THE INSTITUTIONAL VOIDS, SANITATION AND WATER DEFICITS AND THE FIRST COVID-19 NUMBERS IN BRAZIL

Os Vazios Institucionais, Saneamento e Déficit de Água e os primeiros números Covid-19 no Brasil

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ABSTRACT

Purpose: The problem of this research was: What correlation between the deficit of basic sanitation and treated water in Brazil with the incidence and number of deaths caused by covid-19 disease? The aim of this article was to analyze the correlation between the number of cases in COVID-19 with the statistics of basic sanitation and treated water supply and institutional voids.

Methodology: The research is descriptive and uses techniques of correlation statistical analysis of secondary data.

Findings: Statistical calculations show a strong correlation of the variables. The incidence of the disease caused by the new Coronavirus SARS-CoV2, COVID-19 is associated with a lower percentage of the population served by sewage network and water network. It was also demonstrated that the mortality of the disease is strongly associated with a lower percentage of the population served by sewage and water networks, thus indicating a relationship with the theory of Institutional Voids (North, 1990; Douglass & North, 1991; Khanna, Palepu, & Sinha, 2005; Khanna & Palepu, 2010; Rodrigues, 2013).

Originality: It was observed that, in general, the highest number of deaths due to the disease related to the states of the federation/macro-regions with the lowest percentages of care to the aforementioned networks, with some exceptions. Soon it was possible to use the theory of Institutional Voids in the analysis of Brazil in the face of basic sanitation indicators, thus indicating the absence of a social public policy appropriate to the well-being of the population.

Keywords: Institutional Voids. Sanitation and water. Covid-19.

RESUMO

Objetivo: O objetivo deste artigo foi analisar a correlação entre o número de casos no COVID-19 com as estatísticas de saneamento básico e abastecimento de água tratada e vazios institucionais.

Metodologia: Trata-se de pesquisa descritiva que utiliza técnicas de análise estatística de correlação de dados secundários.

Resultados: Cálculos estatísticos mostram forte correlação das variáveis. A incidência da doença causada pelo novo Coronavirus SARS-CoV2 está associada a um menor percentual da população atendida pela rede de esgoto e rede de água. Também foi demonstrado que a mortalidade da doença está fortemente associada a um menor percentual da população atendida pelas redes de esgoto e água, indicando assim uma relação com a teoria dos Vazios Institucionais (North, 1990; Douglass & North, 1991; Khanna, Palepu, & Sinha, 2005; Khanna & Palepu, 2010; Rodrigues, 2013).

Originalidade: Observou-se que, em geral, o maior número de óbitos por doença relacionada aos estados da federação/macrorregiões com os menores percentuais de atenção às redes supracitadas, com algumas exceções. Logo foi possível, a partir de estudo empírico, confirmar a teoria dos Vazios Institucionais no Brasil, diante dos indicadores de saneamento básico, confirmando a ausência de uma política pública social adequada ao bem-estar da população e os primeiros números do COVID-19.

Palavras-chave: Vazios institucionais. Saneamento e água tratada. COVID-19.

1 INTRODUCTION

The world was surprised in early 2020 with a pandemic caused by corona virus SARS-CoV2, a disease called COVID-19, hitherto unknown and without efficient remedy or a vaccine to fight it. By September 2021 13th there is a projection of 5,324,928 deaths until December 2021 (HealthData, 2021). In Brazil, the numbers are also frightening almost 21 million infected and about 586,841 confirmed deaths (Ministério da Saúde [MS], 2021).

1.1 Research problem and Goal

Since the WHO decreed that the disease initiated in Chinese territory had spread throughout the world and became a pandemic, hygiene measures began to be disseminated, including by the Organization itself, as mitigating for contagion control. Among them is the suggestion to wash hands and maintain social distancing (World Health Organization [WHO], 2020). However, in Brazil, 35 million people do not have access to treated water and more than 100 million Brazilians do not have basic sanitation, according to the Ministry of Regional Development (Ministério do Desenvolvimento Regional [MDR], 2020). In this context, this study sought to answer the following question: What correlation between the deficit of basic sanitation and treated water in Brazil with the incidence and number of deaths caused by COVID-19 disease?

The lack of a sewage system and the lack of treated water in several regions of Brazil, such as the North and Northeast (Ministry of Regional Development, 2020), may be related to structural deficiencies. In the literature, it is possible to relate these deficiencies to "institutional voids", which intensify social inequalities in contexts of socioeconomic vulnerability, also indicating deficiencies of formal institutions (Khanna & Palepu, 1997; Khanna & Rivkin, 2001).

