CHAPTER
22

Evaluating information on coronavirus in the Central-West region of Brazil using the database of the brazilian information system

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ABSTRACT
The present work addresses the importance of data analysis to understand the COVID-19 pandemic and its impact in the Midwest region of Brazil. The need for an accurate and correct analysis is highlighted to ensure the adequate allocation of resources in the fight against the disease. The text also describes the steps involved in conducting research on the coronavirus, including proposal, literature review, data quantification, and statistical analysis. According to the Ministry of Health, COVID-19 is caused by the SARS-CoV-2 coronavirus and can range from asymptomatic infections to severe controlled conditions. Most patients (about 80%) may be asymptomatic, while about 20% of cases may require hospital care and approximately 5% may require ventilatory support. The disease is caused by a virus that lives in the controlled tract of bats and may have undergone a mutation process to install itself in the human body. The main symptoms are fever, shortness of breath, dry or secret cough, and sore throat. So far, there is no specific vaccine for the new coronavirus, but at least eight types of vaccines are being made in humans in search of the most efficient immunization. Keywords: Coronavirus, database, perception, solution. Results are presented using line graphs and tables, providing a clear picture of the current situation and informing the public on how to identify and seek treatment for the disease.

Keywords: Corona Virus, Database, Brazil, Analysis.

1 INTRODUCTION

COVID-19 is a disease caused by the SARS-CoV-2 coronavirus, presenting a clinical picture ranging from asymptomatic infections to severe respiratory conditions. According to the World Health Organization (WHO), most patients (about 80%) may be asymptomatic, around 20% may require hospital care for respiratory distress and of these cases, about 5% may need support for the treatment of respiratory failure (ventilatory support). COVID-19 has resonated a lot since the beginning of the first half. In December 2019 there were already rumors. The first cases appeared in Brazil shortly after Carnival, when people became aware of the gravity of the situation. And unfortunately, the situation in Brazil is not very good, because many companies have already been closed and with this many people are losing their jobs. (Lai, 2020).

Data analysis is very important, as it helps in the dissemination of data by facilitating the understanding of people. Until then there had not been due importance to data analysis, recently through this resource researchers followed the evolution of the pandemic. Yes, it is evident that a perfect analysis with the proper visualization allows greater reach, but if it is not done with the required

correction can ruin a job. (Salje, 2020). Hence the importance of the correct use of data analysis. In this way, it is through the analysis of data tools that one can project the possible outcomes of the pandemic. Through the data it is possible to plan the best courses of action considering that it is necessary to define where and in which the few resources available will be applied. The present work consists of exploring, reviewing the existing bibliography and clarifying to the reader about COVID-19, its repercussion, data analysis, repercussion and applicability in the Midwest region, displaying the analysis of the graphs and numbers available in the Coronavirus Panel of the Ministry of Health, stratifying the data by UF of the Midwest region, by cumulative cases of COVID-19 by date of notification, cumulative cases of COVID-19 by an epidemiological week of notification, cumulative deaths of COVID-19 by date of notification, cumulative deaths of COVID-19 by Epidemiological Week of notification. (Ministry of Health, 2020).

In this way, the work will contribute to society, helping in the knowledge about COVID-19, so that the reader can identify the disease, if any, and seek the appropriate treatment.

2 COVID-19

According to the Ministry of Health (MoH) COVID-19 is a disease caused by the SARS-CoV-2 coronavirus, which presents a clinical picture ranging from asymptomatic infections to severe respiratory conditions. According to the World Health Organization (WHO), the majority of COVID-19 patients (about 80%) may be asymptomatic and about 20% of cases may require hospital care because they have difficulty breathing, and of these cases, approximately 5% may require support for the treatment of respiratory failure.

The Ministry of Health, 2020, states that the Coronavirus is a family of viruses that cause respiratory infections. The novel coronavirus agent was discovered on 12/31/19 after cases were reported in China. It causes the disease called coronavirus (COVID-19).

So far it is not known for sure how people were infected with the novel coronavirus in China. The suspicion, according to researchers, is that the virus that lives in the respiratory tract of bats has undergone a process of mutation to be able to settle in the human body, according to the WHO.

