

## Multimorbidity and population at risk for severe COVID-19 in the *Brazilian Longitudinal Study of Aging*

Multimorbidade e população em risco para COVID-19 grave no *Estudo Longitudinal da Saúde dos Idosos Brasileiros*

Multimorbilidad y población en riesgo para la COVID-19 grave en el *Estudio Brasileño Longitudinal del Envejecimiento*

Bruno Pereira Nunes <sup>1</sup>  
Ana Sara Semeão de Souza <sup>2</sup>  
Januse Nogueira <sup>3</sup>  
Fabiola Bof de Andrade <sup>4</sup>  
Elaine Thumé <sup>1</sup>  
Doralice Severo da Cruz Teixeira <sup>5</sup>  
Maria Fernanda Lima-Costa <sup>4</sup>  
Luiz Augusto Facchini <sup>6</sup>  
Sandro Rodrigues Batista <sup>7,8</sup>

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### Abstract

*This study aimed to measure the occurrence of multimorbidity and to estimate the number of individuals in the Brazilian population 50 years or older at risk for severe COVID-19. This was a cross-sectional nationwide study based on data from the Brazilian Longitudinal Study of Aging (ELSI-Brazil), conducted in 2015-2016, with 9,412 individuals 50 years or older. Multimorbidity was defined as  $\geq 2$  chronic conditions based on a list of 15 diseases considered risk conditions for severe COVID-19. The analyses included calculation of prevalence and estimation of the absolute number of persons in the population at risk. Self-rated health status, frailty, and basic activities of daily living were used as markers of health status. Sex, age, region of the country, and schooling were used as covariables. Some 80% of the sample had at least one of the target conditions, which represents some 34 million individuals. Multimorbidity was reported by 52% of the study population, with higher proportions in the Central, Southeast, and South of Brazil. Cardiovascular diseases and obesity were the most frequent chronic conditions. An estimated 2.4 million Brazilians are at serious health risk. The results revealed inequalities according to schooling. The number of persons 50 years or older who presented risk conditions for severe COVID-19 is high both in absolute and relative terms. The estimate is important for planning strategies to monitor persons with chronic conditions and for preventive strategies to deal with the novel coronavirus.*

*Multimorbidity; Coronavirus Infections; Aged*

### Correspondence

B. P. Nunes  
Departamento de Enfermagem em Saúde Coletiva, Faculdade de Enfermagem, Universidade Federal de Pelotas.  
Rua Gomes Carneiro 1, Pelotas, RS 96010-610, Brasil.  
nunesbp@gmail.com

<sup>1</sup> Faculdade de Enfermagem, Universidade Federal de Pelotas, Pelotas, Brasil.

<sup>2</sup> Universidade do Estado do Rio de Janeiro, Rio de Janeiro, Brasil.

<sup>3</sup> Universidade Federal de Campina Grande, Campina Grande, Brasil.

<sup>4</sup> Instituto René Rachou, Fundação Oswaldo Cruz, Belo Horizonte, Brasil.

<sup>5</sup> Faculdade de Saúde Pública, Universidade de São Paulo, São Paulo, Brasil.

<sup>6</sup> Faculdade de Medicina, Universidade Federal de Pelotas, Pelotas, Brasil.

<sup>7</sup> Faculdade de Medicina, Universidade Federal de Goiás, Goiânia, Brasil.

<sup>8</sup> Secretaria de Estado da Saúde de Goiás, Goiânia, Brasil.



## Introduction

The world has witnessed the expansion of a pandemic with an infectious cause called COVID-19, whose etiological agent is the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first reports were in December 2019 in Wuhan, Hubei Province, China, as a set of acute respiratory diseases, subsequently with global spread <sup>1</sup>. As of July 25, 2020, the World Health Organization (WHO) had reported a total of 15,538,736 confirmed cases and 634,325 deaths from the disease in 216 countries. United States, Brazil, India, Russia, South Africa, and Peru are the countries with the most reported cases thus far (World Health Organization. <https://covid19.who.int/>, accessed on 10/May/2020).

SARS-CoV-2 is transmitted mainly by contact with respiratory droplets from patients, and the disease mainly affects the respiratory, cardiovascular, gastrointestinal, and neurological systems. Clinical presentation ranges from asymptomatic to more severe forms with important involvement of the respiratory system. Symptoms consist mainly of fever, dry cough, and shortness of breath with the possibility of complications, mainly pneumonia, acute respiratory distress syndrome (ARDS), and death <sup>2,3,4</sup>. The disease is complex and with limited evidence on the best form of treatment <sup>6</sup>.