Thus, the aim of this article was to analyze the correlation between the number of cases in COVID-19 with the statistics of basic sanitation and treated water supply and institutional voids. The article deals with a descriptive study that used data on COVID-19, basic sanitation and treated water in Brazil, with quantitative emphasis.

This work is justified in the face of the need to expand empirical studies that meet the definition that institutional voids correspond to an absence of matter that has due importance, and can be considered gaps between the rules, legislation and formal norms, according to the way they are implemented or reinforced (Khanna & Palepu, 1997, 2005; Khanna & Rivkin, 2001; Mair & Marti, 2009; Rodrigues, 2013).

Socially this study is related to the relevance of this discussion not only for the Brazilian economy, but also for the fact that they impact the social structure, generating social costs (Rodrigues, 2013). It is intended to reflect on the Institutional Voids and the relationship with the well-being of the population can bring discussions that allow, in the future, a better reaction to a series of diseases.

The article is organized into five chapters, the first being the introduction to the problem and proposed objectives. The second with a literature review, the third about methodology and the fourth on results and discussions. The fifty addressed the final considerations, followed by references.

2 LITERATURE REVIEW

2.1 Theory of Institutional Voids

Several authors have studied institutions and their role over the years and seek to describe a chronological view of studies, such as Veblen (1919), Weber (1978), Guidens (1979), Zuckerm (1987), North (1990) and Scott (2001). In general, the definition adopted by all of them involves the formation of culture, the consolidation of rules and social organizations.

Institutions can be understood as human restrictions responsible for structuring areas such as politics, economics and social. They characterize both informal aspects (such as sanctions, taboos, customs, traditions and codes of conduct) and formal aspects such as rules (constitutions and laws, for example). Institutions were born to create order in human relationships and minimize uncertainties in exchange relationships (North, 1991), then represent a complex structure that represents the Institutional Theory involving the behavior of organizations, groups and individuals portray the regulatory, normative and cognitive rules of institutions (Scott, 2001).

To make a literature review on the topic Institutional voids was carried out a literature review in the Science Direct database in 2020 reflecting the studies published in the international academia. There were 71 articles with the term "Institutional voids" were identified in the title, abstract or keywords, with greater concentration from the years 2018 (Figure 1).
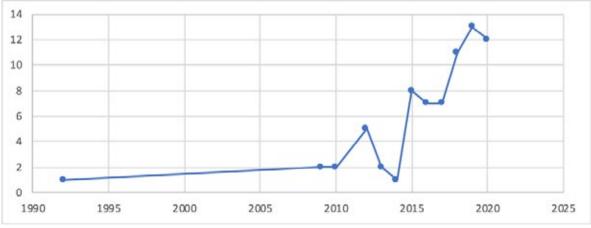

Figure 1: Number of articles published
Source: Science Direct, 2020.

The first article that cited the term was "The Efficiency of Bladder Emptying in the Prune

Belly Syndrome" published in The Journal of Urology (Kinahan, Churchill, McLorie, Gilmour, & Khoury, 1992) and was eliminated from this analysis because it dealt with the term in the medical context in urology the other articles were analyzed, using the VOSViewer Software®.

Of these 70 articles, only one was classified as a review article (Scott, 2008) and the others were classified as research articles. As for the journals that contemplated the researched theme, it is possible to observe concentration in the management area, and the journal International Business Review published the highest concentration of articles (Figure 2).
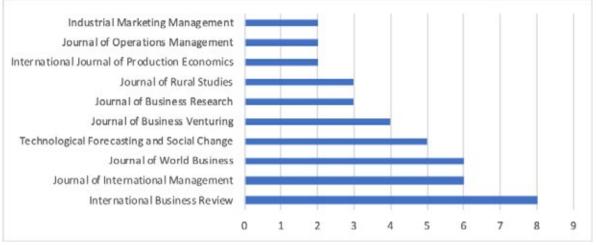

Figure 2: Number of articles per journal
Source: Science Direct, 2020.

Of these articles were 180 distinct authors even considering one article by each author analyzed, 18 authors had correlations forming four nodes in the network of publications (Figure 3).
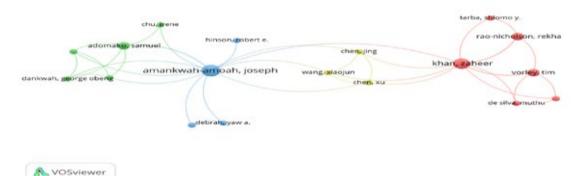

Figure 3: Network of authors
Source: Developed by the authors, 2020.

