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Epidemiological investigation of COVID-19 in the state of Alagoas, Brazil

Investigação epidemiológica da COVID-19 no estado de Alagoas, Brasil

Investigación epidemiológica de COVID-19 en el estado de Alagoas, Brasil

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ABSTRACT

Introduction: The evolution of the cases of COVID-19 in Brazil presented itself in a complex way, with many differences between the regions of the country. The study aims to trace the epidemiological profile of the disease in the state of Alagoas, Brazil. **Outline:** This is a cross-sectional, retrospective study, carried out in the state of Alagoas, Brazil. The collection was carried out before the reports published by the State Health Secretariat of Alagoas with the inclusion of data until 07/30/2020. We investigated sex, age group (in years), race, comorbidities, in addition to the frequency of cumulatively confirmed cases and deaths, according to the epidemiological confirmation week. The data were grouped in Microsoft Excel[®] from a descriptive analysis. **Results:** 58,979 confirmed cases and 1,554 deaths were recorded. Deaths occurred in greater concentration at week 31, in brown, elderly, male and with comorbidities. **Implications:** Knowledge of the epidemiological profile of COVID-19 in the state of Alagoas highlights the need for constant monitoring of cases, strengthening health surveillance, increasing measures to contain the virus, in addition to implementing strategies that consider the groups most vulnerable to infection.

DESCRIPTORS

Coronavirus Infections; Epidemiology; Public Health Surveillance.

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INTRODUCTION

With the emergence of pneumonia of unknown etiology, a new emerging virus was identified in the city of Wuhan, China, belonging to the *coronaviridae* family and to the genus *Betacoronavirus*. After its recognition, the World Health Organization (WHO) named it SARS-CoV-2 and the disease caused by it COVID-19.¹

Characterized by a respiratory disease, COVID-19 can present itself in two different ways: through a Flu Syndrome (FS), that is, with milder symptoms, such as fever, coughs, sore throat, myalgia and arthralgia, or, still, through a Severe Acute Respiratory Syndrome (SARS), which is characterized as a worsening of FS, with dyspnea and respiratory distress, requiring oxygen therapy as treatment.²⁻³

In this context, the rapid spread of the virus, explained by its mode of transmission, through droplets from the saliva, cough or sneeze of an infected person,⁴ resulted in an international spread of the infection, making it three months after the first outbreak of COVID-19 in China, more than 140 countries reported cases of the disease. Thus, in view of the seriousness of the situation, WHO declared, on March 11, 2020, a state of pandemic.⁵⁻⁶

In a global perspective, the arrival of the disease destabilized health services, as they were not prepared for the alarming number of cases. Countries like Italy, with a predominantly elderly population, showed rapid proportions of contamination, with more than 35,000 confirmed cases in about 1 month⁷ and accumulating more than 10,000 deaths in three months.⁸ On the other hand, in Latin America, Brazil was the first country to declare a case of the disease, which was confirmed in February 2020. Two months later, a total of 65,000 cases of COVID-19 were reported by all Latin American countries.⁹

The evolution of the cases of the disease in Brazil was heterogeneous, with differences between the regions of the country.¹⁰ In this sense, throughout

the national territory, the Northeast is the second region with the largest number of confirmed cases of COVID-19¹¹. Until August 5, 2020, there were a total of 909,620 cases accumulated.¹² Furthermore, among the states of the Northeast, Alagoas has, according to the Brazilian Institute of Geography and Statistics (IBGE),¹³ 3,120,494 inhabitants and a density demographic of 112.3 inhabitants per square kilometer,¹⁴ which would justify a rapid community dissemination of COVID-19, making an epidemiological diagnosis essential to understand the expansion of the problem.

Given the above and the serious public health problem that is COVID-19, this study aims to outline the epidemiological profile of COVID-19 in the state of Alagoas, Brazil, from March 15, 2020 to July 30, 2020.

