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Vulnerabilidade social em tempos pandêmicos: correlação entre determinantes sociais de saúde e incidência da COVID-19 nas regiões brasileiras

Social vulnerability in the pandemic period: correlation between social determinants of health and COVID-19 incidence in Brazilian regions

Vulnerabilidad social en tiempos de pandemia: correlación entre los determinantes sociales de la salud y la incidência de la COVID-19 en las regiones brasileñas

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Resumo

Os determinantes sociais de saúde influenciam diretamente no processo saúde-doença. Na pandemia causada pelo novo Coronavírus, denominada *Coronavirus Disease* 2019 (COVID-

19), esses fatores implicam na transmissão e no agravamento da enfermidade. Este trabalho tem como objetivo correlacionar a vulnerabilidade social nas regiões brasileiras com o número de casos confirmados de COVID-19. A análise dos dados foi feita por uma abordagem qualitativa por meio de informações disponibilizadas pelos órgãos públicos como Instituto Brasileiro de Geografia e Estatística (IBGE), Secretarias Estaduais de Saúde, Secretarias Municipais de Saúde e pela literatura indexada na plataforma de dados *Scientific Electronic Library Online (SciELO)* utilizando os descritores em saúde: "Determinantes sociais de saúde", "Processo saúde-doença", "Vulnerabilidade social" e "COVID-19". Como resultados, a discrepância entre as taxas de incidência e mortalidade regionais sugerem relação com a desigualdade social e os índices da COVID-19 nas regiões do Brasil. Norte e Nordeste apresentaram os piores índices na maioria dos parâmetros avaliados. Portanto, a população vulnerável de recursos fundamentais para uma sobrevivência digna está mais suscetível a agravamentos e falhas no enfrentamento de novas doenças infectocontagiosas.

Palavras-chave: COVID-19; Desigualdade social; Processo saúde-doença; Indicadores de saúde.

Abstract

The social determinants of health directly influence in the health-disease process. In the pandemic caused by the novel Coronavirus, denominated Coronavirus Disease 2019 (COVID-19), these factors imply the transmission and worsening of the disease. This work is aimed to correlate the social vulnerability in Brazilian regions with the number of COVID-19 confirmed cases. The analysis was made through a qualitative approach in the search for information made available by public agencies such as the Brazilian Institute of Geography and Statistics (*IBGE*), State Department of Health, Municipal Department of Health and the literature indexed on the Scientific Electronic Library Online (SciELO) database using the health descriptors: "Social determinants of health", "Health-disease process", "Social vulnerability" and "COVID-19". As results, the discrepancy between regionals incidence and mortality rates suggests a relationship with social inequality and COVID-19 indices in the regions of Brazil. North and Northeast had the worst rates in most of the evaluated parameters. Therefore, the vulnerable population of fundamental resources for dignified survival is more susceptible to aggravations and failures in coping with new infectious diseases.

Keywords: COVID-19; Social inequity; Health-disease process; Health status indicators.

Resumen

Los determinantes sociales de la salud influyen directamente en el proceso salud-enfermedad. En la pandemia causada por el nuevo *Coronavírus*, denominada *Coronavirus Disease* 2019 (COVID-19), estos factores implican en la transmisión y el empeoramiento de la enfermedad. Este trabajo tiene como objetivo correlacionar la vulnerabilidad social en las regiones brasileñas con el número de casos confirmados por COVID-19. El análisis de datos se realizó mediante un enfoque cualitativo a través de la información proporcionada por agencias públicas como el Instituto Brasileño de Geografía y Estadística (*IBGE*), Secretarías de Salud del Estado, Secretarías de Salud Municipales y la literatura indexada en la plataforma de datos de la *Scientific Electronic Library Online* (SciELO) utilizando descriptores de salud: "Determinantes sociales de la salud", "proceso salud-enfermedad", "Vulnerabilidad social" y "COVID-19". Como resultado, la discrepancia entre las tasas de incidencia y la mortalidad regionales sugiere una relación con la desigualdad social y los índices COVID-19 en las regiones brasileñas. Norte y Noreste presentaron los peores tasas en la mayoría de los parámetros evaluados. Por lo tanto, la población vulnerable con recursos fundamentales para una supervivencia digna es más susceptible a un empeoramiento y a fallas en el manejo de nuevas enfermedades infecciosas.

Palabras clave: COVID-19; Inequidad social; Proceso salud-enfermedad; Indicadores de salud.