Regarding the cited authors who formed the four clusters with the highest concentration of articles on the theme Institutional Voids, it can be seen that the first and second had five related authors, the third cluster had four related authors followed by the three authors of the last cluster. The other articles have ave correlated texts or did not represent a network of cooperation or advancement of previous studies.

Considering the same group of 18 authors, it is perceived that the theme has a recent interest (Figure 4).

Figure 4: Network of authors by concentration in the years
Source: Developed by the authors, 2020.

Regarding the concentration of studies, it is perceived that the network indicates the relevance of the article developed by Amankwah-Amoah and Khan (Figure 5).

Figure 5: Density Map of Authors
Source: Developed by the authors, 2020.

When the focus was to analyze the keywords of the analyzed articles, among the 285 words used in the 70 articles, only the words used in at least 4 articles were considered, a network of 9 items was created (Figure 6), which can be considered the most significant.
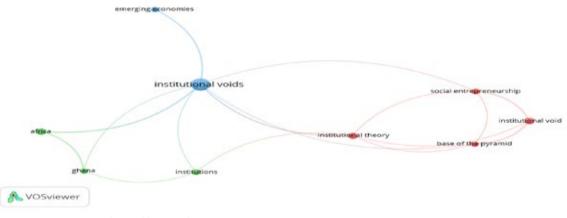
Figure 6: Most commonly used keywords
Source: Developed by the authors, 2020.

If the filter were not limited to words used more than 4 times, the map would bring 218 interconnected keywords, creating a map of the words used in the analyzed articles (Figure 7).
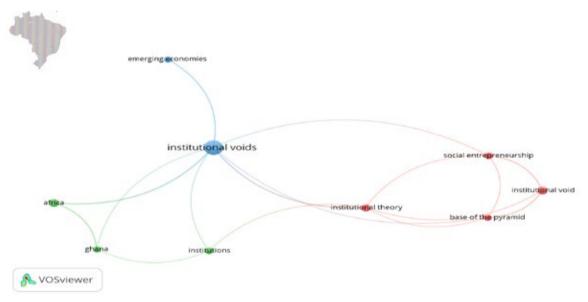

Figure 7: Keywords cited
Source: Developed by the authors, 2020.

It is noticed that the theme is recent and has new studies related to the terms emerging markets, blockchain and technology. The origin of these studies comes from the concept of institutions as the rules of the game in a society. Traditionally, institutional research has emphasized written, formal (laws, policies and regulations) and unwritten and unusual institutions (traditions, customs, norms and culture). Institutional theory encompasses several factors, including rules, norms, schemes, and routines that are accepted as guidelines for social behavior. The theory investigates how these factors are created, disseminated and adapted over time. Changes in institutional norms and practices are seen as emanating from policies and conditions and institutions were defined as the humanly conceived restrictions that structure human interaction (North, 1991).

Institutions can be understood as human restrictions responsible for structuring areas such as politics, economic and social. They characterize both the formal aspects (such as sanctions, taboos, customs, traditions, and codes of conduct) and formal aspects, such as rules (constitutions and laws, for example). Institutions were born to create order in human relations and minimize uncertainties in exchange relationships. (North, 1991).

The effects of the institutional environment can be perceived through: (1) the gradual legitimation of a new procedure, position or element of the structure; and (2) the requirements established by a hierarchically superior element of the institutional environment (usually another organization). Both of these mechanisms produce a number of effects (Zucker, 1987).

Khanna and Palepu (1997) assessed that institutional voids reflect the deficiencies of formal institutions based on rules. They initially described transactional guidelines between buyers and sellers as weaknesses, but later work included voids in other formal institutions, such as government and rule-based institutions.

In many developing economies, formal institutional arrangements that support markets are absent, weak or fail to meet stated goals (Khanna, Palepu, & Sinha, 2005; Khanna & Palepu, 2010). The absence of these institutions does not suggest that there is an institutional vacuum. On the contrary, there is an institutional vacuum, which implies that there are no formal institutions that support markets in contexts that have other formal institutional arrangements. It is possible to identify Institutional Voids in any country by answering a series of questions, which can be asked by company managers (Khanna, Palepu, & Sinha, 2005). Among these questions stands out those related to the Political and Social System.

