



Morbimortality by covid-19 in the social context of the Cariri health region, Ceará
Morbimortalidade por covid-19 no contexto social da região de saúde Cariri, Ceará
Morbimortalidad por Covid-19 en el contexto social de la región de salud Cariri, Ceará

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ABSTRACT

Objective: To analyze the distribution of Covid-19 morbidity and mortality occurrences in the context of the Social Determinants of Health in the Cariri health region, Ceará. **Methods:** The study is of the ecological type of descriptive time series using secondary data, between January 2020 and August 2021, extracted from the platforms IntegraSUS, the Institute of Research and Economic Strategy of Ceará (*Instituto de Pesquisa e Estratégia Econômica do Ceará – IPECE*), and the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística – IBGE*). The study site was the Cariri Health Region, in Ceará, in the five decentralized health areas, comprising 45 cities. The Variables used were family income, the density of residents per bedroom, gender and age group, confirmed cases, and deaths from COVID-19. Data analysis was performed based on Absolute and relative Frequency statistics. **Results:** In Cariri, it was observed that 8,916 families live on less than one minimum wage, in the area of Juazeiro do Norte is the largest number of families with more than $\frac{1}{4}$ to $\frac{1}{2}$ of the minimum wage per month. The municipality of Acopiara had the highest mortality rate and Orós had the highest mortality rate. Although females had the highest morbidity rate, the fatality rate was higher for males in all decentralized areas. **Conclusion:** Factors related to the health-disease-care process were relevant in morbidity and mortality due to COVID-19 in the region of Cariri Cearense. The population in conditions of social vulnerability expresses health in equality, which reinforces the need for interprofessional actions that act with strategies aimed at improving these conditions.

Descriptors: Coronavirus; Social Determinants of Health; Health vulnerability.

RESUMO

Objetivo: Analisar a distribuição das ocorrências de morbimortalidade da COVID-19 no contexto dos Determinantes Sociais da Saúde (DSS) da região de saúde Cariri, Ceará. **Métodos:** O estudo é do tipo ecológico de série temporal descritivo utilizando dados secundários, entre janeiro de 2020 a agosto de 2021, extraídos das plataformas IntegraSUS, Instituto de Pesquisa e Estratégia Econômica do Ceará (IPECE) e Instituto Brasileiro de Geografia e Estatística (IBGE). O local de estudo foi Região de Saúde do Cariri, no Ceará, nas cinco áreas descentralizadas de saúde, composta por 45 municípios. As variáveis utilizadas foram: rendimento familiar; densidade de moradores por dormitório; gênero e faixa etária; casos confirmados e óbitos por COVID-19. Os dados foram



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tabulados a partir de planilhas do programa Microsoft Excel 2019 para posterior análise com base na estatística de frequência absoluta e relativa. **Resultados:** No Cariri, foi observado que 8.916 famílias vivem com menos de um salário-mínimo, sendo a área de Juazeiro do Norte local com o maior número de famílias com mais de $\frac{1}{4}$ a $\frac{1}{2}$ do salário-mínimo por mês. O município de Acopiara apresentou a maior taxa de letalidade e Orós a maior taxa de mortalidade. Embora o gênero feminino apresentasse a maior taxa de morbidade, a taxa de letalidade foi maior no gênero masculino, em todas as áreas descentralizadas. **Conclusão:** Os fatores relacionados ao processo de saúde-doença-cuidado foram relevantes na morbimortalidade por COVID-19 na região do Cariri Cearense. A população em condições de vulnerabilidade social expressa as iniquidades em saúde, o que reforça a necessidade de ações interprofissionais que atuem com estratégias que visem a melhoria dessas condições.

Descritores: Coronavírus; Determinantes Sociais da Saúde; Vulnerabilidade em saúde.