The presence of multiple chronic health problems appears to correlate with the pathogenesis of COVID-19, which had also been observed in previous coronavirus epidemics (MERS <sup>6</sup> and SARS <sup>7</sup>). Although the clinical evolution is not entirely clear, studies have shown a direct and important correlation between the patient's age and disease burden (number and severity of conditions) and increased risk of unfavorable clinical outcomes, such as hospitalization, need for intensive care (ICU), and death <sup>8</sup>. These factors associated with low lymphocyte count and high levels of lactic dehydrogenase at hospital admission were important and independent risk factors for unfavorable clinical progression in these patients <sup>9</sup>.

Approximately 72% of patients admitted to ICU for COVID-19 presented preexisting chronic conditions, compared to 37% of those who did not require intensive care <sup>3</sup>. A meta-analysis of eight studies and data from more than 46,000 Chinese patients showed that hypertension (17%), diabetes (8%), cardiovascular diseases (5%), and chronic respiratory diseases (2%) were the most frequent morbidities and with increased risk of developing a more serious course of SARS-CoV-2 infection <sup>10</sup>. A complementary meta-analysis found that patients with preexisting cardiovascular conditions presented higher risk of severe forms of COVID-19 <sup>11</sup>.

Social determinants of health such as male sex and advanced age appear to correlate with mortality in hospitalized COVID-19 patients <sup>8</sup>. This same systematic review showed that death was twice as likely in patients with any preexisting condition compared to those without such diseases. A study of 72,314 cases by the Chinese Center for Disease Control and Prevention showed a high case-fatality rate in patients with preexisting conditions: cardiovascular disease (10.5%), diabetes (7.3%), chronic respiratory disease (6.3%), hypertension (6%), and cancer (5.6%) <sup>12</sup>. A study of patients in China and Italy found that the presence of any of the above-mentioned self-reported morbidities was associated with 2.4 times higher risk of mortality <sup>13</sup>.

In Brazil, the first case of COVID-19 was reported in the city of São Paulo on February 25, 2020. Brazil has a high transmission rate and is the country of Latin America with the highest number of confirmed cases and deaths <sup>14</sup>. Global health authorities are concerned about the impact of the COVID-19 pandemic in middle and low-income countries due to weaknesses in the health systems, reduced availability of intensive care beds, limited number of mechanical ventilators, and prevalence of morbidities/infection <sup>8,15</sup>.

Within this context, the accelerated aging process in Brazil has played out in a scenario of the high magnitude and impact of chronic and infectious diseases, besides serious socioeconomic iniquities <sup>16</sup>. Thus, to characterize the contingent of persons at risk of severe COVID-19 can support preventive measures (when a vaccine is available, for example) and increase the intensity of nonpharmacological strategies for heightened protection of individuals at high risk <sup>17</sup>. The current study thus aimed to measure the occurrence of multimorbidity and estimate the number of individuals in the Brazilian population 50 years or older at risk for severe COVID-19.

## Methods

This was a cross-sectional nationwide study, using the results from the baseline of the *Brazilian Longitudinal Study of Aging* (ELSI-Brazil), conducted in 2015-2016 in 70 municipalities (counties) in all five of Brazil's major geographic regions. The designed sample is representative of the Brazilian population 50 years or older and consisted of 9,412 individuals, representing a total of 42,407,714 persons in this age bracket in the country (study population). The sample's composition used geographic stratification by three-stage clusters: municipalities, which were allocated in four strata according to the size of the resident population, census tract, and household. More details on the study's methodology can be consulted in a previous publication <sup>16</sup>.

The current study's outcome variable was the simultaneous occurrence of two or more risk conditions for COVID-19. In addition to multimorbidity ( $\geq 2$  conditions), we also analyzed the occurrence of 1 preexisting condition. The following conditions were selected <sup>17</sup>: cardiovascular diseases (hypertension, stroke, acute myocardial infarction, angina, and heart failure), chronic kidney disease, chronic neurological disease (Alzheimer's disease and Parkinson's disease), chronic respiratory disease (emphysema, chronic obstructive pulmonary disease, bronchitis – measured together with the same question), diabetes, arthritis, asthma, cancer, depression, and obesity. With the exception of obesity, which was characterized by the objective measurement of weight and height, the other conditions were obtained from the interviewee's own answer to the following question: "Has a doctor ever told you that you have?". The lack of information on conditions was treated as absence of the problems. Obesity was calculated according to body mass index (BMI), obtained by dividing weight in kilograms by height in meters squared (both as the mean of two measurements), and categorized according to the following cutoff points: BMI  $\geq 30\text{kg/m}^2$  and BMI  $\geq 27\text{kg/m}^2$  for individuals under 60 years and  $\geq 60$  years of age, respectively. Classification of BMI according to age used the criteria recommended by the WHO <sup>13,18</sup>.

We also used the indicators for severity of health status: bad/very bad self-rated health, frailty <sup>19</sup>, and report of some difficulty in performing basic activities of daily living (BADL) <sup>16</sup>. The target BADL were: crossing the room or walking from one room to another, getting dressed, bathing, eating, lying down or getting out of bed, and using the bathroom.

