in March 2020. The ESPIN was a normative instrument that sought to implement sanitary measures of protection, control and containment against the coronavirus, its closure was based on the change in epidemiological standards and the vaccination of Brazilians, and the high vaccination coverage is one of the main reasons for the drop in transmission of the etiological agent of the disease[6].

The symptomatology present by SARS-CoV-2 infection is broad, and there may be fever, respiratory symptoms such as cough, rhinorrhea, dyspnea, desaturation, as well as gastrointestinal symptoms, myalgia, anosmia, ageusia, among others. The more severe presentations of the disease affect more elderly people with previous comorbidities, for example, patients with diabetes mellitus and chronic arterial hypertension2.

Thus, we sought to study the pattern and management of coronavirus infection in citizens of Canoas/RS, hospitalized in a reference hospital of the city's public network. In this context, the research has as general objective to trace the profile of infected patients in the municipality of Canoas/RS who required hospitalization for COVID-19 whose hospital discharge occurred in January 2021. And, as specific, to evaluate the conduct during hospitalization, the recommended care and analyze the incidence of previous comorbidities.

2 METHOD

This is a descriptive, exploratory, retrospective and documentary study, with a quantitative approach, where the medical records of residents of the municipality of Canoas/RS aged 18 years or older, hospitalized with a positive diagnosis for the COVID-19 virus, were analyzed. The medical records analyzed of the target audience included the medical diagnosis of COVID-19 (ICD: B 34.2), who were admitted to the Municipal Hospital of Canoas/RS.

The identification of hospitalized patients related to COVID-19 was performed through research in the Hospital Admission Information System of the municipality of Canoas and the Medical File and Statistics Service (SAME) of the hospital, through the medical records of these patients.

The inclusion criteria for this study were: patients of legal age, who were hospitalized in the reference hospital for COVID-19 in the municipality whose hospital discharge occurred in January 2021; real-time polymerase chain reaction (RT-PCR) test positive for COVID-19; medical records made available in full; reside in the municipality of Canoas. The exclusion criteria were: medical records that were incomplete and/or with incoherent information.

The list with the list of patients was provided by the hospital institution. We analyzed the medical records of all patients aged 18 years and older, who were discharged from hospital in January 2021, with a confirmed diagnosis of COVID-19, corresponding to 51 patients.

The research project was submitted to the ethical committee of the participating hospital institution and the Municipal Health Department of Canoas/RS. After its approval by the aforementioned institutions, it was submitted to the Ethics Committee of the Lutheran University of Brazil, which was approved under CAAE protocol n° 4,428,810. Data were collected through medical records at the Medical Archive and Statistics Services (SAME) of the hospital institution, through the instrument developed by the researchers. The data collection period occurred in the months of October to December 2021.

3 FINDINGS

We analyzed the medical records of 51 patients, residents of Canoas/RS, with a history of hospitalization for COVID-19 in a hospital in the municipality, who were discharged from the hospital in January 2021.

There was a predominance of male patients (n = 31; 60.8%), the general age ranged from 22 to 87 years with a mean of 55.6 years (deviation = 15.20), being 21 elderly patients (41.2%). The white race was the most frequent with 41 patients (80.4%).

Regarding marital status, 31 patients are single (62.7%) and in relation to the length of hospital stay, we have a variation of 2 to 21 days, with an average of 6.8 days; 35 patients were hospitalized

with a maximum period of 7 days (68.6%); 2 were hospitalized for more than 15 days, one of them for 17 days and the other for 21 days.

The patient hospitalized for the longest time is 54 years old and has a history of systemic arterial hypertension (SAH) and diabetes mellitus (DM), in home use of insulin, metformin, enalapril, simvastatin, propranolol, furosemide. In addition, he reported having made use of hydroxychloroquine, azithromycin and prednisone on his own. The second patient with the longest hospital stay is 53 years old with a history of SAH, in home use of losartan. In the third patient there was no information in the medical record.

Table 1 describes the care prescribed during and after hospitalization, as well as modifiable risk factors and pre-existing comorbidities.

Table 1 – Follow-up of prescribed care during and after hospitalization, pre-existing diseases and modifiable risk factors.

