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Analysis of the epidemiological behavior of COVID-19 in the state of Maranhão, Brazil, 2020

Análise do comportamento epidemiológico da COVID-19 no estado do Maranhão, Brasil, 2020

Análisis del comportamiento epidemiológico del COVID-19 en el estado de Maranhão, Brasil, 2020

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ABSTRACT

Introduction: The pandemic of the novel coronavirus (SARS-CoV-2) has already stricken all Brazilian states, representing the great challenge of the year of 2020. In this sense, the present study aimed to analyze the epidemiological profile of COVID-19 confirmed cases in the state of Maranhão. **Outline:** It is an epidemiological study, descriptive, of the cases and deaths by COVID-19 notified in the state of Maranhão in the period of March 2020 to June 2020. **Results:** There were confirmed 6,2711 COVID-19 cases. The most affected region was the one of São Luís with 12,095 confirmed cases, being the patients, mostly, of the female gender (53%) and of the age range of 30 to 39 (19.85%). The cases of male patients showed higher death rate (62%), prevalence of age of 70 and over (52.56%), miscellaneous comorbidities (88%), highlighting cardiovascular and metabolic diseases. **Implications:** The epidemiological curve of the disease is ascending in the state, which shows the need to reinforce measures to contain and enhance human resources.

DESCRIPTORS

Coronavirus; Epidemiological Monitoring; Public Health.

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INTRODUCTION

In the year of 1937, it was discovered a virus family of crown-like aspect which infects human. Posteriorly, in 1965, they would come to be known as coronavirus.[1] These viruses, belonging to Coronaviridae family and to Nicovirales order, are simple-stranded RNA viruses and widely capable of causing respiratory system infections, being the alpha cornonavirus 229E, NL63 and beta coronavirus OC43 subtypes, coronavirus that commonly infect humans. In 2019, this family of viruses became important as etiology of a pandemic, causing impacts in the current human life configuration.

The responsible by the pandemic of the novel coronavirus was discovered at the end of 2019, in the city of Wuhan, China, being a mutation with high infectivity power, causing collapse in the health systems and global economy.[2] This novel coronavirus was denominated, by the Chinese researchers, as coronavirus of Wuhan or novel coronavirus 2019 (2019-nCoV).[2] The infection with this new virus has spread for several countries, being that, in Brazil, the first contamination case was recorded on February 26, 2020 and, ever since, the numbers keep rising and spreading out inland. As an example, in the state of Maranhão, the first case was confirmed on March 20, 2020.

The disease is transmitted through close contact to an infected person, exposure to the cough, sneezing, respiratory droplets or aerossol that penetrate in the lungs through the mouth or through the nose. This transmission is classified as direct by contact.[3] Furthermore, it is possible the contamination to be by indirect contact, once the contamination can happen through of surfaces and objects containing the virus, by dint of the aerosolization of the virus in a closed space or propagation of virus by an asymptomatic person. In front of this, the proper hand hygiene, of the common use objects and of environments is important for the control of the disease, as well as the use of individual protection equipment.

Concerning the signals and symptoms of the infection by SARS-CoV-2, the most reported ones in the literature include fever, pneumonia, cephalalgia, diarrhea, hemoptysis, cough, fatigue and unwell, some of these can be usually confused with an ordinary cold. However, a person infected by the virus can show no one of these symptoms or show more acute ones as pneumonia with respiratory insufficiency and septic shock, being necessary the use of the special cares of intensive therapy.[4]

Given this situation, becomes explicit the need for control and prevention measures of the disease to be adopted by the population and of specific programs by the public agencies aiming the reduction of the number of infected by the virus and its consequences such as: the contacts tracking, the isolation of infected, the social distancing, the environmental sanitization, the use of personal protective materials such as masks and gloves, since has not been possible developing an effective vaccine yet. Thus, this article aims to analyze the epidemiological profile of the confirmed COVID-19 cases in the state of Maranhão.