Scott (2008) added that in addition to formal rules and laws, institutions include formal constructions such as sociocultural norms. Formal influences are composed of two forces: regulatory and normative. Regulatory systems consist of government laws and regulations and their enforcement agencies and associated procedures. Regulatory institutions establish roles and expectations for professional groups. The author also emphasized the cultural-cognitive pillar that focuses on shared beliefs and values among individuals resulting from social interactions that influence behavior. This last pillar, reflecting formal institutions, is particularly important in transition and emerging economies, since it sees institutions beyond the most obvious regulatory and regulatory, and is particularly important to deal with weaknesses in these more formal institutions.

The theme Institutional Voids finds several definitions in the literature. Institutional Voids are defined by Mair and Marti (2009) as situations where the institutional arrangements that support the markets are absent, weak or fail to fulfill their expected role. Characterized by poorly structured and highly fragmented arrangements, institutional voids enable powerful actors to have greater access to resources and opportunities and can sometimes weaken access to them from already marginalized groups. For Mair and Marti (2009), the market can be evaluated as a specialized structure whose operation and existence needs specific rules. The existence of Institutional Voids occurs when there is misalignment between what is considered legitimate by society, formal regulatory institutions (e.g., their laws and regulations), their formal organizations (normative) and cultural-cognitive institutions (e.g., norms, values and beliefs). In terms of formal institutions these can be defined as the rules and regulations written or formally accepted, guiding the economic and legal framework of a society. On the other hand, formal institutions are traditions, customs, social norms, culture and unwritten codes of conduct. According to these authors, voids are environments in which current institutions are insufficient rather than lacking, suggesting a perspective that consists of many competing institutional arrangements rather than an "empty" institutional space (Mair & Marti, 2009; Mair, Marti, & Ventresca, 2012).

Although Institutional Voids take many forms, the three main causes of market failure are missing or unreliable sources of market information, an uncertain regulatory environment, and inefficient judicial systems (Khanna & Palepu, 2010).

According to Rodrigues (2013), there are two types of voids characteristic of emerging markets: the first has its origin in the structure of the institutional system and, therefore, difficult to change. The second depends on changes in the pace of economic growth. In this way, voids can be defined as the rules of the game, while Institutional Voids use the way the game is actually being played (not as it should be, that is, according to the rule).

For Rodrigues (2013), institutional voids correspond to an absence of matter that has its due importance. They can be considered gaps between rules, legislation and formal standards, depending on how they are implemented or strengthened. Thus, these Institutional Voids are important, not only for the national economy, as in the case of Brazil, but because they impact the social structure, generating social costs. They can be understood as gaps between rules and their purposes and the effectiveness of their implementation (Rodrigues, 2013). Although Institutional Voids can be positive for business in many respects, creating opportunities for new business and entrepreneurship, Rodrigues (2013) points out that it is also important to consider that they arise when economic growth advances faster than social and institutional structures.

There are two types of voids: structural and contingent. The structural ones correspond to the distance between the rules and the institutional capacity tr their application, and the contingents arise from a combination of unique factors for certain environments, such as the social and economic contexts in which they are inserted, that is, pressures for growth (Rodrigues, 2013).

McCarthy and Puffer (2016) point out that Institutional Voids appear several times in the literature as a component of institutional theory, although they indicate the scarcity of texts that relate institutional voids, from the individual aspect, understanding them as a way of analyzing opportunities for people or companies to develop.

Therefore, the topic may be controversial. According to Harrison, Scheela, Lai, and Vivekarajah (2018), emerging economies are characterized by the presence of Institutional Voids that challenge and restrict the behavior of economic agents. And, this emptiness, may indicate lack of development, hindering the performance of organizations and consequent absence of progress and social development (Webb, Khoury, & Hitt, 2020). These authors indicate that formal and formal Institutional Voids and their interaction influence two qualitative results in localities: (1) the unique forms of entrepreneurial activity and (2) the objectives underlying this entrepreneurial activity.

2.2 The pandemic caused by COVID-19

COVID-19 is considered a new worldwide disease and is different from others whose causative agent is also coronavirus, such as Acute Respiratory Syndrome (SRHS) and Middle East Respiratory Syndrome (WHO, 2020).

The first notification of COVID-19 took place in Wuhan, China, on 31 December 2019. Its spread around the world was extremely fast and uncontrollable. Even advanced economies with a more efficient health system have not resisted the spread of the disease (WHO, 2020).