Variables	**n = 51**
Prescribed recommendations*	
Follow-up in UBS	8(15,7%)
Isolation after examination	4 (7,9%)
Outpatient Follow-up Pulmonology	2(3,9%)
Other	19 (19,6%)
Prescription drugs**	
Dexamethasone/ Prednisone	20(39,2%)
Amoxicillin + Clavulanato/Amoxicillin	7 (13,7%)
Enalapril	6 (11,8%)
Amlodipine	3 (5,9%)
Losartan	3 (5,9%)
Omeprazole	3 (5,9%)
Aerolin	2 (3,9%)
Azithromycin	2 (3,9%)
Beclometasona	2 (3,9%)
Espironolactona	2 (3,9%)
Fluoxetine	2 (3,9%)
Hydrochlorothiazide	2 (3,9%)
Metformin	2 (3,9%)
Maintain previous medications	2 (3,9%)
Not applicable	4 (7,8%)
Other	19 (37,3%)
Pre-existing diseases**	
Systemic arterial hypertension	26 (51%)
Diabetes mellitus	13 (25,5%)
Asthma	6 (11,8%)
Hypothyroidism	3 (5,9%)
Chronic obstructive pulmonary disease	2 (3,9%)
Deep vein thrombosis	2 (3,9%)
No pre-existing diseases	17 (33,3%)
Other	20 (39,2%)
Modifiable risk factors**	
Obesity	20 (39,2%)
Smoking	6 (11,8%)
Dyslipidemia	3 (5,9%)
Inadequate nutrition	1 (2%)

Variables	n = 51
Overweight	1 (2%)
Sedentary lifestyle	1 (2%)
Does not have	20 (39,2%)
Not applicable	2 (3,9%)

* More than one alternative answer.
** More than one alternative answer.
Results expressed through frequency analysis.
Source: Survey data (2021).

Among the drugs prescribed in Table 2, the most frequent were the use of Dexamethasone (23.5%) and prednisone (15.7%); Amoxicillin + Clavulanate/Amoxicillin (13.7%). The recommendations prescribed after hospital discharge were mentioned in the follow-up at the Basic Health Unit (15.7%); isolation after the examination (7.9%) and follow-up at the Pulmonology Outpatient Clinic (3.9%). The recommendations mentioned only once were placed in the item others, totaling 19 responses (19.6%). Among these cares, we mention the referral to the Ambulatory of Clinical Medicine, to the cardiology clinic, to the speech therapy, to make the influenza vaccine and to seek the emergency service in case of symptoms.

In the pre-established diseases, the most cited was SAH, affected by more than half of the patients (51%), followed by DM (25.5%) and Asthma (11.8%). The other diseases mentioned were of only one patient (39.2%), among them are Alzheimer's disease, dementia, heart disease, depression, AMI and CHF, congenital discopathy and inguinal hernia.

The main modifiable risk factors are obesity (39.2%), smoking (11.8%) and dyslipidemia (5.9%). In addition, 20 participants (52.9%) did not have any type of modifiable risk.

The sum of prescriptions, pre-existing diseases and modifiable risk factors total more than 100%, because the alternative involves more than one type of response.

Table 2 shows the list of medications in home use by patients before hospitalization.

Table 2 – Medications for home use of patients. Canoas/RS, 2022.

Variables	n = 51
Medications in home use	
Yes	30 (58,8%)
No	21 (41,2%)
Type of medicine*	
Losartan	12 (23,5%)
Simvastatin	9 (17,6%)
Enalapril	7 (13,7%)
Azithromycin	7 (13,7%)
Amlodipine	6 (11,8%)
Metformin	6 (11,8%)
Fluoxetine	4 (7,8%)
Glifage	3 (5,9%)
Levothyroxine	3 (5,9%)

Acetylsalicylic acid	2 (3,9%)
Aerolin	2 (3,9%)
Alenia (Italy)	2 (3,9%)
Amitriptyline	2 (3,9%)
Atenolol	2 (3,9%)
Furosemide	2 (3,9%)
Glibenclamide	2 (3,9%)
Isossorbida	2 (3,9%)
Metoprolol	2 (3,9%)
Propranolol	2 (3,9%)
Salbutamol	2 (3,9%)
Other	22 (43,1%)

* More than one alternative answer.
Results expressed through frequency analyses.
Source: Survey data (2021).

Table 2 shows that more than half of the patients use some type of medication at home (58.8%). Losartan, indicated for patients with hypertension, was mentioned by 12 patients (23.5%) and simvastatin, used to regulate the levels of cholesterol (LDL and HDL) and fatty substances called triglycerides in the blood, by 9 patients (17.6%). The other types of medication were mentioned only once in the study (43.1%).

The sum of the medications totals more than 100% because a patient can make use of more than one type of medication, which happens in most cases.

Table 3 describes patients' history of exposure to COVID-19 and the symptoms presented from baseline to hospital admission.

Table 3 – Patients' history of exposure to COVID-19 and symptoms from onset to hospital admission.

