Revista Prevenção de Infecção e Saúde
The Official Journal of the Human Exposome and Infectious Diseases Network

ORIGINAL ARTICLE

DOI: https://doi.org/10.26694/repis.v6i0.10817

Epidemiological analysis of confirmed COVID-19 cases in Caxias, Maranhão, Brazil

Análise epidemiológica de casos confirmados de COVID-19 em Caxias, Maranhão, Brasil

Análisis epidemiológico de casos confirmados de COVID-19 en Caxias, Maranhão, Brasil

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How to cite this article:
da Silva JPB, Costa LN, Monteiro TAS, Pinto TO, Portela NLC. Epidemiological analysis of confirmed COVID-19 cases in Caxias, Maranhão, Brazil. Rev Pre Infec e Saúde [Internet]. 2020;6:10817. Available from: https://revistas.ufpi.br/index.php/nupcis/article/view/10817/ DOI: https://doi.org/10.26694/repis.v6i0.10817

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ABSTRACT

Introduction: The entry of the coronavirus (SARS-CoV-2) in Brazil is spreading rapidly and reaches the interior cities. Caxias, the fifth most populous in Maranhão, since April 2020, has recorded cases of Covid-19. In this study, the objective is to analyze the epidemiological profile of confirmed cases of the novel coronavirus (SARS-CoV-2) reported in the city of Caxias – Maranhão. **Outline:** Observational, descriptive epidemiological study, carried out with secondary data extracted from the Bulletin "COVID-19 in Caxias-MA", from April 12 to June 1, 2020. Age group, sex, city area of cases was evaluated confirmed and deaths. The data were grouped in Microsoft Excel®, with descriptive statistical analysis, absolute and relative frequency. **Results:** In the analyzed period, 290 cases and 11 deaths from the novel coronavirus were confirmed. Of the confirmed cases 24.8% in the age group between 30 to 39 years old and 22.1% in the 40 to 49 years old, 51.7% male and 96.5% in the urban area. Deaths occurred in females (54.5%), aged 60 to 69 years old (36.3%) and comorbidities (72.7%). **Implications:** It is necessary to reinforce social distancing, increase the performance of confirmatory tests of COVID-19, promote notions of hygiene for prevention, monitoring, and control to minimize the spread of the virus.

DESCRIPTORS

Coronavirus Infections; Pandemics; Epidemiology; Epidemiological Monitoring; Public Health Surveillance.

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Submitted: 2020-06-12
Accepted: 2020-06-14

INTRODUCTION

Coronavirus is a group of zoonotic viruses known for a long time, isolated for the first time in 1937. They have a simple positive sense RNA genome and belong to the Coronaviridae family, of the order Nidovirales, responsible for triggering severe respiratory syndrome since common colds.[1]

Three of these infections have recently caused major outbreaks of deadly pneumonia: MERS-CoV was the cause of Middle East respiratory syndrome (MERS); SARS CoV, responsible for an outbreak of severe acute respiratory syndrome (SARS) and, recently, SARS-CoV-2, classified as beta coronavirus of the same subgenus of MERS.[2]

Since the end of 2019, the COVID-19 pandemic for the novel coronavirus (SARS-CoV-2), discovered in the city of Wuhan, China, has presented itself as one of the greatest global health challenges of this century.[3] In Brazil, the first case was confirmed on February 26, 2020.[4] In Maranhão, the first case was confirmed 23 days later, on March 20, 2020 and the number of infected people grew rapidly, with 35,297 cases confirmed on May 31, 2020.[5]

The new agent discovered has high transmissibility and causes an acute respiratory syndrome that varies from mild cases - about 80% - to very severe cases with respiratory failure - between 5% and 10% of cases. Its lethality varies, mainly, according to the age group and associated clinical conditions such as cardiovascular diseases, diabetes, chronic respiratory diseases, hypertension, and cancer.[6]

