A brief epidemiological analysis of COVID-19 in Piauí, Brazil

Uma breve análise epidemiológica da COVID-19 no Estado do Piauí, Brasil

Un breve análisis epidemiológico de COVID-19 en el estado de Piauí, Brasil

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ABSTRACT

Introduction: The disease called COVID-19 is caused by a new type of virus in the Coronavirus family. Due to the ease of contagion with SARS-CoV-2, the number of cases increases rapidly. Therefore, the objective is to develop an epidemiological analysis of confirmed cases and deaths in the State of Piauí. **Outline**: Descriptive study, conducted by the epidemiological survey of COVID-19 cases and deaths in the State of Piauí in the first 60 days of the presence of the infection in the state. The variables used were: affected municipalities, sex, age group, and comorbidities or risk factors identified among confirmed deaths. **Results**: It was observed that most infected people are female and in the economically active age group. As for the fatal victims, the majority were male, elderly people over 60 years old and with at least one underlying comorbidity. **Implications:** Epidemiological analysis allows us to see the need to monitor and inspect control measures, in addition to strengthening health surveillance in the state, as the numbers of cases and deaths increase every day and may have a greater impact on society.

DESCRIPTORS

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

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INTRODUCTION

The disease called COVID-19 originated in the city of Wuhan, capital of Hubei province in China, where the first cases were detected in December 2019. With the increase in the number of cases in several countries, the World Health Organization (WHO) declared at the end of January 2020 that it was a Public Health Emergency of International Importance.[1]

It was identified that the infection is caused by a new type of virus of the Coronavirus family, and this new virus is named SARS-CoV-2 and the disease caused by it COVID-19.[1] It is believed that the virus has made the transition from animals to humans due to the broad commercialization of seafood and wildlife in markets in China.[2-3]

The transmission of the virus occurs through contact with droplets from the respiratory tract of infected people generated when talking, coughing, or sneezing. In addition, SARS-CoV-2 can be transmitted when a healthy person touches contaminated objects or surfaces, and thus touches mucous membranes (eyes, nose, or mouth).[4-5]

The virus incubation period is estimated to be 14 days, although there are reports that this period can last up to 24 days.[4] The proportion of asymptomatic individuals is not yet well defined, but patients with symptoms may develop fever, cough, dyspnoea, myalgia, fatigue, nasal congestion, diarrhea, among others.[6-7]

The lethality of SARS-CoV-2 varies, mainly, according to the age group and the clinical conditions of the affected individuals.[7] Studies[3,8] demonstrate that the presence of comorbidities, such as arterial hypertension, diabetes, and chronic obstructive pulmonary disease may be associated with the worsening and worse prognosis of COVID-19. The infection can be limited to mild flu-like symptoms, but it can progress with severe dyspnea and pneumonia, especially in elderly patients.[9]

Due to the ease of contagion of SARS-CoV-2, the number of cases increases rapidly, and according to data from the COVID-19 World Tracker instructed by Microsoft®, until May 18, 2020, 4,786,672 confirmed cases have already been recorded worldwide, with 2,692,336 active cases, 1,776,641 recovered individuals, and 317,695 deaths. To date, the United States is ahead in the number of cases, with 1,537,256; and in Brazil, on the same date, 254,220 confirmed cases of the disease are recorded.[10]

Considering the magnitude of the disease, world leaders have adopted measures to restrict the movement of people, such as closing borders, non-essential businesses, suspension of classes, crowded events, and home confinement of the population.[11] The conduct of health authorities for the Brazilian population is to reinforce the importance of preventive measures against the novel coronavirus, such as social distancing, good hygiene practices, and respiratory etiquette.[12]

Given this context and considering the importance of knowing the epidemiological situation of the infection, the present study aims to develop an epidemiological analysis of confirmed cases and deaths in the State of Piauí, through the characterization of the profile of these individuals.