Variables	**n = 51**
History of exposure to COVID-19	
Not applicable	13 (25,5%)
No	35 (68,6%)
Yes	3 (5,9%)
Symptoms from onset to hospital admission*	
Dyspnea	39 (76,5%)
Cough	27 (52,9%)
Fever	21 (41,2%)
Myalgia	13 (25,5%)
Headache	9 (17,6%)
Fatigue	9 (17,6%)
Dis-ease	9 (17,6%)
Diarrhea	6 (11,8%)
Rinorreia	6 (11,8%)
Anosmia	5 (9,8%)
Ageusia	5 (9,8%)
Chest pain	5 (9,8%)

Variables	n = 51
Vomiting and nausea	3 (5,9%)
Dessaturação	2 (3,9%)
Sore throat	2 (3,9%)
Odynophagia	2 (3,9%)
Abdominal pain	2 (3,9%)
Other	12 (23,5%)

* More than one alternative answer.
Results expressed through frequency analyses.
Source: Survey data (2021).

According to Table 3, only three patients responded affirmatively about exposure to COVID-19 (5.9%). One reported infection at the Hospital Pronto Socorro de Canoas (HPSC); one for contact with the infected wife and another did not mention the reason.

Among the symptoms, from the beginning to hospitalization, the most frequent were dyspnea (76.5%), cough (52.9%) and fever (41.2%), in the other symptoms appear anosmia; decreased urinary volume back pain; dyspnoea, weakness, hyporexia, hypotension; inappetence; prodromal symptoms; sweating and tachypnea.

4 DISCUSSION

Among the main epidemiological data of the research, a predominance of hospitalizations was seen in the population of the group from 20 to 59 years and in the majority men. According to studies that observe the characteristics of sex and age in the general population, the mean age was 47 years and with a predominance of males of 58%[7]. In addition, according to Teich et al.[8] of the Albert Einstein Institute of São Paulo, the length of stay was on average 9 days and the prevalence of cases was up to 7 days.

In the analysis of the drugs prescribed to patients with discharge, the use of glucocorticoids in approximately 40% of the individuals stands out. Dexamethasone (23.5%), Prednisone (15.7%) and Beclomethasone (3.9%) were the drugs of choice. Studies with results on the use of corticosteroids in post-COVID-19 patients are still scarce. However, the discussion about the use of these medications during hospitalization is the object of several studies. According to a review in the *Brazilian Journal of Health Review*, "Corticosteroids need to be used with caution, considering the risk-benefit ratio, as a short-term therapeutic approach, to present evidence of survival. However, the prolonged use of steroids can be harmful, as well as, there is no evidence that long-term management of those infected with COVID-19 prevents the patient from progressing to complications"[9].

Analyzing the prescription of corticosteroids at hospital discharge, it is important to relate the previous diseases of individuals, since their use may be related. Inflammatory diseases affecting the

airways, asthma and COPD were observed in about 15% of the patients, and therefore there may be a possible indication for the use of these drugs[9].

Among the previous diseases seen in individuals hospitalized during the period, systemic arterial hypertension was observed in more than half of the cases (51%). Such data is expected, since there is a high prevalence worldwide. In addition, according to a study published by the NCD *Risk Factor Collaboration* in 2021 in *The Lancet*, the number of hypertensive people who do not undergo any treatment for control already reaches 700 million around the world. However, it is easy to associate SAH as an important risk factor for COVID-19, presenting an increased risk of developing the severe form of COVID-19 and increased mortality10.

In addition, it is important to evaluate its action together with other risk factors, DM as a previous disease and obesity as a modifiable risk factor were two findings with high frequency in the research, with incidences of 25% and 39%, respectively. Thus, their relationships are analyzed, since obesity, for example, is recognized as a risk factor for the development of DM and SAH. In addition, a clear relationship is observed between the comorbidities and previous diseases mentioned with the list of medications in home use of the patients observed. Antihypertensive drugs such as losartan (23.5%), enalapril (13.7%), amlodipine (11.8%) were seen in almost 50% of the cases; Simvastatin used to control dyslipidemia is used by 17% of patients and finally, drugs for glycemic control such as metformin (11.8%), glyphage (5.9%) and glibenclamide (3.9%) totaling almost 18%. Thus, the drugs mentioned account for about 85% of those used at home, confirming the relationship with the comorbidities and previous diseases most commonly seen in the research.