The causative virus is transmitted mainly between people through respiratory droplets and contact routes. Thus, virus transmission can occur via direct contact with infected people, via indirect contact with surfaces contaminated by an infected person. Aerial transmission is also possible in circumstances that generate aerosols, such as saliva droplets.[6]

The incubation period is estimated at 5 to 6 days, ranging from 0 to 14 days. Asymptomatic and pre-symptomatic individuals can transmit infection, a fact that makes dissemination even faster and easier.[7]

As for the clinic at COVID-19, there is a very wide spectrum, ranging from asymptomatic manifestations to severe pneumonia with respiratory failure and septic shock. Frequently reported signs and symptoms include fever, cough, myalgia or fatigue and shortness of breath at the onset of the disease. The course of fever among patients with COVID-19 is not fully understood and may be prolonged and intermittent.[8]

Given the scenario of great infectivity and increased lethality, to the point of causing collapse in health systems, it is extremely necessary to fill the knowledge gaps about the disease, in order to delay and control its spread. Thus, the aim of this study was to analyze the epidemiological profile of confirmed cases of the novel coronavirus (SARS-CoV-2) reported in the city of Caxias – MA.

METHOD

This is an observational, descriptive epidemiological study, carried out based on secondary data extracted from the "COVID-19 in Caxias-MA" Bulletin, which is accessible online and free of charge on the municipality's website (https://caxiasCOVID19.com.br/).

The study was carried out in the city of Caxias, a municipality in the state of Maranhão, in the Mid-North, the fifth most populous in the state, which had, according to data from the 2010 demographic census, a population of 155,129 people, a demographic density of 30, 12 inhabitants / km^2 and Human Development Index (HDI) of 0.624. The estimated population, for the year (2019), was 164.880 inhabitants.

The study population consisted of 290 confirmed cases of COVID-19, in individuals residing

in the city of Caxias-MA, from April 12 to June 1, 2020, which are available on the website of the aforementioned information panel.

The period stipulated by this study is because the first case notified to COVID-19, in the city of Caxias -MA, occurred on April 12, 2020 and that the panel update, until the moment of data collection. data, it last happened on June 1, 2020, at 9 pm.

Data extraction was performed on the first day of June 2020, after the bulletin was updated. After that, the data were grouped in Microsoft Excel®, in which the descriptive statistical analysis (absolute and relative frequency) was performed. The variables evaluated were: age group (in years), sex (male / female), area of the city (urban / rural) of cases confirmed by COVID-19 and the presence or absence of comorbidities in patients who died by COVID-19.

This research was not submitted to the National Health Council's Research Ethics Committee system, because it used secondary data from a public domain platform with free access, according to Resolution nº 510/2016. However, all ethical aspects set out in Resolution nº 466/2012 were respected.

RESULTS

During the 50 days after the first confirmation of COVID-19 in Caxias, Maranhão, 290 cases and 11 deaths from the novel coronavirus were confirmed.[9]

Table 1 shows the predominance of confirmed cases of infection by the novel coronavirus in economically active individuals, with a higher concentration from 30 to 39-years old age group (24.8%) and from 40 to 49 (22.1%), males (51.7%) and residents in the urban area of the city of Caxias-MA (96.5%). The public with the least number of records were children and adolescents, with 3.5% and 3.1% of cases, respectively.

Table 1 – Confirmed cases of COVID-19, according to age group, sex and area of the city. Caxias, Maranhão, Brazil, 2020.

VARIABLE	n	%
Age range		
0 to 9 years old	10	3.5
10 to 19 years old	09	3.1
20 to 29 years old	39	13.4
30 to 39 years old	72	24.8
40 to 49 years old	64	22.1
50 to 59 years old	36	12.4
60 years old or more	60	20.7
Sex		
Male	150	51.7
Female	140	48.3
City area		
Urban	280	96.5
Rural	10	3.5
TOTAL	**290**	**100.0**

Regarding the death records by COVID-19, it can be seen in Table 2, that the majority occurred in females (54.5%), elderly (60 years old or more), with a greater concentration in the age group of 60 to 69 years old (36.3%) and with the presence of comorbidities (72.7%). It is noteworthy that in the studied period there were no deaths in individuals aged 0 to 39 years old.