METHOD

It is an epidemiological survey, performed as from secondary data collected from the "Maranhão COVID-19 Panel". The study geographic cutout was the state of Maranhão, which, in accordance with the 2010s demographic census, has a population density of 19.81 people per square kilometer, and Human Development Index (HDI) of 0.639.[5] The estimated population, referring to the year 2019, is of 7,075,181 people.

The study population was established by 62,711 COVID-19 confirmed cases, accumulated between March and June 2020, in resident subjects from all over state of Maranhão. The data are available on the website of the above-mentioned elucidative panel:

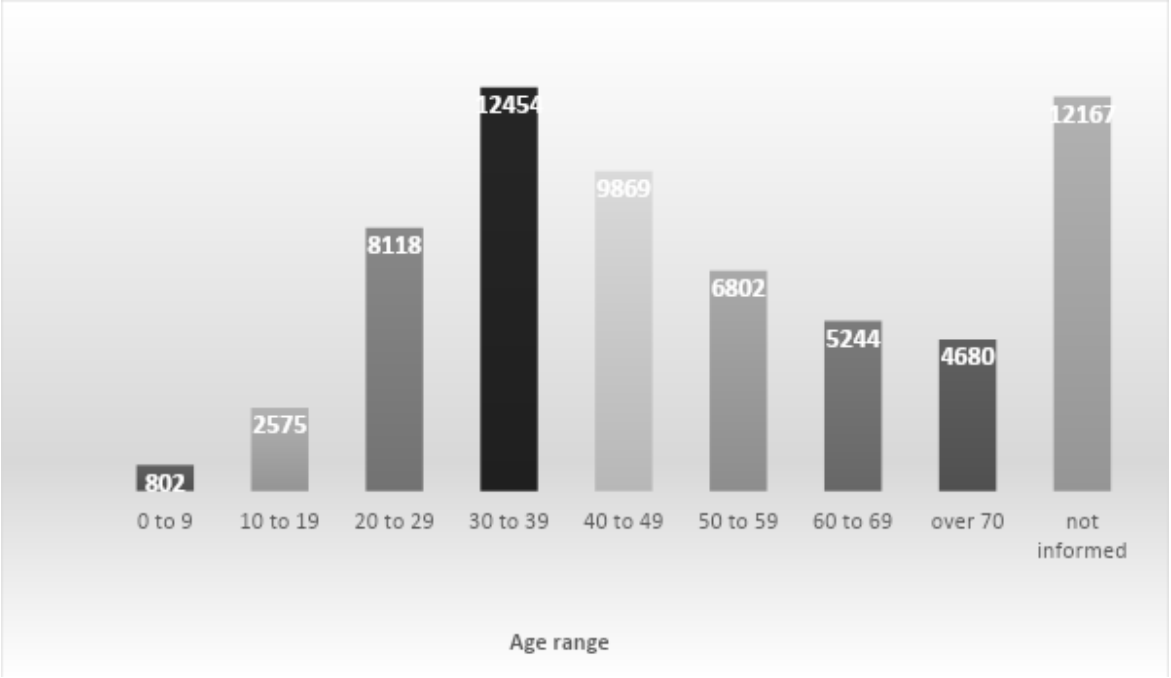
(http://www.saude.ma.gov.br/wp-content/uploads/2020/06/BOLETIM-16-06). The used period for the descriptive analysis is consecutive to the first COVID-19 notified case, occurred on March 20, 2020, and the 16th of June 2020, epidemiological bulletin basis for the study survey.

The data extraction was performed at 18th of June 2020. Then, the data were grouped using the software Excel® and the software TABWIN-at which the comparative statistical analysis was performed. Age range (in years), gender (male, female) and associated comorbidities were the considered variables in the analysis of COVID-19 cases and confirmed deaths by microregion of the state. The study was not submitted to the system of Ethics Research Committee of the National Health Council by virtue of had been applied secondary data from the public domain platform with free access, according to recommendation of the Resolution n°510, April 7, 2016, from the National Health Council of the Ministry of Health of Brazil.

