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RESEARCH ARTICLE

EPIDEMIOLOGICAL PROFILE AND GEOGRAPHICAL DISTRIBUTION OF COVID-19: AN EPIDEMIOLOGIC STUDY IN THE AMAZON XINGU REGION, BRAZIL

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ABSTRACT

COVID-19 emerged in December / 2019 in China and became a global crisis that requires strategies such as social isolation, increased testing and vaccination. In a descriptive, cross-sectional, and quantitative epidemiological study, based on secondary data, collected by the public database of the Tenth Regional Health Department of the State of Pará, 11.693 diagnosed cases of infection by the SARS-CoV-2 virus were analyzed between April and September, 2020, in a region in the Brazilian Amazon. It was found that 396 people needed hospitalization and 260 died. Among the infected group, women had a 5.8% higher prevalence compared to the number of men. In addition, individuals aged 30 to 39 years made up most of the sick population with COVID-19. It was observed that all municipalities in the region faced, in the analyzed period, a calamitous epidemic situation, with a high rate of viral transmission, a significant number of deaths and little capacity to cope with the health crisis. Another peculiar point concerns the way of life of urban, traditional, and riverside communities in the Amazon, which relate in different ways, impacting the spread of COVID-19. Thus, these analyzes demand a closer look at COVID-19 in the region, to avoid an even more pernicious outcome for the ongoing crisis.

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INTRODUCTION

The first cases of the Coronavirus disease 2019 (COVID-19) were identified in December 2019, more precisely, in a group of patients admitted with a diagnosis of pneumonia of unknown etiology to hospitals in the city of Wuhan, China (Wang *et al.,* 2020). Initially, the outbreak caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was restricted to the province of Hubei in China but it spread rapidly to several countries, causing a global pandemic in March 2020 (Batista *et al*., 2020). The coronavirus is transmitted mainly through respiratory droplets. For the infection, the average incubation period is approximately four to five days before the symptom's onset, 97.5% of these patients have clinical signs with an average duration of 11.5 days (Guan *et al*., 2020; Li *et al*., 2020).

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Within five to six days after the symptom's onset, the virus reaches its peak viral load and severe cases progress to acute respiratory distress syndrome (Huang *et al*., 2020). The clinical manifestations of COVID-19 in 80% of cases are classified as mild, generally characterized by fever, dry cough, and tiredness. In more severe cases, equivalent to 5%, there is progressive dyspnea, pulmonary bleeding, severe lymphopenia and renal failure (Li *et al.,* 2020; Chan *et al.,* 2020). The severe phases, associated with diseases of the lower respiratory tract, are frequently observed in individuals with risk factors, such as: heart disease, pneumatics, and other chronic conditions such as diabetes, obesity and asthma (Chan *et al.,* 2020). Laboratory diagnosis occurs through the Reverse-Transcriptase Polymerase Chain Reaction (RT-PCR) test, referring to the polymerase chain reaction with reverse transcription, remaining a reference standard for the definitive diagnosis of COVID-19 infection, with positive radiological finding (Guan *et al*., 2020; Li *et al*., 2020). Considering this scenario, the world population faces a crisis, which has plagued diverse peoples and ethnicities on all continents (Batista *et al*., 2020; Caetano *et al*., 2020; Pan *et al.,* 2020).

As a result, governments and institutions around the world are urged to make decisions and set strategies to reduce the impacts arising from this new disease that causes a high number of hospitalizations in Intensive Care Units (ICU) and high mortality (Chan *et al.,* 2020). Thus, among the strategies adopted are included social distancing, field hospitals, increased number of tests, etc. It is notable that just as important as epidemiological screenings, the adaptation of protocols and provision of support for populations inserted in specific contexts to contain the increase in cases and the mortality rate are needed (Caetano *et al*., 2020). Based on this context, it is essential to compose prevention, monitoring and care protocols for different populations within different territories that suffer the effects of this disease in different ways. As stated by Pan, *et al* (2020) cultural, behavioral, and socioeconomic differences between ethnic groups can influence viral spread and, consequently, the basic number of reproduction (R0) in a specific area. According to the authors, health behaviors and conditions are different in communities of black, Asian, and other minority ethnic groups, such as indigenous peoples compared to white individuals. This may be related to a higher prevalence of certain infectious respiratory diseases, such as tuberculosis. Differences in local culture can also influence society's responses to government measures, which can be seen in the different blockade actions between countries in Asia and countries in Europe and North America (Pan *et al.,* 2020).

