Clinical and Epidemiological Profile after Covid-19 Hospitalization in São Leopoldo, RS

Perfil Clínico e Epidemiológico Após Hospitalização por Covid-19 em São Leopoldo, RS

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Abstract

The disease associated with SARS-CoV-2 is called coronavirus disease 2019 (COVID-19) and has a wide clinical spectrum, ranging from asymptomatic infections to severe conditions. In this scenario, the objective of this study was to describe the clinical and epidemiological profile of the population infected with SARS-CoV-2 that required hospitalization in 2020 in São Leopoldo, RS, and to associate the different variables studied with the death outcome. This is a retrospective cohort study, with descriptive and associative analysis of the population of all adult individuals hospitalized for SARS-CoV-2 infection in 2020 in São Leopoldo. Clinical and epidemiological data were collected from the patients, and the following variables were investigated in the medical records: age, sex, race, marital status, length of stay, use of invasive or non-invasive ventilatory support, smoking history, previous comorbidities and symptoms, and outcome hospital discharge or death. The study included 481 patients consecutively, with a higher prevalence of age in the age group from 60 to 69 years (24.3%). 54.9% were male (n=264), and 84.8% (n=340) were white. There were 175 deaths (36.4%), with CI 95% 32.1-40.7. The variables age (80 years or older, 53.4%, p<0.001), length of stay (8 days or more, 47.1%, p<0.001) and need for invasive mechanical ventilation (95.1%, p<0.001) were associated with death. By sharing information with transparency and data quality about the panorama of the first year of the pandemic in the city, this study provides elucidating data, such as the characteristics of hospitalized patients and risk factors for complications related to COVID-19.

Keywords: COVID-19. Hospitalization. Pandemics. Health Profile.

Resumo

A doença associada ao SARS-CoV-2 é denominada doença do coronavírus 2019 (COVID-19), e possui amplo espectro clínico, variando de infecções assintomáticas a quadro graves. Neste cenário, o objetivo deste estudo foi descrever o perfil clínico e epidemiológico da população infectada por SARS-CoV-2 que necessitou internação em 2020 em São Leopoldo, RS, e associar as diferentes variáveis estudadas com o desfecho morte. Trata-se de um estudo de coorte retrospectivo, com análises descritivas e associativas da população de todos os indivíduos adultos internados por SARS-CoV-2 em 2020 em São Leopoldo. Foram coletados dados clínicos e epidemiológicos dos pacientes, e investigadas nos prontuários as seguintes variáveis: idade, sexo, raça, estado civil, tempo de internação, uso de suporte ventilatório invasivo ou não invasivo, história de tabagismo, comorbidades e sintomas prévios, e desfecho de alta hospitalar ou óbito. O estudo incluiu 481 pacientes de forma consecutiva, com maior prevalência de idade na faixa etária de 60 a 69 anos (24,3%). 54,9% eram do sexo masculino (n=264), e 84,8% (n=340) eram brancos. Ocorreram 175 óbitos (36,4%), com IC 95% 32,1-40,7. As variáveis idade (80 anos ou mais, 53,4%, p<0,001), tempo de internação (8 dias ou mais, 47,1%, p<0,001) e necessidade de ventilação mecânica invasiva (95,1%, p<0,001) estiveram associadas ao óbito. Ao compartilhar informações com transparência e qualidade de dados sobre o panorama do primeiro ano da pandemia na cidade, este estudo fornece dados elucidativos, como as características dos pacientes internados e fatores de risco para complicações relacionadas à COVID-19.

Palavras-chave: COVID-19. Hospitalização. Pandemias. Perfil de Saúde.

1 Introduction

In December 2019, a new coronavirus called severe acute respiratory syndrome coronavirus (SARS-CoV-2) emerged in China. The disease associated with SARS-CoV-2 was called coronavirus disease 2019 (COVID-19), and has a wide clinical spectrum, ranging from asymptomatic infections to severe conditions. According to the World Health Organization (WHO), the majority (more than 80%) of patients with COVID-19 may be asymptomatic or oligosymptomatic (few symptoms), and approximately 20% of detected cases require hospital care due to respiratory distress which up to 5% may require mechanical ventilation or ventilatory support[1].

