EDITORIAL

Three urgent needs in the battle against COVID-19: specific medications, information and acceptance of Pandemic

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Abstract

The first confirmed case of COVID-19 was notified to the Brazilian Ministry of Health on February 26, 2020. On November 20, 2021, by the end of Epidemiological Week-46 (EW-46) 257,168,692 confirmed cases of COVID-19 reported worldwide. Among the countries with the highest number of accumulated cases the United States of America ranks number one (47,701,872), followed by India (34,510,413), Brazil (22,012,150), the United Kingdom (9,857,658), and Russia (9,135,149). Concerning deaths, 5,146,467 were confirmed worldwide until November 20, 2021. The United States was the country with the highest accumulated number of deaths (771,013), followed by Brazil (612,587), India (465,662), Mexico (292,145), and Russia (257,891).

Keywords: COVID-19, lethality, mortality, time-series

EPIDEMIOLOGY AND BACKGROUND

The first confirmed case of COVID-19 was reported to the Ministry of Health (MS) of Brazil on February 26, 2020. Based on daily data reported by the State Health Departments to the Ministry of Health and compiled by the COVID-19 Brazil/Ireland Observatory, 22,012.150 COVID-19 cases and 612,587 COVID-19 deaths were confirmed in Brazil in less than two years (from February 26, 2020 to November 20, 2021). The cumulative incidence rate of COVID-19 was 10,367.5 cases per 100,000 inhabitants, while the cumulative mortality rate was 288.6 deaths per 100,000 inhabitants.

COVID-19 is a global public health problem and is the most extensive pandemic in the recent history. It is caused by the new coronavirus (SARS-CoV-2) and is characterized by being a potentially severe respiratory infection with global distribution and presents a high transmissibility between people by respiratory droplets, airborne or contact with contaminated objects and surfaces.

Having information about the behavior of COVID-19 is essential for prevention of the disease and care of the population using public health measures implemented by Federal, State and Municipal Brazilian governments. Measuring and monitoring the numbers of cases and deaths of the disease and analyzing these numbers allows public health workers to present mortality and lethality rates for the whole populations and for segments of the population[1].

Using health indicators and other epidemiological data constructed from data collection and their analysis by statistical methods, health diagnoses are made to support the implementation of health promotion and disease prevention measures collectively[2,3]. Therefore, it is important for every health care professional, particularly for those working on the frontline of the fight against COVID-19, to develop their capacity to implement the epidemiological method with the aim of reducing diseases, promoting health and improving health care in the

population. Moreover, it is essential for everyone involved in combating the COVID-19 pandemic to work with two indices: mortality and lethality. The mortality rate is a demographic index and is the ratio between the number of deaths and the number of population within a specific period of time (weeks, months, a year). Frequently, the rate is represented as the number of deaths in every 100 inhabitants (%). Lethality is a measure of the severity of the disease, estimated by dividing the number of deaths by a given disease by the number of cases of the same disease (%)[2].

From the beginning of the pandemic through November 6, 2021, there were 249,546,001 confirmed cases of COVID-19 worldwide, with the United States of America (USA) being the country with the highest number of accumulated cases (46,465,823), followed by India (34,355,509), Brazil (21,874,324), the United Kingdom (UK) (9,317,072) and Russia (8,613,533)[4,5].

During the same period, there were 5,044,871 confirmed deaths worldwide, with USA being the country with the highest number of accumulated deaths (754,310), followed by Brazil (609,388 deaths), India (460,791), Mexico (289,674) and Russia (241,095)[4,5]. The gross incidence rate in the world through November 6, 2021, was 31,688.5 cases for every million inhabitants.

In Brazil, the cases of new deaths related to COVID-19 were different in the different regions of the country. The number of new cases of COVID-19 was 21,179 in the Southeast, 19,087 in the Northeast, 18,611 in the South, 6,778 in the Central-West region and 4,584 in the North (Ministry of Health, 2021). The number of new deaths was 945 in the Southeast, 327 in the South, 189 in the Central-West region,188 in the Northeast, and 45 in the North. Thus, the Southeast was the region with the highest absolute number of cases and new deaths[4].

The estimation of the rates takes into consideration the number of inhabitants per location, thus removing the effect of the population's size on the comparison between regions. Until November 6, 2021, the Southern region of Brazil was the one with the highest incidence rate, reaching 61.6 cases/100,000 inhabitants. The Central-West region had the second highest rate of incidence (41.1 cases/100,000 inhabitants), followed by the Northeast (33.3 cases/100,000 inhabitants), the North (24.5 cases/100,000 inhabitants) and the Southeast (23.8 cases/100,000 inhabitants). The overall incidence in Brazil was 33.2 cases/100,000 inhabitants in the 44th epidemiological week[4,5].

Through November 6, 2021, the Central-West, South and Southeast regions recorded a mortality rate of 1.1 deaths/100,000 inhabitants, with the Northeastern region having a rate of 0.3 deaths/100,000 inhabitants. The overall mortality rate for Brazil through November 6, 2021 was 0.8 deaths per 100,000inhabitants[4].