The independent variables were sex (female, male), major geographic region of Brazil (North, Northeast, Central, Southeast, and South), age (in complete years: 50-59, 60-69, 70-79,  $\geq 80$ ), and schooling (none, 1-4, 5-8,  $\geq 9$  years).

The analyses were performed in Stata SE 15.0 (<https://www.stata.com>) and included calculation of the prevalence (%) and estimated absolute number of persons in the population. We estimated the prevalence rates for 1 and  $\geq 2$  conditions according to age bracket, region, and sex. The estimates of occurrence and population projections for bad/very bad self-rated health, frailty, and incapacity for basic activities of daily living were stratified by schooling. Statistical significance was assessed with Pearson's chi-square test. Sampling parameters and individual weights were considered in all the analyses.

ELSI-Brazil was approved by the Ethics Research Committee of the René Rachou Institute, Oswaldo Cruz Foundation (case review n. 886,754). All participants signed a free and informed consent form before starting the interview, and the study met all the regulatory and legal requirements.

## Results

Half of the study population was female (53.9%), 50 to 69 years of age (47.6%), and lived in the Southeast region (47.2%). Of the total, 13.3% had no schooling and 26.9% had  $\geq 9$  years of schooling.

Approximately 34 million Brazilians  $\geq 50$  years of age have  $\geq 1$  risk condition for severe COVID-19. Percentagewise, the occurrence was similar between regions, with higher estimated absolute numbers in the Southeast ( $\approx 16.3$  million) and Northeast ( $\approx 8$  million). Persons under 60 years presented lower prevalence of morbidities, but they represented a larger number of individuals in absolute terms. Half of the study population (52%) had multimorbidity at risk for severe COVID-19 (22,068,747 persons), proportionally higher in the Central, Southeast, and South of Brazil. The South-

east ( $\approx 11$  million) and Northeast ( $\approx 4.5$  million) still presented the highest estimated absolute numbers. There was an increase in the prevalence of multimorbidity with advancing age, independently of geographic region (Table 1).

Among women, the most prevalent risk condition were cardiovascular diseases, obesity, arthritis, and depression. Having at least one risk condition for severe COVID-19 was more prevalent among women in the Southeast (89.5%) and lower in the Northeast (84.1%). The South showed the highest prevalence of cardiovascular diseases (63.3%). The Southeast recorded higher prevalence of obesity (48.6%) and depression (36.1%), and the North showed higher prevalence of arthritis (37.7%) in women (Figure 1a). Prevalence of one or more risk conditions for severe COVID-19 was 86.4% for women and 74.3% for men. Having one or more risk conditions for severe COVID-19 was more prevalent in women in the Southeast (89.5%) and less prevalent in the Central (81.6%).

Prevalence of multimorbidity was higher in women (59.4%), most prevalent in the South (67%), while among men the prevalence of multimorbidity was 43.5%, with the highest prevalence in the Southeast (47.3%) (Figure 1). In men, the most prevalent conditions were cardiovascular diseases, obesity, diabetes, and arthritis. The highest prevalence rates of cardiovascular diseases (54.1%) and obesity (36%) were in the Central, and diabetes (16.7%) and arthritis (15.4%) were more prevalent in men in the North (Figure 1b).

The most prevalent conditions related to severe COVID-19 among Brazilians  $\geq 50$  years of age were cardiovascular diseases (56%), obesity (39%), arthritis (21%), and depression (18.5%), with little variation between regions of the country. When stratified by age, the most prevalent conditions in all ages were cardiovascular diseases and obesity (Figure 2). In relation to gender, women presented higher prevalence rates of individual conditions when compared to men, except for cancer (Figure 2).

The largest differences in prevalence rates between the sexes were for arthritis and depression. Women presented prevalence rates for arthritis of 25% and 31.1% in the lowest and highest age brackets, respectively, while for men the prevalence rates were 9% and 16.4%, respectively. Mean prevalence of depression was 25.2% in women, compared to 10.6% in men (Figure 2).

Prevalence of multiple risk conditions for severe COVID-19 plus indicators of precarious health status was proportionally similar between regions of the country, with higher absolute numbers in