According to the Epidemiological Bulletin for monitoring COVID-19 of the Municipality of São Leopoldo, with an estimated population of 236,835 people until June 7th, 2021, among 75,950 individuals tested, there were 26,333 positive cases, and of these, 25,422 recovered, and a total of 586 died. The mortality rate announced by WHO can vary between 2 and 4% of the total number of infected. On this date, there were 57 active admissions to the municipal hospital[2].

The most frequent clinical conditions at the beginning of the disease manifestation are: fever, cough, fatigue and myalgia.

In a study published in 2020, age was a consistent marker for the need for intensive care, and 72% of patients had previous comorbidities[3]. In the other study, the association between age and the presence of previous comorbidities increased the risk of mortality in patients infected with the virus[4].

Another previous study, conducted in the Philippines, showed that of the 8212 SARS-CoV-2 infections in the country, until April 2020, 319 cases (3.9%) occurred in people aged 0-20 years, with the outcome of death in only 12 individuals in this age group. The study concluded that the impairment resulting from COVID-19 severely burdens older age groups, healthcare workers and densely populated urban areas[5].

Different percentages of invasive mechanical ventilation time in COVID-19 patients worldwide reflect the lack of consensus regarding the need for its use. This is because many problems and particularities are incorporated in the epidemiological reports of different countries, as is the case of clinical decision-making, which has always varied among professionals, even in known pathologies, much studied and understood[6].

A study carried out in New York City, in the United States, revealed that among the 2634 infected with the virus who participated in the study, 373 were admitted to the Intensive Care Unit (ICU) and of these, 320 received invasive mechanical ventilation, presenting mortality rate of 88.1% (n=282). Mortality rates for those who received mechanical ventilation in the age groups 18 to 65 years or older were 76.4% and 97.2%, respectively, while the mortality rates for those in the 18 to 65 age groups or more who did not receive mechanical ventilation were 19.8% and 26.6%, respectively[7].

In this pandemic scenario, the objective of this study was to describe the clinical and epidemiological profile of the population infected with SARS-CoV-2 that required hospital admission in 2020 in São Leopoldo, RS, and to associate the different variables researched with the death outcome.

2 Material and Methods

This is a retrospective cohort study, based on descriptive and associative analysis of the population of all adult individuals hospitalized for SARS-CoV-2 infection at Centenário Hospital, in the city of São Leopoldo, RS, in the year 2020.

All people over 18 years old, hospitalized with COVID-19 at Centenário Hospital since the beginning of the pandemic, in March 2020, until December of this year, were eligible. Patients with different outcomes of discharge or death were excluded. Data were only collected after the hospital consented to access the medical records for data collection, as well as project approval by the Unisinos Research Ethics Committee (number 4,289,269).

A total of 491 patients infected with SARS-CoV-2 were identified in the Medical Archive Service of the hospital from the beginning of the pandemic (March 2020) to the end of the year (December 2020). Ten medical records were excluded, as the individuals had transferred to other hospitals or simply left the hospital, leaving a sample of 481 patients/ records.

The collection of patients' epidemiological and clinical data was carried out by investigating the following variables in the medical records: age, sex, race, marital status, length of stay, use of mechanical ventilation or non-invasive ventilatory support, smoking history, previous comorbidities and symptoms, and the outcome of hospital discharge or death.

Statistical analysis for data generation was performed using the SPSS program version 21.0, with a significance level of 5% ($p < 0.05$). Descriptive nalyses were performed to characterize the clinical and epidemiological profile of the sample evaluated. The statistical test to verify the differences between the prevalence in the comparison of the proportions among the variables associated with the death outcome was Pearson's Chi-Square.

3 Results and Discussion

In the present study, 481 medical records referring to the hospitalization of patients at Centenário Hospital, in São Leopoldo, RS, due to infection by SARS-CoV-2 from March to December 2020 were analyzed.

Among the 481 hospitalized patients, there were 175 deaths (36.4%), with 95% CI 32.1-40.7. The variables associated with deaths were (1) age, in which the age group of 80 years old or older had a death prevalence of 53.4% compared to the other age groups; (2) the variable length of stay, where it was observed that 47.1% of the patients who remained hospitalized for 8 days or more died, while only 34.4% of the patients who were hospitalized for less than 7 days had the same outcome; (3) and a strong association was also found among patients undergoing invasive mechanical ventilation (IMV), in which 95.1% of this group died.