In the west of Pará state in Northern Brazil, the Xingu region, comprises nine municipalities along the Transamazonian Highway (BR-230). The region has an estimated population of more than 370,000 inhabitants, with Altamira (in the geographical coordinates 3°12'04" South latitude, and 52°12'49" West longitude of Greenwich) the most populous city, with approximately 116,000 people. The other eight municipalities are: Anapú, Medicilândia, Vitória do Xingu, Placas, Senador José Porfírio, Porto de Moz, Pacajá and Uruará (municipalities between the geographic coordinates 3° 45'05" South latitude, 54°24'06" West longitude Greenwich; 1°40'44" South latitude, 52° 16'04 West longitude of Greenwich; 3°50'53" South latitude, 50°35'44" West longitude Greenwich) all varying from 10,000 and 50,000 inhabitants (IBGE, 2020). The Belo Monte Hydroelectric Plant, the second largest in Brazil and the largest entirely Brazilian, had a considerable impact on this portion of the Xingu Region. The plant was built between 2010 and 2017, as part of the federal government's Growth Acceleration Program, the project cost was over R$ 30 billion and caused a transformation in the social and population profile in all municipalities. The growth in the circulation of people, capital and goods in the region has boosted trade and brought countless investments. But to the same extent, the region experienced an increase in socioeconomic problems such as violence, the exacerbation of agrarian conflicts, the relocation of traditional populations, prostitution, and the swelling of educational and health services, which, although mitigated, are still felt in the region (Amazonia-Real, 2021). In this context, as the COVID-19 pandemic expands to environments with less robust health systems in the most diverse populations, it will be increasingly important to ensure that health systems include diverse and marginalized communities, like traditional, indigenous, riverside and resettled communities (Batista *et al*., 2020; Caetano *et al*., 2020; Pan *et al.,* 2020; Sousa *et al.,* 2021). An understanding of the regional distribution of COVID-19 cases in the Transamazônica and Middle Xingu region is necessary taking into account the socioeconomic and cultural peculiarities of the area. The region has several social and structural deficiencies linked to unique impacts on coping with SARS-CoV-2, such as the under sizing of hospital beds and restricted access to water treatment. In addition, one of the most striking characteristics of the region is the existence of traditional and riverside communities with their specific forms of social organization, based on kinship, proximity (physical and mental) and community and reciprocal relationships, which can directly impact the propagation of COVID-19 (Sousa & Ferreira *et al.,* 2021). Considering these features, the location is unique in the Brazilian territory and the specific analysis of the distribution of the cases of COVID-19 becomes essential. This context motivated the execution of the research that enabled the description of the epidemiological profile and geographic distribution of the first cases of the disease in the Xingu region - Pará - Brazil.

