Original Article

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Morbid profile and clinical outcome of elderly interned for COVID-19

Perfil mórbido e desfecho clínico de idosos internados por COVID-19

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Abstract

Introduction: The elderly play an important role in the chain of transmission and contamination by coronavirus, being the portion most likely to develop serious illness and, consequently, death. *Objective:* To investigate the relationship between the morbid profile and clinical outcome of the elderly infected by the coronavirus, in order to understand the relationship between these elements and their epidemiological repercussions on health. *Materials and methods:* This is a cross-sectional, quantitative and descriptive research carried out in a Brazilian public hospital. A total of 194 elderly people aged 60 years or older, of any gender, race and origin, who were hospitalized due to COVID-19 infection, participated in the research. The object of the study was electronic medical records. To analyze the information collected, tabulation was performed in a spreadsheet, followed by descriptive analysis. Data were applied under logistic regression condition, using the STATA program. *Results:* Of the patients, 51.0% were men. Most were aged between 70-74 years (22.68%). The predominant admission symptoms were dyspnea and cough, totaling almost 100% of the complaints. The most reported comorbidity was systemic arterial hypertension, a diagnosis present in 65.46% of the analyzed medical records. The variables age and presence of comorbidity showed positive significance when related to the outcome of death. *Conclusions:* The population studied has particularities that must be considered in health care, adapting assistance strategies, recovery and rehabilitation of functionality, in order to maintain quality of life in old age.
Keywords: coronavírus. coronavirus infections. aged. hospitalization. comprehensive health care.

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Introduction

Coronaviruses are single-stranded RNA viruses that are able to infect humans and a wide range of animals. The pathological agent receives this name due to its spherical morphology with projections to the surface similar to a solar corona[1]. Respiratory droplets and contact transmission are considered the main sources of transmission[2].

In its pathogenesis, SARS-CoV-2 infects the alveolar epithelial cells of the lung using receptor-mediated endocytosis via angiotensin II-converting enzyme as an entry receptor. Thus, infected patients may be asymptomatic or may present mild clinical manifestations, such as fever, cough and fatigue, and in more severe cases, involvement of the lower respiratory tract with severe dyspnea and findings of pneumonia on imaging tests, especially computed tomography[1,3].

In this scenario, although the adult population is the most affected, the elderly are part of the age group at risk since as they are more likely to develop serious illnesses and, consequently, have higher mortality rates[1]. In Brazil, the title of elderly is given to an individual aged 60 years or more.[4]

Recent studies show that coronavirus-associated pneumonia is more severe in the elderly due to a greater association with chronic diseases, the involvement of multiple lung lobes, and a lower proportion of lymphocyte production compared to young individuals[3,5]. It should also be noted that the most common chronic diseases in older people who died of severe acute respiratory syndrome (SARS) due to COVID-19 are heart disease, diabetes *mellitus* and kidney disease[6].

Given the importance of the elderly in the coronavirus transmission chain, this study aimed to investigate the correlation between the morbid profile and the clinical outcome of these patients, in order to understand how these elements these elements are related and their epidemiological impact on health.

Materials and methods

This is a cross-sectional, quantitative and descriptive research that involves the analysis of electronic medical records of all elderly patients hospitalized for COVID-19, in a public hospital service in the city of Montes Claros-MG, between March 2020 and September 2021. The sampling is non-probabilistic, so that the selection of the elements was made intentionally, non-random, taking into account the characteristics of the group, in this case, the elderly.

Data were extracted from the medical records of patients aged 60 years or older, of any race and sex, with or without confirmed health comorbidities, from any geographic region, who got medical care at the aforementioned service. These data were then analyzed according to predetermined variants.

The names of the participants in the study have not been revealed and they have been classified by means of numbers, with the number 01 being assigned to the first medical record analysed, and so on.

After analyzing the variables contained in the medical records and tabulating them using a Microsoft Excel 16.0 spreadsheet, a descriptive analysis was performed to characterize the frequencies and percentiles of the events studied. The data were then reorganized so that they could be used in logistic regression, with death as the main event, and age, length of hospital stay and presence of comorbidities as explanatory variables.

The likelihood ratio test (LR test) and the Hosmer-Lemeshow test were also used to generate statistics with a chi-squared distribution, and to assess whether there were significant differences between the observed frequencies. Based on the results, a p-value greater than 5.0% is

considered a good fit to the model. The program used for the analysis was STATA.