1. Introduction

In December 2019, a novel viral strain of the genus *Coronavirus* was identified, named Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). Since then, this agent has caused numerous cases of severe respiratory infection worldwide. Due to rapid geographical spread, in March 2020 the World Health Organization (WHO) declared a state of the pandemic (Carvalho, et al., 2020; Holanda, 2020; OPAS, 2020; Sousa, et al., 2020).

The nomenclature for the comorbidity caused by the virus is Coronavirus Disease 2019 (COVID-19), defined as pneumonia associated with the acute respiratory syndrome (Huang, et al., 2020). Currently, it accounts for about 10 million infected people worldwide and more than 500 thousand deaths, according to data from Johns Hopkins University, USA (2020).

The concept of the health-disease process has a multidimensional character because understanding covers different spheres (Carrapato; Correia; Garcia, 2017). As defined by the WHO in 1947, health is not understood to be only the absence of illness or disease, but assess the complete wellness physically, mental and social (Buss & Pellegrini Filho, 2007).

States have the legal obligation to protect and guarantee this fundamental right inherent to the human person (right to health), includes in the 1988 Constitution of the Federative Republic of Brazil. The right to the preservation of human dignity and the right to life gives the Brazilian State the task of mediating essential healthcare and must act in a way that can serve everyone, especially the most vulnerable (Brasil, 1988; Piovesan, 2013; Ramos, 2018).

Such rights are associated with Human Rights, giving instructions to public operators to ensure the wellness of the population in an equitable manner, respecting and obeying the principles and the organizational structure of the public health system. Therefore, fundamental principles must guide all State actions (Ramos, 2018).

Despite the existence of all theoretical framework, Brazil is identified as an unequal country in most economic and social aspects. This information is evidenced by the social indices presented by the Brazilian Institute of Geography and Statistics (*IBGE*), which showed the divergence between parameters such as education, unemployment, and per capita monthly household income, for example (IBGE, 2019).

In the face of health sanitary circumstances, known that lives conditions and access to basic resources influence the development and aggravation of comorbidities, including infectious diseases make individuals susceptible to diseases (Buss & Pellegrini Filho, 2007; Santos, 2020b).

This work is aimed to correlate the social vulnerability in Brazilian regions with the number of COVID-19 confirmed cases.

2. Methodology

This study was developed in a qualitative descriptive (Pereira, et al., 2018) approach to understanding, elucidate and detail the main social aspects of Brazil, dividing them into their respective regions: North, South, Midwest, Northeast, and Southeast. The social survey was carried out in June 2020 using the most recent *IBGE* data, published in full, referring to each of the parameters of interest.

Data from 2018, 2019, and 2020 National Household Sample Survey (*PNAD*) and 2010 Demographic Census were evaluated to analyze data on population, unemployment, per capita income, education, sanitation, and access to water. All indices were observed on the regional scale. To report the epidemiologic investigation of this COVID-19 outbreak was collected through the Federal Government platform (covid.saude.gov.br) and made available by the respective State Department of Health, Municipal Department of Health.

The data collected was analyzed by statistical descriptive (absolute and relative frequency) and presented in graph productized on the Microsoft Excel® 2019 version. Were associated with the social determinants of health described in the literature indexed in the Scientific Electronic Library Online (SciELO) scientific database. For search, an association of descriptors was used, such as: “Social determinants of health”, “Health-disease process”, “Social vulnerability” and “COVID-19”.

By the way, this work has used a public access database, therefore it was not necessary to submit this project for approval by the Ethics Research Committee. But was followed by all the ethics roles of health research while relating to humans under Brazilian *Resolução n*º 466/2012.

3. Results

3.1. Right to Health

The 1988 Constitution of the Federative Republic of Brazil, in its article 196, provides health as a right of every human being and the duty of the State ensure through social and economic politics aimed at reducing the risk of disease and the effect of socioeconomic inequalities (Brasil, 1988).

Universal access to health is a fundamental right classified simultaneously as social and diffuse, considering that the right to stay healthy or recover this state, living in a healthy environment. Is indisputable that the right to health is connected to the right to life, because is obvious that these essential and elementary material conditions are presupposed to dignified human survival (Ramos, 2018).

As referred to in article 1st, item III, of the 1988 Constitution, as one of the foundations of the Federative Republic of Brazil, the dignity of the human person is considered the macro principle that gives unity of meaning to the entire constitutional order. This principle means protection for the person holder of rights and duties in the relationships (Brasil, 1988; Piovesan, 2013).

