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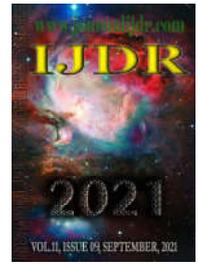
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RESEARCH ARTICLE

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LETHALITY AND CHARACTERISTICS OF DEATHS BY COVID-19 IN THE STATE OF PERNAMBUCO

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ABSTRACT

Covid-19 is a world wide disease that causes the most recent viral pandemic. Characterized as a severe acute respiratory syndrome caused by SARS-CoV-2, it is the causative agent of a series of pneumonia cases in the city of Wuhan. In the state of Pernambuco, the first confirmed case of the disease was in March 2020 of a couple residing in the city of Recife who were together in Italy. of Covid-19 cases and deaths in the State of Pernambuco. The first case of the disease was confirmed in the State on March 12, 2020, so this analysis was carried out with the results released until August 30, 2021, that is, a time frame of one year and eight months corresponding to the presence of the virus in the state and the hospitalization time of hospitalized patients. evidently due to the fact that it is the capital Recife, it has the largest land area in the state and the resident population, as well as the economic hub of the state, where the largest number of people are concentrated, due to the GDP generated by hospitals, businesses, colleges, companies and so on. To understand the context in which Pernambuco is inserted and the level of the situation in which the state finds itself. consequently, the number of deaths is evidently due to the fact that it is the capital Recife, it has the largest territorial extension of the state and resident population, as well as it is the economic center of the state, where the largest number of people are concentrated., due to the GDP generated by hospitals, businesses, colleges, companies and so on. To understand the context in which Pernambuco is inserted and the level of the situation in which the state finds itself. consequently, the number of deaths is evidently due to the fact that it is the capital Recife, it has the largest territorial extension of the state and resident population, as well as it is the economic center of the state, where the largest number of people are concentrated, due to the GDP generated by hospitals, businesses, colleges, companies and so on. To understand the context in which Pernambuco is inserted and the level of the situation in which the state finds itself. Thus, it can be inferred how essential is the structural development of public health in Pernambuco, especially in less developed centers, as well as the priority preservation of people with comorbidities and in an older age group.

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INTRODUCTION

Covid-19 is a worldwide disease that causes the most recent viral pandemic. Characterized as a severe acute respiratory syndrome caused by SARS-CoV-2, it is the causative agent of a series of pneumonia cases in the city of Wuhan¹. The new strain of Coronavirus has not previously been identified in humans.¹ However, the animal source causing Covid-19 has not yet been identified.^{two}. Knowledge about the characteristics of the virus, how it spreads among people, how serious the resulting infections are, how to protect the susceptible and treat the sick was the main concern of authorities and researchers at the beginning³. Later, the information showed that this virus can be transmitted between humans mainly by respiratory droplets, coughing and sneezing in a short distance, also being transmitted by objects contaminated by the virus or even by the spread of the virus through the air, mainly affecting people with immunity weakened⁴. Among the most common symptoms are cough, fever, runny nose, sore throat and difficulty breathing, and recently, loss of smell (anosmia) and taste loss (dysgeusia)⁵. Gastrointestinal symptoms such as diarrhea, abdominal pain, nausea and vomiting are atypical, but may be present⁶. The virus's survival will depend on a means that favors its maintenance in the environment⁷. As with other respiratory illnesses, Covid-19 infection can be more severe for some people and can lead to pneumonia or breathing difficulties.⁹ Elderly people and people with pre-existing comorbidities such as diabetes, hypertension and heart disease seem to be more vulnerable to becoming seriously ill with the virus.¹⁰ In Brazil, the first case was confirmed in February 2020 in the state of São Paulo and it was an imported case in which the patient had returned from a trip from Italy¹¹. In the state of Pernambuco, the first confirmed case of the disease was in March 2020 of a couple residing in the city of Recife who were together in Italy.¹² In the same month, the World Health Organization declared the Covid-19 world pandemic¹³. From then on, until August 2021, there was an increase in the number of confirmed cases of Covid-19 in Pernambuco, with an increase of 593,462 cases were confirmed, 18,899 of which evolved to death¹⁴. Currently in Pernambuco, SES pointed out that there are 607,529 infected by the coronavirus, with 19,383 deaths¹⁵. Covid-19's mortality and lethality has grown a lot since the virus appeared, and many of these cases were due to the presence of risk factors and comorbidities, which act as enhancers of the virus's lethality, among which, heart diseases such as hypertension, diabetes, old age, obesity, immunosuppressed people, kidney, liver, hematological and respiratory problems, thus being predictive factors for an increased risk of death¹⁶. In order to elucidate these issues, this study aimed to discuss the deaths caused by Covid-19 in the state of Pernambuco during the pandemic, and their correlation with comorbidities associated with patients and their age group.