COVID-19 is a disease caused by coronavirus SARS-Cov-2. Infected people may have differentiated clinical cases. Some are affected by asymptomatic infections and others already show severe respiratory conditions. The symptoms of COVID-19 may resemble cases of a common cold, causing those affected to have fever, cough, and shortness of breath. However, infection can lead to pneumonia, multiple organ failure, severe acute respiratory syndrome, and even death in more

severe cases. The transmission takes place through a sick person to another through close contact, which can be through a handshake, saliva droplets, sneezing, coughing, phlegm, or else through contaminated objects or surfaces such as mobile phones (Ministério da Saúde [MS], 2020)

According to the World Health Organization (WHO, 2020), the majority of patients with COVID-19 (about 80%) may be asymptomatic and about 20% of cases may require hospital care because they have respiratory distress and of these cases approximately 5% may require support for the treatment of respiratory failure (ventilatory support).

The number of cases of COVID-19 worldwide was 32,925,668, with 995,352 deaths (WHO, 2020). The estimated average rate of COVID-19 infection is 2.5 (Statista.com, 2020). Despite advanced studies, there is currently no vaccine or specific remedies for the treatment and fight of the disease caused by COVID-19 whose mortality rate varies substantially by country, the population affected by the disease, the availability and application of tests and the ability of each nation to adopt control measures necessary to advance the virus (WHO, 2020).

For each case of confirmation of COVID-19 in Brazil there are seven real cases in the population of the main Brazilian urban centers, according to the first phase of the study Evolution of the Prevalence of Covid-19 Infection in Brazil: Population-Based Study (Epicovid19-BR) (Petry, 2020). According to data from the Ministry of Health, on September 26, 2020, there were 4,718,488 confirmed cases of infected, with 141,441 deaths. The incidence of the disease for every 100,000 inhabitants was 2,245.1 and mortality per 100,000 inhabitants reached 67.3 (MS, 2020).

2.3 Basic Sanitation in Brazil

According to data from the National Sanitation Information System (SNIS) of the Ministry of Regional Development (MDR, 2020) in Brazil, in 2018 (last available information) only 53.2% of the Brazilian population were servebyth a sewage network. This means that, that year, 107.5 million Brazilians had access to basic sanitation and more than 100 million Brazilians did not have this access. Despite this scenario, in 2018, the total investments in the sector were only R$ 4.74 billion (MDR, 2020).

The analysis of more stratified data reveals that this average number of the country does not reflect the reality of different regions of the country (Figure 8). In the Northern Region, only 10.5% of the inhabitants have access to the sewage network. In the Northeast Region, the number, although higher, also demonstrates a brisk scenario, that is, only 28% of the population are served with basic sanitation (MDR, 2020). The contrast is evidenced with the analysis of other regions. In the Southeast, the population served with sanitation reaches 79.2% and in the Midwest, 52.9% (MDR, 2020).
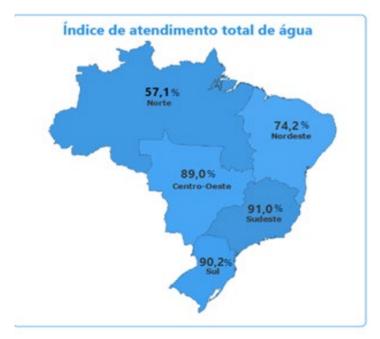
In relation to basic sanitation, it is important to highlight that Researchers from the Department of Sanitary and Environmental Engineering of the School of Engineering of the Federal University of Minas Gerais are performing sewage monitoring in Belo Horizonte and Contagem (MG), to map the occurrence of the new coronavirus. The objective is to discover the information that sewage can contain about the spread of Covid-19 in specific communities over time (Rigueira Jr., 2020).

Figure 8: Brazilian regions - Total sewage service
Source: Sistema Nacional de Informações sobre Saneamento - Ministério do Desenvolvimento Regional (2018).

The analysis of water care information to the Brazilian population reveals slightly more sour numbers, but no less worrying (Figure 9). According to the SNIS (MDR, 2020), on average, 83.6% of the Brazilian population, that is, 169.1 million people, is served by a water network, and this means that 35 million Brazilians do not have treated water. But the data disaggregated by state demonstrate a discrepant reality. In the Northern Region of the country, only 57.1% of the population are servebyth a water network. In the Northeast, the number is 74.2% of care. In the Southeast region the percentage is much higher: 91%, while in the Southern regions it is 90.2% and in the Midwest 89.0%.

Figure 9: Brazilian regions - Total water service index
Source: Sistema Nacional de Informações sobre Saneamento - Ministério do Desenvolvimento Regional (2018).

3 METHODOLOGY

The research is descriptive and uses techniques of statistical analysis of secondary data. The deficiency of basic sanitation is demonstrated in the analysis of the percentage of the population served by sewage network.