**Table 1**

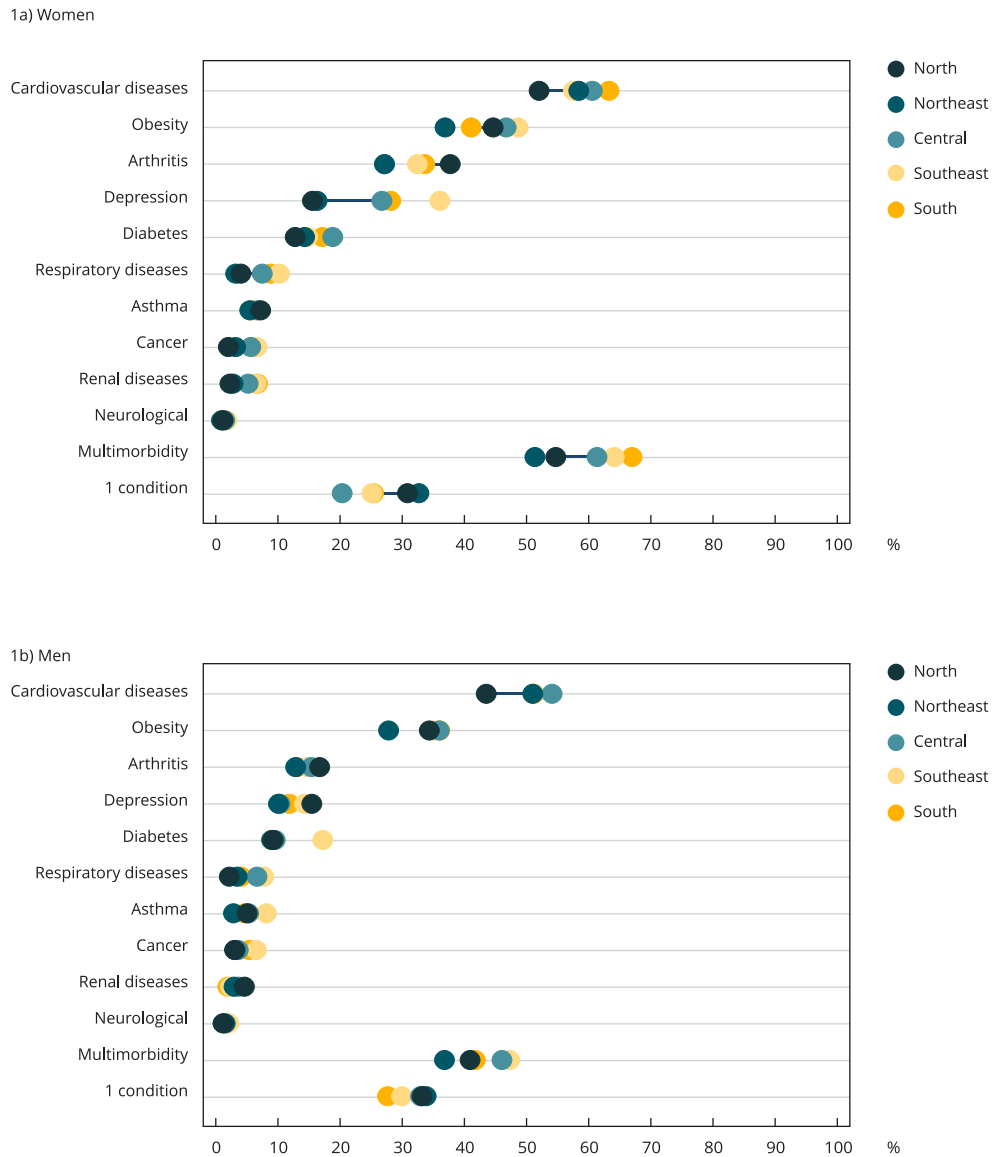
Prevalence (%) and estimated absolute number (n) of risk conditions and multimorbidity for severe COVID-19 by age and major geographic region of Brazil among individuals  $\geq 50$  years of age. *Brazilian Longitudinal Study of Aging (ELSI-Brazil)*, 2015-2016.

Variables	North % (n) *	Northeast % (n) *	Central % (n) *	Southeast % (n) *	South % (n) *	Brazil % (n) *
<b>1 condition</b>						
Age (years)						
50-59	36.1 (441,999)	34.4 (1,639,156)	27.9 (396,750)	30.2 (2,859,776)	30.7 (1,020,662)	31.5 (6,358,342)
60-69	30.1 (206,546)	30.5 (918,354)	26.7 (216,554)	25.7 (1,533,634)	23.3 (488,281)	26.7 (3,363,370)
70-79	23.3 (75,163)	33.4 (565,905)	21.9 (88,647)	22.6 (705,484)	17.0 (186,498)	24.4 (1,621,698)
$\geq 80$	25.6 (31,376)	36.5 (274,795)	22.0 (35,114)	24.8 (365,417)	32.3 (160,067)	28.9 (866,769)
Overall	32.0 (755,084)	33.2 (3,398,210)	26.4 (737,065)	27.3 (5,464,311)	26.4 (1,855,508)	28.8 (12,210,178)
<b>Multimorbidity (<math>\geq 2</math> conditions)</b>						
Age (years)						
50-59	40.1 (490,735)	37.3 (1,777,758)	45.8 (651,119)	45.0 (4,253,316)	43.5 (1,448,564)	42.7 (8,621,492)
60-69	56.3 (386,856)	50.6 (1,524,325)	62.7 (508,788)	61.6 (3,676,159)	66.8 (1,402,914)	59.6 (7,499,043)
70-79	52.6 (169,731)	53.0 (897,013)	67.6 (273,107)	65.8 (2,049,850)	73.3 (804,459)	63.2 (4,194,161)
$\geq 80$	64.3 (78,742)	50.0 (376,614)	64.2 (102,685)	61.1 (898,320)	60.2 (297,690)	58.4 (1,754,051)
Overall	47.8 (1,126,064)	44.8 (4,575,710)	54.9 (1,535,700)	54.4 (10,877,644)	56.3 (3,953,628)	52.0 (22,068,747)

\* n = estimated number for the Brazilian population.