Table 2 – Deaths confirmed by COVID-19, according to age group, sex and comorbidities. Caxias, Maranhão, Brazil, 2020.

VARIABLE	n	%
Age range		
40 to 49 years old	02	18.2
50 to 59 years old	01	9.1
60 to 69 years old	04	36.3
70 to 79 years old	01	9.1
80 years old or more	03	27.3
Sex		
Male	05	45.5
Female	06	54.5
Comorbidities		
Without comorbidities	03	27.3
With comorbidities	08	72.7
TOTAL	**11**	**100.0**

Among the associated comorbidities, there was a higher occurrence of cases of Diabetes Mellitus (50.0%) and obesity (25.0%) in patients who died during the studied period (Table 3).

Table 3 – Profile of comorbidities associated with COVID-19 mortality in Caxias, Maranhão, Brazil, 2020. (n=8)

ASSOCIATED COMORBITIES	n	%
Diabetes Mellitus	04	50.0
Obesity	02	25.0
Hypertension + Diabetes Mellitus	01	12.5
Heart disease	01	12.5
TOTAL	**08**	**100.0**

DISCUSSION

Considering the outcomes of the cases of COVID-19 in the city of Caxias -MA and the growing increase in the number of cases of the disease, leading to a greater demand for health services, we can see an increase in the number of beds, especially for exclusive intensive care. for the treatment of COVID-19 according to Ordinance Nº 568, of March 26, 2020 from the Ministry of Health.[10] For the municipality of Caxias, Ordinance No. 1240, of May 18, 2020, enabled 20 beds in the Intensive Care - Adult ICU Type II - COVID-19.[11]

Up to the time of data collection, of the 290 confirmed cases with COVID-19, 185 were in home isolation, 22 in hospital and 72 individuals were recovered.[9] With regard to testing, this was limited to patients who have symptoms of COVID-19 and home contacts of confirmed cases, a fact that makes it difficult to trace the real situation of the disease in the city, as well as it can denote underreporting of cases, in view of that there may be asymptomatic individuals.

When analyzing the sex of individuals with a positive diagnosis, there is a predominance of males, a finding also observed in a study conducted in Wuhan, China.[12,13] However, when compared with data from the state of Maranhão[5] and other Brazilian regions, a different pattern is observed, with a predominance of positive diagnoses in female individuals. This pattern can be observed in a study carried out in the state of Mato Grosso, in which 75.0% of the affected population was female.[14] In previous SARS and MERS epidemics, men were also more likely to be infected than women.[13] This may have to do with the important role that a woman's X chromosomes and sex hormones play in the body's immune system.[15]

On the other hand, a study published in the New England Journal of Medicine, shows that there was no statistically significant difference in the comparison of those infected between the sexes, presenting 54% females and 46% males.[16] Corroborating this data, a study carried out in the city of Rio de Janeiro, one of the most affected cities in the country, shows a prevalence of females (51.4%).[17] It is worth mentioning that population estimates for 2020 show a slight predominance of females in the Brazilian population and also in Maranhão.[18]

Regarding the age group, the majority of those affected with COVID-19, predominated in economically active individuals form 30 to 39 years old. These findings are reiterated in a study carried out in the most affected city outside the province of Hubei, Wenzhou, China, which presented 58.9% of confirmed cases in individuals in this age group[19], as well as a similar finding in a study conducted in Beijing, China, in which mean age of the patients was 34 years old.[20] It is known that in most cases these individuals are asymptomatic, which favors the spread of the virus and makes it difficult to control the disease.[21]