METHOD

This is a descriptive study, conducted by the epidemiological survey of cases and deaths of COVID-19 in the State of Piauí. The first case of the disease was confirmed in the State on March 19, 2020, so the analysis was performed with the results released until May 18, 2020. Thus, the study period corresponded to the first 60 days of the presence of the infection in the state. Data were collected on the epidemiological panel of the Piauí Health Information Portal, which is managed by the Piauí State Department of Health (SESAPI), updated daily and freely accessible.[13]

The State of Piauí is located in the northwest of the Northeast region of Brazil, and is bordered by five states: Maranhão, Ceará, Pernambuco, Bahia, and Tocantins. The State has a territorial extension of 251,616.823 km², is divided into 04 mesoregions and 15 microregions, totaling 224 municipalities. According to the last census developed by the Brazilian Institute of Geography and Statistics (IBGE) conducted in 2010, the population of the State was 3,118,360 inhabitants.[14]

The variables used in the study were: affected municipalities (with confirmed cases and deaths), sex (female / male), age group (in years), and comorbidities or risk factors identified among confirmed deaths.

The data were tabulated in Microsoft Excel® 16 spreadsheets and later exported to the TABWIN software, where the results were extracted for availability in tables. The static map of the state of Piauí was extracted directly from the epidemiological panel of SESAPI. The information was analyzed comparatively and contextualized with the corresponding literature.

This study was not submitted to the Human Research Ethics Committee (CEP), as it is a work with secondary data available on a public domain portal. It should be noted that its preparation followed the rules and guidelines of Resolution No. 466/2012 that regulates research with human beings.[15]

RESULTS

In Brazil, the confirmation of the first case of COVID-19 occurred on February 26, 2020.[16] According to the Piauí State Department of Health,[13] the first confirmed case of COVID-19 in the State occurred 21 days later, on March 19, 2020.

During the 60 days after the first confirmation of SARS-CoV-2 infection in the State of Piauí, 2,440 cases and 85 deaths from COVID-19 were confirmed. In addition, on the present date (May 18, 2020) there were 369 suspects hospitalized, of these 239 were hospitalized in clinical beds, 127 in Intensive Care Units (ICU) beds, and 03 in stabilization beds. The graph below shows the evolution of cases in the State and it is noteworthy that the rapid tests started on April 13.[13]