RESULTS

On June 16th, 2020, the state of Maranhão showed 62,711 COVID-19 confirmed cases, with 24,204 asymptomatic cases. From the confirmed ones, 12,454 are between 30 and 39 years old, that corresponds for 19.8% of the affected. However, 12,167 of the infected did not have their ages considered, representing 19.4% of the total confirmed (Chart 1).

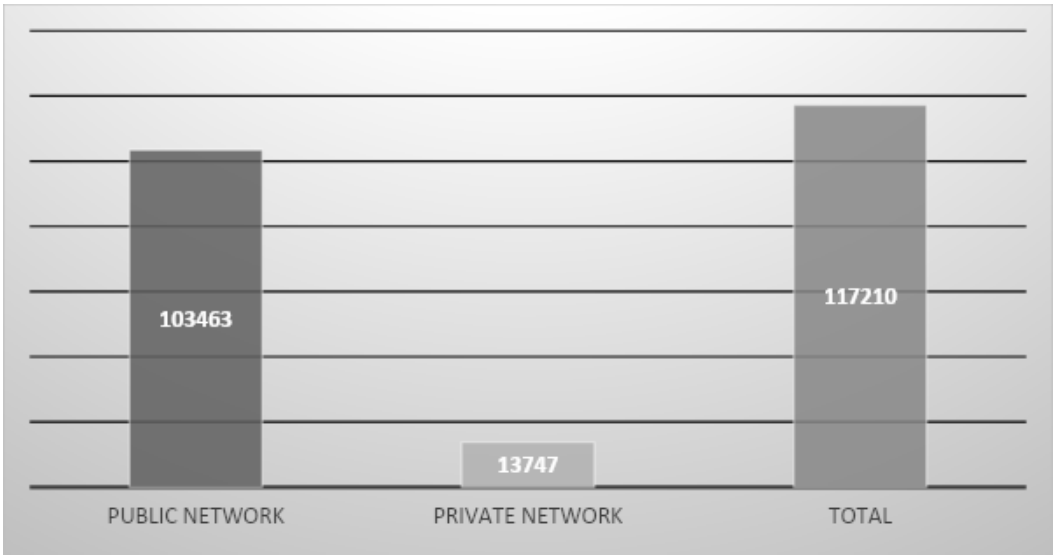
Chart 1 – Distribution of the number of COVID-19 confirmed cases according to the age range in the state of Maranhão, Brazil, 2020.



Source: Epidemiological Bulletin COVID-19 Maranhão, State Health Secretary of the Maranhão.

Concerning the performed diagnosis tests, 103,463 were carried out in the public network, while 13,747 were done in the private network, totalizing 117,210 laboratory tests performed in the state of Maranhão, accounted for since the first suspected case, on February 28, 2020 (Chart 2).