Still within this context, it was observed that individuals within the age group between 10 and 19 years old followed by 0 to 9 years old, had the lowest frequency of cases, similar to a study conducted in Huabei and Wuhan, China.[22]

According to the literature, children probably develop milder, oligosymptomatic clinical conditions, because maturity and the ability to bind to ACE2 may be less than those of adults. This is a problem from an epidemiological point of view, as children can be important reservoirs, becoming sources of infection.[23]

In relation to confirmed cases according to the city area, the largest number was identified in patients who lived in the urban area. Within this context, it is worth mentioning that some decisive determinants for the occurrence of emerging diseases are the high population density and the speed of transport. COVID-19 initially spread to large urban centers, such as the city of Rio de Janeiro, the second location to record cases of COVID-19 in Brazilian territory[17], a fact justified by the fact that it is an important point of access and entry for travelers.

The mortality data found in the city of Caxias-MA follow the pattern of national data regarding the age group, with a higher risk of death for individuals aged 60 years old or over,[17,24] being similar also to the study carried out in China, through a summary report with 72,314 cases from the Chinese Center for Disease Control and Prevention.[25]

Moreover, according to the literature, metabolic changes related to the aging process make the group more susceptible, as these disorders increase the production of cytokines, exacerbating the pro-inflammatory response in cases of viral infection.[26]

In this study, it was found that women are more susceptible to death, revealing, until the time of data collection, a difference in patterns with the numbers found in the national literature, which shows a prevalence of death among male individuals.[24]

The reality of Caxias-MA is also in contrast to the study carried out in Wuhan, China, which compared the relationship between sex and COVID-19 disease progression and revealed a higher number of deaths in males,[27] as well as the research carried out in Italy, which shows that of the 23,188 deaths from COVID-19 infection in the country, approximately 70% occurred in men.[28]

Among the comorbidities related to deaths due to COVID-19, there was a higher occurrence of chronic diseases. In an American study, higher percentages of hospital admission were observed among individuals with at least one underlying health condition. Among the findings, there is a significant number of patients affected by diabetes mellitus, chronic lung disease and cardiovascular diseases.[29] These results are corroborated and observed in

countries such as China and Italy, which suggest that patients with underlying health conditions and risk factors, including diabetes mellitus, hypertension, Chronic Obstructive Pulmonary Disease, coronary artery disease, cerebrovascular disease, chronic kidney disease and smoking , present greater risk and predisposition to hospitalizations and development of serious conditions or death by COVID-19.[30,31]

The limitations of the study are related to the constant updating of data, due to the dynamics of disease transmission. Therefore, further epidemiological studies are needed and surveillance teams must exercise caution when monitoring epidemic trends to critically assess longitudinality as well as constant changes in epidemiological and social scenarios to identify the real magnitude of the health problem in the population. of the municipality.

CONCLUSION

In the analysis of the results presented, it was observed that, just as in the world scenario, the infection by COVID-19 in the city of Caxias, Maranhão is configured as a public health problem, due to insufficient scientific knowledge, its high speed of dissemination. and ability to cause deaths in vulnerable populations, requiring attention to the circulation of the virus within the state, alerting risk groups and effective health interventions.

The evaluated information of the notified cases pointed to progression in the number of infected people, regardless of sex and age, which affect, above all, people aged between young adults and the elderly, belonging to the male sex.

As for mortality due to COVID-19, the female sex was predominant, with the elderly and those with comorbidities being the groups most affected. The evaluated information of the reported cases showed similarities with the studies carried out during the progression of the disease in other places.

In view of the above, it becomes necessary to implement strategies for the control of coronavirus, such as measures of social distancing, an increase in the performance of confirmatory tests for COVID-19, and the promotion of hygiene notions for prevention, monitoring and control to minimize the spread of the virus.

Besides, within the current framework of very restrictive policies regarding social isolation strategies, knowing the epidemiology of infection in the population will be indispensable to plan the population's gradual return to its activities, as well as mitigate the economic, social and psychological damage of most vulnerable populations.