MATERIALS AND METHODS

This study is the result of an epidemiological, descriptive, and cross-sectional research, with a quantitative approach, carried out through the survey of secondary data referring to the cases of COVID-19 in the Xingu region in Pará State, Northern Brazil (Brasil, 2021). Data from the disease notification records, referring to the period between the 18th and 38th Epidemiological Week in the year 2020 were used. Data collection was carried out between September 23, 2020 and September 30, 2020. The variables used for the study were: age group, distribution by gender (sex), diagnostic method, need for hospitalization, existence of relevant comorbidities/risk factor, municipality of residence and lethality. Only cases confirmed by RT-PCR, rapid test and/or clinical diagnosis were included in the analysis. For the purposes of epidemiological analysis, cases that did not have age and sex data were not included in the analysis. The collected data were processed using MS Excel software and analyzed using descriptive statistics. Thematic maps were developed from the formatted spreadsheets to represent the cases of COVID-19 in the Xingu region. In the production of the maps, the Geographic Information System from the database of the Brazilian Institute of Geography and Statistics was used, as a spatial reference SIRGAS 2000 (EPSG: 4674) was used, through the free software QGIS 3.10.1, which is the main tool for spatial study. Since this study was carried out with secondary data, accessed from a bank with anonymized sensitive information, in the public domain, it was not necessary to submit it to a Human Research Ethics Committee.

RESULTS

The survey found 11,693 confirmed cases of COVID-19, 396 (3.39%) hospitalizations and 260 (2.22%) deaths, from April 24 to September 11, 2020, in the Xingu region. When analyzing the total number of COVID-19 cases, by sex, it was observed that 6,188 (52.9%) were distributed among females and 5,505 (47.1%) among males, with no significant predominant incidence between the sexes and affecting, mainly, the age group between 30 to 39 years (Table 1). Regarding the diagnostic methods for COVID-19 performed in the Xingu region, the rapid tests were the most performed diagnostic method (87.65%), followed by the clinical-epidemiological diagnosis (7.99%) (Table 2). As for the

clinical analysis of patients with comorbidities, which involve a higher risk when presented with COVID-19, the study showed that 456 (3.90%) patients had heart disease and 310 (2.65%) diabetes. Among the cardiopathic patients, 161 (9.51%) are residents of the municipality of Medicilândia. Considering the patients with diabetes, 127 (3.16%) live in the city of Altamira (Table 3). The research investigated the main symptoms presented by patients diagnosed with COVID-19, such as: fever, sore throat, dyspnea, myalgia, headache, anosmia, ageusia and cough. Fever was the most reported symptom among patients confirmed with COVID-19 in the analyzed period.

This condition reached 7,868 people. Furthermore, 7,066 people reported having cough. As for geographical distribution, confirmed cases occurred in a variable manner in the Xingu region, with the highest number in Altamira (4,019 cases), followed by Medicilândia (1,693 cases) and Uruará (1,083 cases) (Figure 1). Regarding the incidence of COVID-19, in the Xingu region, the study showed a confirmed cases rate of 330.36/10,000 inhabitants. The survey revealed that the city of Vitória do Xingu had the highest rate in the region (617.84), followed by the cities of Medicilândia (529.48) and Senador José Porfírio (491.29). As for the geographical distribution of the number of deaths, there was variation between the municipalities, with the highest lethality measured in Altamira (116 cases), followed by Porto de Moz (26 cases), Anapú (21 cases) and Vitória do Xingu (21 cases) (Figure 1).

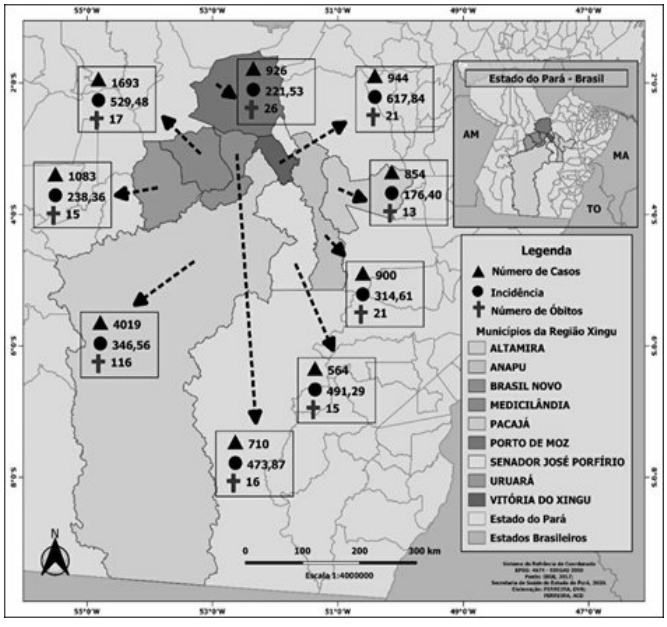

Figure 1. Spatial distribution of the total number of COVID-19 cases and incidence per 10,000 inhabitants in municipalities of the Xingu Region in Pará State, Northern Brazil in the period between the 18th and the 38th epidemiological weeks of 2020