Asthma was the third most frequently seen previous disease in the study (11.8%). Because it is a disease that directly affects the airways, the idea arises that its presence may be related to susceptibility to infection and possibly exacerbations. However, according to Carvalho, et al, 2020, the relationship of asthma and COVID-19 is not yet very clear and does not seem to cause asthma exacerbations, nor have some characteristic signs of asthma, such as wheezing, been described in studies on COVID-19. According to the authors, the susceptibility and risk of severe COVID-19 among asthma patients may differ depending on age, disease severity, degree of control, their phenotype or endotype, or the type of treatment implemented[11].

It is observed that only 3 patients answered affirmatively about exposure to COVID-19 and, combined with the knowledge of the high potential for the spread of COVID-19, it can be assessed that with the increasing number of COVID-19 cases, it becomes difficult to know where the infection occurred. In addition, COVID-19 is highly transmissible, albeit with a short exposure time, making it challenging to often know how the disease was contracted. In another study, a history of close contact with a positive/suspected case was reported by 61.1% of the patients8.

Among the symptoms presented by the hospitalized patients, the most preponderant was dyspnea. This symptom can be attributed both to the impairment of the respiratory system and to the impairment of several other systemic mechanisms, and the pathophysiology of shortness of breath caused by COVID-19 is not yet fully understood. It is known that, in addition to being severe, shortness of breath is a symptom with a high risk of aggravation, such as pulmonary edema and respiratory failure[12].

During the pandemic, the practice of tracking blood oxygenation levels during infection emerged, with a level of less than 94% considered indicative for severe illness. The evolution of a severe condition can lead to Acute Respiratory Distress Syndrome, which may occur in different grades and risks as well12.

During the infectious picture, the body produces an exaggerated amount of inflammatory cytokines in order to fight the virus. However, what actually occurs is a flood of fluids in the lung, which ends up increasing the inflammation and, consequently, aggravating the feeling of shortness of breath[12]. As previously discussed, the corticosteroid Dexamethasone can curb this dysregulated inflammatory process in several patients with respiratory failure. However, this medication can also cause serious adverse effects by weakening the smooth muscles, which are responsible for breathing[9].

Overall, the percentage of patients requiring hospitalization for COVID-19 treatment was about six times higher than inpatients with no underlying medical conditions. The most serious complication of COVID-19 is respiratory failure and acute respiratory distress syndrome, which can progress to multiple organ failure, leading to death12.

In this research, cough was present in 27 patients (52.9%) corroborating with the World Health Organization, dry cough was identified in 68% of patients infected with COVID-19. Coughing during a viral infection manifests itself as an immune defense mechanism, in an attempt to expel foreign bodies in the airways and respiratory tracts. In addition, it was observed that post-COVID-19 cough can also occur, being considered a post-infection sequela8,9,12.

Fatigue was recorded in 17.6% of the patients. Fatigue is reported in several studies to be one of the main symptoms during and after COVID-19 infection. The tiredness felt by some patients can be so intense, that it is accompanied by muscle pain, joints, difficulty with memory and attention. Some studies point out that post-COVID-19 fatigue can last up to 6 months after infection. It was observed that the performance of a multidisciplinary health team, including doctors, nurses, pharmacists, public health specialists and government representatives is essential for the prevention and management of this disease. In addition, patients and their families, in order to reduce the contagion and, consequently, the complications of the disease, should be educated and encouraged to adhere to current health guidelines, to perform frequent hand hygiene and to seek emergency care as soon as necessary12.

In addition, it is estimated that 17.9% to 33.3% of infected patients are asymptomatic - which facilitates high transmissibility and reinforces the difficulty of pointing out how the contagion occurred. On the other hand, in general, the symptoms most commonly presented by patients, globally and also in the city of Canoas/RS, were fever, cough and shortness of breath and, less commonly, sore throat, anosmia, dysgeusia, anorexia, nausea, malaise, myalgias and diarrhea[12].

5 CONCLUSION

In this article, we observed the epidemiological situation of the COVID-19 pandemic in the city of Canoas, Rio Grande do Sul. The results expressed the reflex, observed around the world, in a smaller municipality.

It is noteworthy that patients with advanced age (≥ 60 years) and patients with medical comorbidities (SAH, obesity, cardiovascular disease, DM, chronic lung disease, and smoking) have a higher risk of developing the severe form of COVID-19.

Of the 51 patients studied, only three knew how to report, at the time of diagnosis, how they had contracted the disease. It was observed that 62.7% of the total sample of hospitalized patients has the status of single. Further studies are needed to understand whether this value, although significant, was a coincidence of the study, or if there is epidemiological relevance.

Finally, it is worth emphasizing the importance of multidisciplinary care to combat and prevent COVID-19 among the population.

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