The criterion for verifying whether a person has a dignified life is reflected in the availability of essential services, the State is responsible for ensuring the basic conditions of survival, the so-called existential minimum (Piovesan, 2013).

Considering the constitutional text and the legal doctrines are evidenced that in exceptional situations, such as epidemics or pandemics, the right to health cannot be ruled out.

It is a State responsibility to adopt emergency measures of confrontation and public policies able to grant, in an isonomic way, the necessary means to enjoy this fundamental right even in the face of sanitary crisis, the occasion was innumerable social problems come to the fore.

3.2. Health-disease process and social determinants of health

The conception of the disease-health process varied according to the models adopted throughout history. However, most authors present the correlations between health and social determinants. The influence of social sciences in the scope of health sciences is perceived. Thereat, both areas made progress in society and its health situation study, allowing the intertwining of care and social links (Buss & Pellegrini Filho, 2007).

The different approaches on the social determinants of health also allowed to modify how the disease is treated, passing from a biomedical model focused on the physical state to an integrative type, dynamic and multidimensional, being analyzed with a biopsychosocial perspective (Carrapato, Correia & Garcia, 2017).

According to Narvia and Pedro (2008) the health conditions didactically divided into three perspectives: subindividual, individual, and collective. The subindividual would be the biological relationship between health and pathology with a dynamic balance between normality-abnormality and functionality-dysfunction. The individual, on the other hand, would have as a principle the biological and social plan of a single individual, in which the process of health and illness in conditions of individual existence, in groups, and social class. The collective is an expansion of the individual, being inserted in a society in which the health-disease process will cover the phenomena of different levels of family analysis, housing, micro area, neighborhood, municipality, country, work, and others.

However, the basic concept of social determinants of health was constructed and classified into five levels: biological, economic, social, environmental, and lifestyle. They also add the services referred to as fundamental by the constitution: health, education, transport and leisure (Buss & Pellegrini Filho, 2007; Carrapato, Correia & Garcia, 2017), configuring axes subject to individual analysis that serves as indicators of the individual's health status, facilitating research, and interpretation.

3.3. Social Indicators

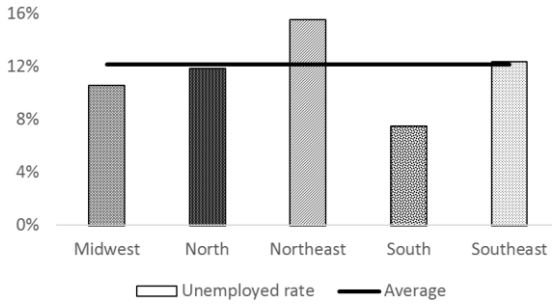
Despite the existence of a whole egalitarian theory, Brazil is still identified as a country whose social inequality is associated with your history (Goes; Ramos; Ferreira, 2020). Data from the Demographic Census conducted by *IBGE* (2010) estimated 190 million inhabitants in Brazil. However, the Projection of the Population of Brazil for the year 2020 also from the *IBGE* predicts values that already exceed the range of 200 million inhabitants (IBGE, 2010; 2020).

About 42% of the Brazilian population live in the Southeast region, composed of four states (Rio de Janeiro, São Paulo, Minas Gerais, and Espírito Santo). The second region with the largest resident population is the Northeast, corresponding to 27.8% and comprises nine states (Ceará, Paraíba, Bahia, Pernambuco, Rio Grande do Norte, Alagoas, Sergipe, Maranhão, and Piauí). The South, North, and Midwest regions have the lowest population indexes respectively with 14.3%, 8.3%, and 7.3%. The predominant housing is the urban area. However, the Northeast presented the highest statistics in the rural area pointing out that more than 1/4 of its population lives in these locations (IBGE, 2010).

Concerning monthly income, the *PNAD* of 2019 pointed out the per capita monthly household income of each Brazilian state. The North and Northeast have together 16 states and all had lower values monthly household income than those other regions. Besides, 12 states from the same regions had monthly per capita household income below the minimum wage applied in 2019 (IBGE, 2019).

Regarding unemployment, the *PNAD* of the 1st 2020 semester found that the unemployed average in the country is 12.2% (Graph 1).

Graph 1. National unemployment rate.

