

Covid-19 among older adults: profile of admissions according to gender

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Highlight:

1. In females, the death outcome presented higher percentages among older women aged 80 or over; 2. In males, death presented higher percentages among older people aged 70 or over; 3. In both genders, the presence of risk factors resulted in higher percentages of deaths.

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ABSTRACT

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Objective: Comparing demographic and clinical aspects with the outcome of COVID-19 hospitalizations among elderly people according to gender. **Methods:** This is an ecological study, with analysis of the profile of older adults notified with COVID-19 in Minas Gerais. Data from the Individual Registration Form of cases of Severe Acute Respiratory Syndrome Hospitalized from March 9, 2020, referring to the first notification in the database of elderly people in the State of Minas Gerais, on March 8, 2022, were used. The final sample consisted of 83,808 notifications from elderly people diagnosed with COVID-19. Descriptive analysis and chi-square test were performed in Statistical Package for the Social Sciences (SPSS). **Results:** The profile found among older adults who died showed that men were 80 years old or older and women 70 to 80 years old; both were white, lived in the urban area, had risk factors, used non-invasive ventilatory support and required admission to the Intensive Care Unit. **Conclusion:** There is an age difference between elderly men and women in the evolution to death, while the other characteristics were similar. This fact makes it possible to reflect on the impacts on health in different groups of individuals.

Keywords: Coronavirus Infections. Aged. Sex Distribution. Risk Factors. Mortality.

INTRODUCTION

On December 12, 2019, the Wuhan Municipal Health Commission (China) reported the discovery of cases of an acute respiratory disease caused by the new coronavirus (SARS-CoV-2)¹. Called COVID-19, the disease is characterized by an acute respiratory infection caused by a subtype of the coronavirus, which is potentially serious, highly transmissible and spread globally². Concerned about the alarming levels of transmission, inaction and its severity, the World Health Organization (WHO) classified COVID-19 as a pandemic¹.

In Brazil, the first confirmed case occurred in February 2020, followed by the first death in March of the same year, which meant that this context of high transmissibility and death rates resulted in a Public Health emergency decree of national importance². Regarding the contextualization of COVID-19 in Brazil, there were significant differences between regions and states, where the Southeast had the highest number of cases and the State of Minas Gerais had the second highest number of notifications. More than three million cases and more than 63 thousand deaths were identified, with a higher percentage of deaths among older adults, males and individuals with risk factors³.

With the increase in the number of cases in the elderly population and, due to the high risk of this age group, specific care actions and strategies were developed, highlighting social distancing⁴ so that there was a reduction in the risk of deaths and hospitalizations with complications in these individuals.

In Minas Gerais, the older population corresponded to approximately 20% of the total number of deaths due to COVID-19³. The greater chance of hospitalization and high mortality rate among older adults who became infected with COVID-19 occurred due to risk factors, such as: diabetes mellitus and cardiovascular diseases associated with hypertension⁵. This context is corroborated by an international systematic review, in which diseases of the cardiovascular, respiratory, nervous and renal systems, as well as malignancies were associated with a higher risk of mortality among older individuals with COVID-19⁶.

The high mortality rates in this population group were also identified in a national study carried out in the Northeast region, which found a higher risk of death especially in those aged over 80 years, who had comorbidities and were male⁷. Research in the state of Pará found that lethality among older men was 1.6 times higher when compared to women and this difference increased to 1.8 among younger older people, that is, in the age group of 60 to 79 years⁸. Thus, it is possible to identify a disparity between death and age of older adults who were diagnosed with COVID-19, mainly according to gender.

It is worth noting that an investigation with older adults in Minas Gerais found that the age group of 80 years or more and low education were considered factors associated with less knowledge of preventive actions regarding COVID-19, such as: hand hygiene, respiratory etiquette, cleaning of surfaces and objects and social distancing⁹, which can result in inefficiency in preventing contamination and increased transmissibility rates.

Research in China¹⁰ and Italy¹¹ identified that the majority of deaths/serious cases with ICU admissions occurred among older adults and males; and Chinese studies verified the presence of comorbidities and the need for mechanical ventilation¹²⁻¹³.

The difference according to gender in hospitalizations was also highlighted in a Chinese investigation, which found that 26.2% of women had severe cases and 21.4% of patients reached the composite endpoint, characterized by admission to an Intensive Care Unit (ICU), mechanical ventilation or death; while for the male group, 39.6% were classified as severe cases and 30.2% reached the endpoint¹⁰.

Although studies indicate higher mortality among older males, there is a gap regarding possible differences in this age group, between gender, in factors related to evolution, in cases considered serious and requiring hospitalization, especially in Brazil. Therefore, the objective of the present investigation was to compare demographic and clinical aspects with the outcome of COVID-19 hospitalizations among older people according to gender.