Statistical data analysis restricted descriptive analysis of study variables based on 3 strategies: a) identification of measures of central tendency (mean) and variability (standard deviation, minimum and maximum); b) graphical analysis via boxplot, bar charts and dispersion diagram; and c) correlation analysis, whose parameters of analysis will be those established by Cohen (1988). For Cohen (1988), correlation coefficients with values between |0.10| and |0.29| can be considered small; between |0.30 to 0.49| can be regarded as a medium; and between |0.50 and 1.00| can be considered large.

Table 1 shows the data, in percentage, of the population served by sewage network, the percentage of the population served by water network, the incidence of Covid-19 for every 100,000 inhabitants and mortality by Covid-19 per 100 mi inhabitants. All this information is disaggregated by the Federation Unit in Brazil. These are official data released by the Ministry of Health and the Ministry of Regional Development. It is the basic data of this article.

Table 2 shows the same information contained in Table 1 for the regions of the country: South, Southeast, North, Northeast and Midwest, in this work called macro regions.

Table 1 - First part of the database

Brazilian State (UF)	Acronym	% Pop. serviced by sewage network	% Pop. serviced by water network	Incidence of Covid-19 (100,000 inhabitants)	Mortality from Covid-19 (100,000 inhabitants.)
Acre	AC	10,1	47,1	1.395,1	38,0
Alagoas	AL	21,4	74,6	960,8	28,7
Amapá	AP	7,1	34,9	3.241,6	46,6
Amazonas	AM	10,0	81,1	1.623,0	65,9
Bahia	BA	39,5	81,6	365,0	10,8
Ceará	CE	25,5	59,0	1.118,3	64,3
Distrito Federal	DF	89,3	99,0	1.289,1	16,9
Espírito Santo	ES	54,9	81,2	1.001,5	37,1
Goiás	GO	46,4	85,6	278,5	5,5
Maranhão	MA	13,8	56,4	1.059,0	26,4
Mato Grosso	MT	35,6	89,3	348,9	13,3
Mato Grosso do Sul	MS	49,5	86,4	234,7	2,2
Minas Gerais	MG	72,1	82,1	154,8	3,8
Pará	PA	5,2	45,6	1.093,1	55,2
Paraíba	PB	36,1	74,3	1.016,0	21,0
Paraná	PR	71,4	94,4	155,9	4,7
Pernambuco	PE	27,5	80,5	576,9	47,0
Piauí	PI	14,4	75,9	521,8	16,7
Rio de Janeiro	RJ	65,4	90,5	613,4	54,7
Rio Grande do Norte	RN	23,9	87,1	646,3	24,5
Rio Grande do Sul	RS	32,1	86,4	202,7	4,4
Rondônia	RO	4,9	49,4	1.022,5	26,3
Roraima	RR	51,7	81,5	1.959,8	44,7
Santa Catarina	SC	23,7	89,1	306,4	4,0
São Paulo	SP	89,8	96,2	541,4	30,0
Sergipe	SE	25,5	86,9	917,1	24,1
Tocantins	TO	26,4	79,3	599,2	11,6

Note: The first part of the database included the name column (acronym) that bears the abbreviation of each federation unit.
Source: Ministério da Saúde (2020) e Sistema Nacional de Informações sobre Saneamento - Ministério do Desenvolvimento Regional (2018).

Table 2 - Second part of the database

Macro-region	Incidence of Covid-19 (100,000 inhabitants)	Mortality from Covid-19 (100,000 inhabitants)	% Population served by sewage network	% Population served by water network
North	1.304,8	49,5	10,5	57,1
Northeast	736,3	30,8	28,0	74,2
South	209,6	4,4	45,2	90,2
Southeast	483,8	28,9	79,2	91,0
Midwest	473,1	8,7	52,9	89,0

Source: Ministério da Saúde (2020) e Sistema Nacional de Informações sobre Saneamento - Ministério do Desenvolvimento Regional (2018).

4 RESULTS AND DISCUSSIONS

The high values of standard deviation associated with incidence and mortality due to Covid-19 and the percentage of the population served by the sewage network reveal the discrepancies between the different macro-regions of the country (Table 3).