**Figure 1**

Prevalence of risk conditions for severe COVID-19, presence of one condition and multimorbidity according to geographic region of Brazil and stratified by sex in individuals  $\geq 50$  years of age. *Brazilian Longitudinal Study of Aging (ELSI-Brazil)*, 2015-2016.

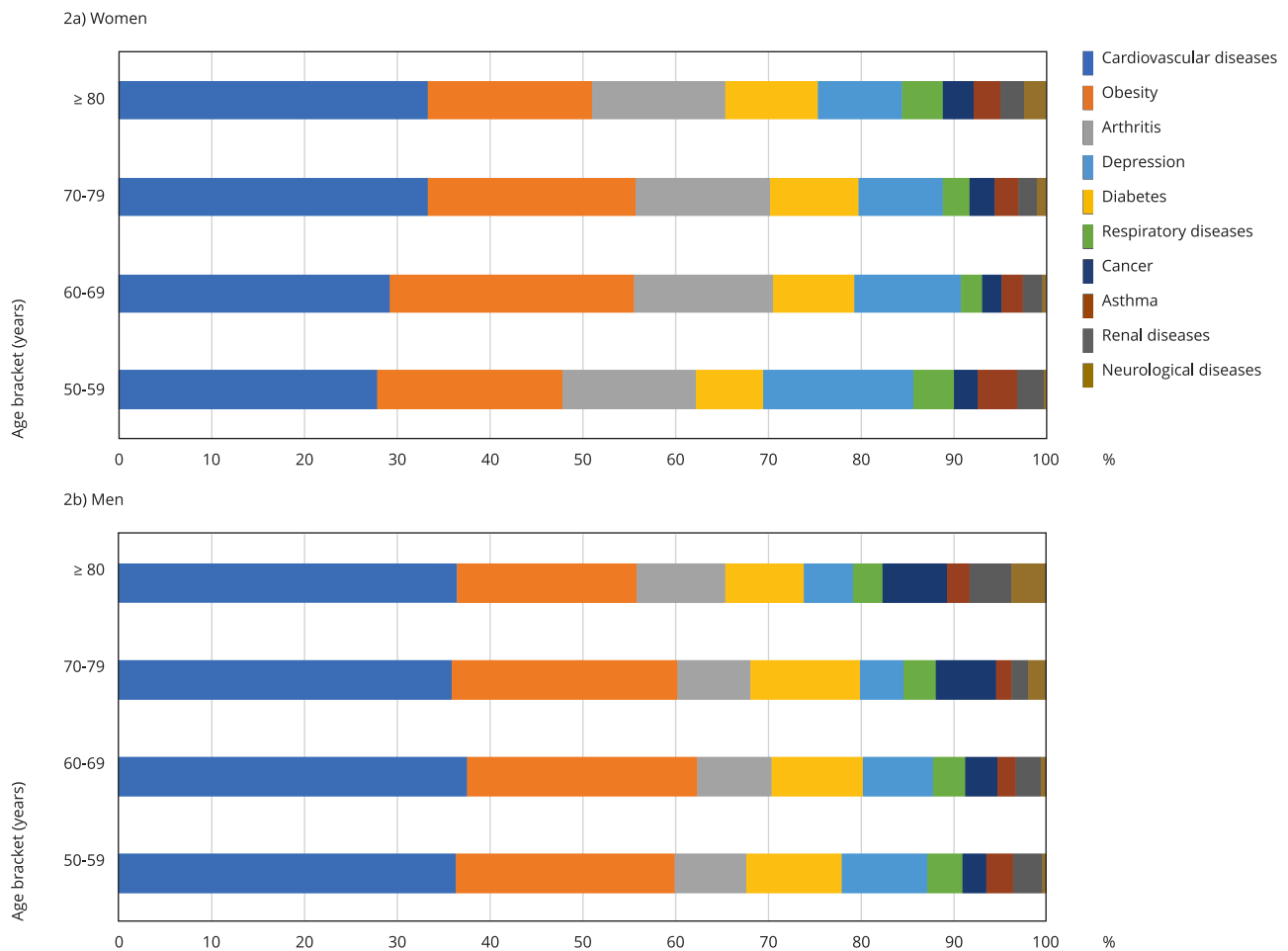


the Northeast and Southeast. A total of 2,412,355, 3,656,104, and 4,774,649 individuals presented multiple risk conditions for severe COVID-19 plus frailty, bad self-rated health, and incapacity for BADL, respectively (Table 2).