For both years 2020 and 2021, almost 80% of people infected by SARS-CoV-2 recovered from the disease, not requiring hospital management and nearly 15% had severe forms of the disease (COVID-19), particularly those who were older and/or with comorbidities, such as cardiac or pulmonary problems, diabetes or cancer[4].

Prevention and Control:

During the early days of the pandemic, there were joint efforts globally to slow down viral transmissibility and contain the new coronavirus transmission by using non-pharmacological measures, such as face masks[6]. Despite these actions, Brazil recorded approximately 615 thousand deaths, officially registered in the Ministry of Health with COVID-19 as the primary cause of death[4].

This devastating COVID-19 pandemic required the fast development of sanitary processes which are capable of preventing deaths and reducing complications in people infected by SARS-CoV-2. Mass vaccination is the natural candidate for this goal, and in fact there has been significant reduction in COVID-19 lethality and mortality indicators in the Brazilian regions with the increasing number of individuals vaccinated against COVID-19[6].

Based on scientific evidence, vaccination seems to be the proper and safe process to prevent severe cases of COVID-19 and to reduce the number of deaths. Vaccines have proven over time to be the best intervention in public health for the control, removal and eradication of infectious diseases. Similarly, published research to date indicates that there is enough evidence to support using immunization to prevent COVID-19 to control the ongoing pandemic[7].

The platforms for COVID-19 vaccine development, particularly those approved by the World Health Organization (WHO), have reported an increasing number of new vaccines being developed against COVID-19 throughout the world, focused on new technologies, not overlooking those already being used, such as the vaccine using inactivated whole-cell vaccines, since they represent a tested and safe long-term vaccination method[7,8].

A representative of this type of vaccine, widely used in Brazil, is CORONAVAC, which is produced from the inactivated and weakened SARS-CoV-2 virus. The rest of the vaccines produced in Brazil are of the replicating and non-replicating viral vector vaccines, nucleic acid vaccines (DNA, RNA), and protein-based vaccines (with protein subunits and particles similar to the virus)[8,9].

The epidemiological data recorded worldwide through November 6, 2021, show that the vaccines using the inactivated and weakened virus, such as CORONAVAC, have been efficient to control SARS-CoV-2 virus transmissibility[7,8]. This type of vaccine (CORONAVAC) stands out because it has the potential to trigger a wider immune response against the virus, not restricted to the S protein (from "spike"), like vaccines against COVID-19 from other platforms (such as the Pfizer non-replicating viral vector vaccine, and the AstraZeneca and Janssen vaccines, that have been authorized by the National Agency for Sanitary Surveillance (ANVISA - Agência Nacional de Vigilância Sanitária) in Brazil, with the potential of being more effective against the new coronavirus variants (SARS-CoV-2)[7,8].

According to Bargieri and Boscardin (2021), CORONAVAC is quite different from other vaccines, since it not only uses the Spike protein, but the whole virus. This means that it induces an immunological response against the Spike protein but also against the other 25 proteins of the virus. CORONAVAC induces low levels of antibodies

in general, and low levels of neutralizing antibodies. Also, it is efficient to prevent COVID-19[9].

In recent findings, with 85 patients who recovered from COVID-19, there was an indication that the CORONAVAC, produced in Butantan and from the Sinovac pharmaceutical company is capable of doubling the amount of neutralizing antibodies and multiplying by 4.4 times the level of immunoglobulin (IgG) in people who already had the disease, suggesting that CORONAVAC stimulates the humoral immunologic memory of