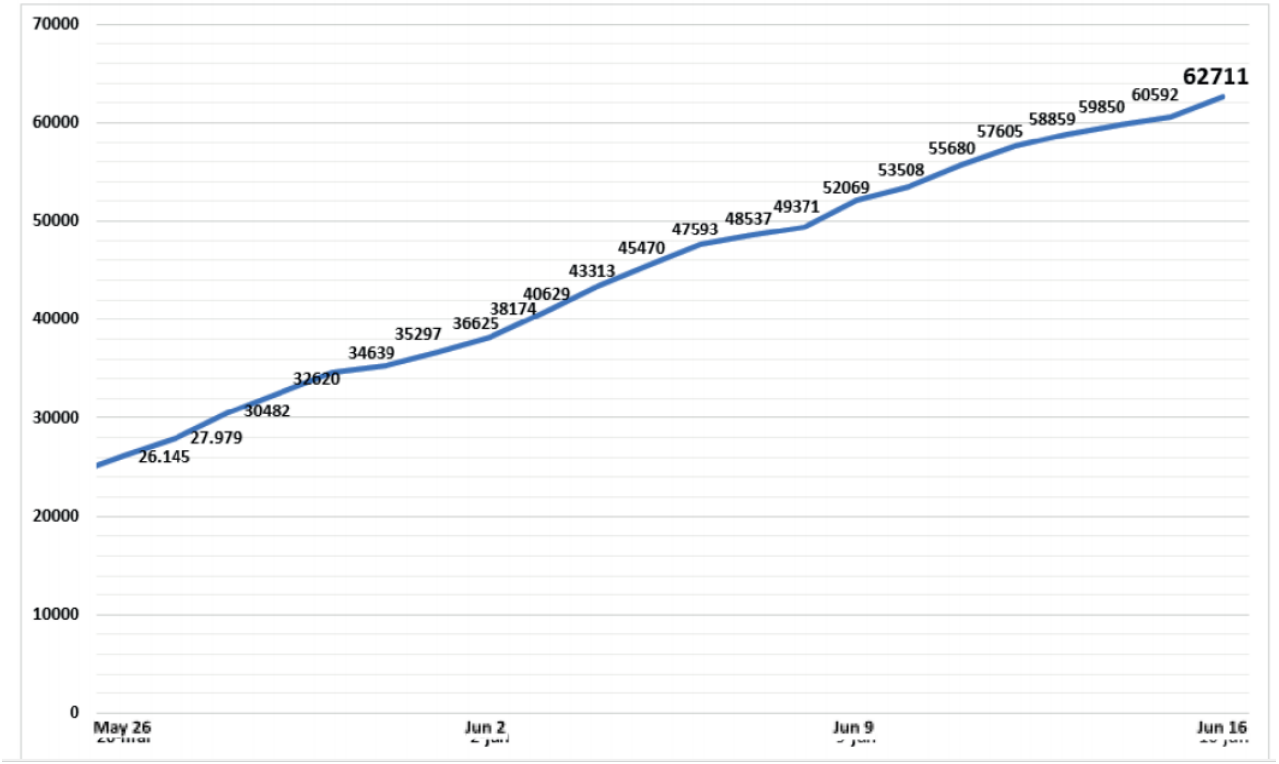
Chart 2 – Distribution of the laboratory tests done for diagnosing COVID-19, referring to the public and private networks.



Source: Epidemiological Bulletin COVID-19 Maranhão, State Health Secretary of the Maranhão.

As to the evolution, on June 1, 36,625 cases were established, meanwhile on June 16, 62,711 cases were considered. This represented a substantial increase of 71.22% of the initial number (Chart 3).

Chart 3 – Evolution of COVID-19 cases from May 16, 2020 to June 16, 2020.



Source: Epidemiological Bulletin COVID-19 Maranhão, State Health Secretary of the Maranhão.

Regarding the number of deaths, 1,537 SARS-CoV-2 infected people evolved to death, being the elderly over 70 years old the most affected ones, corresponding to 52.56% of the total. On the other hand, children between 0 and 9 years-old were the

ones who less death incidence (11 recorded), conferring 0.71% of the death data (Chart 4).

Chart 4 – Number of deaths regarding the age range.

Source: Epidemiological Bulletin COVID-19 Maranhão, State Health Secretary of the Maranhão.

Still concerning the number of deaths, 946 refer to men (61.54%) and 591 refer to women (38.45%).

Respecting to the association between comorbidities and deaths, 88% of the subjects who died as COVID-19 fallout had comorbidities. From those, the Systemic Arterial Hypertension was the most often one (39%), followed by diabetes mellitus (26.69%). Pneumopathy was the less often sort of comorbidities, with 0.81% of all.

In accordance with the disease spatial distribution, the city of São Luís, capital of the state of Maranhão, presented the largest number of cases (12,095), corresponding to 19.28% of the total. However, the municipalities Altamira of Maranhão and Nova Colinas totaled the least number of cases, both with 2 contaminated subjects (0.003%).

DISCUSSION

The city of São Luís presented the largest number of COVID-19 confirmed cases of the state of Maranhão. In this aspect, the epidemiological evaluation is proportional to the amount of inhabitants as far as the capital of Maranhão has, according to the Brazilian National Institute of Geography and Statistics (IBGE), an estimated population of 1,101,884 inhabitants and has a population density of 1,215.69 inhabitants per square kilometer, with data referring to the year 2019.[5] Moreover, the city of São Luís presents large density of educational institutions and business centers, concentrating 38.0% of state's Gross Domestic Product (GDP), consequently, maintains intense flow of people and interstate connections, favoring greater transmission of the disease.