According to the MS, 2020, the main symptoms are: Fever, shortness of breath and Dry or secretive cough and sore throat and There is still no specific vaccine for the new Coronavirus. Many researchers are using different strategies to create the vaccine. According to the WHO (World Health Organization), at least eight types of vaccines are already being tested in humans, in search of the most efficient immunization for the control of the new disease.

2.1 THE REPERCUSSIONS OF COVID-19

The repercussion of covid-19 has been very great since the beginning of the first semester, at the end of 2019 rumors of the virus were already heard, but only when the first cases appeared in the country shortly after the carnival, that people began to pay attention to the gravity of the situation. And unfortunately, the situation in Brazil is not very good, because many companies have already been closed and with this many people are losing their jobs.

Since the beginning of the pandemic, the financial health of the country is destabilized, and the states with the highest numbers of infected, health are collapsing. And each day that passes has only increased the number of people who are dying.

The novel coronavirus has infected more than 5 million people worldwide. According to the Johns Hopkins University tally, 5,014,943 people have contracted the SARS-Cov-2 virus since it emerged. The United States leads in the number of confirmed cases (with 1,551,853 people infected), followed by Russia (317,554) and Brazil (291,579), which on Wednesday counted 888 more deaths and brought the total number of deaths to 18,859.

2.2 THE REPERCUSSION OF DATA ANALYSIS

Because of the latest events, data analysis is of paramount importance, as it has helped a lot in the dissemination of data and facilitated people's understanding. The importance of data analysis had never been noticed, as in recent months, because it is through it that researchers have been following the evolution of the pandemic.

According to the IGTI website, 2020, it is no use having a perfect analysis without a good presentation of the result. It may seem like an exaggerated claim, but the visualization created from the analysis has the potential to enhance every important aspect of being observed, but it also has the potential to ruin a job that may have cost months of effort. Hence the importance of using data analysis correctly.

Right now we have data analysis in our favor, although the data, for now, are not showing positive results with COVID-19 in some states, it is through this tool that we have a perspective of when the pandemic can be stabilized if the population takes all the necessary care suggested by the (WHO). It is through the data that it is verified how many beds each state needs according to how many people have already been infected by the virus and if there is a need for isolation and maintaining only essential activities. Hence the importance of data analysis.

Still based on IGTI, 2020, for the data to have value it is necessary to analyze them. In turn, for the analysis to be effective, it must be based on three fundamental pillars: first, on the acquisition of

the relevant data; then in the models/algorithms used to obtain the desired predictions; and, finally, in the visualization of the results, based on which concrete actions can then be taken.

So, with this framework in mind, let's consider some tangible examples of how data analysis can contribute to fighting the COVID-19 pandemic and consequently ensure our safety: Monitoring the location of people with a high probability of infection (even if without confirmation), Development of outbreak prediction models by geography, this prediction by geography would enable an allocation of health professionals (scarce and tireless resources) proactive rather than reactive, based on the zones in which the number of cases was estimated to increase the most shortly. Real-time visualization of data related to the supply of essential goods, and the creation of a signaling system/monitoring of the elderly in isolation, in the face of the declared state of emergency, is important to ensure that the elderly, one of the groups most fragile by this outbreak and with this is necessary a redoubled care.

3 METHODOLOGY

Research on the coronavirus in the Midwest region of Brazil, which is composed of the states of Goiás (GO), Mato Grosso (MT), Mato Grosso do Sul (MS) and the Federal District (DF). The present work consists of research by data collection, as well as a bibliographic review, through articles and publications of official bodies, addressing the main information about COVID-19, its repercussion, data analysis its repercussion and applicability. (Gelman, 2014).

According to Brito 2019, bibliographic research is a type of research that is based on the analysis and interpretation of written materials, such as books, scientific articles, reports and theses, intending to collect information on a specific topic. It is widely used in several areas of knowledge, such as academia, industry, health and public administration, to identify reliable and up-to-date sources of information, inform decisions and improve existing knowledge. The bibliographic research can be carried out systematically, using well-defined criteria of the selection of materials, or exploratory, seeking general information on a subject. It is an important tool for the production of new knowledge and for improving the understanding and use of existing information.