RESUMEN

Objetivo: Analizar la distribución de las ocurrencias de morbimortalidad de COVID-19 en el contexto de los Determinantes Sociales de la Salud (DSS) de la región de salud Cariri, Ceará. **Métodos:** El estudio es del tipo ecológico de serie temporal descriptivo utilizando datos secundarios, entre enero de 2020 y agosto de 2021, extraídos de las plataformas IntegraSUS, Instituto de Investigación y Estrategia Económica del Ceará e Instituto Brasileño de Geografía y Estadística. El local de estudio fue Región de Salud de Cariri, en Ceará, en las cinco Áreas Descentralizadas de Salud, compuesta por 45 municipios. Las variables utilizadas fueron: rendimiento familiar; densidad de residentes por dormitorio; género y franja de edad; casos confirmados y óbitos por COVID-19. Los datos fueron tabulados a partir de planillas del programa Microsoft Excel 2019 para análisis posterior con base en la estadística de frecuencia absoluta y relativa. **Resultados:** En Cariri, fue observado que 8.916 familias viven con menos de un sueldo mínimo, siendo el área de Juazeiro do Norte el local con el mayor número de familias con más de $\frac{1}{4}$ a $\frac{1}{2}$ del sueldo mínimo por mes. El municipio de Acopiara presentó la mayor tasa de letalidad y Orós la mayor tasa de mortalidad. Aunque el género femenino presentase la mayor tasa de morbilidad, la tasa de letalidad fue mayor en el género masculino, en todas las áreas descentralizadas. **Conclusión:** Los factores relacionados al proceso de salud-enfermedad-atención fueron relevantes en la morbimortalidad por COVID-19 en la región del Cariri Cearense. La población en condiciones de vulnerabilidad social expresa las iniquidades en salud, lo que fortalece la necesidad de acciones interprofesionales que actúen con estrategias que busquen mejorar estas condiciones.

Descriptores: Coronavirus; Determinantes Sociales de la Salud; Vulnerabilidad en salud.

INTRODUCTION

The COVID-19 pandemic, which started in 2020, caused a large amount of damage to the society, health, and economy of many countries. The symptoms presented, in most patients, were fever, cough, shortness of breath, muscle pain, headache, confusion, chest pain, and diarrhea. The occurrence of severe forms of the disease has been perceived since its beginning. It sometimes manifests through vascular complications, damage to organ function, acute respiratory injury, acute kidney injury, septic shock, and pneumonia associated with mechanical respiration⁽¹⁾.

With rapid spread, COVID-19 spread through contact with the infected person through droplets. Given the rapid transmissibility of the new coronavirus, the World Health Organization (Organização Mundial da Saúde – OMS) declared, on March 11, 2020, as a pandemic and regimes that the government takes urgent and aggressive measures to minimize the impact of the virus. Thereby, it was considered a public health emergency, a fact that determined that new flexibility strategies and sanitary measures were adopted during the pandemic⁽²⁾.

Thus, it was realized that, in the face of the pandemic, it would be necessary to implement effective and strategic actions for prevention and health promotion. In this way, social distancing measures were adopted under the autonomy of the authorities at the state and municipal levels, considering local particularities. Prevention actions to mitigate the spread of the virus were mainly due to the mandatory use of a mask, hand washing, social isolation, and the suspension of activities in non-essential trade⁽³⁾ and later with the application of vaccines⁽³⁾.

In Brazil, COVID-19 directly impacted health services, especially concerning the number of hospitalizations. However, the health system presented failures in care, where in some situations there was bed unavailability, due to the demand generated by the COVID-19 virus, which resulted in increased mortality⁽⁴⁾.

The pandemic has exposed the social disparities in Brazil, which, by the way, were in the background for too long. Inequalities have become corroborative factors with the spread of the virus since the incidence rates of morbidity and mortality showed a progression in Brazilian States with a higher inequality rate. Thus, there is an urgent need to formulate strategies aimed at social protection and based on structural and socio-spatial inequalities at multiple scales^(5,6).

Because of this, understanding the complexity of the determining factors related to health behaviors is relevant in the elaboration of multi-professional and integrated health strategies. In addition to providing important data for the formulation of intersectoral policies that seek to improve basic living conditions during the post-pandemic period. With this, it will be possible to start discussions in the scientific field, which will elucidate which interactions and situations are considered determinants in the unfolding of the health-disease process in relation to the COVID-19 infection⁽⁷⁾.

Thus, the objective was to analyze the distribution of occurrences of morbidity and mortality from COVID-19 in the context of the Social Determinants of Health in the Cariri health region, State of Ceará.

METHODS

This research consists of an ecological time series study, descriptive with a quantitative approach, which used secondary data from the public domain available on the public health management transparency platform of the Ceará Health Department (IntegraSUS/SESA-CE), a database from the Institute of Research and Economic Strategy of Ceará (Instituto de Pesquisa e Estratégia Econômica do Ceará – IPECEDATA) and from the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* – IBGE).