The cities of Altamira of Maranhão and Nova Colinas registered only 2 confirmed cases, fact explained by the low population and low quantity of services which test possible contaminated. Altamira of Maranhão has an estimation of 8,128 inhabitants, according to the IBGE, and population density of 15.34 inhabitants per square kilometer, while Nova Colinas has an estimated population of 5,384 inhabitants[5] and population density of inhabitants per square kilometer.

Consonant to the analysis of COVID-19 confirmed cases in the state of Maranhão, it can be observed that, considering age range, the more stricken group is the one correspondent to the ages between 30 and 39 years old. The considered group is represented, mainly, by persons belonging to the Economically Active Population (EAP) and that exerts, mostly, essential labor activities. Such analysis is compatible with the study about the likely focus of

contamination in Wuhan, China, where workers of a wholesale Market were the first one to become infected. [6] In this way, there is a straight relation between the job and the contamination by SARS-CoV-2, what is observed in the state of Maranhão and in cities around the world, such as Wuhan.

Regarding the performed diagnosis tests, these are done in the private healthcare network in a much less quantity. Such fact is straight related to the low purchasing power of the affected ones by the pathology. In line with this, the Ministry of Health of Brazil, by means of straights purchases, donations and public-private partnership, acquired a representative number of tests to be available in the public health network in attempt of improving the number of COVID-19 diagnosis tests,[7] including two kinds of tests: (i) the RT-PCR, which detects the presence of the virus in the sample; and (ii) the rapid serology test, which verifies the presence of antibodies against the coronavirus. However, the mal distribution of those exams in the state, associated to the insufficient offer of qualified professionals, favor the underreporting of disease.

With respect to the evolution of the number of cases during June 2020, in 15 days there was an increase of 26,086 cases, which corresponds to more than 70% growth of the numbers. This fact is explained by *en masse* noncompliance of the measures of social isolation in the state, besides of the attenuation of the measures for total standstill of the activities in the capital, the so-called lockdown. Therefore, classical measures of public health, including social isolation, social distancing are efficacious in the control of evolution of cases, what was observed in China, once that due to the effective isolation measures taken from the government, the augmentation of COVID-19 cases started to decelerate on February 14, 2020, according to data released by the National Health Commission of China.[7]

Referring to the amount of hospital beds of the *Sistema Único de Saúde* (SUS), in accordance to the State Health Secretary of the Maranhão, São Luís presents the higher quantity of the state, with 240 bed exclusive for Intensive Care Unit (UCI) and 752 clinical beds, both exclusive for COVID-19.With respect to the existent beds, the capital presents 4,177, including the ones derived out of the public network (SUS) and of the private network.[8] Such a condition relates to the fact that São Luís has the best economy of the state, that is, greater health investment conditions to meet the large population demand.

With regard to the number of deaths analyzed according to the age group, patients over 70 years old are the ones who die the most (808 deaths) when infected with SARS-CoV-2 and those who are in the age group from 60 to 69 years old also had a high mortality rate (377 deaths). Besides that, data related in highly stricken countries, as China and Italy, are highlighting the same point: elderly have high infection risk by the novel coronavirus, considering morbidity, serious complications, and mortality.[9] Still referring to the deaths, 62% of those happens to men. This fact can be traditionally explained by a hegemonic model of manhood,[10] where exists higher female seek for health services, while men usually seek for health attendance in advanced stages of the disease, which favors a worse prognosis.

On the other hand, 1,537 of the registered deaths on June 16, 2020, 1,345 correspond to individuals with comorbidities. Of this amount, 862 refer to Systemic Arterial Hypertension and 590 to the Diabetes Mellitus. In this context, the study performed by Bloomgarden[11] demonstrated SARS-CoV-2 biding and the human dipeptidyl peptidase IV (DDP-IV) receptor, showing an association of diabetes with greater weight loss and greater pulmonary inflammation, with macrophage infiltrates and worse prognosis. With respect to the hypertensive patients, the treatment with

angiotensin-converting enzyme inhibitors increases the COVID-19 infection risk.[12] Despite this, this study has restrictions, since the survey of epidemiological data happens daily, being affected by possible changes.