RESUMO

Introdução: A entrada do coronavírus (SARS-CoV-2) no Brasil espalha-se rapidamente e chega às cidades do interior. Caxias, a quinta mais populosa do Maranhão, desde abril de 2020, registra casos de COVID-19. Neste estudo, o objetivo é analisar o perfil epidemiológico dos casos confirmados do novo coronavírus (SARS-CoV-2) notificados na cidade de Caxias-Maranhão. **Delineamento**: Estudo epidemiológico observacional, descritivo, realizado com dados secundários extraídos do Boletim "COVID-19 em Caxias-MA", no período de 12 de abril a 01 de junho de 2020. Foram avaliados faixa etária, sexo, área da cidade de casos confirmados e óbitos. Os dados foram agrupados no Microsoft Excel®, realizada análise estatística descritiva, frequência absoluta e relativa. **Resultados**: No período analisado foram confirmados 290 casos e 11 óbitos pelo novo coronavírus. Dos casos confirmados 24,8% na faixa etária entre 30 a 39 anos e 22,1% de 40 a 49 anos, 51,7% do sexo masculino e 96,5% da zona urbana. Os óbitos ocorreram em indivíduos do sexo feminino (54,5%), com 60 a 69 anos (36,3%) e comorbidades (72,7%). **Implicações**: Torna-se necessário reforçar o distanciamento social, aumentar a realização de testes confirmatórios de COVID-19, promover noções de higiene para prevenção, monitoramento e controle a fim de minimizar a disseminação do vírus.

DESCRITORES

Infecções por Coronavírus; Pandemia; Epidemiologia; Monitoramento Epidemiológico; Vigilância em Saúde.

RESUMEN

Introducción: La entrada del coronavirus (SARS-CoV-2) en Brasil se está extendiendo rápidamente y llega a las ciudades del interior. Caxias, la quinta ciudad más poblada de Maranhão, desde abril de 2020, ha registrado casos de COVID-19. En este estudio, el objetivo es analizar el perfil epidemiológico de los casos confirmados del nuevo coronavirus (SARS-CoV-2) reportados en la ciudad de Caxias - Maranhão. **Delineación:** Estudio epidemiológico observacional descriptivo, realizado con datos secundarios extraídos del Boletín "COVID-19 en Caxias-MA", del 12 de abril al 1 de junio de 2020. Se evaluó el rango de edad, sexo, área de la ciudad de casos confirmados y defunciones. Los datos fueron agrupados en Microsoft Excel®, con análisis estadístico descriptivo, frecuencia absoluta y relativa. **Resultados:** En el período analizado se confirmaron 290 casos y 11 muertes por el nuevo coronavirus. De los casos confirmados 24,8% en el grupo de edad entre 30 a 39 años y 22,1% en el de 40 a 49 años, 51,7% varones y 96,5% en el área urbana. Las muertes ocurrieron en mujeres (54,5%), de 60 a 69 años (36,3%) y comorbilidades (72,7%). **Implicaciones:** Se hace necesario reforzar la distancia social, incrementar la realización de pruebas confirmatorias de COVID-19, promover nociones de higiene para la prevención, seguimiento y control con el fin de minimizar la propagación del virus.

DESCRIPTORES

Infecciones por Coronavirus; Pandemias; Epidemiología; Monitoreo Epidemiológico; Vigilancia en Salud Pública.

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COLLABORATIONS

JPBS, LNC, TASM and TOP contributed to work outline, analysis and interpretation of results, and article writing. NLCP contributed to data collection and critical review of the article. All the authors agree and take responsibility for the content of this manuscript version to be published.

ACKNOWLEDGMENTS

Not applicable.

AVAILABILITY OF DATA

Data can be retrieved from the Bulletin “COVID-19 in Caxias-MA”.

FUNDING SOURCE

Not applicable.

CONFLICTS OF INTEREST

There are no conflicts of interest to declare.