The study data comprised all the records found and obeys the corresponding time frame between January 1, 2020, and August 30, 2021. This happened because IntegraSUS has considered data on COVID-19 from January 1, 2020, when confirmed cases have already been reported. Data collection on social indicators, monthly family income, and the density of residents per bedroom were collected from the IBGE, which was available only in 2010.

The place of the study comprised the health region of Cariri, located in the state of Ceará, in the Northeast region of Brazil, which is composed of five Decentralized Health Areas (Áreas Descentralizadas de Saúde – ADS): Brejo Santo, Crato, Iguatu, Icó, and Juazeiro do Norte. The estimated population is 1,462,418 inhabitants, distributed in 45 cities, and, with that in mind, the most populous and economically developed cities were chosen as the host cities of the ADS⁽⁸⁾.

The variables used were based on indicators of the Social Determinants of Health and social vulnerability, limited to: monthly family income, the density of residents per bedroom, gender, and age group. The COVID-19 variables were: confirmed cases due to gender and age group, deaths due to gender and age group, and hospitalizations due to COVID-19.

IntegraSUS changed during the data gathering period, implying two gathering stages: the first stage was collected from August 30 to September 02, 2021, and the second was on September 15. As a result, these changes influenced the quantitative research, with a difference of 335 cases and 13 deaths in the two stages.

Thus, data analysis was performed based on descriptive statistics of absolute and relative frequency, through numerical variables. Data were tabulated from Microsoft Excel 2019 spreadsheets. Thus, for the calculation of lethality and mortality, the following formulas were used:

$$\text{Lethality Rate (CFR, in \%)} = \frac{\text{Number of deaths disease} \times 100}{\text{Number of confirmed cases of the disease}}$$

$$\text{Mortality Rate} = \frac{\text{Number of deaths} \times 100}{\text{Total population}}$$

This study did not require consideration by the Research Ethics Committee (*Comitê de Ética em Pesquisa – CEP*), according to Resolution 510/2016 of the National Health Council (*Conselho Nacional de Saúde – CNS*), since the results refer to secondary data with public access granted by the State Health Department of Ceará (*Secretaria de Saúde do Ceará – SESA*). However, strict efforts were made to adhere to the international ethical standards for research involving human beings, and Resolution No. 466/2012 of the Ministry of Health⁽⁹⁾.

RESULTS

The ADS in the planning region of Cariri has a population of approximately 1,497,246 inhabitants, with the majority being women (n=769,297; 51.3%). Regarding age, there was a predominance between 30 and 39 years old (n=256,595; 17.1%). The prevalent family monthly nominal income class per capita earns more than ¼ to 2 minimum wages (n=11,838; 43.3%); and the density of residents per bedroom corresponds to more than 1.0 to 3.0 residents per house (n=258,915; 67.4%). (Chart I).

Chart I – Distribution of Social Determinants of Health in the ADS of the Cariri health region. Cariri, Ceará, Brasil, 2021.

Variables	DECENTRALIZED HEALTH AREAS ***					Total
	Icó	Iguatu	Brejo Santo	Crato	Juazeiro do Norte	
Gender*						
Male	85.105	159.718	107.154	169.541	206.431	727.949
Femile	88.042	164.840	109.770	181.122	225.523	769.297
Total	173.147	324.558	216.924	350.663	431.954	1.497.246
Age*						
10 to 19 years old	24.459	45.342	32.208	54.403	39.929	196.341
20 to 29 years old	27.552	51.981	37.159	60.442	76.324	253.458
30 to 39 years old	26.546	51.637	53.224	54.016	71.172	256.595
40 to 49 years old	22.599	42.788	28.530	43.452	55.519	192.888
50 to 59 years old	19.499	36.797	22.044	35.447	39.752	153.539
60 to 69 years old	14.160	25.980	14.812	23.985	26.233	105.170
70 to 79 years old	9.295	16.985	10.070	16.325	16.995	69.670
80 or more	5.173	9.073	5.628	8.670	9.126	37.670
Total	149.283	280.583	203.675	296.740	335.050	1.265.331
Prevalent family monthly nominal income class per capita**						
No income	954	1530	808	1.629	2.316	7.237
Up to 1/4 of the minimum wage	1.082	2.381	1.449	1.834	2.170	8.916
More than 1/4 up to 2 minimum wages	914	2.254	1.373	2.600	4.697	11.838
Total	2.950	6.165	3.630	6.063	9.183	27.991
Density of residents per bedroom**						
Up to 1.0 resident	11.541	23.092	12.710	24.155	26.282	97.780
More than 1.0 to 3.0 residents	29.931	61.462	38.856	55.996	72.670	258.915
More than 3.0 residents	2.789	4.889	4.639	6.244	8.766	27.327
	44.261	89.443	56.205	86.395	107.718	384.022