Associations according to schooling showed that lower schooling correlated with higher prevalence rates and estimated absolute numbers. For example, 18.4% of persons with no schooling presented multimorbidity plus incapacity for BADL, compared to 6.4% for individuals with  $\geq 9$  years of schooling. All the differences according to schooling were statistically significant (Table 3).

**Figure 2**

Prevalence of risk conditions for severe COVID-19 according to age groups stratified by sex among individuals  $\geq 50$  years of age. *Brazilian Longitudinal Study of Aging (ELSI-Brazil), 2015-2016.*



**Table 2**

Prevalence of risk conditions and multimorbidity for severe COVID-19 according to self-rated health, frailty, and incapacity for basic activities of daily living (BADL) stratified by geographic region among individuals  $\geq 50$  years of age. *Brazilian Longitudinal Study of Aging* (ELSI-Brazil), 2015-2016.

Variables	North	Northeast	Central	Southeast	South	Brazil
	%	%	%	%	%	%
	(95%CI)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	(95%CI)
	n *	n *	n *	n *	n *	n *
1 condition						
Bad/Very bad self-rated health	4.1 (2.8-6.2) 97,812	3.7 (2.8-5.0) 379,093	1.3 (0.6-2.9) 37,070	1.4 (1.0-2.0) 290,462	1.4 (0.9-2.1) 96,305	2.1 (1.7-2.6) 900,741
Frailty	1.6 (0.6-4.2) 36,860	3.8 (2.5-5.6) 345,383	0.6 (0.3-1.3) 17,410	1.4 (1.0-2.1) 266,806	1.5 (0.8-2.8) 104,253	1.9 (1.5-2.6) 770,711
Incapacity for BADL	3.0 (1.5-5.9) 71,335	4.9 (4.1-5.9) 504,437	3.9 (2.3-6.7) 109,795	3.1 (2.4-4.0) 621,169	2.5 (1.7-3.7) 178,301	3.5 (3.0-4.1) 1,485,037
Multimorbidity ( $\geq 2$ conditions)						
Bad/Very bad self-rated health	10.8 (9.2- 12.5) 253,775	9.7 (8.0-11.7) 986,880	9.5 (6.2- 14.4) 266,595	7.5 (6.3-8.9) 1,495,267	9.3 (7.4-11.6) 653,586	8.6 (7.7-9.6) 3,656,104
Frailty	6.4 (4.7-8.5) 143,261	6.6 (5.4-8.1) 603,444	5.4 (4.2-7.0) 145,539	6.1 (5.3- 7.0) 1,133,256	5.8 (4.0-8.2) 386,856	6.1 (5.6-6.8) 2,412,355
Incapacity for BADL	10.7 (9.0-12.6) 251,891	11.9 (10.6-13.2) 1,214,073	9.4 (6.5-13.2) 261,823	11.0 (9.6-12.6) 2,202,181	12.1 (10.2-14.1) 844,680	11.3 (10.4-12.2) 4,774,649

95%CI: 95% confidence interval.

\* n = estimated number for the Brazilian population.

**Table 3**

Prevalence of risk conditions and multimorbidity for severe COVID-19 according to self-rated health, frailty, and incapacity for basic activities of daily living (BADL) stratified by schooling among individuals  $\geq 50$  years of age. *Brazilian Longitudinal Study of Aging (ELSI-Brazil)*, 2015-2016.

Variables	Schooling (years)			
	None	1-4	5-8	$\geq 9$
	%	%	%	%
	(95%CI)	(95%CI)	(95%CI)	(95%CI)
	n *	n *	n *	n *
1 condition				
Bad/Very bad self-rated health	4.2 (3.3-5.3) 234,162	2.7 (1.9-3.6) 431,717	1.5 (0.9-2.3) 134,855	0.7 (0.5-1.2) 85,950
Frailty	4.8 (3.3-6.9) 231,635	1.9 (1.4-2.5) 285,917	2.1 (1.3-3.3) 179,809	0.6 (0.4-1.1) 67,867
Incapacity for BADL	6.5 (5.2-8.0) 361,966	3.7 (3.0-4.6) 601,348	3.6 (2.7-4.8) 327,997	1.6 (1.1-2.3) 181,165
Multimorbidity ( $\geq 2$ conditions)				
Bad/Very bad self-rated health	13.7 (11.7-15.9) 764,252	10.5 (9.2-12.0) 1,691,027	7.1 (5.5-9.2) 648,972	4.7 (3.8-5.6) 529,459
Frailty	10.9 (9.2-12.9) 529,415	7.6 (6.5-8.8) 1,132,640	5.1 (4.2-6.2) 438,458	2.6 (1.8-3.7) 278,692
Incapacity for BADL	18.4 (16.2-20.7) 1,024,966	13.2 (12.0-14.5) 2,135,352	9.2 (7.6-11.0) 834,155	6.4 (5.4-7.6) 729,779

95%CI: 95% confidence interval.