Graph 1 – Number of cases and deaths reported every 05 days in the State of Piauí, Brazil, 2020.
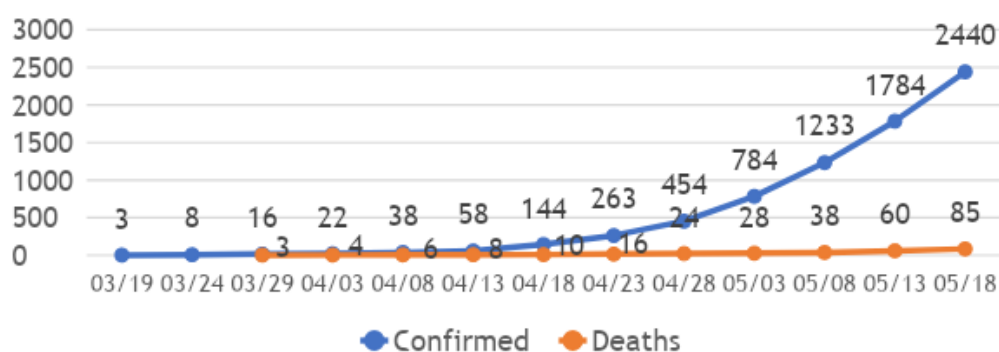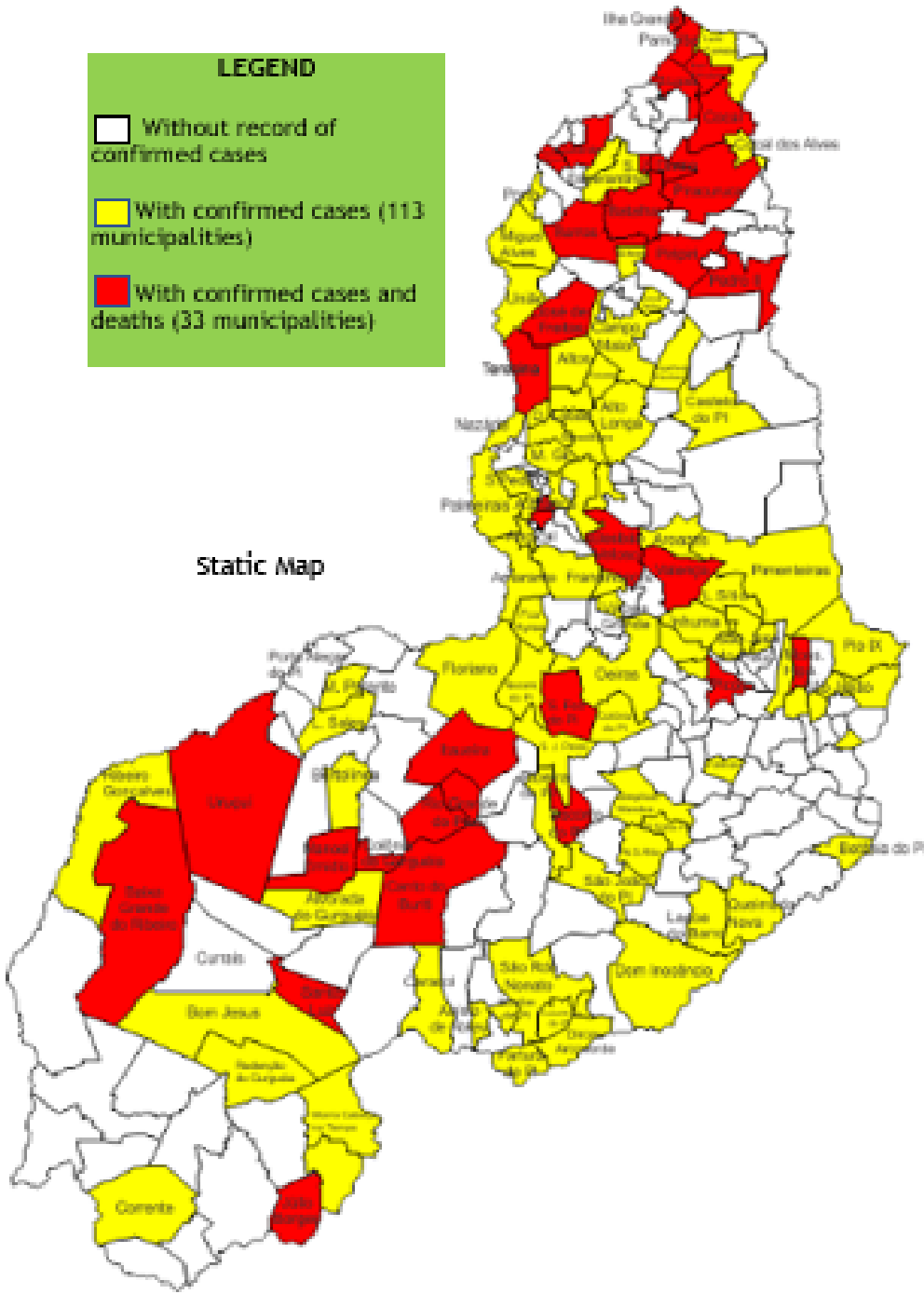

Source: Piauí State Department of Health (SESAPI). **04/13** – Rapid test starts.

The most affected municipality is the capital Teresina with 1,327 confirmed cases, making up 54.38% of the total. Regarding deaths, the municipality also has the largest number, reaching the mark of 40 deaths by COVID-19, that is, 47.05% of the total notifications from the State.

Among the 224 municipalities in Piauí, 113 (50.4%) have confirmed case records and 33 (14.7%) with death records shown in Firgure 1, below:

Figure 1 – Distribution of municipalities with confirmed case and death records in the State of Piauí, Brazil, 2020.

Source: Epidemiological Panel COVID-19, Piauí State Department of Health (SESAPI).

Table 1 shows the predominance of confirmed cases of infection with the novel coronavirus in women (52%) and adults, with the highest concentration among those aged 30 to 39 years (27.75%). The public with the least number of records were children and adolescents, especially those aged 0 to 9 years, who represented only 2.58% of the cases.

Table 1 – Distribution of COVID-19 cases by sex and age group. Piauí, Brazil, 2020.

Variable	n	%
Sex		
Female	1269	52
Male	1171	48
Age group (years)		
0 to 9	63	2.58
10 to 19	83	3.40
20 to 29	437	17.91
30 to 39	677	27.75
40 to 49	411	16.84
50 to 59	325	13.32
60 to 69	229	9.39
70 to 79	143	5.86
80 or older	72	2.95
Total	**2,440**	**100.00**

Source: Piauí State Department of Health (SESAPI). **Legend**: n – Absolute number.