CONCLUSION

According to the obtained results, an evolution in the number of confirmed cases had been observed, mainly in women and individuals aged from 30 to 39 years old. Of the infected ones, the more susceptible ones for progressing to death are those over 70 and those with comorbidities. This infection profile is similar in other parts of the world, as evidenced in the above-mentioned bibliographical surveys. On the other hand, the performance of tests is still inaccessible, insofar as it has high cost in the private network and intense bureaucratization in the public network, although that concentrates the higher amount of diagnosis tests. In this perspective, the SARS-CoV-2 pandemic is the great challenge of the present due to the shortage of drug therapies and high transmissibility. Therefore, actions of epidemiological surveillance must be intensified, with greater diffusion of hygiene practices and greater monitoring of compliance of the social isolation measures, aiming the case control. Furthermore, research subsidies aiming the vaccine and new therapies development should be applied.

RESUMO

Introdução: A pandemia do novo coronavírus (SARS-CoV-2) já atingiu todos os estados brasileiros, representando o grande desafio do ano de 2020. Nesse sentido, o presente estudo objetivou analisar o perfil epidemiológico de casos confirmados de COVID-19 no estado do Maranhão. **Delineamento:** Trata-se de um estudo epidemiológico, descritivo, de casos e óbitos pela COVID-19 notificados no estado do Maranhão, no período de março a junho de 2020. **Resultados**: Foram confirmados 6.2711 casos de COVID-19. A região mais acometida foi a de São Luís com 12.095 confirmados, sendo os pacientes, em sua maioria, do sexo feminino (53%) e de idade entre 30 e 39 anos (19,85%). Os casos de pacientes do sexo masculino apresentaram maior taxa de óbitos (62%), prevalência de idade de mais de 70 anos (52,56%), comorbidades diversas (88%), destacando-se as doenças cardiovasculares e metabólicas. **Implicações:** A curva epidemiológica da doença é ascendente no estado, o que evidencia a necessidade de reforçar medidas de contenção e valorização dos recursos humanos.

DESCRITORES

Coronavirus; Monitoramento Epidemiológico; Saúde Pública.

RESUMEN

Introducción: La pandemia del nuevo coronavirus (SARS-CoV-2) ya ha llegado a todos los estados brasileños, lo que representa el gran desafío del año 2020. En este sentido, el presente estudio tuvo como objetivo analizar el perfil epidemiológico de los casos confirmados de COVID-19 en el estado de Maranhão. **Delineación**: Se trata de un estudio epidemiológico descriptivo de casos y defunciones por COVID-19 notificados en el estado de Maranhão, de marzo a junio de 2020. **Resultados**: Se confirmaron 6.2711 casos de COVID-19. La región más afectada fue São Luís, con 12.095 confirmados, siendo la mayoría de las pacientes mujeres (53%) y con edades comprendidas entre 30 y 39 años (19,85%). Los casos de pacientes masculinos tuvieron mayor tasa de mortalidad (62%), prevalencia de mayores de 70 años (52,56%), diversas comorbilidades (88%), especialmente enfermedades cardiovasculares y metabólicas. **Implicaciones**: La curva epidemiológica de la enfermedad va en aumento en el estado, lo que pone de relieve la necesidad de reforzar las medidas para contener y mejorar los recursos humanos.

DESCRIPTORES

Coronavirus; Monitoreo Epidemiológico; Salud Pública.

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COLLABORATIONS

LASM: Contributions to work conception, outline and to article writing. ESP, JSOJ, PSMGR, RMDO and RMDO: Contributed to data collection, analysis and interpretation. FEDA: Contributions to work critical review. All the authors agree and take responsibility for the content of this manuscript version to be published.

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AVAILABILITY OF DATA

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CONFLICTS OF INTEREST

There are no conflicts of interest to declare.