recovering patients, accelerating the production of neutralizing antibodies and their circulation levels in the bloodstream[10]. Thus, every dose of the inactivated virus vaccine is made up of trillions of particles of the virus, and stimulates the immune system to identify the virus as soon as it gets in contact with it. As CORONAVAC contains the whole inactivated SARS-CoV-2 virus, the immune system produces antibodies that identify many antigens (proteins) of the new coronavirus. The S protein is the main one, used by the SARS-CoV-2 to penetrate within human cells, but not the only one[11].
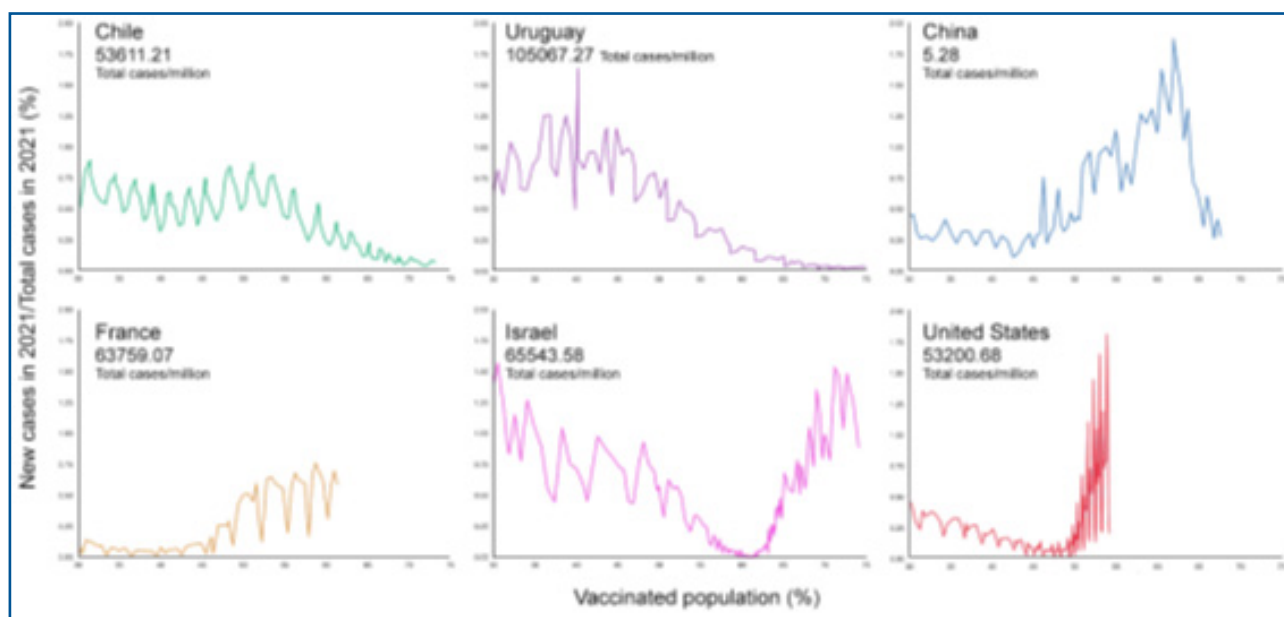

Figure 1: New cases of COVID-19 versus the percentage of vaccinated population. The numbers under the name of the country indicate the total of reported cases since the beginning of 2021. For the comparison, the same axes, X and Y, were used in all graphs. The file with the data used in the construction of the graphs was taken from official data storages reported by each country (check the "Statement of data availability" below).

Figure 1 shows the new COVID-19 cases versus the percentage of vaccinated population. The data (collected up to August 24, 2021) were selected using 30% of the vaccinated population as limit. In the countries of Chile, Uruguay and China, the CORONAVAC vaccine was predominantly used. In France, Israel and the US, only mRNA/AV vaccines were used[11].

Coronavirus has 25 proteins in total, mostly responsible for regulating the multiplication and exit of the virus from human cells. Thus, a variant that presents S-protein alteration (mutation) is no longer identified by specific vaccines containing only the S protein[11].

Likewise, we should highlight a post-COVID-19 condition occurring in individuals with a history of probable or confirmed infection by SARS-CoV-2, generally 3 months after the onset of COVID-19, with symptoms lasting for at least 2 months, which cannot be explained by an alternative diagnosis.

The characterization of this post-COVID-19 condition is ordinary symptoms, including fatigue, shortness of breath, cognitive dysfunction, and others, which generally have an impact on daily life. The symptoms could be new after the initial recovery of an acute COVID-19 episode or persist after the initial disease. The symptoms may also fluctuate or recur over time.

Thus, these symptoms may fluctuate (modify over time in terms of quantity or quality), they may recur (a return of the manifestations of the disease after the period of improvement), or manifest as a cluster (two or more symptoms related to each other and occurring jointly).

◼ CONCLUSIONS AND RECOMMENDATIONS

When fighting against the COVID-19 pandemic, on November 1, 2021, there was a total of 6,893,866,617 doses of the vaccine administered in the world population[4]. As we don't have a specific medication for the treatment of COVID-19, COVID-19 continues to be a challenging condition for public health at the global level for the foreseeable future. It is therefore reasonable to consider vaccination as the natural candidate to be the intervention of choice to slow down viral transmission, and to consider the vaccines that are produced with the inactivated virus as the vaccines of choice to combat the spread of COVID-19 at the present time.

There continues to be many questions related to COVID-19 infection and its sequelae. Research on COVID-19 behavior in the Brazilian population will help to advance both the prevention and the research, and will probably change as new scientific evidence emerges.

The JHGD has been contributing to a better understanding of the challenge of COVID-19 through the publication of the papers published in this 31.3 issue[12-30] about lethality and mortality of COVID-19, the laboratory diagnosis, and the scale of evaluation of the fear of COVID-19.

From our point of view, the consequences of COVID-19 will continue to evolve, with scientific dissemination being the only way to fight against misinformation and the absence of scientific knowledge. Health education provides knowledge about transmission, as well as the ongoing search for new strategies for global health in the fight against COVID-19.

In science, truth is transient. This is the greatest scientific legacy of humanity. We believe that today, the vaccine produced from the inactivated and weakened SARS-CoV-2 virus is our greatest hope to control the COVID-19 pandemic.

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