Regarding the confirmed COVID-19 death records, it can be seen in Table 2 that the majority occurred in males (62.4%) and in the elderly (72.94%), with the highest concentration in the age group of 70 to 79 years (27.06%). It is noteworthy that in the studied period, no deaths were detected in individuals aged 0 to 9 years.

Table 2 – Distribution of COVID-19 deaths by sex and age group. Piauí, Brazil, 2020.

Variable	n	%
Sex		
Female	32	37.6
Male	53	62.4
Age group (years)		
0 to 9	0	0.00
10 to 19	1	1.18
20 to 29	3	3.53
30 to 39	3	3.53
40 to 49	7	8.24
50 to 59	9	10.59
60 to 69	17	20.00
70 to 79	23	27.06
80 or older	22	25.88
Total	**85**	**100.00**

Source: Piauí State Department of Health (SESAPI). **Legend**: n – Absolute number.

As shown in Table 3, among the patients who died, 90.2% had some underlying comorbidity. The presence of heart diseases (including Systemic Arterial Hypertension) stood out with 48.04%, followed by Diabetes Mellitus (30.39%). However, 9.8% of deaths recorded did not show any comorbidity.

Table 3 – Comorbidities associated with confirmed COVID-19 deaths. Piauí, Brazil, 2020.

Associated comorbidities	n	%
Heart disease including hypertension	49	48.04
Diabetes	31	30.39
Pneumopathy	4	3.92
Chronic neurological or neuromuscular disease	2	1.96
Kidney disease	0	0
Immunodepression	2	1.96
Obesity	1	0.98
Asthma	0	0
Hematological disease	0	0
Liver disease	0	0
Puerperium	0	0
Down's syndrome	0	0
Neoplasm	3	2.94
No comorbidities	10	9.80

Source: Epidemiological Panel COVID-19, Piauí State Department of Health (SESAPI). **Legend**: n – Absolute number.

DISCUSSION

The state capital, Teresina, is the municipality with the largest number of confirmed cases and deaths. The reason for this finding is because the municipality has the highest population density, and therefore has the largest contingent of people moving, in addition, the city is configured as the epicenter of the epidemic in the State.

According to the results described and presented in Graph 1, Piauí started its rapid tests from April 13, thus triggering the increase in the number of notifications. The extensive testing of suspected individuals, made possible by rapid tests, would be one of the main measures used in the control of the pandemic in several countries because it would be able to detect cases early.[17]

As shown in Figure 1, the State of Piauí has approximately half (50.4%) of its municipalities affected by COVID-19. To avoid the expansion and the emergence of new epicenters of the disease in the State, the remaining 49.6% need to intensify their sanitary barriers and preventive measures by strengthening their health systems.

Ensuring equipment, training and hiring professionals in the municipalities that work as a reference in the main Mesoregions of the State are essential, especially with regard to the treatment of the most serious patients so that there is no overcrowding in the capital's hospitals - where they have the largest number of clinical and ICU beds.

Although there is no statistically significant difference, most of confirmed cases were female, corroborating a study[18] developed in Pará, which presented a percentage of 53%. In contrast, studies conducted in Wuhan, China, showed percentages of prevalence of cases in males, 56%[19] and 67.67%.[20]

The fact that there are many confirmed cases in females can be explained by the vast majority seeking health facilities more frequently, with report of these cases and recognition by local health authorities. Women, in addition to having a better habit of self-care, mostly carry the responsibility of ensuring care for their family, further increasing their attendance and search for health services.[21]

Regarding the age group, the majority of those affected with COVID-19 in Piauí belonged to the range of economically active people, with a higher concentration among individuals aged 30 to 39 years. This finding is like that found in the State of Maranhão, where there was a predominance of the age group between 30 and 49 years.[22]

The economically active population represents the portion of individuals most affected by COVID-19 infection. This factor is a consequence of the greater

exposure of this public, through move to develop professional activities or the performance of essential activities external to social isolation, such as going to supermarkets and pharmacies. Thus, these individuals become the main vectors for the spread of the disease.[18]

Some measures, such as isolation and quarantine, were adopted to contain this spread of the virus in Brazil by limiting the movement of individuals by Law No. 13,979/2020,[23] enacted on February 6, 2020. According to the law, isolation aims to separate contaminated people or goods / objects to prevent the spread of the virus. The quarantine includes the restriction of activities, or the separation of potentially contaminated goods / objects, or the separation of sick and non-sick people, to avoid possible contamination and spread of COVID-19.[23-24]