METHODOLOGY

This is a documentary and descriptive research, with a quantitative approach carried out from the epidemiological survey of cases and deaths in Covid-19 in the State of Pernambuco. The first case of the disease was confirmed in the State on March 12, 2020, so this analysis was performed with the results released until August 30, 2021, that is, a time frame of one year and eight months corresponding the presence of the virus in the State and the hospitalization time of hospitalized patients. The study site was Pernambuco, considering its capital Recife, the Metropolitan Region of Recife and the interior of the state. Administratively, Pernambuco is divided into 185 municipalities distributed in 12 Health Regions (Geres), grouped into four Health Macroregions. According to the last demographic census, the state had a population of 9,496,294 people and its capital had 1,637,834, according to data from the SUS IT Department (DATASUS) for 2018. The Metropolitan Region do Recife is made up of 14 municipalities and concentrates about 42% of the state's population, according to the same projections (DATASUS). Population residing in Pernambuco.

Each of these administrative units of the State Health Department is responsible for a part of the cities, acting in a more localized way in primary care, in restructuring the hospital network, in municipal actions, in combating the Covid-19 pandemic. The Health management model allows the particularities of each region to receive attention when deciding on actions and campaigns. The variables used in the study were: affected municipalities (with confirmed cases and deaths). In addition, the age group (in years) and comorbidities or risk factors identified among the deaths were analyzed, where, based on these data, lethality was calculated, which served as a basis for availability in tables. Data were collected from the Covid-19 epidemiological panel (SEVS/CIEVS-PE. Data updated until 08/30/2021, from the CIEVES-PE Health Information Portal, which is managed by the Pernambuco State Health Secretariat (SES-PE), updated daily and freely accessible. The information was analyzed comparatively and contextualized with the corresponding literature, and epidemiological calculations were performed to obtain percentage data of the disease lethality data, as well as absolute numbers. This research was not submitted to the Ethics Committee for Research with Human Beings (CEP), as it is a work with secondary data available on a public domain portal. It is noteworthy that its preparation followed the rules and guidelines of Resolution No. 466/2012, which regulates research with human beings.

RESULTS AND DISCUSSION

The reason why the capital of Pernambuco expresses the largest number of confirmed cases and, consequently, the number of deaths, is evidently due to the fact that it is the capital Recife, it has the largest territorial extension of the state and resident population, as well as, from the state's economic hub, where the largest number of people are concentrated, due to the GDP generated by hospitals, businesses, colleges, companies, and so on. To understand the context in which Pernambuco is inserted and the level of the situation in which the state finds itself. The SES shows the balance of the epidemiological situation of the Covid-19 in the state through epidemiological bulletins and daily epidemiological report on the CIEVES-PE platform. In the northeast, the state of Pernambuco is the state with a moving average of 31% demonstrating a state of decline in confirmed cases of Covid-19. Table 1 shows the sociogeographic distribution of confirmed Covid-19 cases and deaths in the State of Pernambuco and its lethality. The State of Pernambuco presents 607,529 thousand confirmed cases, with the I regional health 269,597 cases, followed by the II regional health with 29,722, III Health Region with 19,396 of cases, IV Health Region with 93,699 of cases, V Health Region with 33,815 of cases, VI Health Region with 23,155 of cases, VII Health Region with 14,672 of cases, VIII Region of Health with 38,933 cases, IX Health Region with 24,580 of cases, X Health Region with 20,033 of cases, XI Health Region with 19,865 of cases, XII Health Region with 20,062 of cases. The highest lethality of Covid-19 in the state of Pernambuco occurs in the cities of Recife with (n=5285), followed by Jaboatão dos Guararapes (n=1700), Olinda (n=981), Paulista (n=811), Caruaru (n=707), Cape St. Augustine (n=520), Camaragibe (n=436), finally, Vitória de Santo Antão with (n=304). Other municipalities according to the last epidemiological report of August 31, 2021.

Considering that individuals with comorbidities are at higher risk or at risk for hospitalization for Severe Acute Respiratory Syndrome (SRAG) by Covid-19 and the same risk factors for deaths in the state were also observed, in our study it was possible to observe that heart diseases had the highest frequency in cases of death by Covid-19, with 48.61% of cases (n=175), followed by diabetes with 38.9% of cases, among others. Therefore, to understand the context in which Pernambuco is inserted and the level of the situation in which the state finds itself. The SES shows the balance of the epidemiological situation of Covid-19 in the state through the epidemiological bulletins and daily epidemiological report on the CIEVES-PE platform. In the northeast, the state of Pernambuco is the state with a moving average of 31% showing a state of decline in confirmed cases with Covid-19.