As for the distribution of hospitalizations and hospitalizations in the Intensive Care Unit (ICU), 396 (3.39%) patients required hospitalization of which 130 (1.11%) in the ICU. The statistical validation tests of the results were performed using the Chi-squared test. The study revealed significant differences for patients who were not hospitalized and survived, and this group was approximately 58 times larger than that composed of hospitalized patients who died (11,232/195) ($p < 0.001$).

DISCUSSION

Considering the 11.693 confirmed cases of COVID-19 in the period, the incidence rate of the disease was 330.36 per 10,000 inhabitants. The city of Vitória do Xingu had the highest rate in the region (617.84), followed by the cities of Medicilândia (529.48) and Senador José Porfírio (491.29). One of the reasons that may explain the great incidence of COVID-19 in the municipality of Vitória da Xingu, is its characteristic of a port region, connecting other municipalities with the transamazon road, in addition to being a transit area to the Amazon River. Port areas have historically been the epicenters of disease transmission in pandemic times, as occurred in the early twentieth century in the capital of Pernambuco state, when the British ship S. S Demerara docked in the port with suspected cases of Spanish Flu. This episode is cited as the first record of the disease in Brazil (Bertolli, 2003). It was also observed that 52.9% of the cases of COVID-19 in the Xingu region affected female patients. This data is like the studies by Richardsom, *et al* (2020). Furthermore, one of the reasons that may explain the lower number of case reports among men is the historical and cultural tendency for women to be the ones who most seek health services, thus enabling the diagnosis of several diseases (Bertolli, 2003). The research revealed that the rapid test was the most used diagnostic method for the detection of COVID-19 in the Xingu region (87.65%), followed by the clinical-epidemiological diagnosis (7.99%).

The gold standard for the diagnosis of the COVID-19 is the RT-PCR exam, with molecular analysis, but at the time of the reported cases, the offer of this resource was still scarce and expensive. Rapid tests appear as an alternative and complementary methodology for the diagnosis of the disease. However, they can mask real serology results, implying underreporting of the disease and loss of the virus replication window (Escalera-Antezana *et al.,* 2020). The analysis of the clinical profile of the patients, shows that 456 (3.90%) had heart disease and 310 (2.65%) diabetes. Among the cardiac patients, 161 (9.51%) are residents of the municipality of Medicilândia. In the diabetics group, 127 (3.16%) live in the city of Altamira. One of the reasons for heart diseases to be at the top of the comorbidities associated with COVID-19, is because these diseases already have a chronic inflammatory process, which can be aggravated by viral infection, such as that of the SARS-CoV-2 virus. In addition, one of the phases of virus' action is the inhibition of the Angiotensin-Converting Enzyme 2, ECA-2, which would deregulate the Renin-Angiotensin-Aldosterone system, causing local and systemic tissue damage (Bonow *et al.,* 2020). Patients who have pre-existing medical disorders deserve special attention, once the virus' attack can maximize the effects of conditions already existed, increasing the possibility of death. There is also a direct influence between age and especially previous risk factors with the development of severe forms of COVID-19 (Borges *et al.,* 2013). The study also evaluated the main symptoms presented by patients diagnosed with COVID-19 in the Xingu region. It was found that fever was the most reported symptom (65.7%), followed by cough. These numbers are inferior to that registered in other studies. The study conducted by Huang, *et al* (2020) with 41 patients in Wuhan, China registered fever in 98% of the patients analyzed. Following the same trend, the study by Wang, et al (2020) also in Wuhan, China based on the analysis of 69 patients registered fever in 87% of them.