After the creation of Law No. 13,979/2020, this restriction on the movement of people adopted in several countries, allowed the states and cities that form Brazil to start implementing their restriction measures through decrees from March. Currently, this is one of the only available forms of disease control, confirming the seriousness of the situation.[25] In Piauí, the first decree launched for this purpose was Decree No. 18,884 on March 16, 2020.[26]

Concerning the observed age group, on the other hand, individuals from 0 to 9 years old had the lowest number of cases. To this end, studies[27-28] show that children are less likely to acquire COVID-19; and, in addition, it was found that infectious diseases have a better outcome in this population group.

The possible reason for this finding is that children perform fewer essential activities, outdoor activities and travel, making this group less likely to contract the virus.[28] Moreover, it is noteworthy that state schools had their classes suspended by Decree No. 18,884/2020 from the day of their publication to the present date. Suspension was recommended for municipal and private schools, which adopted this measure, constituting an important contribution to the social isolation of children and adolescents.[26]

It is observed that despite the number of diagnosed cases being female, mortality was higher in the male group (62.4%), as it can be seen in Table 2. This finding is reiterated by the study[18] conducted in Pará, where the percentage of 56% of deaths due to COVID-19 was found to be male. This datum is also corroborated by a study[29] conducted in the city of Teresina-PI, where 63.64% of deaths were in the male population. As it presents most confirmed cases and deaths, the data collected in the capital are like the findings of the present study conducted in the State of Piauí.

Men are more susceptible to death because they seek health services late, resulting in late treatment and, consequently, an increase in the complications of the disease. This is due to the great majority of men are afraid, do not have time, or because they do not feel they need some assistance, since due to a cultural taboo they cultivate the idea that the householder cannot fall ill and have difficulty maintaining the habit of self-care. By not adopting this habit, men are less reported, with underreporting, and making them more susceptible to complications of the disease, late treatment, and high chances of death.[22,30]

The age distribution of deaths associated with SARS-CoV-2 infection in Piauí demonstrated that the elderly public (individuals aged 60 or over) had the highest number of recorded deaths associated with COVID-19. This datum is corroborated by other national[18,22] and international studies.[31]

Characterized by biological, physical, psychological, and sociocultural changes, aging is linked to a series of declines in the body's functions, decreased muscle strength and resistance, the emergence of chronic diseases, among other events. These lead to greater propensities and complications of diseases, hospitalizations and even death, so it is necessary to take a special look at this population.[32]

For some authors[33], certain factors can increase the risk and exposure of this population to COVID-19, such as: family arrangements in which the elderly is passive to care and often does not receive the necessary attention; elderly people living with children, due to their potential for transmission; elderly people who live in retirement homes and have frequent contact with caregivers, visitors, and crowds; elderly workers whose only family income comes from their job, endanger their health by needing to leave their isolation.

The elderly people are more susceptible to infectious diseases due to immunosenescence - natural damage that the immune system suffers during the aging process. Therefore, the isolation measures also aim to protect these individuals from possible contamination with the virus, and greater caution and understanding of the disease by both caregivers and the elderly themselves, whether institutionalized or not, are necessary.[34]

Among the deaths recorded in the analyzed period, the underlying comorbidities identified with the highest occurrence were heart disease (including hypertension) and diabetes mellitus. Studies[3,20] developed at the international level corroborate this finding, where such studies have shown that the presence of comorbidities such as arterial hypertension, diabetes mellitus, and coronary diseases are related to the increased possibility of death from COVID-19.

The Brazilian Guideline for Diagnosis and Treatment of COVID-19[12] defined the following as risk factors for clinical complications of the disease: age equal to or greater than 65 years, presence of comorbidities (hypertension, diabetes, pre-existing lung diseases, cardiovascular diseases, immunosuppression, and cancer), and use of corticosteroid and immunosuppressive therapy.

Most of these comorbidities represent the class of Chronic Noncommunicable Diseases (NCDs) that result from life habits, pathophysiological changes, and the genetic component itself of everyone.