Table 3 - Descriptive analysis of study variables - Measures of central tendency and variability

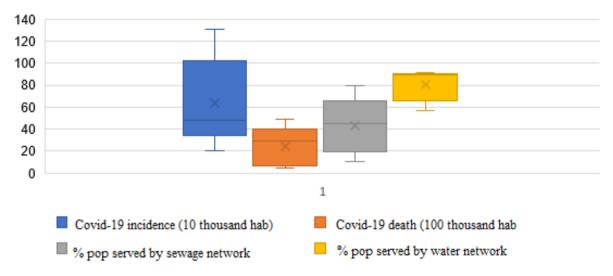| Variable	Average	Standard deviation	Minimum	Maximum
Incidence of Covid-19 (100,000 inhabitants)	641,5	414,9	209,6	1.304,8
Mortality from Covid-19 (100,000 inhabitants)	24,5	18,3	4,4	49,5
% of the population served by sewage network	43,2	26,0	10,5	79,2
% of the population served by water network	80,3	14,7	57,1	91,0

Note: Analysis performed with the data categorized by state macro-regions.
Source: Prepared by the authors.

An overview of them is presented below:
- Incidence and mortality due to Covid-19: North has 1,304.8 cases and 49.5 deaths per 100,000 inhabitants, whereas in the South region, these values are, respectively, 209.6 and 4.4;
- Percentage of the population served by sewage network: Southeast offers sewage network to 79.2% of its population and the North region, only 10.5%.

Despite the discrepancies between the different macroregions, the distributions of variables do not present outliers (Figure 9).
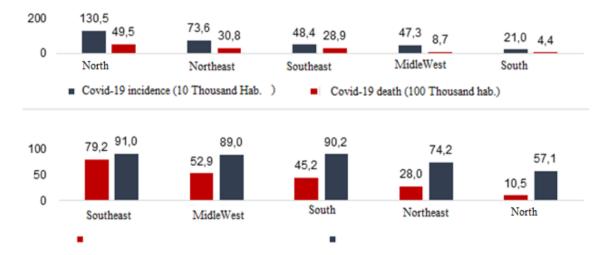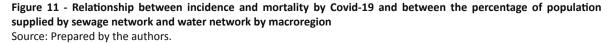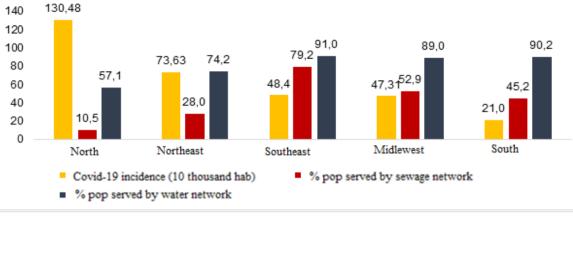
Note: For better visualization of the boxes, the incidence of Covid-19 was evaluated for every 10,000 inhabitants.
Figure 10: Descriptive analysis of study variables
Source: Prepared by the authors.

The relationship between incidence and mortality by Covid-19 and between percentage of the population served by sewage and water network. In both cases, the northern region has the worst indicators: higher incidence and higher number of deaths and lower sewage and water care (Figure 10).

From Figures 11, 12 and 13, we can verify the relationship between covid-19 incidence and percentage of the population served by the water and sewage network and between mortality from the disease and a percentage of the population served by the water and sewage network (the northern region being the worst indicators). It is also possible to verify that, in general, the decrease in the number of infected and deaths from the disease is accompanied by an increase in the percentage of population served by the water network. These results are in line with the definitions and concepts of the Theory of Institutional Voids (Khanna, Palepu, & Sinha, 2005; Khanna & Palepu, 2010, Rodrigues, 2013).

Figure 11 - Relationship between incidence and mortality by Covid-19 and between the percentage of population supplied by sewage network and water network by macroregion
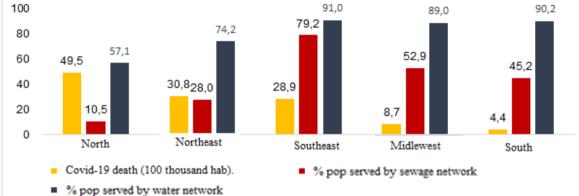Source: Prepared by the authors.

Figure 12 - Relationship between incidence and mortality of Covid-19 and percentage of the population served by water and sewage network by macro-region
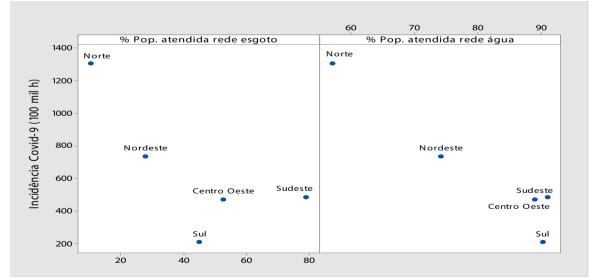Source: Developed by the authors.