Reference: *IBGE, 2020; **IPECEDATA, 2010.

***ADS (Áreas Descentralizadas de Saúde): Decentralized Health Areas are composed of cities in order to coordinate, articulate and organize the health system in each área.

In Cariri, it was observed that 8,916 families live on up to ¼ of the minimum wage. At ADS Juazeiro do Norte, most families receive more than ¼ to 2 minimum wages per month. The ADS of Iguatu, Brejo Santo, Crato, and Icó have a similar distribution, related to the large number of families that receive up to ¼ of the minimum wage per month.

Based on the description of the number of people in a room that serves as a bedroom for residents, it is possible to identify an overview of the five ADS and how these indicators are distributed in the region. Juazeiro do Norte, and Crato, for example, have the highest number of residents per bedroom compared to the other ADS.

Between January 1, 2020, and August 30, 2021, 157,602 confirmed cases and 3,079 deaths from COVID-19 were observed in the Cariri region. The highest percentages of confirmed cases were among the ADS of Juazeiro do Norte with 27.8% (n=43,844), Crato with 23.7% (n=37,338), and Iguatu with 20.2% (n=31,837). This percentage, therefore, occurred due to the large number of inhabitants.

Chart II – Distribution of morbimortality and main determinants in the ADS of the Cariri health region. Cariri, Ceará, Brasil, 2021.

Variables/ADS*	Icó	%	Iguatu	%	Brejo Santo	%	Crato	%	Juazeiro do Norte	%	Total
Population	172.994	11,6	323.376	21,6	216.206	14,5	349.132	23,4	429.364	28,7	1.491.072
Confirmed cases	20.872	13,2	31.837	20,2	23.711	15,0	37.338	23,69	43.844	27,8	157.602
Deaths	350	11,4	679	22,0	490	15,9	596	19,3	964	31,3	3.079
Lethality **	1,68%	-	2,13%	-	2,07%	-	1,60%	-	2,20%	-	-
Mortality ***	2,02	-	2,10	-	2,27	-	1,71	-	2,25	-	-

Reference: INTEGRASUS, 2021.

ADS (Áreas Descentralizadas de Saúde): Decentralized Health Areas are made up of cities with the aim of coordinating, articulating and organizing the health system in each area; The letality rate (CFR, and %) was calculated as the number of deaths from the disease divided by the number of confirmed cases of the disease times 100. ***The mortality rate was calculated from the number of deaths divided by the total population times 1000.

The ADS of Juazeiro do Norte has the highest number of confirmed cases and deaths caused by COVID-19 rather than the other ADS. The municipality of Acopiara, from ADS Iguatu, had the highest mortality rate, 3.6%, and Orós from ADS Icó, with 4.1, had the highest mortality rate. Although, we can also mention that these cities are part of Icó and Iguatu ADS, respectively, and are among the highest number of residents per bedroom.

In the data obtained, the confirmed percentage of women is greater than that of men in all cities. Regarding deaths, males were prevalent in all ADS. Given this, it was noticed that the lethality rates in all ADS would be higher in males, that is, women were more infected; however, they did not reach the critical stage of the disease, unlike men who evolved to death most of the time.

Chart III – Characterization of the epidemiological findings of COVID-19 – Cariri, Ceará, Brasil, 021.

ADS*	MALE			FEMALE		
	Cases (n=70.078)	Deaths (n=1.732)	Lethality**	Cases (n=87.862)	Deaths (n=1.334)	Lethality **
Icó	12,95%	11%	2,13%	13,43%	12%	1,33%
Iguatu	20,17%	22%	2,70%	20,38%	23%	1,75%
Brejo Santo	15,10%	16%	2,55%	14,95%	16%	1,67%
Crato	23,00%	19%	2,00%	24,09%	18%	1,15%
Juazeiro do Norte	28,78%	33%	2,80%	27,15%	30%	1,68%

Reference: INTEGRASUS, 2021.