METHODS

Ecological, retrospective, quantitative and analytical study carried out over a two-year period from the start of the pandemic. Data were used from the Individual Registration Form of Cases of Severe Acute Respiratory Syndrome Hospitalized from March 9, 2020, which was the date of the first notification in the database in an older individual in the States of Minas Gerais, until March 8 2022.

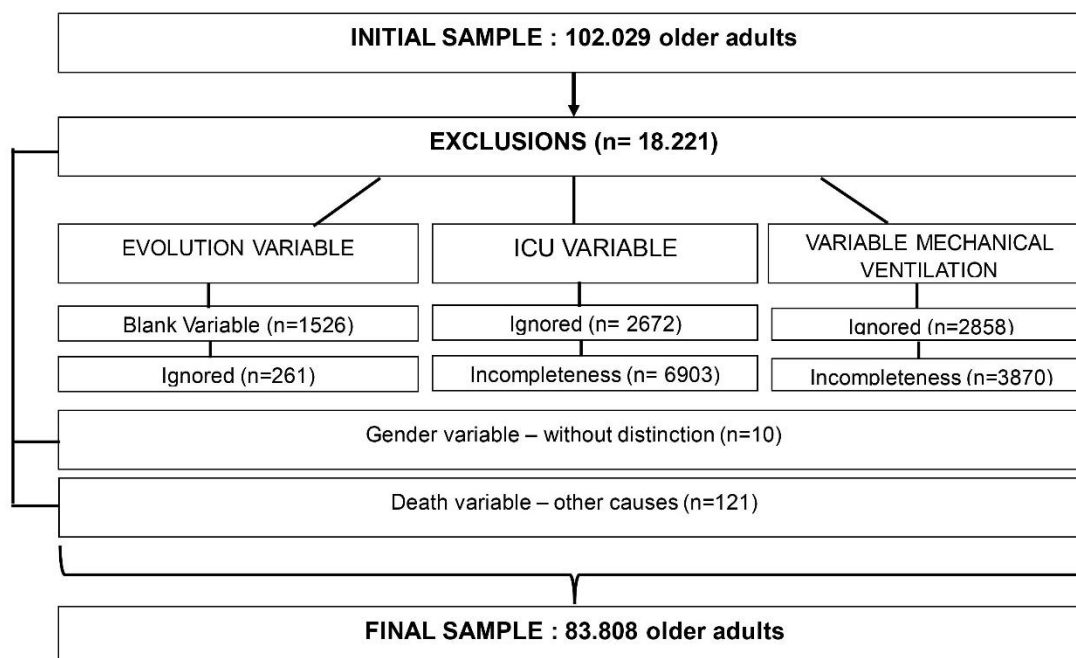
The information, referring to the state of Minas Gerais, was obtained through the Individual Registration Form - Hospitalized Severe Acute Respiratory Syndrome Cases, in a data spreadsheet in the Excel® program available on the Integrated Health Surveillance Platform of the Ministry of Health (<http://plataforma.saude.gov.br/coronavirus/dados-abertos/>), in the Influenza Epidemiological Surveillance Information System (SIVEP-Gripe).

Data were used for a period of two years (January 28, 2020 to January 27, 2022), counting from the date of the first notification of suspected COVID-19 in the state. Thus, from the period mentioned above, all notifications of COVID-19 in the state of Minas Gerais of older people aged 60 or over and who were hospitalized were selected. Cases in which the data presented incomplete fields or were ignored were excluded as it made it impossible to develop the proposed analyzes to meet the research objective.

Of the total number of COVID-19 cases diagnosed in the state of Minas Gerais over a two-year period, 102.029 were hospitalized older adults. Of these, 18.121 were excluded due to incomplete data (Figure 1). Thus, it was found in the database that 83.808 older people met the established criteria and comprised the final sample of the study (Figure 1).

Figure 1 presents the composition flowchart of the sample of older people diagnosed with COVID-19 in the State of Minas Gerais.

Figure 1 – Flowchart of composition of the sample of elderly people diagnosed with COVID-19 in the State of Minas Gerais, Uberaba, 2022



Source: Prepared by the authors, 2022.

The variables studied were: sex (male, female); age group (60 |70, 70 |80, 80 and over); evolution (cure, death); risk factors (yes, no), use of ventilatory support (yes, invasive; yes, non-invasive; no), ICU admission (yes, no).

The data were subjected to descriptive analysis and the chi-square test in the Statistical Package for the Social Sciences (SPSS)® software, with a significance level of 95%. Tests were considered significant when $p < 0.05$.

The project does not require consideration by the Human Research Ethics Committee, as it used data from a publicly accessible spreadsheet.