The final results were compared with the information reported in the epidemiological bulletins of the Ministry of Health, the State Health Department of the State of Minas Gerais and the Municipal Health Department of the city of Montes Claros, available to citizens through electronic research.

The research had the consent of the public institution for data collection. The study was also approved by the Ethics and Research Committee Involving Human Beings, substantiated opinion No. 51657121.3.0000.5146, in accordance with Resolution 466/2012. The secrecy and confidentiality of the data collected have been guaranteed.

Results

The sample consisted of 194 medical reports. Of the patients, 51.0% were male. The majority were between 70 and 74 years of age (22.68%), followed by those over 80 years of age (22.1%). Regarding race, 54.63% of the patients identified themselves as brown, and 39.1% were unidentified (Table 1).

Regarding the origin of the patients, only 2.0% came from asylums or long-term institutions, and 82.4% were residents of the city of Montes Claros.

In 2020, 77 out of 194 evaluated cases were registered. In that year, the month with the highest number of hospitalizations was August (22.0%), whereas in 2021, almost half of the total number of cases for the year was concentrated in the month of March (49.5%). The length of hospital stay ranged from 2 days to more than 1 month, with a predominance of <6 days (36.0%) (Table 2).

The sample was consisted entirely of patients aged 60 years or older with influenza-like symptoms and/or a clinical history suggestive of coronavirus contamination. The predominant admission symptoms were dyspnea and cough, accounting for almost 100% of the complaints, followed by fever and myalgia (Table 3).

The most commonly reported comorbidity was systemic arterial hypertension, a diagnosis present in 65.46% of the medical records analyzed, followed by type 2 diabetes *mellitus* (Table 3).

Based on the results obtained, with a p-value greater than 5.0% (0.9595), the model can be considered a good fit. The variables age and presence of comorbidity showed positive significance when related to the outcome of death. Thus, age (variable X1) increases the probability of death (positive coefficient); the shorter the hospital stay (variable X2), the lower the probability of death (negative coefficient); the presence of comorbidities (variable X3) increases the probability of death (positive coefficient).

Table 1: Sociodemographic characteristics. Montes Claros - MG, Brasil, 2021.

Characteristics	Frequency (n)	Percentage (%)
Sex		
Male	99	51,03
Female	95	48,96
Age		
60-64 years old	40	20,61
65-69 years old	37	19,07
70-74 years old	44	22,68
75-79 years old	30	15,46
80 years old or more	43	22,16
Race		

Characteristics	Frequency (n)	Percentage (%)
Brown	106	54,63
White	10	5,15
Yellow	2	1,0
Black race	0	-
Indigenous	0	-
Not identified	76	39,1
Origin		
Private housing	190	97,9
Asylum	4	2,1
City		
Montes Claros	157	80,9
Montes Claros (área rural)	3	1,5
Bocaiúva	3	1,5
Salinas	3	1,5
Capitão Enéas	3	1,5
Monte Azul	3	1,5
Porteirinha	3	1,5
Claro dos Poções	2	1,0
Itacambira	2	1,0
Olhos d´água	2	1,0
Mirabela	1	0,5
Grão Mogol	1	0,5
Padre Carvalho	1	0,5
São João da Ponte	1	0,5
São João do Pacuí	1	0,5
São Francisco	1	0,5
Brasília de Minas	1	0,5
Juramento	1	0,5
Coromandel	1	0,5
Ubaí	1	0,5
Glaucilândia	1	0,5
Guaraciama	1	0,5
Janaúba	1	0,5

Source: medical records, 2021.

Table 2: Length of hospital stay and hospitalization period. Montes Claros - MG, Brasil, 2021.

Variable	Frequency (n)	Percentage (%)
Length of stay		
<6 days	70	36,0
6-8 days	29	14,9
9-11 days	29	14,9
12-13 days	5	2,5
14-16 days	15	7,7
>16 days	45	23,19
Hospitalization/month/year		
March 2020	1	1,2
April 2020	2	2,5
May 2020	0	-
June 2020	3	3,8
July 2020	9	11,6
August 2020	17	22,0
September 2020	10	12,9
October2020	12	15,1
November 2020	8	10,3

Variable	Frequency (n)	Percentage (%)
Dezember 2020	15	19,4
2020	**77**	
January 2021	13	11,1
February 2021	14	11,9
March 2021	58	49,5
April 2021	12	10,2
May 2021	5	4,2
June 2021	6	5,1
July 2021	5	4,2
August 2021	2	1,7
September 2021	2	1,7
2021	**117**	

Source: medical records, 2021.