ADS (Áreas Descentralizadas de Saúde): Decentralized Health Areas are made up of cities with the aim of coordinating, articulating and organizing the health system in each area; The letality rate (CFR, and %) was calculated as the number of deaths from the disease divided by the number of confirmed cases of the disease times 100.

The highest lethality rates were observed in the cities of Acopiara, Jucás, Antonina do Norte, Jardim, Mauriti, and Orós, which belong to the ADS of Iguatu, Crato, Juazeiro do Norte, Brejo Santo and Icó, respectively. Among these cities, Acopiara, and Jucás are part of the ADS of Iguatu.

CHART IV – Presentation of lethality rates by COVID-19 according to age group – Cariri, Ceará, Brasil.

AGE GROUP */ADS**	LETHALITY***				
	Icó	Iguatu	Brejo Santo	Crato	Juazeiro do Norte
10 a 14 anos	0,0%	0,0%	0,0%	0,0%	0,0%
15 a 19 anos	0,0%	0,1%	0,1%	0,0%	0,1%
20 a 24 anos	0,1%	0,1%	0,2%	0,0%	0,1%
25 a 29 anos	0,4%	0,1%	0,4%	0,1%	0,1%
30 a 34 anos	0,3%	0,4%	0,2%	0,2%	0,4%
35 a 39 anos	0,4%	0,5%	0,4%	0,3%	0,5%
40 a 44 anos	0,6%	0,8%	0,9%	0,5%	0,9%
45 a 49 anos	0,8%	0,8%	1,5%	0,6%	1,4%
50 a 54 anos	1,4%	1,7%	2,1%	1,0%	2,2%
55 a 59 anos	2,0%	2,6%	3,6%	2,7%	4,2%
60 a 64 anos	3,0%	3,6%	5,4%	2,8%	4,5%
65 a 69 anos	4,2%	5,0%	6,8%	4,4%	6,1%
70 a 74 anos	7,8%	8,1%	9,0%	7,4%	11,7%
75 a 79 anos	10,3%	11,6%	13,3%	10,5%	16,8%
80 ou mais	15,6%	22,7%	20,7%	17,4%	26,5%

Reference: INTEGRASUS, 2021.

ADS (Áreas Descentralizadas de Saúde): Decentralized Health Areas are made up of cities with the aim of coordinating, articulating and organizing the health system in each area; The letality rate (CFR, and %) was calculated as the number of deaths from the disease divided by the number of confirmed cases of the disease times 100.

Regarding ADS lethality rates, it was observed that people aged over 70 years had the highest rates, with greater relevance for the age group of 80 years and over. This group concentrated the highest rates, 15.6% in Icó, 22.7% in Iguatu, 20.7% in Brejo Santo, 17.4 in Crato and 26.5% in Juazeiro do Norte.

DISCUSSION

Faced with the repercussions generated by the pandemic, complex factors emerged related to a possible increase in the spread of the virus, especially in people in vulnerable situations. Therefore, the present study sought to understand how health inequalities became more prominent in this context and how the developed analyses provided the following findings. In this study, the health region of Cariri presented the number of families living on less than one minimum wage, with emphasis on ADS Juazeiro do Norte, with the largest number of families receiving more than ¼ to ½ of the minimum wage per month. The municipality of Acopiara, ADS Iguatu, had the highest mortality rate and Orós, ADS Icó, had the highest mortality rate. Regarding the age group, it was noticed that the most infected people were those between 30 and 34 years old, however, the deaths were higher in people aged 80 years or more.

Regarding gender, in all ADS, the virus infected more women, however, the lethality rate was 2.8% higher in men. Thus, the data agree with a survey based on secondary data in Rondônia, in the North region of the country, with a higher incidence of COVID-19 among women, with 53.5% of cases, and lethality among men, with 2.7%. This finding can be explained by the feminization of care, thinking of care as something socially delegated to women, historically associated with professions or everyday responsibilities^(10,11).