RESULTS

Among the 83.808 older people, female and male respectively, the majority were 60 |70 years old (37.1%; 40.4%), white (43.1%; 42.6%), lived in the urban area (89.2%; 88.7%), had risk factors and/or comorbidities (82.6%; 78.2%), used non-invasive ventilatory support (61.6%; 59.2%), was not admitted to the ICU (63.9%; 59.9%) and recovered (58.4%; 53.8%).

In females, compared to cure, the death outcome presented higher percentages among older women aged 80 or over; with risk factors; who used non-invasive ventilatory support and who were hospitalized in the ICU (Table 1).

Table 1 contains data related to the characteristics of elderly women related to cure and the outcome of death.

Table 1 – Demographic profile, risk factors, ventilatory support and ICU according to the progression to death and/or cure among elderly women with COVID-19 in the State of Minas Gerais, Brazil, 2022

Variables	Women				X ²	p
	Cure		Death			
	N	%	n	%		
Age group (in years)						
60 70	10095	42.0	5173	30.2	842.995	<0.001
70 80	7778	32.4	5516	32.2		
80 and more	6157	25.6	6436	37.6		
Risk factor						
Yes	19180	79.8	14825	86.6	369.528	<0.001
No	4850	20.2	2300	13.4	317.600	
Ventilatory Support						
Yes, invasive	1461	6.1	6901	40.3	7572.735	<0.001
Yes, non-invasive	16750	69.7	8592	50.2		
No	5819	24.2	1632	9.5		
UTI						
Yes	4724	19.7	10118	59.1	6740.242	<0.001
No	19306	80.3	7007	40.9		

Source: Prepared by the authors, 2022.

Note: Chi-square test, p<0.05.

In males, compared to cure, death presented higher percentages among older people aged 70 or over; with risk factors; who used non-invasive ventilatory support and who were hospitalized in the ICU (Table 2).

Table 2 contains data related to the characteristics of elderly men related to cure and the outcome of death.

Table 2 – Demographic profile, risk factors, ventilatory support and ICU according to the progression to death and/or cure among elderly men with COVID-19 in the State of Minas Gerais, Brazil, 2022

Variables	Male				X ²	p
	Cure		Death			
	N	%	N	%		
Age group (in years)						
60 70	10777	47.0	6476	32.9	1142.767	<0,001
70 80	7529	32.8	6826	34.6		
80 and more	4647	20.2	6398	32.5		
Risk factor						
Yes	17128	74.6	16218	82.3	368.724	<0,001
No	5825	25.4	3482	17.7		
Ventilatory Support						
Yes, invasive	1405	6.1	8136	41.3	7918.718	<0,001
Yes, non-invasive	15694	68.4	9554	48.5		
No	5854	25.5	2010	10.2		
UTI						
Yes	4973	21.7	12140	61.6	7045.687	<0,001
No	17980	78.3	7560	38.4		

Source: Prepared by the authors, 2022

Note: Chi-square test, p<0.05

DISCUSSION

The data from the present study show a relationship between older age and the outcome of death in both sexes. However, the higher percentage of deaths among 80-year-old women may be related to greater longevity and widowhood, which is corroborated by national and international literature, in which the majority of older women live alone or do not have family members¹⁴⁻¹⁶.

Older people with these characteristics may present worse health-related conditions and habits, such as poor diet¹⁷, in addition to being responsible for activities of daily living related to household chores such as shopping and going to supermarkets, resulting in greater chances of exposure and risk of contamination. This context can result in limited appreciation of self-care, characterized by insufficient demand for health services, especially in primary care¹⁸ and considering the pandemic context, which generated possible difficulties and fear. Therefore, the social characteristics of older adults must be considered in health care actions with a view to identifying the possible weaknesses and potentialities of this population group.

Research carried out in Rio Grande do Norte with results similar to the present investigation observed that older people aged 80 or over, regardless of gender, had a 7.06 times higher risk of death from COVID-19 when compared to individuals up to 59 years old⁷. This was also observed among older individuals in a cohort study in China, which observed that advancing age, especially among those aged 80 or over, had a greater risk of developing a severe or critical form of the disease¹⁹. A possible justification for increasing age representing a greater risk of death among older adults with COVID-19 occurs due to the process of immunosenescence, characterized by the deterioration of immunity, at the same time as there is a decrease in the functions of the immune system, which results in increased susceptibility to diseases, mainly respiratory diseases²⁰, and represents a greater risk for the development of severe forms in individuals with COVID-19.

However, in relation to gender, research carried out in Wuhan, Lombardy, New York and Denmark found that males were at greater risk of developing a worsening of COVID-19^{10-11,21}. This can be justified by biological factors, such as differences in the immune response related to sex chromosomes and higher levels of antibodies in women compared to men; social characteristics related to alcohol use, smoking and obesity; and comorbidities²². Among women, the peak of contagion and complications occurs until the

age of 60 and with a risk of developing more serious infections due to the type of occupation, such as health and/or social assistance²³⁻²⁴.