Table 1. Geographical distribution of Covid-19 cases, deaths and lethality in the State of Pernambuco

CITIES	ABSOLUTE NUMBER	RELATIVE No.	DEATHS	LETHALITY
RECIFE	150835	24.7%	5285	27.2%
JABOATÃO DOS GUARARAPES	35448	5.8%	1700	8.7%
OLINDA	24056	3.9%	981	5%
PAULISTA	10997	1.8%	811	4.1%
CARUARU	34790	5.7%	707	3.6%
CAPE OF SANTO AUGUSTINHO	9775	1.6%	520	2.6%
CAMARAGIB	7508	1.2%	436	2.2%
VICTORY OF SANTO ANTÃO	7272	1.1%	304	1.5%
OTHERS	327905	54.2%	8667	45.1
TOTAL	608586	100%	19411	100%

The comorbidities associated with these cases and the structural and medical situations may also justify the high lethality shown in the state, with a lethality of 53.9% of SARS confirmed for Covid-19, regarding gender, males are found in 52.5% of cases and for females, 47.5% of cases. As for race/color, 71.3% of confirmed cases are of the still color. Underreporting of confirmed cases and deaths is a possibility in this scenario, as it is quite common in structurally less developed cities not to have internet to access the platform CIEVES-PE for immediate notification of cases as well as deaths, in addition, the complexity of the health database management routine, such as removing duplicates and closing cases, the difficulties that lead to delays in the processing of clinical samples and release of laboratory results, in addition to the work overload of the professionals involved in this surveillance. Since the emergence of Covid-19 and its spread, heart disease has been established as the predominant risk factor in deaths, much of which is due to the binding of the SARS-CoV-2 virus to the angiotensin 2 converting enzyme (ACE2), an enzyme that expresses several functions in various places in the body, including the heart, kidney and pulmonary alveoli. According to studies by Wang, & Wang et al., 2020. ACE2 acts by modulating cardiac constrictor and dilating events, essential events in the control of hypertension, for the same reason that also justifies the risk of higher mortality from kidney diseases and lung diseases. Already in the studies developed by Oswaldo Cruz Foundation (Fiocruz), a correlation between Covid-19 and diabetes can be justified by induction of inflammation in circulating cells of the immune system with increased expression of ACE2 and ALOX5 genes, making them more prone to invasion of the new coronavirus, Sars-CoV-2.

As well as the increase in leukotriene B4 (LTB4) in blood cells, a lipid mediator associated with changes such as inflammation and impaired healing in diabetes, indicating that LTB4 may be a mediator that increases the risk of severe covid-19 in individuals with comorbidity is one of the causes of the most pronounced systemic inflammatory response, where these patients require intensive care more often due to lung injury. In parallel with the comorbidities described, they are commonly more frequent in elderly people, so the prevalent number of deaths in the advanced age group may be linked to the prominence of deaths in the presence of comorbidities. Thus, clinical complications related to Covid-19 in the elderly and have worse outcomes and an increased risk of death. In Pernambuco, the effects of Covid-19 are more severe in people over 60 years of age, in addition to the distribution of severe cases according to health region and municipality of residence in the state, with an absolute number of 53322 cases, it is more prevalent in the elderly. These results demonstrate the existence of a greater progressive trend in people over 60 years of age, however, it is not known whether the change in these indicators results from differences in disease severity, but they are strong predictors of the course of Covid-19.

FINAL CONSIDERATIONS

Based on this study, it became possible to obtain an insight into the partial context of the morbidity and mortality of Covid-19 in the State of Pernambuco. Although there are many cases and deaths in the State of Pernambuco, in the general context of Northeast and Brazil,

the rate of cases and deaths and, consequently, their lethality is less of a concern, however, it is worth emphasizing the care so that cases are continuously minimized. In addition, it is important to emphasize the care of patients who have associated comorbidities that are characterized as a risk factor for Covid-19, aiming to control the spread of the pandemic in the state, since the number of deaths that occurred is closely correlated with discharge prevalence of deaths in people with these predisposing diseases. In addition, the high age group is another predisposing factor for the growth of morbidity and mortality, becoming important the lockdown for the reduction and viral control of the pandemic, especially in the age group between 60 and 80 years. According to the understanding of the Ministry of Health, at this time it is highly likely that vaccination is highly favorable in preventing the disease, especially for the group of people with comorbidities. Thus, it can be inferred how essential is the structural development of public health in Pernambuco, especially in less developed centers, as well as the priority preservation of people with comorbidities and in an older age group. It is expected that this study can contribute in several aspects, including the need to redirect resources to the most needy areas, especially to municipalities far from the metropolitan region of Recife, strengthening Health Surveillance strategies, based on continuing education, which may be reflected in the improvement of disease promotion, prevention and control strategies.

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