\* n = estimated number for the Brazilian population.

## Discussion

Our results reveal the magnitude of occurrence of multiple conditions associated with the risk of developing clinically severe forms of COVID-19 among Brazilians in the process of aging. According to estimates, at least 34 million Brazilians  $\geq 50$  years of age presented some risk condition, which highlights the considerable contingent of persons at risk of severe COVID-19, thus representing more than the total population of other South American countries except Colombia and Argentina. Only 40 countries of the world have larger total populations than Brazil's estimated contingent at risk of severe COVID-19. Meanwhile, multimorbidity affected half of the study population and was higher in the country's southernmost regions, although the Northeast and Southeast presented the largest absolute numbers of individuals with  $\geq 2$  preexisting conditions. Cardiovascular diseases and obesity were the most frequent conditions in both women and men. The severity of health status (functional incapacities, frailty, or bad/very bad self-rated health) associated with multimorbidity was also frequent in the sample, both in relative terms ( $> 6\%$ ) and in the estimated number in the population ( $> 2.4$  million).

Multimorbidity is a public health problem in Brazil due to its magnitude, complex clinical management, and impact for society and the health systems. Added to this is the scarcity of scientific evidence, especially from randomized clinical trials <sup>20,21</sup>. This area still needs progress in the form



of epidemiological measurement in the country, but the occurrence is obviously high, mainly in the elderly <sup>22,23</sup>. This combination of different chronic conditions tends to create inflammatory processes, increasing the susceptibility to different problems, including acute infectious diseases <sup>24</sup>. A study in the Brazilian city of Manaus in 2015 found a higher dengue rate in the previous year in persons with multimorbidity <sup>25</sup>.

Although the knowledge is still incipient on the biological mechanism that increases the risk of infections among persons with multimorbidity, the mechanism appears to be associated with increased inflammation and the body's decreased immune response capacity <sup>26,27,28</sup>. Nevertheless, it is essential to understand this process in greater detail, considering the identification of differences according to morbidity patterns <sup>29</sup>.

Given the current lack of treatment and a vaccine for the prevention of COVID-19 and the epidemiological evidence on the greater severity of the novel coronavirus among persons with multimorbidity, the adoption of nonpharmacological interventions is crucial for the prevention of severe cases of the infection <sup>30,31</sup>. Our findings revealed a huge contingent of persons at risk of severe COVID-19 in all regions of Brazil, despite the relative and absolute differences in the occurrence of risk conditions. Even when specifying for individuals with multimorbidity plus severe health status, the number is still high, emphasizing the need to protect the entire population and mainly persons in the process of aging and in situations of vulnerability. The Brazilian Unified National Health System (SUS) and primary healthcare, through coordination of care by the Family Health Strategy, will continue to play a relevant role in mitigating social inequities in health through prevention of COVID-19 infection and management of chronic conditions and multimorbidity during and after the pandemic, especially protecting the poorer population <sup>30,31</sup>.

The results point to higher occurrence of the outcomes in groups with less schooling, corroborating the prevailing social inequity and its impact on elderly Brazilians' health <sup>16</sup>. Health inequalities in Brazil can be seen in the differences in prevalence rates for chronic conditions and multimorbidity, and in access to and use of health services <sup>22,32,33</sup>. Multimorbidity is prevalent in women, elderly, persons with less schooling, and the unemployed <sup>22,34</sup>. In addition, despite the strides in access to and use of health services in the Brazilian population, important social and geographic inequalities still persist. The use of health services correlates directly with individual factors such as higher schooling and having a private health plan <sup>35</sup>. Although present before the pandemic, health inequalities may increase with COVID-19, generating risks of different outcomes from acquiring the disease and aggravating the clinical status in individuals with the same level of morbidity.

The study has some limitations. Information on preexisting conditions was obtained by self-report (except for obesity), which may underestimate disease rates due to difficulties in access to diagnosis, especially for lower-income persons <sup>23</sup>. Another limitation is the use of conditions defined as posing risk for severe COVID-19. This topic is still subject to preliminary information, and it is possible that better scientific evidence will help us better select the conditions associated with severe COVID-19. In addition, we only selected the conditions related to the risk of severe COVID-19 that are available in the ELSI-Brazil study's database <sup>17</sup>.

This study is based on initial evidence of the effect of the presence of chronic diseases on the potential risk of SARS-CoV-2 infection, mainly on its negative clinical outcomes. Although the evidence is still incipient, the findings thus far consistently identify the importance of the relationship between chronic conditions and severe COVID-19 <sup>8</sup>. Thus, the study of the epidemiology of multimorbidity related to severe COVID-19 in the Brazilian population, especially in the elderly, may represent an important strategy for the definition of strategies and tools for caring for the population with accumulated risks, from the demographic, socioeconomic, and health status point of view. The findings underline the importance of differential measures in a country with continental dimensions.