Table 1 shows the distribution of characteristics of people with COVID-19 hospitalized at Centenário Hospital in 2020 and the association of variables with the death outcome.

Table 1 - Demographic and clinical characteristics of hospitalizations and distribution of deaths by COVID-19 in the city of São Leopoldo/RS (2020)

	Total (%)	Prevalence of Deaths (%)	p-value
Age Group			**<0.00**1
17 to 39 years old	58 (12.1)	7 (12.1)	
40 to 49 years old	65 (13.5)	12 (21.5)	
50 to 59 years old	98 (20.4)	30 (30.6)	
60 to 69 years old	117 (24.3)	51 (43.6)	
70 to 79 years old	85 (17.7)	42 (44.4)	
80 years old and older	58 (12.1)	31 (53.4)	
Sex			0.441
Female	217 (45.1)	83 (38.2)	
Male	264 (54.9)	92 (34.8)	
Race			0.867

	Total (%)	Prevalence of Deaths (%)	p-value
White	340 (84.8)	126 (37.1)	
American Indian	26 (6.5)	11 (42.3)	
Black	35 (8.7)	13 (37.1)	
Marital status			0.291
Married or Common Law Marriage	249 (52.0)	96 (38.6)	
Others	230 (48.0)	78 (33.9)	
Hospitalization time			**<0.001**
< 7 days	309 (64.2)	94 (34.4)	
8 days or more	172 (35.8)	81 (47.1)	
Usage or MV			**<0.001**
No	336 (70.0)	38 (11.3)	
Yes	144 (30.0)	137 (95.1)	
Smoking			0.112
No	404 (84.0)	141 (34.9)	
Yes	77 (16.0)	34 (44.2)	
Kidney disease			0.455
No	443 (92.1)	159 (35.9)	
Yes	38 (7.9)	16 (42.1)	
Drugs, alcohol, HIV			0.720
No	451 (92.1)	165 (36.6)	
Yes	30 (6.2)	10 (33.3)	
COPD + Asthma			0.416
No	395 (82.1)	147 (37.2)	
Yes	86 (17.9)	28 (32.6)	
Diabetes Mellitus			0.580
No	348 (72.3)	124 (35.6)	
Yes	133 (27.7)	51 (38.3)	
Arterial hypertension			0.994
No	272 (56.5)	99 (36.4)	
Yes	209 (43.5)	76 (36.4)	

Source: Resource data.

As for the previous symptoms reported by the population studied, dyspnea, cough and fever, pain, coryza, ageusia (loss of the sense of taste), anosmia (complete loss of smell), lowering of the sensorium, nausea/vomiting, fatigue and diarrhea were described.

Despite the limitations of incomplete documentation of clinical data in medical records, 4.7% (n=21) cases of diarrhea were identified in the sample of 462 individuals. 71.7% (n=327) cases of dyspnea and 2.8% (n=13) cases of anosmia were detected in the population of 460 individuals.

When verifying the data filled in 457 medical records of the total of 481, 39.2% (n=179) presented cough or fever; 32.3% (n=147) reported pain; 5.3% (n=24) presented coryza; 4.3% (n=19) had nausea/vomiting; 2.8% (n=12) had sensorium lowering; 2.6% (n=10) had ageusia and 1.6% (n=7) had fatigue.

The analysis of the clinical and epidemiological profile of the population infected by SARS-CoV-2 that required hospitalization in 2020 in the municipality of São Leopoldo reveals risk factors associated with death: (1) age group, with an ascending linear trajectory (the older, the greater the risk of death); (2) length of stay (the highest death rate was associated with patients who were hospitalized for more than one week); and (3) use of invasive mechanical ventilation (IMV) (almost all patients who died required IMV).

When exploring the age group variable associated with COVID-19 cases, the results of the present study point to a greater number of individuals between 60 and 69 years old, corresponding to 24.3% (n=117) of the sample, which corroborates the findings of the systematic review which also identified a higher prevalence of affected individuals in this age group among the 15 publications gathered[8].