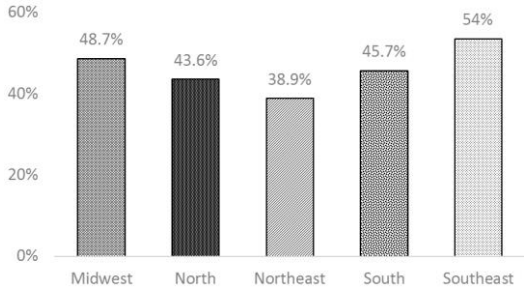


Source: *PNAD*, *IBGE* (2020) (adapted).

The Northeast (15.6%) and Southeast (12.4%) had indexes above the national average. Furthermore, it is observed that the Northeast had an unemployment rate with a standard deviation higher than the country average. While the Southeast and the North (11.9%) are in a borderline with a low standard deviation. The Midwest (10.6%) and the South (7.5%) had the lowest values (IBGE, 2020).

In respect of the educational attainment level, the *PNAD* of the 2nd 2018 trimester analyzing the percentage of people over 25 years of age who completed at least the stage of compulsory basic education (high school), according to Graph 2.

Graph 2. Educational attainment level of people aged 25 or over who completed high school.

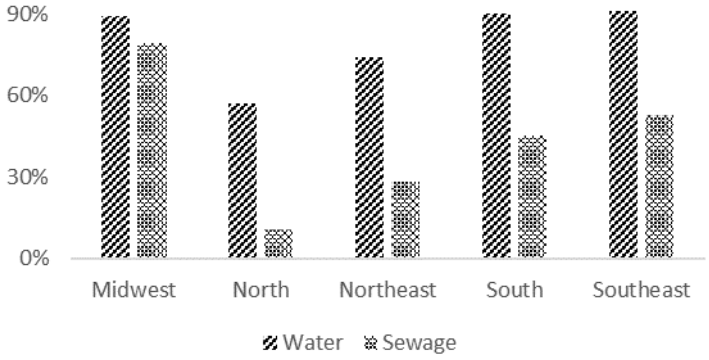


Source: *PNAD, IBGE* (2018) (adapted).

Observe that the North (43,6%) and the Northeast (38,9%) regions presented the worst rates affording to Graph 2, while the other regions have a percentage above 45%. The Southeast has the better educational attainment level (54%).

Graph 3 presents data from the 2018 National Sanitation Information System (*SNIS*) on access to treated water and sewage by region:

Graph 3. Access to treated water and sewage by region.



Source: *SNIS*, 2018 (adapted).

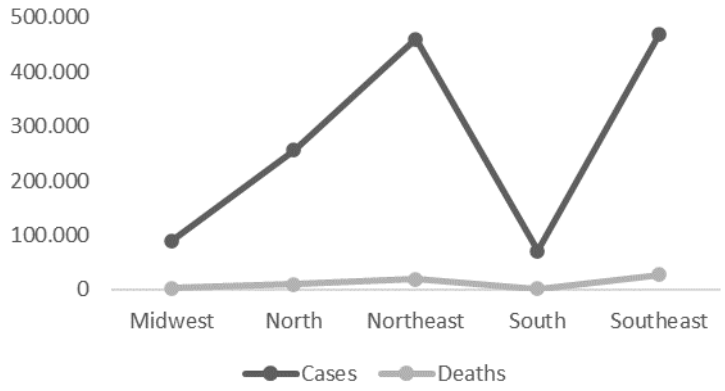
Like the other parameters analyzed, the North and Northeast regions have the worst access rates to treated water and sewage network (57% and 10.5%) (74.2% and 28%), respectively. Midwest showed the best results (89% and 79,2%).

Notes a predominance of the North and Northeast regions in all the social, educational and environmental aspects analyzed, which demonstrated inferior to the other regions, mainly the Northeast. Briefly, the North and Northeast presented themselves as the regions most affected by inequality, monthly income, education, access to water, and sewage rates. Only in the unemployment rate did the Southeast show bad levels, but is partially justified because is the one-most populous region in Brazil. However, it obtained the best results concerning the education attainment level.

3.4. Epidemiological Features of COVID-19 in Brazil

Until June 28, 2020, the total number of Brazilian infected with SARS-CoV-2 is over 1.3 million. The general number of deaths is almost 60 thousand throughout Brazil. The Southeast and Northeast regions have a greater number of confirmed cases, presenting respectively almost 470 thousand and 460 thousand cases, where together correspond to about 70% of the value of the absolute cases. The Southeast region alone accounts for more than 25 thousand deaths followed by the Northeast region (18 thousand deaths). The North (9,3 thousand), Midwest (1,6 thousand), and South (1,4 thousand) regions showed lower values in both indices, as shown in Graph 4.