From the collected data, it can be argued that the five ADS that are part of Cariri presented decisive factors in the spread of COVID-19. The Juazeiro do Norte ADS, with the highest proportion of urban population, presented expressive data about living conditions that the population already faced before the pandemic period. Before the pandemic in Cariri, most families had a monthly family income of less than half the minimum wage in Cariri. Thus, we can understand family income as the indicator with the greatest influence on food availability, where low-income residences have a greater risk of food insecurity compared to higher-income residences^(12,13,14).

In addition, ADS Juazeiro do Norte recorded the highest numbers of cases and deaths among the other regions, according to the city of residence. In addition, the results also show an exacerbation of the number of families living

without monthly income in Juazeiro do Norte. In the Brazilian context, the pandemic affected all workers, however, those most affected were those in lower socioeconomic groups, with limited access to health services, or those in the informal economy, such as immigrants and domestic workers⁽¹⁵⁾.

According to a survey carried out by IBGE (2019) on subnormal clusters, territorial areas in situations of social vulnerability, with precarious housing and socioeconomic conditions, in addition to weaknesses in basic sanitation, are more likely to suffer more from the spread of COVID-19. In this way, it is clear that precarious housing conditions make it difficult to adopt sanitary measures for those who have already experienced difficulties^(16,17).

Overcrowding is defined as sharing a room with more than three people, an important factor for vertical isolation during the quarantine of one of the infected family members. Thus, it contributed to the increase in the incidence rate in the Brazilian Federative Units (*Unidades Federativas* – UF), with an inequities scenario during the pandemic. Quarantine, in many cases, was unfeasible considering the housing deficit, making this proposal unfeasible and, consequently, increasing the spread of the virus⁽¹⁸⁾.

COVID-19 highlighted the importance of domestic infrastructure determinants to contain the spread of the virus. It is noticed, in this study, that indicators of social vulnerability can influence the increase in cases of COVID-19. In research carried out in the neighborhoods of Fortaleza, Ceará, it was shown that the indicators had an influence on the incidence of COVID-19 in the metropolis, in other words, the higher the level of education, the lower the risk of contracting the virus^(19,20,21).

In addition to the level of education, other social aspects have become more evident concerning inequality during the COVID-19 pandemic, in rich and poor countries. The poorest countries, consequently, are subject to infection and the development of more serious cases due to factors such as the probability of sharing the same bedroom with more people, more use of public transport, lack of basic sanitation, difficulty in accessing information and maintaining social isolation depending on employment and income characteristics⁽²²⁾.

It is also essential to identify the indicators of social vulnerability in times of a pandemic, allowing the prioritization of groups with greater exposure, and thus carrying out interventions in the community. There is an urgent need to direct public resources and strengthen health promotion actions, in regions with greater social vulnerability, to reformulate new public policies to reduce social inequalities.

It is noticed that populations with the highest level of vulnerability had greater impacts on the effects of the pandemic. This is due to the absence and/or insufficiency of resources, the difficulty in carrying out social isolation, maintaining their jobs and incomes, less access to clinical and specialized health services, and difficulty in accessing prevention strategies and/or treatment of the disease in their daily lives⁽²³⁾. From this perception, prevention and health promotion actions can contribute to the improvement of the population's health conditions.

In addition to the concern about the health problems that the virus could cause, there was the concern about how to put into practice preventive measures with a shortage and/or insufficiency of hygiene materials and the concern with food for the family, who already lived with the minimum. This fact culminated in the number of families living without income in the Cariri health region, which increased to 7,237 families⁽²⁴⁾.

Analyzing the territory of Ceará, a study carried out at the beginning of the pandemic presented Cariri as the region with the lowest incidence rates, which indicates the effectiveness of the strictness of social isolation. However, analyzing the others, the lethality coefficient of this region showed an exacerbation of values. The underreporting of cases may have been a contributing factor, considering the economy of tests at the beginning of the pandemic, where the most serious cases were prioritized, in addition to the large period between collections and test results⁽²⁵⁾.

Still in Ceará and relation to the number of confirmed cases, a study carried out in April 2021, using the same platform, provided data that in both sexes, the most affected age group was between 30 and 39 years old, 22.6% for females and 22.5% for males. This research corroborates the results found about women becoming infected more than men⁽²⁶⁾.