Table 1. Distribution of COVID-19 cases in the region classified by age and gender. Data extracted from the Notifications of Diseases of the Secretariat of Public Health of Pará[13]

Cohort	Female	Gender	Male
<1	51 (0,44%)		54 (0,46%)
1 to 5	92 (0,79%)		82 (0,71%)
6 to 19	577 (4,97%)		491 (4,23%)
20 to 29	1295 (11,15%)		951 (8,19%)
30 to 39	1544 (13,30%)		1359 (11,70%)
40 to 49	1156 (9,96%)		1059 (9,12%)
50 to 59	738 (6,36%)		702 (6,05%)
60 to 69	400 (3,44%)		403 (3,47%)
70 to 79	188 (1,62%)		242 (2,08%)
80 to 89	89 (0,77%)		97 (0,84%)
90 or more	14 (0,12%)		27 (0,23%)

Table 2. Distribution of diagnostic methods used during the research period. Data extracted from the Notifications of Diseases of the Secretariat of Public Health of Pará[13]

Municipality	Laboratory Test	%	Rapid Test	%	Clinical	%	% of diagnostic methods in Xingu Region
Altamira	271	6.74	3743	93.13	5	0.12	34.37
Anapu	12	1.33	888	98.67	0	0	7.07
Brasil Novo	62	8.73	510	71.83	138	19.44	6.07
Medicilândia	19	1.12	1121	66.21	553	32.66	14.48
Pacajá	60	7.03	787	92.15	7	0.82	7.3
Porto de Moz	50	5.4	873	94.28	3	0.32	7.92
Senador José Porfírio	6	1.06	556	98.58	2	0.35	4.82
Uruará	16	1.48	880	81.26	187	17.27	9.26
Vitória do Xingu	14	1.48	891	94.39	39	4.13	8.07
Total	510	4.36	10249	87.65	934	7.99	100

Table 3. Distribution of patients with comorbidities and stratification of patients with Covid-19 that had fever, sore throat, dyspnea, myalgia, headache, anosmia, ageusia or cough. Data extracted from the Notifications of Diseases of the Secretariat of Public Health of Pará[13]

		Altamira	Anapú	Brasil Novo	Medicilândia	Pacajá	Porto de Moz	Senador José Porfírio	Uruará	Vitória do Xingu	Total
Comorbid	Heart Diseases	120 (2,99%)	8 (0,89%)	12 (1,69%)	161 (9,51%)	20 (2,34%)	62 (6,69%)	13 (2,30%)	47 (4,34%)	13 (1,38%)	456 (3,90%)
	Pneumopathy	53 (1,32%)	2 (0,22%)	1 (0,14%)	0 (0%)	0 (0%)	1 (0,11%)	2 (0,36%)	2 (1,18%)	1 (0,11%)	62 (0,53%)
	Immunocompromised	106 (2,64%)	0 (0%)	1 (0,14%)	2 (0,12%)	2 (0,23%)	2 (0,22%)	1 (0,18%)	0 (0%)	0 (0%)	114 (0,97%)
	Diabetic	127 (3,16%)	7 (0,78%)	10 (1,41%)	73 (4,31%)	21 (2,46%)	25 (2,70%)	8 (1,42%)	29 (2,68%)	10 (1,06%)	310 (2,65%)
	Renal	13 (0,32%)	0 (0%)	2 (0,28%)	5 (0,30%)	2 (0,23%)	3 (0,32%)	1 (0,18%)	0 (0%)	0 (0%)	26 (0,22%)
	Neuropathy	2 (0,05%)	0 (0%)	1 (0,14%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0,09%)	0 (0%)	4 (0,03%)
	Asthma	8 (0,20%)	1 (0,11%)	2 (0,28%)	5 (0,30%)	3 (0,35%)	4 (0,43%)	1 (0,18%)	4 (0,37%)	0 (0%)	28 (0,24%)
	Obesity	11 (0,27%)	0 (0%)	2 (0,28%)	3 (0,18%)	0 (0%)	2 (0,22%)	0 (0%)	0 (0%)	2 (0,21%)	21 (0,18%)
Symptoms	Fever	2437	634	351	1275	645	689	379	771	687	7868
	Sore throat	1597	433	263	1004	366	510	298	664	402	5537
	Myalgia	813	42	247	928	160	306	38	552	238	3324
	Cough	2144	604	351	1197	509	588	375	728	570	7066
	Coryza	145	27	36	203	29	16	20	382	31	889