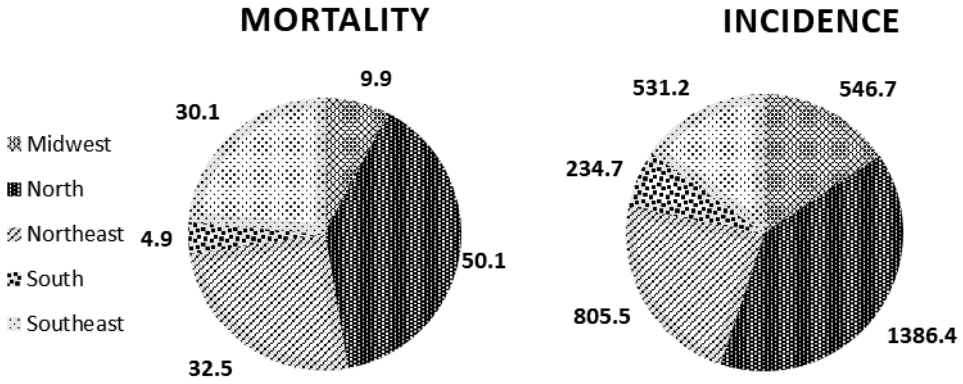
Graph 4. Epidemiology of COVID-19 in Brazil until June 28, 2020.



Source: State Department of Health. Brazil (2020) (adapted).

Although the greater number of COVID-19 confirmed cases and deaths being in the Southeast, the mortality and the incidence rates (Graph 5) are lower than the North and Northeast regions. The mortality and the incidence rate are calculated for each 100 thousand inhabitants.

Graph 5. Mortality and incidence rates of Covid-19 by Brazilian region.



Source: State Department of Health. Brazil, 2020 (adapted).

Analyzing this graph only, is evidence that the North is the region with higher mortality and incidence rates, besides the Graph 4 lower values when compared to Northeast and Southeast, for example. The explanation for this fact is the northern population is smaller than other regions, which significantly increases these parameters.

4. Discussion

The historical marks created by slavery generated the social inequality in Brazil (Goes; Ramos; Ferreira, 2020). The vulnerable population is the hardest hit in the COVID-19 pandemic, due to scarcity or lack of prevention and treatment mechanisms and resources, access to healthcare, food, water, basic sanitation, the difficulty of maintaining employment and income, moreover, the cannot maintain WHO recommendations for controlling the spread of the pandemic, such as social isolation or social distancing, causing an increase in the speed of the spread of the disease (Farias & Leite Junior, 2020; Guinancio, et al., 2020).

Assessments of the implications that social distancing has been causing in the population and concluded that besides the biopsychosocial damages, economic and quality of

life consequences are also viewed (Ficanha, et al., 2020). It is notorious these consequences are further prevalent in a vulnerable population, because resources are limited or nonexistent.

As evidenced in the *IBGE* results (2018, 2019, 2020), practically in all the social aspects analyzed, which directly influence the maintenance of the health of individuals and the society, the North and Northeast regions presented the worst indexes referring to the various vulnerability (social, economic, and environmental). Additionally, the same regions exhibited the highest COVID-19 incidence and mortality rates (State Department of Health, Brazil, 2020). Such facts may be associated with life conditions (Farias & Leite Junior, 2020), that suggests a greater susceptibility to contamination and aggravation.

A study about the Brazilian health system evidenced that the discrepancies COVID-19 incidence and mortality between the regions happens for the divergence in the supply of ICU beds, mechanical ventilators, and doctors for these regions (Castro, et al., 2020). Still, according to Castro et al., the Federal District is the one-most federative unit prepared to attend the regional demands arising from the pandemic. That is, once again the North and Northeast are the worst regions in this distribution and emergency supporting in the fight against coronavirus, agreeing with the results of this article.

The educational attainment level can influence different ways in the worsening of comorbidities. The survey “Markers of inequality in self-rated health in Brazilian adults according to sex”, carried out nationwide in 2020, found that men and women who declared themselves black and brown peoples living in the North and Northeast regions and who are outside the workforce are the ones who most self-assess their health as regular or negative. Also, there was an increasing gradient of self-rated health as the proportion of schooling and family income per capita worsened (Sousa, et al., 2020). It is noted that the study associated the family income per capita to the number of people outside the labor force as determinants of health level, namely, it takes unemployment into account.