Bibliographic research can be used to analyze the state of the art in health-related studies. The techniques used in the bibliographic research present results that demonstrate the relevance of the analysis of the information so that one can make future projections as a field of study in rapid growth. The article is an important read for researchers and students who are interested in using bibliographic research to analyze the state of the art in a specific area (González-Monteagudo, 2020).

Step 1: Research Proposal. The research proposal was designated by the supervising professor. Stage 2: Bibliographic Research. At this time, the bibliographic selection was carried out, choosing articles and publications of organs, where the most relevant topics for the research were addressed,

with an approach to explore, review and clarify to the reader about COVID-19, its repercussion, data analysis, its repercussion and applicability.

Step 3: Quantification and Data Processing. A goal has been set to analyze the graphs and figures available on the Ministry of Health's Coronavirus Dashboard, stratifying the data by FU, from the Midwest region, by cumulative cases of COVID-19 by date of notification, cumulative cases of COVID-19 by an epidemiological week of notification, cumulative deaths of COVID-19 by date of notification, cumulative deaths of COVID-19 by Epidemiological Week of notification.

Step 4: Turn Data into Statistics. As a methodology for analyzing the data in the research and the evaluation of the COVID-19 scenario, its repercussion, data analysis and its applicability in the Midwest region. Screenshots were taken of the information contained in the graphs of the Coronavirus Panel of the Ministry of Health, analyzed evidencing the real situation of the disease and people's knowledge about the subject, as well as the appropriate conduct in the current times.

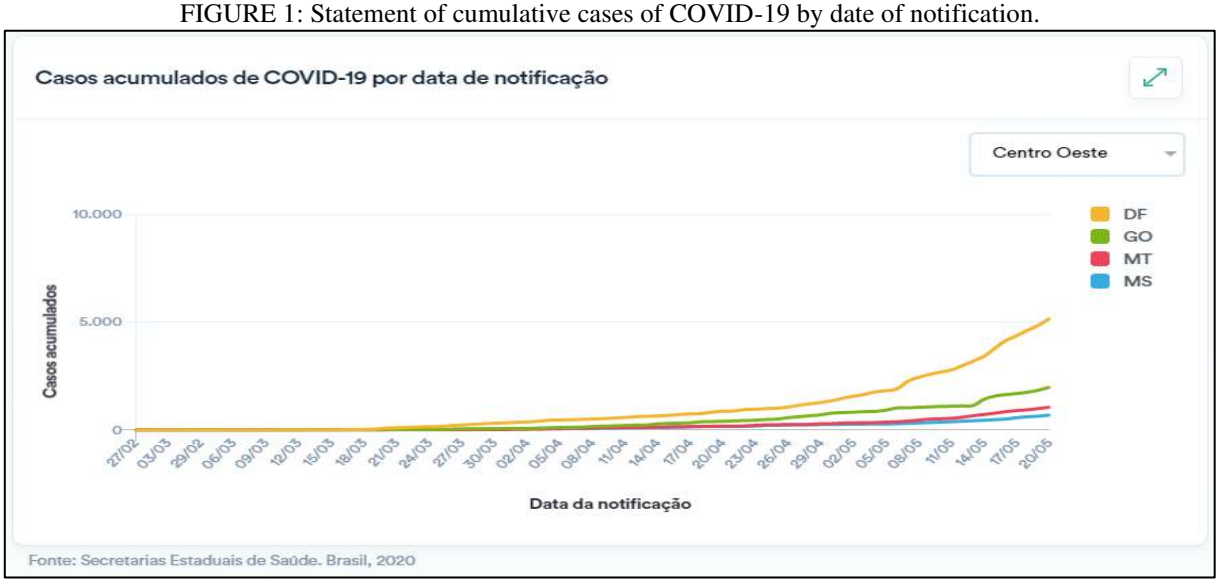
It should also be remembered that the generation and interpretation of statistics is extremely important in the health area, as it allows the evaluation of trends and the planning of effective public health interventions. Statistics can be used to identify population groups at higher risk of developing certain diseases, assess the effectiveness of therapeutic interventions, and identify inequalities in health care delivery. In addition, statistics are also essential for monitoring the spread of infectious diseases, assisting in identifying outbreaks and planning effective responses. Without the collection and interpretation of statistics, decisions made in the health area would be based on subjective assumptions and perceptions, which could lead to mistaken decisions and the implementation of ineffective interventions. Therefore, the generation and interpretation of statistics are fundamental to improving the health and well-being of the population. (DeSalvo, 2019).