However, the highest number of deaths occurred in the age group of 80 years or older (53.4%, n=31), an association also found in a study carried out in Bahia, which compiled all those patients detected with COVID-19 from March to October 2020, totalling 17,092 individuals, and found 28% (n=1908) of deaths in the age group of 80 years or older[9]. Other studies also found a median age among deaths of 81-ear-od individuals [10], and identified a prevalence of deaths of 51.6% in the age group over 70 years[11]. These findings reinforce older age as the most determining risk factor for the death of patients with COVID-19, and the data obtained in the present study are similar to the situation faced in Brazil and in the world. The fragility of the elderly patients before an infection by the new coronavirus is due to the changes suffered by the immune system as the person ages, as well as a higher incidence of chronic diseases in this population[6]. Others studies also stated in their study that the most significant predictor for unfavorable outcome and mortality associated with COVID-19 was age[12].

A hospital stay of more than one week was associated with a higher prevalence of deaths, almost half of the sample (n=81, 47.1%). These data corroborate the findings of the related literature, as in the systematic review which showed that the most severe cases of the disease required longer hospital stays[13]. Previous studies conducted in hospitals in Northwell Health, New York, observed an average of 4.8 days of stay in patients who died (95% CI 2.3-7.4), and an average of 3 .9 days for those who were discharged (95% CI 2.4-6.7)[6].

These studies add more strength to the findings of the present study. A longer hospital stay is necessary for the care of critically ill patients who require more invasive procedures and, consequently, have a higher mortality rate due to the rapid pulmonary, cardiac or neurological deterioration characteristic of this new condition. However, more days hospitalized may also reflect better care capacity of the hospital institution[14].

The death outcome associated with the use of IMV investigated in the present study, identified in 95.1% of the sample (n=137), confirm the previous findings where 97% of the followed sample submitted to IMV died in a hospital in Wuhan, China[15]. Others also found a high prevalence of death in the sample studied: of 3988 patients admitted to Intensive Care Units in Lombardy, Italy, 2929 patients used IMV and 1514 died[16]. It is important to clarify that there are

multifactorial aspects that place elderly patients or those with severe comorbidities who undergo IMV, one of the best markers of critical illness, at greater risk of death[17].

A higher hospitalisation prevalence of men with COVID-19 was observed in the year 2020 in the city of São Leopoldo, RS, corresponding to 54.9% (n=264) of the sample, corroborating previous studies with 60.3%[7], and with 60.7% of male individuals[16], as well as the study in which out of 3988 patients, 3188 of them were male[18].

However, a higher prevalence of death was found among women, where among the 217 women hospitalized, 38.2% (n=83) died, without expressing a significant value for risk of death, in contrast to previous studies that point to higher rates of death in men, as described in the study with a prevalence of 40.1% of deaths in male patients[9], and in the study carried out in England, which showed the female sex as a reduced risk factor for death[19].

The most prevalent race in this research was white (84.8%, n=340), as in the study which carried out a descriptive analysis of the profile of all patients hospitalized for COVID-19 in the state of Paraná until September 2020, and found the profile of confirmed hospitalized cases of 85% of white individuals[20]. Also, others observed a population of 39.8% of white individuals[7]. These findings may be related to demographic, economic and sociocultural factors representing the Caucasian immigration that colonized the southern region of the country.

The predominant marital status was married (or in a common law marriage), which corresponded to 52% (n=249) of the infected sample, and which, in the same way, had the highest prevalence of death (38.6%, n=96). Few studies have associated marital status and death, or have investigated this variable to characterize their sample, however, one study divided the patients in common law marriage, single, divorced and without information, and observed a greater risk of death in patients with COVID-19 in common law marriage (54.2%).[21].

From the 77 patients who had a smoking history, 44.2% (n=34) died. Other researches conducted a systematic review of five studies with samples from 41 to 1099 individuals infected with the virus, where no study showed a statistically significant difference associating smoking with death, and only one identified a significant difference in the association of smoking with the manifestation. of the severe clinical signs of the disease. The authors suggest that the results related to smoking are associated with other impacting factors, such as the presence of certain previous comorbidities[22,23].

4 Conclusion

The results of this study make it possible to initially contribute to the planning of preventive and therapeutic strategies and actions that can better serve the user seeking health in the municipality of São Leopoldo. By sharing information with transparency and data quality about the overview of the first year of the pandemic in the municipality,

this study provides elucidating data, such as the characteristics of hospitalized patients and risk factors for complications related to COVID-19.

Although this study has limitations such as the retrospective design, in terms of severity predictors, older age, need for mechanical ventilation and longer hospital stays, they were the variables that were most associated with the outcome of death in the sample studied.

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