Figure 13: Relationship between covid-19 incidence and percentage of population served by sewage network and water network by macro-region
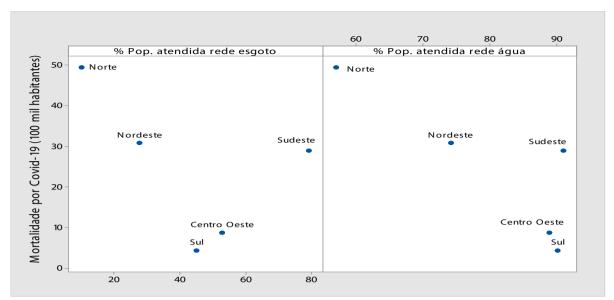Source: Developed by the authors.

Figure 14: Covid-19 Mortality Ratio and Percentage of Population Served by Sewage Network and Water Network by Macroregion
Source: Developed by the authors.

Based on the results of the correlation analysis, it was verified that the incidence of Covid-19 is strongly associated with the percentage of the population served by the sewage network ($r = -0.727$) and by water network ($r = -0.959$). And even though mortality from the disease is strongly associated with the percentage of the population served by sewage ($r = -0.500$) and water ($r = -0.845$) (Table 4). This confirm the concept of institutional voids as a lack of structure and that the Brazilian current institutions are insufficient rather than poor (Mair et al., 2012).

Table 4 - Correlation analysis

Variable	% of the population served by sewage network	% of the population served by water network
Incidence of Covid-19 (100,000 inhabitants)	-0,727	-0,959
Mortality by Covid-19 (100,000 inhabitants)	-0,500	-0,845

Note: Analysis performed with the data categorized by macro-region.
Source: Developed by the authors.

Statistical calculations show a strong correlation of the variables. The incidence of the disease caused by the new Coronavirus SARS-CoV2, COVID-19 is associated with a lower percentage of the population served by sewage network and water network. It was also demonstrated that the mortality of the disease is strongly associated with a lower percentage of the population served by sewage and water networks.

The results from the analysis of statistical correlation between the variables used confirm the concepts of institutional theory and the relevance of institutional voids.

The concept that the institutions were relevant to create order in human relationships and minimize uncertainties (North, 1991) and that includes behavior of organizations, groups and individuals portray the regulatory, normative and cognitive rules of institutions (Scott, 2001). These results also reinforce the main point of the paper that Institutional Voids (North, 1991; Khanna, Palepu, & Sinha, 2005; Khanna & Palepu, 2010; Rodrigues, 2013) are related with COVID-19 in different regions of Brazil.

5 CONCLUSIONS

This study considers that the deficiency of basic sanitation and treated water can be understood within the context of institutional voids, that is, absence of raw material (sanitation and water network) essential for the population, which corresponds to a failure of government policies in the country. We did not seek to analyze casualty effect, that is, the objective was not to demonstrate that sanitation and water deficiency causes COVID-19. The main objective was to prove that there is a strong correlation between these variables, as observed in the statistical analysis, where it was possible to verify the existence of a negative relationship between mortality due to COVID-19 and the availability of sewage and water networks.

These negative results indicate that when one variable increases the other decreases (and vice versa). Thus, the incidence of COVID-19, as demonstrated, is strongly associated with the lowest percentage of the population served by sewage network and water network. It was also demonstrated that the mortality of the disease is strongly associated with the lowest percentage of the population served by sewage and water network.

It was observed that, in general, the highest number of deaths due to the disease relsted to the states of the federation/macro-regions with the lowest percentages of care to the aforementioned networks, with some exceptions. Soon it was possible to use the theory of Institutional Voids in the analysis of Brazil in the face of basic sanitation indicators, thus indicating the absence of a social public policy appropriate to the well-being of the population.

It is instigated, from this article, to seek, to highlight the need for investment in public policies for the universalization of sanitation and treated water in Brazil, since authors indicated that this is an opportunity.

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Contribution of authors

Every author should account for at least one component of the work. Paper approved for publication need to specify the contribution of every single author.

Contribution	[Author 1]	[Author 2]	[Author 3]	[Author 4]
1. Definition of research problem	√			
2. Development of hypotheses or research questions (empirical studies)	√	√		
3. Development of theoretical propositions (theoretical work)		√		
4. Theoretical foundation / Literature review	√	√		
5. Definition of methodological procedures	√	√		
6. Data collection	√			
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