4 FINDINGS

The research presented satisfactory results evidencing the information related to the behavior of the coronavirus (COVID-19) since the first case was confirmed in Brazil, especially in the Midwest region, evidencing in a visual way through graphs. As shown in Figures 1 to 4.

Figure 01 presents the information related to the **cumulative cases of** COVID-19 by date of notification on a linear scale. Data available as of February 27, 2020 for the states of Goiás (GO), Mato Grosso (MT), Mato Grosso do Sul (MS) and the Federal District (DF).

FIGURE 1: Statement of cumulative cases of COVID-19 by date of notification.



Source: Coronavirus Panel, Federal Government, 2020.

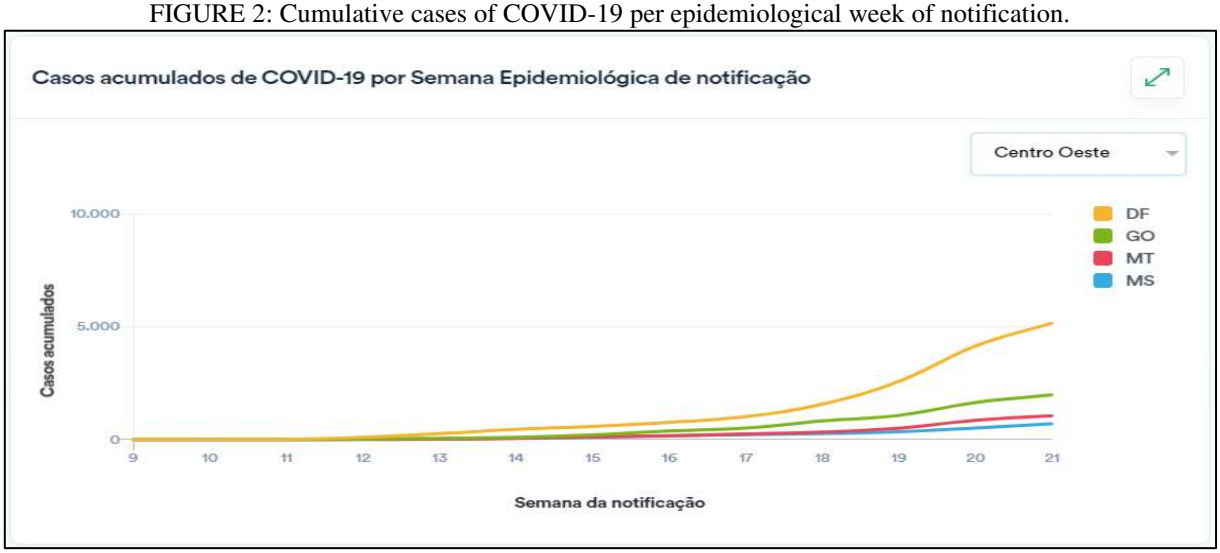
Figure 1 shows the results in a line graph and contains the evolution of the viral picture in the Midwest Region by date of notification. In yellow color the line represented the Federal District, where the first confirmed case was on March 10, on the 15th there were 8 cases, 100 on the 21st, 230 on the 27th. On the 2nd of March, there were 370 confirmed, 59 on the 8th, 651 on the 14th, 872 on the 20th, 1066 on the 26th. Already in May on day 02 were 1566 cases, 2442 on day 08, 3410 on day 14 and at 20:00 hours on day 20 the total confirmed cases was 5161.