Table 3: Admission comorbidities and symptoms. Montes Claros - MG, Brasil, 2021.

Varriable	Frequency (n)
Comorbidities	
Not reported	7
Without comorbidities	25
Systemic arterial hypertension	127
Diabetes *Mellitus* 2	51
Heart disease	30
Stroke	12
Hypothyroidism	12
Obesity	11
COPD	6
Alzheimer	4
Kidney disease	3
Neoplasm treated	3
Hepatical cirrhosis	2
Parkinson disease	2
Symptoms	
Not reported	11
Dyspnea	145
Cough	94
Fever	55
Myalgia	46
Headache	8
Lowering of conscience	5
Hyporexia	1
Weight loss	1

Source: medical records, 2021.

Discussion

In the most recent data, Brazil ranks third in the world in the number of confirmed cases and second in the number of deaths due to coronavirus[6].

Age is an independent and determinant factor for hospitalization and mortality due to coronavirus infection. Several studies confirm that individuals over 65 years of age are more susceptible to adverse clinical outcomes[7-11]. In the state of Minas Gerais, individuals over 60 years of age represent 18.6% of all confirmed cases since the beginning of the pandemic[12]. In the city of

Montes Claros, the elderly represent 13.8% of all confirmed cases and 66.6% of all deaths[13].

The most accepted theory to explain this relationship is "immunosenescence", a natural and biological phenomenon that determines the decline of the immune response with age[14]. The accumulation of deficits in the immune system acquired over time predisposes to a greater probability of infection by any pathogen. In addition, the elderly have a higher proportion of memory immune agents – humoral response –, specialized in fighting already known microorganisms, when compared to primary immune response agents, which is an obstacle to face the new virus[14,15]. There is also the influence of changes in respiratory dynamics, which are natural to the aging process, especially with regard to lung capacity for gas exchange and expulsion of inhaled particles[16].

Another immunologic determinant of infection is gender. Women are more susceptible to coronavirus infection than men, but severe disease is more common in males[15]. Notably, this distinction between the sexes is due to the heterogeneity of the immune response, which goes beyond the presence of other coefficients, such as environmental exposure and low demand for health care. In general, males have high plasma concentrations of innate immune cytokines, while females show early activation of T cells. In addition to the lower gene expression of the adaptive response, men, the older they get, develop a state of hyperinflammation and low immunity about 6 years earlier than women[17.]

In addition to age group, the presence of comorbidities is related to a more severe stage of the disease and a higher rate of death[4,16,18,19]. In the city of Montes Claros, most of the elderly hospitalized have some disease[13]. Systemic arterial hypertension is the most common chronic disease in COVID-19 confirmed cases worldwide[11]. Confirming these data, in our research, the most prevalent comorbidities were systemic arterial hypertension and diabetes *mellitus*, and there was a high association of these comorbidities with death.

In contrast to a study conducted in China, which found a higher mortality rate in patients with chronic lung disease[20], the present study did not confirm this association. Similarly, although obesity has shown to be a risk factor for many diseases, few of the medical records analyzed showed patients with high body mass index (BMI).

Regarding race, previous studies show that black race is a social determinant strongly associated with coronavirus hospitalization[8,9,19]. In the state of Minas Gerais, most patients self-identify as brown[12]. This variable also did not show significance in our analysis. This may be due, in part, to the lack of race identification in some medical records.

A Brazilian study estimated that nearly half of COVID-19 deaths would be among institutionalized older adults[21,] which was not the case in our analysis.

This search has limitations. First, the information from the medical records analyzed, because they were collected in an emergency room setting, may not include the full medical history of the patient, with underreporting of health characteristics being accepted. Second, despite the consistency of the data with other studies and health bulletins, there may be stratification of the observed variables due to the fact that the survey was conducted in a single health service.

Conclusion

The population studied has particularities that must be considered in health care. To protect the lives of these individuals, every precaution must be taken to prevent COVID-19 infection. Social distancing, wearing an appropriate mask, maintaining respiratory and hand hygiene are simple and effective measures. Vaccination is also highly recommended[22].

In addition, the planning of assistance strategies during the illness, as well as integrated actions in the process of recovery and rehabilitation of the functionality of these patients, can prevent and/or minimize negative health outcomes and are essential to maintain the quality of life in old age.

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