The high mortality rate observed in this study of the elderly corroborates a recent study in which the highest incidence and mortality rates were inversely related to the proportion of the elderly and the aging rate. In addition, there is the premise that the States of the North and Northeast regions were more affected by the COVID-19 pandemic in Brazil⁽²⁷⁾.

The high mortality rate observed in the elderly in this study corroborates recent research in which the highest incidence and mortality rates were inversely related to the proportion of the elderly and the aging rate. In addition, there is the premise that the states of the North and Northeast regions were more affected by the COVID-19 pandemic in Brazil.

Among the justifications for high mortality and lethality rates, in the North and Northeast regions, among the elderly

are the difficulty and availability of access to health services due to the territorial dimension of the region, precarious urban transport system, a smaller number of hospital beds, ICU and respirators, which makes care difficult in the face of complications triggered by the COVID-19 infection. In addition, there are unique issues such as the number of residents per residence, especially in nursing homes or geriatric clinics, difficulty in maintaining social isolation, and preventive measures, among others⁽²⁸⁾.

Health prevention and promotion measures, aimed at the more vulnerable populations and a greater risk of developing COVID-19, require careful monitoring of the actions implemented in the face of previously recognized social determinants. Among the actions mentioned above, we can emphasize greater attention to those of a behavioral nature. Thus, adequate operationalization by the population will allow them to improve at a lower cost and with greater effectiveness⁽²⁹⁾.

In the context of improving the quality of the population's life during the COVID-19 pandemic, the proposal to implement integrative therapies associated with clinical treatment as a health promotion was an action that stood out in clinics and the scope of the Health System (*Sistema Único de Saúde – SUS*). These actions were made through integrative and complementary practices (*Práticas Integrativas e Complementares – PIC*), showing a practical form of care^(30,31); although this study has not focused on the study of PICS during the pandemic in the Cariri region.

Thinking about overcoming the difficulties presented by the health determinants found in this study, we can list vaccination and non-pharmacological prevention measures such as social distancing, hand hygiene, use of masks, cleaning and disinfection of environments, and the isolation of suspected and confirmed cases through quarantine of contacts of COVID-19 cases. However, it is understandable that implementing these measures is a challenge for the vulnerable population because of the social condition they live in, and it is up to the authorities to minimize the intersectoral harms exposed to this population⁽³²⁾.

Study restrictions included the secondary dimension of the data and the possible margin of underreporting by the use of public access platforms. The healthcare network is expected to monitor the population under its responsibility and outline actions that address real demands and needs. In Health Surveillance actions, continuous identification is expected with the recording of information on situations that put people's health at risk, with priority given to primary prevention and health promotion. Based on social aspects, it is suggested that they be identified and notified continuously through sensitive indicators on the vulnerability profile of populations. These indicators are a method of substantiating and subsidizing actions aimed at guaranteeing basic rights, in addition to instructing the population in basic life rights acknowledgment, to empower communities with the acquisition of technical knowledge and political awareness; through access to information and effective participation in decision-making and policy implementation.

FINAL CONSIDERATIONS

The social vulnerability indicators of the cities are linked to the social determinants of quality of life. However, considering its population density, it was shown that in the period related to the intersectoral crisis of the COVID-19 pandemic, between January 2020 and August 2021, there was a significant increase in the mortality and lethality rate.

The findings indicated that unfavorable social and health conditions imply the health-disease-care process during the pandemic period and the worsening of clinical conditions and their consequences.

Thus, the execution of intersectoral actions with an emphasis on health promotion is recommended, as well as the implementation of affirmative and redistributive policies that make it possible to reduce health inequalities in the population living in conditions of social vulnerability. These measures are necessary for the emergency of the pandemic situation but remain over time to remit social inequalities and face other health crises that affect this population and, consequently, their quality of life.

CONFLICTS OF INTEREST

The authors declare that there were no conflicts of interest.

CONTRIBUTIONS

Maria Vitória Ribeiro da Silva, José Auricélio Bernardo Cândido and **Antonio Germane Alves Pinto** contributed to the preparation and design of the study; data acquisition, analysis, and interpretation; writing and revising the manuscript. **Cícero Damon Carvalho de Alencar** contributed to the preparation and design of the study. **Stefane Vieira Nobre** and **Cleide Carneiro** contributed to writing and revising the manuscript. **Maria Regilânia Lopes Moreira**

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