METHOD

This is a cross-sectional, descriptive and retrospective study, carried out in the state of Alagoas, Brazil. The collection of variables was carried out in the light of reports published by the State Health Secretariat of Alagoas (SESAU/AL).¹⁴

The current study relates the frequency of cases after laboratory confirmation of COVID-19 infection, whether or not followed by hospital admissions due to FS or SARS and deaths due to epidemiological factors. The variables investigated were: sex, age group (in years), race, comorbidities, in addition to the frequency of cumulative confirmed cases and deaths according to the epidemiological confirmation week. The exploration of the information took place in August 2020. Data from March 15, 2020 to July 30, 2020 were included. From this, any epidemiological data that could not be correlated to COVID-19 were excluded. Subsequently, the data were organized in Microsoft Excel®, where descriptive statistics were performed.

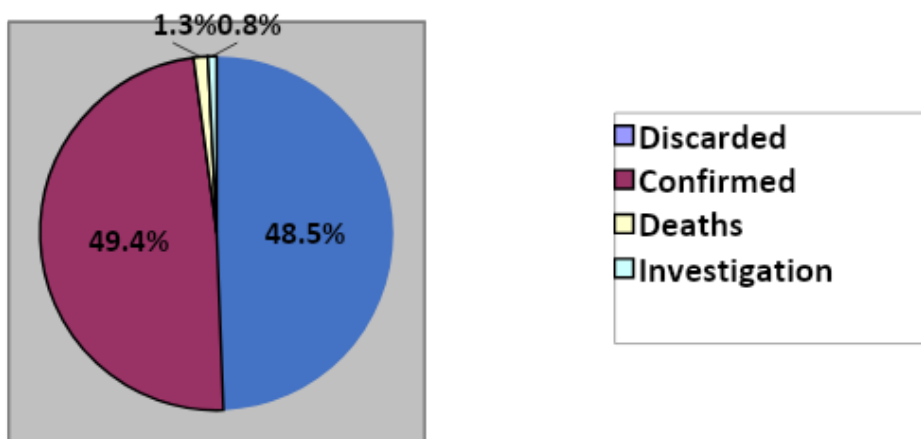
As these are secondary data in the public domain, approval by the Research Ethics Committee

was not required. The Regulatory Norms and Guidelines for Research Involving Humans (Resolution CNS 466/12) were respected.

RESULTS

The results found in the delimited period show 120,113 reported cases in Alagoas. Of these, 973 were under investigation (0.8%), 58,979 confirmed cases (48.5%), 60,161 discarded cases (49.4) and a total of 1,554 deaths (1.3%) registered (Figure 1).

Figure 1 – Frequency of notified cases of COVID-19 in the state of Alagoas, Brazil, 2020.



The number of cases confirmed by COVID-19 was observed according to sex. In FS there was the highest number of female cases (56.3%) reported,

while in SARS it was male (55.6%). In addition, the predominant age group between FS and SARS was 30 to 39 years old and over 70 years old, respectively (Table 1).