## Contributors

B. P. Nunes participated in the conception, data analysis, writing of the article's first version, and critical revision of the content. A. S. S. Souza e J. Nogueira collaborated in the data analysis, writing of the article, and critical revision of the content. F. B. Andrade, E. Thumé, D. S. C. Teixeira, M. F. Lima-Costa e L. A. Facchini contributed in the conception and critical revision of the article's content. S. R. Batista participated in the conception and writing and critical revision of the manuscript.

## Additional informations

ORCID: Bruno Pereira Nunes (0000-0002-4496-4122); Ana Sara Semeão de Souza (0000-0002-4554-1551); Januse Nogueira (0000-0001-5204-7116); Fabíola Bof de Andrade (0000-0002-3467-3989); Elaine Thumé (0000-0002-1169-8884); Doralice Severo da Cruz Teixeira (0000-0002-2894-3049); Maria Fernanda Lima-Costa (0000-0002-3474-2980); Luiz Augusto Facchini (0000-0002-5746-5170); Sandro Rodrigues Batista (0000-0001-7356-522X).

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## Resumo

O objetivo deste trabalho foi medir a ocorrência de multimorbidade e estimar o número de indivíduos na população brasileira com 50 anos ou mais em risco para COVID-19 grave. Estudo transversal de base nacional com dados do Estudo Longitudinal da Saúde dos Idosos Brasileiros (ELSI-Brasil), conduzido em 2015-2016, com 9.412 indivíduos com 50 anos ou mais. A multimorbidade foi caracterizada como  $\geq 2$  condições crônicas com base em uma lista de 15 morbidades consideradas de risco para COVID-19 grave. As análises incluíram cálculo de prevalência e estimativa do número absoluto de pessoas na população em risco. Autoavaliação do estado de saúde, fragilidade e atividades básicas da vida diária foram utilizadas como marcadores da situação de saúde. Sexo, idade, região geopolítica e escolaridade foram usados como covariáveis. Cerca de 80% dos indivíduos da amostra apresentaram pelo menos alguma das morbidades avaliadas, o que representa cerca de 34 milhões de indivíduos; a multimorbidade foi referida por 52% da população em estudo, com maior proporção nas regiões Centro-oeste, Sudeste e Sul. Doenças cardiovasculares e obesidade foram as condições crônicas mais frequentes. Estima-se que 2,4 milhões de brasileiros estejam em risco grave de saúde. Desigualdades segundo a escolaridade foram observadas. O número de pessoas com 50 anos ou mais que apresentam morbidades de risco para COVID-19 grave é elevado tanto em termos relativos quanto absolutos. A estimativa apresentada é importante para planejar as estratégias de monitoramento das pessoas com morbidades crônicas e de prevenção no enfrentamento do novo coronavírus.

Multimorbidade; Infecções por Coronavírus; Idoso

## Resumen

El objetivo de este trabajo fue medir la ocurrencia de multimorbilidad y estimar el número de individuos en la población brasileña, con 50 años o más, en riesgo de COVID-19 grave. Estudio transversal de base nacional, con datos del Estudio Brasileño Longitudinal del Envejecimiento (ELSI-Brasil), llevado a cabo en 2015-2016, con 9.412 individuos con 50 años o más. La multimorbilidad se caracterizó como  $\geq 2$  condiciones crónicas, en base a una lista de 15 morbilidades consideradas de riesgo para COVID-19 grave. Los análisis incluyeron el cálculo de prevalencia y estimación del número absoluto de personas en la población en riesgo. La autoevaluación del estado de salud, fragilidad y actividades básicas de la vida diaria fueron utilizadas como marcadores de la situación de salud. Sexo, edad, región geopolítica y escolaridad fueron usados como covariables. Cerca de un 80% de los individuos de la muestra presentaron por lo menos alguna de las morbilidades evaluadas, lo que representa cerca de 34 millones de individuos; la multimorbilidad fue referida por un 52% de la población en estudio, con mayor proporción en las regiones Centro, Sureste y Sur. Enfermedades cardiovasculares y obesidad fueron las enfermedades crónicas más frecuentes. Se estima que 2,4 millones de brasileños están en riesgo grave de salud. Se observaron desigualdades según la escolaridad. El número de personas con 50 años o más que presentan morbilidades de riesgo para la COVID-19 grave es elevado, tanto en términos relativos, como absolutos. La estimación presentada es importante para planear las estrategias de monitoreo de las personas con morbilidades crónicas y de prevención en el combate al nuevo coronavirus.

Multimorbilidad; Infecciones por Coronavirus; Anciano

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