In 12 patients analyzed in Bolivia, fever was observed in 75% of patients (Escalera-Antezana *et al.,* 2020). According to Silva *et al* (2020), in symptomatic patients, there are clinical manifestations such as fever, cough, dyspnea, myalgia and fatigue, which can be accompanied by respiratory secretion, headache, hemoptysis and diarrhea. Thus, this symptom is often pointed out as being like that of infections by other viruses such as Novovirus and Influenza (Lai *et al.,* 2020). According to the meta-analysis carried out by Li *et al* (2020), the most common symptoms presented by patients with COVID-19 are fever and dry cough. It is noteworthy that symptoms such as high fever, dry cough and dyspnea, in addition to the greater recurrence of evolution to severe and critical infections, require ventilatory support and oxygen therapy, differentiating it from other common respiratory infections. Regarding the distribution of hospitalizations and ICU admissions of patients diagnosed with COVID-19 in the Xingu region, 396 (3.39%) were hospitalized and 130 (1.11%) patients required admission to the Intensive Care Unit (ICU). This result can be corroborated by the WHO data, which reveal that 80% of patients will have mild symptoms and will not require hospitalization. The other 20% will be hospitalized, of which 20%, 3 out of 4 will need oxygen therapy and 25% will need care in the ICU (WHO, 2020). The study found that the number of hospitalizations in the Xingu region was lower than expected, compared to other regions in the world.

This can be explained by the undersized health services and the shortage of ICU beds in the Brazilian Amazon. In a group of five states, with the lowest offer of ICU beds per 10,000 inhabitants, 3 of them are states in the Legal Amazon (Noronha *et al.,* 2020). It can be inferred that, if the availability of hospitals beds in the Xingu region was greater or minimally adequate, certainly more hospitalizations could have occurred. In fact, Pará is one of the federative units most strongly marked by a undersized health assistance, which directly impacts the number of hospitalizations (Sousa *et al.,* 2021). With an inefficient service infrastructure, there is a high probability of health system collapse due to the need for hospitalization. It is also necessary to consider a historical shortage of health professionals in the North of Brazil, marked by the lowest index of doctors per thousand inhabitants in the country, registering 1.05, in this case. On the other hand, the Southeast and South regions have 2.44 and 2.27 doctors per thousand inhabitants, respectively. At the beginning of 2020, just over 19 thousand of these professionals were working in the North of the country. In the city of São Paulo, for example, there are more than 30 thousand doctors working. Thus, it is possible to note that the lack of supplies and professionals can be one of the causes for high mortality among hospitalized patients in the region. The survey showed that 195 of the 396 hospitalized patients died, which represents almost 50% of the sample. Added to this is the fact that the North has the lowest number of respirators per 100 thousand inhabitants in Brazil. There are only 3500 units for a population of almost 16 million inhabitants (Daspett *et al.,* 2020).