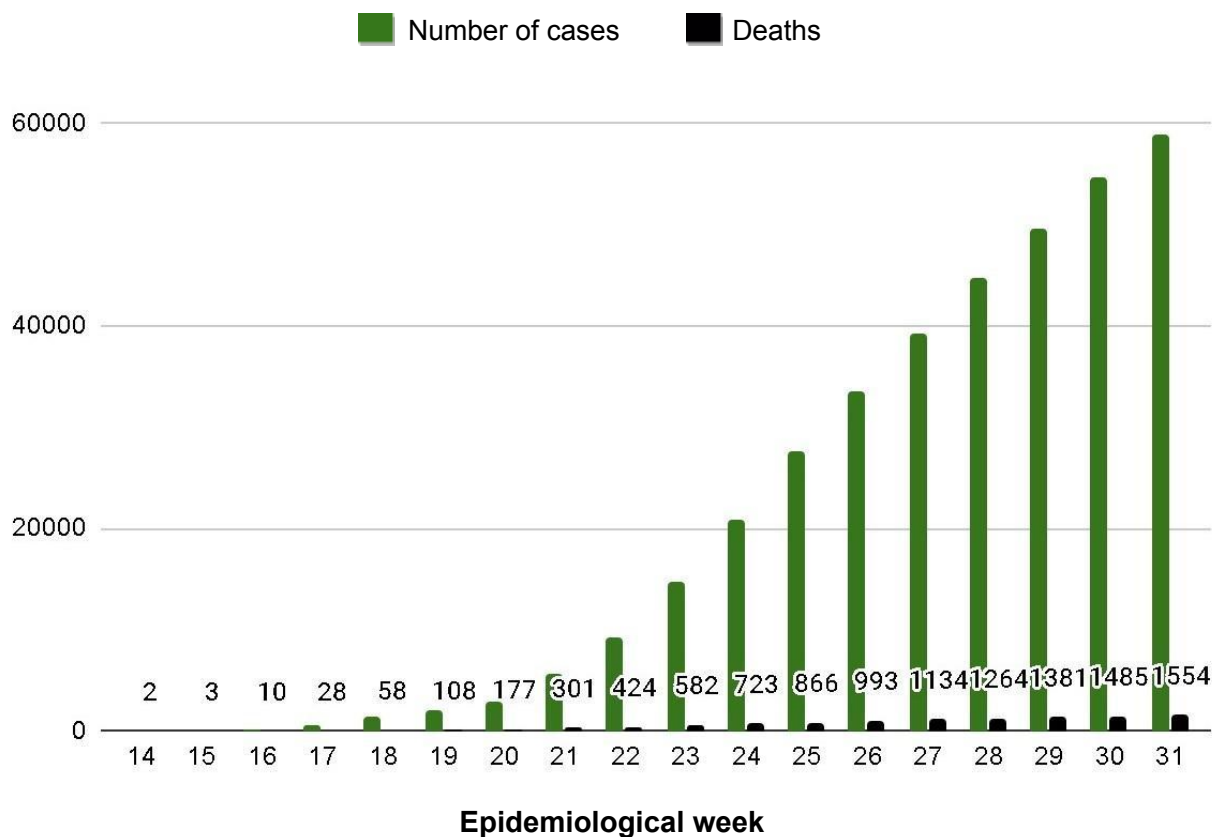
Table 1 – Confirmed cases of Flu Syndrome and Severe Acute Respiratory Syndrome with laboratory confirmation for COVID-19, according to sex and age group. Alagoas, Brazil, 2020.

Variable	Flu syndrome		Severe Acute Respiratory Syndrome	
	n	%	n	%
Sex				
Male	23753	43.7	2555	55.6
Female	30631	56.3	2040	44.4
Total	54384	100	4595	100
Age range (years)				
≤ 10	1113	2.0	53	1.2
10 – 19	2854	5.2	46	1.0
20 – 29	9748	17.9	171	3.7
30 – 39	13901	25.6	409	8.9
40 – 49	12067	22.2	673	14.6
50 – 59	7855	14.4	822	17.9
60 – 69	4192	7.7	965	21.0
≥ 70	2654	4.9	1456	31.7
Total	54384	100	4595	100

In Figure 2, there was an exponential advance in the number of confirmed cases according to each

epidemiological week and in the number of deaths in the state with the apex of both variables in week 31.

Figure 2 – Frequency of cumulatively confirmed cases and deaths according to epidemiological confirmation week. Alagoas, Brazil, 2020.



As for the frequency of deaths, of the total of 1554 people who declared race/color, 1056 claimed color/brown race and 51 color/black race. In

addition, in relation to comorbidities, the predominance was diabetes with n = 591 of the total of 2102, as shown in Table 2.

Table 2 – Frequency of deaths with laboratory confirmation for COVID-19, according to race / color and comorbidities and risk factor. Alagoas, Brazil, 2020.

Variable	Deaths	
	n	%
Race / Color		
White	163	10.5
Black	51	3.3
Brown	1056	68.0
Indigenous / Not reported	284	18.3
Total	1554	100
Comorbidities		
Without comorbidities	484	23.0
Diabetes	591	28.1
Systemic Arterial Hypertension	364	17.3
Cardiopathy	251	11.9
Other	412	19.6
Total	2102	100

Regarding the number of deaths according to age group and sex, it was found in Table 3 that the

highest concentration of deaths occurred in the elderly (over 60 years old) male (n = 635).

Table 3 – Frequency of deaths with laboratory confirmation for COVID-19, according to age group and sex. Alagoas, Brazil, 2020.