Regarding per capita household income, all 16 states in the North and Northeast regions had low average monthly earnings. Of these, 12 still showed values below the minimum wage applied to 2019 (IBGE, 2019). Noteworthy, in agreement such the article 158 of 1988 Federal Constitution is guarantee workers the right to the minimum wage capable of satisfying, according to the conditions of each region, the normal needs of the worker and his family. A lower wage means lower food or health conditions, implying fragile situations in terms of coping and prophylactics measures to prevent the dissemination of the infectious.

The *IBGE* (2020) point to the highest unemployment rates for the Northeast and Southeast regions, which may evoke mention of the case numbers since the need for this

population to submit to precarious autonomous jobs result in a continuous circulation in search of livelihood are potential transmitters of the virus in the community (Calmon, 2020; Farias & Leite Junior, 2020; Pires; Carvalho; Xavier, 2020). Besides, the COVID-19 pandemic effects caused an economic impact and the vulnerably peoples have to continue working or looking for ways to generate different sources of income to maintain them with fundamental resources, although be forced to submit to the virus.

In short, Pires, Carvalho and Xavier (2020) evaluated the different dimensions of the impacts caused by different regions in the developing and underdeveloped countries in the whole world and the results of the survey put out that low-income populations have risk factors connected to their daily lives, such as frequently using the means of public transport, less access to basic sanitation, health services, and hygiene materials. It is important to mention that these conditions also have implications and consequences for mental health, due to insecurity or financial dependence caused by collective unemployment, shutdowns and closing of businesses, mainly small businesses.

In the case of a virus of respiratory contamination with easily diffused by droplets and aerosols which can still be found on surfaces and objects (Carvalho, et al., 2020), there is a greater likelihood of contagion. These people become more prone to the disease and, consequently, more cases. Still, if there is no specialized assistance to meet their necessities interfere in restoring the health (Santos, 2020a).

According to *SNIS* data (Brasil, 2018a; Brasil, 2018b), about to 55% of the population in the North have access to treated water and about 10% with sewage. Oral transmission is believed to be the main form of COVID-19 dissemination. Still has found that the virus can be in the feces of infected individuals (Santos, et al., 2020). Therefore, the absence of this indispensable treatment resource generates yet another possible form of contagion (Massa & Chievegatto Filho, 2020).

Other pathologies may be associated with these worst sanitary conditions in the living environment. For example, parasites have lower prevalence and low risk of contagion in areas with the best sanitation conditions (Busato, et al., 2014). Consequently, living in unhealthy places, such as favelas and communities that do not have adequate basic sanitation and in many cases, without health care, resulting from inequality, represents greater vulnerability and can cause aggravations and deaths in the pandemic period (Calmon, 2020).

In this perspective, all this emergency sanitary situation caused by COVID-19 pandemic associate to social inequity existent between Brazilian regions induced an increase in the COVID-19 confirmed cases and an upper incidence and mortality rates in the North and

Northeast regions, for presented the worst health status indicators, makes the understanding of the health-disease process complicates.

5. Conclusion

As evidenced, the social divergences between the Brazilian regions suggest a causal relationship with the COVID-19 regional incidence and mortality rates. North and Northeast had the worst rates in most of the evaluated parameters. Therefore, the vulnerable population of fundamental resources for dignified survival is more susceptible to aggravations and failures in coping with new infectious diseases.

The application of contingency plans like those adopted by other countries have shown effectiveness regarding combating viral spread. However, social determinants of health have a high influence on health problems and the probability of contamination, especially in the most vulnerable population, given the limited hygiene materials and basic access to water and food, resources that are ensured by programmatic norms contained in the Federal Constitution.

We must have clarity of the existential minimum that must be guaranteed, even during declarations of states of public calamity. Also, the public health sector must join the other fields of society to combat the explicit inequities that exist. Public policies must ensure an adequate treatment that covers every facet of social inequality, providing better sanitary conditions, mobility, work, health, and leisure, thus affecting the quality of life of individuals, with universal access and egalitarian to health actions and services for their promotion, protection, and recovery.

Therefore, research about the social conditions of the Brazilian regions and the discrepancies identified in each region will serve for the development of public policies to improve the economic, social and health aspects of the inhabitants, according to the individual needs of each society place.

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