Still about figure 1, in green color about the state of Goiás the first case notified was on March 13, 2020, on 03/20 the state had 15 cases, on 03/27 there were already 49 on 03/04 88, 191 on 04/10, on 04/17 335, 486 cases on 04/24, on May 1 808, in 08/05 1053, in 15/05 there were 1423 until the day 20 1978cases, revealing that in the last two weeks the state of Goiás had a greater growth in the number of cases.

The line in red color representing the state of Mato Grosso. On March 20, 2020, Mato Grosso had its first confirmed case of COVID-19. As of April 15, it had 151 confirmed cases. As of April 30, it has confirmed 297 cases. On May 15, 779 cases and on May 20, at 8 p.m. Brasilia time, notified 1054. In blue concerning the state of Mato Grosso do Sul-MS, according to the chart on May 17 had been counted 570 cases, and in the penultimate update, MS already had 693 cases of Covid-19.

Figure 2 provides information regarding the **cumulative cases of** COVID-19 per epidemiological week in the Midwest region, with information available from the 9th week of the year for the UFs (Federative Unit) of GO, MT, MS and DF.

FIGURE 2: Cumulative cases of COVID-19 per epidemiological week of notification.



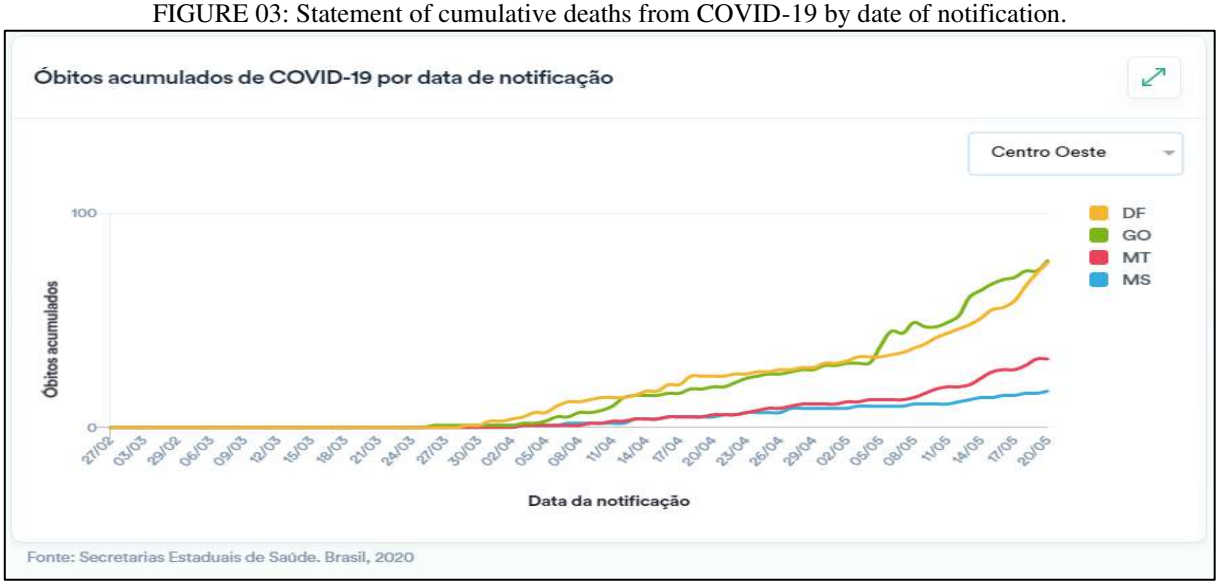
Source: Coronavirus Panel, Federal Government, 2020.

Figure 2 shows the cumulative cases of COVID-19 per epidemiological week of notification. In yellow the representative line of the DF with the first case in week 10, in week 11 there were 6 confirmed, 100 in week 12, 260 in week 13, 454 in week 14, 579 in week 15, 762 in week 16, 1013 in week 17, 1566 in week 18, 2576 in week 19, 4140 in week 20 and ending in week 21 with a total of 5161 cases. In green the state of Goiás that in the 12th epidemiological week, there were 20 confirmed cases, in the 13th 56, 14th 103, 16th 318, 17th 506, 18th 825, 19th 1069, 20th 1640, in the 21st week 1978, revealing greater growth of the nominal in the last 2 weeks.