Variable	Deaths			
	Female		Male	
Age range (years)	n	%	n	%
≤ 10	5	0.8	7	0.8
10 – 19	4	0.6	4	0.4
20 – 29	12	1.8	7	0.8
30 – 39	27	4.1	34	3.8
40 – 49	55	8.3	74	8.3
50 – 59	93	14.0	129	14.5
60 – 69	158	23.8	224	25.2
70 – 79	159	23.9	232	26.1
≥ 80	151	22.7	179	20.1
Total	664	100	890	100

DISCUSSION

The northeastern region of Brazil consists of nine states, among them, Alagoas with 58,979 cases. The state is among the six with the highest number of infected with COVID-19, behind Bahia, Ceará, Maranhão, Pernambuco and Paraíba, respectively.¹² However, when considering the population number of each state, Alagoas has a high incidence, with 1762.7 individuals per 100,000 inhabitants.¹⁴

In the face of numerous factors that justify the high community transmission, there is tourism, which is expressed as one of the main axes of the state's economy with a large hotel chain, in addition to restaurants, bars and cafeterias. The increasing spread of the virus favored the adoption of measures aimed at social isolation and the maintenance of essential services, which were also not 100% respected. Chinese research has shown that premature easing of isolation policies can result in the rapid growth of deaths related to COVID-19.¹⁵

The present research pointed out that, among the two manifestations of COVID-19, FS is more prevalent in women and SARS in men. In line with our study, which presented SARS with a high rate in elderly men, an article published about SARS by COVID-19 in Brazil demonstrated that age over 60 years and male are predominant in people who had SARS associated with COVID-19.¹⁶ This can be

explained by the biological differential, where there is a distinction of the immune system and cellular constitution between the sexes,¹⁷ since female can induce a differentiated and anticipated inflammatory immune response.¹⁸ Thus, by presenting this more effective response, women tend to develop the milder form of the disease when compared to men.

The exponential increase in the number of cases and deaths in the state of Alagoas during the epidemiological weeks can be explained by the way in which the virus spreads. SARS-CoV-2 is known to be transmitted through the coughing or sneezing of infected people, whether symptomatic or asymptomatic.⁴ In addition, the virus can be carried to the mucous membranes after contact with contaminated objects, when there is no correct hand hygiene. Thus, these factors contribute to the high contagiousness of the disease, since relatives and family members close to infected individuals are likely to acquire COVID-19.¹⁹ Faced with this, as the days go by, more people become infected, get sick and die. This fact can justify the highest rates in the last week analyzed, with the peak of the number of confirmed cases and deaths by COVID-19 in week 31.

About color/race in the frequency of deaths, there was a predominance of browns. Due to the heterogeneity of color in Brazil, it is difficult to associate and discuss this variable. However, the idea

is believed and defended that the context of inequalities in Brazilian society was enhanced with the arrival of the pandemic of COVID-19, with the number of cases between browns and blacks.²⁰ Part of the country's black population lives in a condition of social and economic vulnerability, in situations of poverty and housing without water and basic sanitation,²¹ making it impossible to carry out adequate hand washing, access to masks and health services, contributing to higher coronavirus mortality in this population.²⁰

Concerning comorbidities, people who have diabetes mellitus (DM), arterial hypertension (SAH) and heart disease are at a higher risk of developing complications of COVID-19, due to several pathophysiological issues and, above all, due to the impairment of the immune system.²² Potential mechanisms include: increased affinity cell binding, decreased viral elimination and T cell functions, in addition to susceptibility to hyperinflammation and cytokine storm.²³ Thus, these factors can favor the replication of the virus and its subsequent dissemination, compromising lung function.²²

As for the elderly, the high number of deaths occurs mainly due to the fragile immune system characteristic of aging, which, associated with chronic diseases commonly present in this age group, favors the increase in the development of infectious diseases.²² In this sense, the greater the age, the greater the chance of developing the severe form of COVID-19.^{22,24}

Nevertheless, it was possible to observe that male had a higher percentage than the female in relation to the mortality rate. A study carried out with residents in the state of Ceará showed that male are the most difficult to voluntarily comply with quarantine, ²⁵ since this is one of the main strategies to contain the advance of the virus, ²⁶ in addition to the other associated risk factors as the presence of comorbidities, age and adherence to treatment care.