In addition, the middle Xingu region is characterized by its large territorial extension and the ICU beds are centralized in the municipalities' headquarters. Thus, there is a difficult logistics of displacement of the population to obtain a bed. The average distance that a resident need to travel to receive care in an ICU bed in the Xingu region of Pará is between 240 and 500 kilometers. All difficulties in access and the scarcity of human resources and infrastructure in the region directly impact the use of an ICU bed by the health system user (Noronha *et al.,* 2020). The geographical distribution of cases varied in each municipality in the Xingu region, with the highest number in Altamira (4,019 cases), followed by Medicilândia (1,693 cases) and Uruará (1,083 cases). Chronologically, until July 2020, the North region of Brazil registered more than 400 thousand confirmed cases of SARS-CoV-2 infection and, in parallel, the Xingu region, considering all nine municipalities, totaled at least 6,000 cases of the disease at the time[24]. It is also observed, analyzing the state context, that other regions of Pará such as Baixo Amazonas and Carajás presented a sudden increase in cases, possibly related to the high migratory flow related to mining, in the case of Parauapebas, and with port regions, in the case of Santarém (Sousa & Júnior, 2020). The research also evaluated the geographical distribution of deaths, where the highest number was observed in Altamira (116 cases), followed by Porto de Moz (26 cases), Anapú (21 cases) and Vitória do Xingu (21 cases). It was already expected that Altamira would obtain the largest number, due to the size of its population and the number of confirmed cases. However, Porto de Moz, during the period in question, recorded the second highest number of deaths, despite being the fifth place in the number of cases and having one of the lowest incidence rates. The high mortality due to the disease in the municipality of Altamira can be explained by the low socioeconomic indicators, such as precarious basic sanitation, poor conditions of transport and housing, conflicts in the countryside and incipient Human Development Index (HDI). Widespread poverty and financial difficulties in the municipality are elements capable of making it difficult to face the pandemic and the response capacity of the local health system, significantly increasing the mortality rate related to COVID-19 (Cardoso & Cardoso, 2020). When assessing the fatality rate in the Xingu region, defined as the proportion of deaths by COVID-19 in relation to the total number of patients, by sex and age group, there is a higher lethality for males, aged 70 to 79 years. The analysis of data referring to mortality by gender allows us to ascertain that, despite the greater number of people infected with SARS-CoV-2 in the region being women, the group of men have died the most. Innumerable reasons are associated with higher mortality among men, for example, the production of estrogens in women and immunological factors related to the X chromosome, which, once doubled in the female gender, is supposed to have several advantages for immunity (Horst *et al.,* 2016). On the other hand, testosterone, a predominantly male hormone, appears to have an immunosuppressive effect, making men more susceptible to infections and contagious events (Holdstock *et al.,* 1982). In addition to these factors, women are less affected by viral infections because they have a greater production and circulation of antibodies, adding to the fact of a higher level of synthesis of inflammatory biomarkers (Bernardi *et al.,* 2020). Analyzing the age, it is possible to observe that the highest mortality among women aged 60 to 69 years and among men aged 70 to 79 years follows the national and world rate, since adults are the most infected, however, the elderly are the ones who most die (Shahid *et al.,* 2020). Studies show a lethality of almost 15% in people over 80 years old, who contracted COVID-19. In the age group from 70 to 79 years old, this index is 8% and, from 60 to 69 years old, it is 8.8%. These rates are 3.82 times higher than the general average (Hammerschimdt & Santana, 2020). Thus, in general, between the 18th and 38th Epidemiological Week of 2020, 11.693 cases of COVID-19 were confirmed in the Xingu region. The highest incidence occurred among females (52.9%). In addition, there were 396 (3.39%) hospitalizations and 260 (2.22%) deaths. The delay in the performance of public management and the socioeconomic difficulties of the region, which makes it harder for the population to adhere to preventive measures, may explain the explosion of cases. According to Córdoba & Aiello et al (2016), with the difficulty in maintaining social distance, less access to health and basic sanitation, job shortages and falling income, it is observed that COVID-19 disproportionately reaches the most vulnerable and poor regions, like the Amazon Xingu. Considering the particularities of the region, such as the significant population of traditional communities, indigenous and riverside residents, it is necessary to take a closer look at the development of COVID-19 in the region, opting for a massive health education campaign and improvements in the health assistance, to avoid an even more pernicious outcome to the current crisis.

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