Continuing with the analysis of Figure 2. In red the line referring to the state of Mato Grosso, which had the first confirmed case of COVID-19 in week 12, in week 15 there were 121 cases. At week 18 it had 331 cases. And in the latest update of the portal, it shows that in week 21 there were 1054 confirmed cases. In blue the representative line of the state of Mato Grosso do Sul-MS, from the day 16/05, They were registered more than 29 cases observing a very rapid growth. The epidemiological bulletin of cases updated on 21/05, MS recorded 18 new cases, adding up to a total of 693 cases.

Figure 03 presents the information about **the accumulated deaths of** COVID-19 by date of notification in the Midwest region, with information available for the states of Goiás (GO), Mato Grosso (MT), Mato Grosso do Sul (MS) and the Federal District (DF).

FIGURE 03: Statement of cumulative deaths from COVID-19 by date of notification.



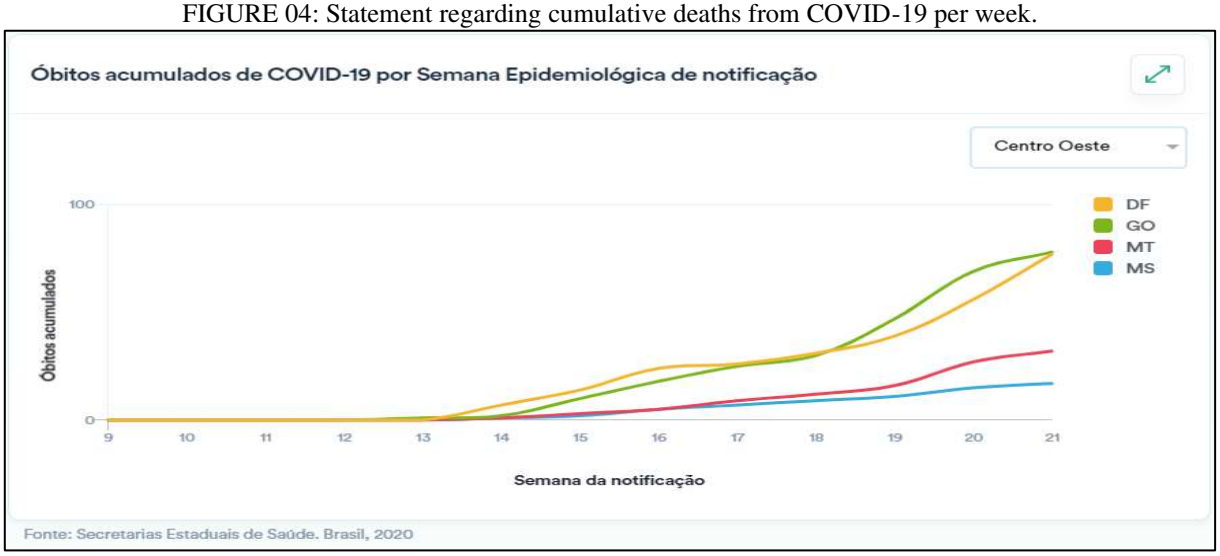
Source: Coronavirus Panel, Federal Government, 2020.

Figure 3 represents results regarding cumulative deaths from COVID-19 by the date of notification in the Midwest region. In yellow the representative line of the DF where the first death occurred on March 29, on April 2 had 04, 12 on day 08, 17 on day 14, 24 on day 20, 27 on day 26. On May 2 there were 31, on the 8th there were 37, on the 14th there were 51 and on the last day 20 there were 77 deaths. In green color the state of Goiás, as shown in the graph, had the first notification of death on March 26, this number remained unchanged until April 2, on 09/04 there were already 7 deaths, on 04/16 16 deaths, on 04/23 23 notifications, on 04/30 29 deaths notified, in 05/07 44 notifications, in 05/14 64 deaths and on day 20 there were already 78 notifications.