Regarding skin color, data similar to the current research was identified in a Brazilian investigation among elderly people diagnosed with COVID-19²⁵. However, a higher percentage of elderly people who self-declare black skin color was found in a national survey in Brazilian states, diverging from the present investigation²⁶.

A result consistent with the present investigation regarding the occurrence of a greater number of diagnoses among individuals residing in urban areas was identified in Cuba. One of the factors that may justify this finding is that urban areas have a larger population of people, consisting of commercial areas, hospitals and companies, which generates greater movement and circulation of individuals, and therefore, the COVID-19 virus²⁷. It is noteworthy that the high levels of existing pollution can increase the population's susceptibility to more serious symptoms and greater respiratory complications related to the disease. Additionally, oxidizing pollutants in the air can impair immune function and attenuate the lung's efficiency in clearing the virus in the lungs. Simultaneous inhalation of chemical pollutants along with the COVID-19 virus can also exacerbate the level of COVID-19 infection. The state of pro-inflammation, injury and fibrosis combined with the immune response or increase in cytokines induced by COVID-19 can increase the severity of the infection²⁸.

Considering the risk factors related to the outcome of death, a similar result was identified in a cross-sectional study in five regions of Brazil²⁵. A systematic review found that morbidities such as diabetes mellitus, cardiovascular diseases, chronic obstructive pulmonary disease, high blood pressure and acute kidney injury represented an increased risk of mortality from COVID-19²⁹. Likewise, an integrative review found that older adults who were infected with COVID-19 and diagnosed with diabetes mellitus and/or cardiovascular diseases associated with the presence of hypertension had a higher risk of hospitalization and a high mortality rate⁵. Therefore, early monitoring and tracking of older people by Primary Care nurses is essential, especially among those who have characteristics that represent a greater risk of mortality, as well as actions aimed at health education and self-care to monitor chronic conditions.

Hospitalization in the ICU among the older adults was also verified in Italian¹¹, Chinese¹² and five Brazilian regions²⁵ investigations, which reveals the severity of the clinical picture of this disease in this age group, the impact on the health service in terms

of expenditure on health, overcrowding of hospital beds and the possibility of worsening of pre-existing conditions due to the diagnosis of COVID-19.

Regarding the use of mechanical ventilation, divergent data were found in a retrospective study carried out in Italy, in which invasive mechanical ventilation was used in 89% of older people and non-invasive ventilation was used in only 10% of this age group¹¹. Likewise, an investigation carried out in China found that 41.2% of older adults classified as severe cases of COVID-19 reached the composite endpoint, characterized by admission to the Intensive Care Unit, mechanical ventilation and/or death¹⁰. However, it is important to highlight the lack of Brazilian research that evaluated this outcome among older individuals so that it would be possible to target interventions and prevent problems related to mechanical ventilation. However, a national study identified that vitamin D, zinc and iron deficiency were biomarkers of worse clinical characteristics, such as the need for mechanical ventilation in patients with COVID-19³⁰.

Thus, the role of nursing based on the data found is enhanced in monitoring comorbidities, as these are factors that may represent greater risk in the context of COVID-19, and in the active search for older adults who present higher risk characteristics. Furthermore, it is essential to encourage actions to prevent contamination, such as correct use of masks, washing hands and use of alcohol gel, which makes it possible to reduce the number of adverse outcomes.

In secondary and tertiary care, there is a need to improve care aimed at older adults, with professionals who recognize the pathophysiology of aging and risk factors related to COVID-19, so that there is correct monitoring of signs and symptoms, mainly in the control and ventilatory support.

This study had as limitations the incompleteness of data requiring the exclusion of notifications when considering the object of study, in addition to the use of secondary data in research, which can be a challenge given the quality of the database. However, ecological studies are useful as they provide a view of the collective, given by large samples.

It is noteworthy that the lack of national and international research that analyzed mortality from COVID-19 according to gender among older adults and that evaluated this age group over time made it impossible to provide detailed discussion.

CONCLUSION

In females, deaths showed higher percentages among older women aged 80 or over, and in men, among those aged 70 or over. In both genders, the presence of risk factors, use of non-invasive ventilatory support and hospitalization in the ICU resulted in higher percentages of deaths. These data can help local authorities identify distinct priority groups for interventions and preventive actions.

There is also a need to update research, since in the context of the pandemic this seems to be a difficult task, given that the natural history of the disease is still being recognized and studied, through vaccination. Recognizing how a pandemic affects an age group and whether it occurs differently according to gender makes it possible to understand the impacts of health emergencies on different individuals and communities, in addition to developing effective and equitable policies and interventions.

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