The present study has limitations. As it addresses a relatively recent disease and with data

being updated daily, this profile may change over time. In addition, there are few studies that analyze the same variables presented in this work in the state, and when associated with the underreporting of cases and deaths related to the disease, they make it difficult to characterize the real scenario of COVID-19.

CONCLUSION

It was possible to characterize the epidemiological profile of COVID-19 in the state of Alagoas, in which young adult women and elderly men, predominantly manifested FS and SARS, respectively. With regard to the number of cases and deaths, the apex occurred at week 31, prevailing the color / brown race, people with comorbidity associated with DM and elderly men.

Given the above, this study enables knowledge about the specificities related to the disease in the context of the state of Alagoas, which contributes to the strengthening of possible intervention strategies, such as: encouraging compliance with social distancing, correct hand hygiene, access and wearing masks, as well as health care. Besides that, it is worth emphasizing the importance of distribution and testing, so that there is control and reduction of cases in the state.

RESUMO

Introdução: A evolução dos casos da COVID-19 no Brasil se apresentou de forma complexa, com muitas diferenças entre as regiões do país. O estudo objetiva traçar o perfil epidemiológico da doença no estado de Alagoas, Brasil. **Delineamento:** Trata-se de um estudo transversal, retrospectivo, realizado no estado de Alagoas, Brasil. A coleta foi realizada diante dos informes publicados pela Secretaria Estadual de Saúde de Alagoas com a inclusão dos dados de até 30/07/2020. Investigou-se sexo, faixa etária (em anos), raça, comorbidades, além da frequência de casos confirmados cumulativamente e óbitos segundo semana epidemiológica de confirmação. Os dados foram agrupados no Microsoft Excel® a partir de uma análise descritiva. **Resultados:** Foram registrados 58.979 casos confirmados e 1.554 óbitos. Os óbitos ocorreram em maior concentração na semana 31, em pessoas pardas, idosos, sexo masculino e com comorbidades. **Implicações:** O conhecimento do perfil epidemiológico da COVID-19 no estado de Alagoas evidencia a necessidade de constante monitoramento dos casos, fortalecimento da vigilância em saúde, aumento das medidas de contenção ao vírus, além de implementação de estratégias que levem em consideração os grupos mais vulneráveis à infecção.

DESCRITORES

Infecções por Coronavirus; Epidemiologia; Vigilância em Saúde Pública.

RESUMEN

Introducción: La evolución de los casos de COVID-19 en Brasil se presentó de manera compleja, con muchas diferencias entre las regiones del país. El estudio tiene como objetivo rastrear el perfil epidemiológico de la enfermedad en el estado de Alagoas, Brasil. **Delineación:** Se trata de un estudio transversal, retrospectivo, realizado en el estado de Alagoas, Brasil. La recolección se realizó antes de los informes publicados por la Secretaría de Salud del Estado de Alagoas con inclusión de datos hasta el 30/07/2020. Se investigó sexo, grupo de edad (en años), raza, comorbilidades, además de la frecuencia de casos confirmados acumulativamente y defunciones según la semana de confirmación epidemiológica. Los datos se agruparon en Microsoft Excel® a partir de un análisis descriptivo. **Resultados:** Se registraron 58.979 casos confirmados y 1.554 defunciones. Las muertes ocurrieron en mayor concentración a la semana 31, en morenos, ancianos, varones y con comorbilidades. **Implicaciones:** El conocimiento del perfil epidemiológico de COVID-19 en el estado de Alagoas destaca la necesidad de un seguimiento constante de los casos, fortalecer la vigilancia en salud, incrementar las medidas para contener el virus, además de implementar estrategias que tomen en cuenta a los grupos más vulnerables a infección.

DESCRIPTORES

Infecciones por Coronavirus; Epidemiología; Vigilancia en Salud Pública.

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COLLABORATIONS

CRS, DFS, JOO, CMOC, TMPB, CRBC: Substantially contributed to the conception, to data collection, analysis and interpretation, to writing the text, to critical review of the content, and to the approval of the final version of the manuscript. All the authors agree and take responsibility for the content of this manuscript version to be published.

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AVAILABILITY OF DATA

Data are available on the site: <https://www.saude.al.gov.br/coronavirus/>

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Not applicable.

CONFLICTS OF INTEREST

There are no conflicts of interest to declare.