Still on Figure 3. On April 6, 2020, the state of Mato Grosso, in red, had its first death from COVID-19. On April 21 there were 6 deaths. On May 6, 14 deaths. And in the last update of the portal held on May 20, reported 32 deaths in the region. In the state of Mato Grosso do Sul, according to the visible blue crescent line, the first death occurred on April 2, 2020, and the number of deaths reported by COVID-19 grows gradually, managing to maintain the number of 16 deaths until the last update. Knowing thus that the measures of variation are in theory negative, totaling 17 deaths to date.

Figure 04 deals with the information related to the **accumulated deaths of** COVID-19 per epidemiological week in the Midwest region, with information available from the 9th week of the year for the UFs (Federative Unit) of GO, MT, MS, and DF.

FIGURE 04: Statement regarding cumulative deaths from COVID-19 per week.



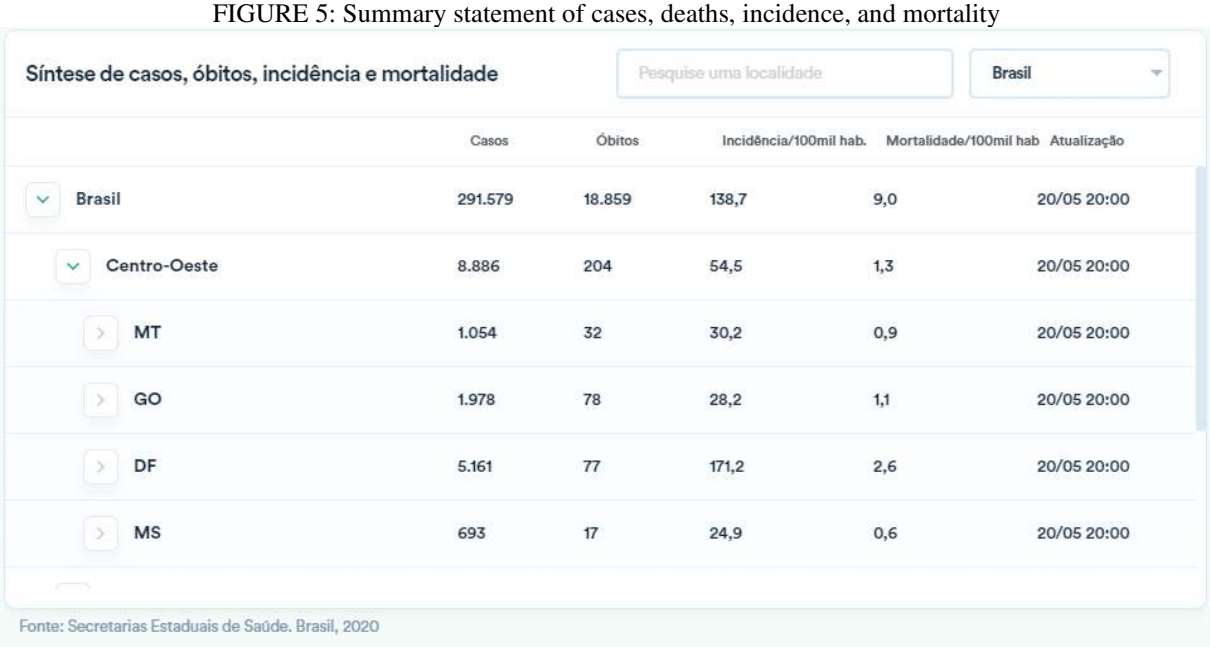
Source: Coronavirus Panel, Federal Government, 2020.

Figure 4 shows results for cumulative COVID-19 deaths per epidemiological week of notification. In yellow is the representative line of the DF that had the first deaths reported in week 14 with 7 deaths, in week 15 there were 14 deaths, 24 in week 16, 26 in week 17, 31 in week 18, 39 in week 19, 56 in week 20 and 77 in week 21. In green the state of Goiás that in the 13th epidemiological week had the first confirmed death, in the 14th 2 confirmations, in the 15th there were already 10 notifications, 16th 18 deaths, 17th 25 deaths, 18th 30, 19th were 47, 20th 69 confirmed, in the 21st week 78, it is noted that the number of deaths in the last two weeks grew less.