Naturally, NCDs can cause dysfunctions in the body, greater risks of complications when associated with other diseases and reduced life expectancy for people living with one of them.[35]

That said, it is necessary to understand that people who have comorbidities and are contaminated with the novel coronavirus are more susceptible to the development of COVID-19 in its most severe form because they already have a compromise in the functions of their organism, requiring early detection and effective prevention and treatment measures.[36]

It is important to realize the value of epidemiology in identifying problems to delimit objectives, goals, to choose interventions as well, since, in the context of Public Health, it contributes to the monitoring of various diseases and also helps in their treatment.[37] Therefore, epidemiology continues to assist studies at all times in several countries around the world, in view of the urgency of collective control and treatment measures to combat COVID-19, as it is a new and little-known pathology.

CONCLUSION

From the above, it was possible to obtain a brief epidemiological analysis of the cases of COVID-19 in the State of Piauí. It was found that regarding the profile of infected people, most are female and in the economically active age group. Regarding the profile of fatal victims, it is observed that the majority were male, elderly people over 60 years of age and with at least one underlying comorbidity.

The data found have a similarity between the findings of other studies conducted, demonstrating that the disease, despite its singularities and exceptions, selects and affects groups also considered more vulnerable by other infectious diseases.

Some of the main interventions adopted to control the disease in the State of Piauí were isolation and quarantine. However, there is a great need to monitor and inspect such control measures in addition to strengthening Health Surveillance of the

state, as the numbers of cases and deaths, according to the information portal used, increase every day, and may have a greater impact on society.

It is noteworthy that the limitations of the present study are due to constant updates of the data, since the proliferation of the virus is not stable. Moreover, underreporting, the increase in the number of asymptomatic cases and the small amount of rapid testing can interfere and modify these data at the time of epidemiological analysis.

RESUMO

Introdução: A doença denominada COVID-19 é causada por um novo tipo de vírus da família dos Coronavírus. Em decorrência da facilidade do contágio do SARS-CoV-2, o número de casos aumenta rapidamente. Diante disso, objetiva-se elaborar uma análise epidemiológica dos casos e óbitos confirmados no Estado do Piauí. **Delineamento**: Pesquisa descritiva, realizada através do levantamento epidemiológico de casos e dos óbitos da COVID-19 no Estado do Piauí nos primeiros 60 dias da presença da infecção no estado. As variáveis utilizadas foram: municípios afetados, sexo, faixa etária e comorbidades ou fatores de risco identificados entre os óbitos confirmados. **Resultados**: Observou-se que a maioria das pessoas infectadas são do sexo feminino e na faixa etária economicamente ativa. Quanto às vítimas fatais, a maioria eram pessoas do sexo masculino, idosos com mais de 60 anos e com pelo menos uma comorbidade subjacente. **Implicações**: A análise epidemiológica permite visualizar a necessidade de monitoramento e fiscalização de medidas de controle, além do fortalecimento da Vigilância em Saúde do estado, pois os números de casos e óbitos aumentam a cada dia podendo repercutir em maiores prejuízos para a sociedade.

DESCRITORES

Infecções por Coronavirus; Epidemiologia; Vigilância em Saúde Pública; Monitoramento Epidemiológico; Pandemias.

RESUMEN

Introducción: La enfermedad llamada COVID-19 es causada por un nuevo tipo de virus en la familia Coronavirus. Debido a la facilidad de contagio con SARS-CoV-2, el número de casos aumenta rápidamente. Por lo tanto, el objetivo es desarrollar un análisis epidemiológico de casos confirmados y muertes en el Estado de Piauí. **Delineación**: Investigación descriptiva, realizada a través de la encuesta epidemiológica de casos y muertes de COVID-19 en el estado de Piauí en los primeros 60 días de la presencia de la infección en el estado. Las variables utilizadas fueron: municipios afectados, sexo, grupo de edad y comorbilidades o factores de riesgo identificados entre las muertes confirmadas. **Resultados**: Se observó que la mayoría de las personas infectadas son mujeres y pertenecen al grupo de edad económicamente activo. En cuanto a las víctimas fatales, la mayoría eran hombres, personas mayores de 60 años y con al menos una comorbilidad subyacente. **Implicaciones**: El análisis epidemiológico nos permite ver la necesidad de monitorear e inspeccionar las medidas de control, además de fortalecer la Vigilancia de Salud del estado, porque que el número de casos y muertes aumenta cada día y puede tener un mayor impacto en la sociedad.

DESCRIPTORES

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

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