Following on from the analysis of Figure 4. In red is the state of Mato Grosso, where the first death from COVID-19 occurred in week 14, in week 17 there were 9 deaths, in week 19, 16 deaths, and 32 deaths in week 21. In blue the state of Mato Grosso do Sul, the lines begin to rise from week 13, where the first case of death from COVID-19 was recorded in the state of Mato Grosso do Sul, represented by the blue line, and there were 10 deaths until the 19th week.

Figure 5 shows information related to the synthesis of cases, deaths, incidence, and mortality, with information for the states of Goiás (GO), Mato Grosso (MT), Mato Grosso do Sul (MS), and the Federal District (DF) until May 20, 2020, at 8 p.m.

FIGURE 5: Summary statement of cases, deaths, incidence, and mortality



Source: Coronavirus Panel, Federal Government, 2020.

Figure 5 shows the data for the Synthesis of cases, deaths, incidence, and mortality until May 20, 2020, at 8 p.m. Nationally there are a total of 291,579 cases, with 18,859 deaths, an incidence of 138.7/100,000 inhabitants. with a mortality of 9.0/per 100,000 inhabitants. Regionally there are 8,886 cases, with 204 deaths, an incidence of 54.5/per 100,000 inhabitants. with a mortality of 1.3/per 100,000 inhabitants. In the state of Mato do Grosso there are 1,054 cases, with 32 deaths, an incidence of 30.2/100,000 inhabitants. with a mortality rate of 0.9/per 100,000 inhabitants. The state of Goiás records 1,978 cases, with 78 deaths, an incidence of 28.2/per 100,000 inhabitants. with a mortality of 1.1/per 100,000 inhabitants. The Federal District has confirmed 5,161 cases, with 77 deaths, an incidence of 171.2/100,000 inhabitants. with a mortality rate of 2.6/100,000 inhabitants. Finally, Mato Grosso do Sul confirmed 693 cases, with 17 deaths, an incidence of 24.9/per 100,000 inhabitants. with a mortality rate of 0.6/100,000 inhabitants.

5 CONCLUSION

COVID-19 is a disease caused by the SARS-CoV-2 coronavirus that can present from asymptomatic infections to severe respiratory conditions. There is not yet a specific vaccine for the new coronavirus, but researchers around the world are working on different strategies for creating an efficient vaccine for the control of the disease. Data analysis has been instrumental in tracking the evolution of the pandemic and in determining the need for isolation and social distancing measures in different states and regions.

In addition, it is notorious that bibliographic research is a valuable tool to obtain reliable and up-to-date information on the subject. It is widely used in different areas of knowledge, including

health, and can be carried out in a systematic or exploratory way. In this context, it is essential to emphasize the importance of using data analysis correctly and effectively. The acquisition of relevant data, the proper choice of models and algorithms, and the clear visualization of the results are fundamental for the analysis to be efficient and for the decisions made based on it to be the most appropriate.

It is possible to notice that the Midwest Region of Brazil has faced significant growth in the number of cases and deaths related to COVID-19. The Federal District, Goiás, Mato Grosso, and Mato Grosso do Sul showed an increase in the number of confirmed cases and deaths throughout March, April, and May 2020.

It is important to note that the states showed different growth in the number of cases, which can be attributed to factors such as the social distancing measures adopted in each region, as well as the behavior of the population regarding the recommendations of the health authorities. In addition, it should be remembered that these data reflect only the reported cases and that there may be underreporting in some regions.

In short, the data presented show the need for effective measures to contain the spread of COVID-19 in the Midwest Region and throughout the country, to minimize the impact of the disease on the health of the population and the health system. The analysis of this information is fundamental to guide public policies and decisions made by health authorities, as well as to raise awareness of the importance of combating the pandemic.

It is also worth remembering the need to follow the guidelines of the World Health Organization and local health agencies to prevent the spread of the disease, including the use of masks, hand hygiene, and social distancing. The COVID-19 pandemic is an unprecedented situation and requires everyone's joint effort to control its spread and minimize its public health impacts.

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