

## SOCIODEMOGRAPHIC AND BEHAVIORAL PROFILE OF PATIENTS WITH COVID-19 IN THE CENTRAL REGION OF RIO GRANDE DO SUL

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**Highlights:** 1. High-risk epidemiological and behavioral profile. 2. Educational actions to strengthen the promotion and prevention of new diseases. 3. Strengthening public policies for pandemic crisis situations.

PRE-PROOF

(as accepted)

This is a preliminary, unedited version of a manuscript that was accepted for publication in *Revista Contexto & Saúde*. As a service to our readers, we are making this initial version of the manuscript available, as accepted.

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## ABSTRACT

Identifying the population affected by COVID-19 is essential for making decisions regarding the treatment of the pathology as well as its sequelae. To this end, studies are needed that characterize those affected, in order to promote health actions that support continuity of care and meet the demands arising from the illness process caused by the sequelae of the disease.

**Objective:** to analyze the epidemiological and behavioral profile of users diagnosed with COVID-19 in a highly-complex hospital in the central region of the state of Rio Grande do Sul (RS). **Method:** this is a quantitative, retrospective, descriptive analysis of medical records of users with a confirmed diagnosis of COVID-19, hospitalized between 2020 and 2022, totaling twenty-six months. **Results:** 664 patient records were analyzed, with a predominance of adults and elderly people. The highest incidence of hospitalized patients was from the central region of RS, of Brazilian nationality, male, white, married, and with incomplete primary education. Regarding the risk behavior variable, there was a predominance of non-smokers and non-drinkers. Regarding the behavioral habits related to immunization for COVID-19, most of the records did not contain information on whether or not the patient had received the vaccine. **Conclusion:** this study indicates and emphasizes the need for public policies that meet the needs of this public – post-Covid-19 patients –, including longitudinal monitoring, as a strategy for preventing new diseases, and health promotion and education, aiming for quality of life and ensuring equity of care.

**Keywords:** SARS-CoV-2; Medical Records; Teaching Hospitals; Epidemiology; Public health; Sistema Único de Saúde.

## INTRODUCTION

The set of health services and equipment in a given geographic territory, be it a health district, a municipality, or a regional health department, is part of the so-called Rede de Atenção à Saúde (Health Care Network) in Sistema Único de Saúde<sup>1</sup> (SUS). This network, called organizational arrangements of health actions and services, comprises different technological densities, which, integrated through technical, logistical, and management support systems, seek to guarantee comprehensive care<sup>2</sup>. For these services to work synchronously, service offerings in the same geographic territory are not sufficient. It is

necessary to know how such services relate to each other, what communication is established between them, as well as which care and management models are being produced<sup>3</sup>.

To view this synchronization, the National Humanization Policy (Política Nacional de Humanização - PNH)<sup>4</sup> brings the principle of transversality, which uses tools and devices to consolidate networks, links, and co-responsibility between users, workers, and managers. Transversalization consists of recognizing that different specialties and health practices<sup>1</sup> can relate to the experience of those who are assisted. Together, this knowledge can produce health in a more co-responsible way.

Despite this, with the arrival of the COVID-19 pandemic, this care network suffered an immeasurable impact, demonstrating weaknesses in its composition and the execution of its services. On January 30<sup>th</sup>, 2020, the World Health Organization (WHO)<sup>5</sup> declared that the outbreak of the new coronavirus constituted a Public Health Emergency of International concern (PHEIC) – the highest alert level in the Organization –, as provided by the International Health Regulations, requiring a coordinated and immediate international response.

On March 11<sup>th</sup>, 2020, COVID-19 was declared by the WHO as a pandemic – a term that refers to the geographic distribution of a disease and not its severity<sup>5</sup>. The designation recognizes that, at the time, there were outbreaks of the disease in several countries and regions around the world. On March 20<sup>th</sup>, 2020, SARS-CoV-2 – which causes Covid-19 – affected more than 214,000 people around the world. The first recommendations from the Brazilian Ministry of Health and the Centers for Disease Control and Prevention (CDC)<sup>6</sup> were aimed at contingency plans for cases of infection by the Influenza virus, due to the clinical and epidemiological similarities between these respiratory viruses.

The first case confirmed in Brazil by the Ministry of Health was on February 26<sup>th</sup>, 2020, in São Paulo<sup>7</sup>. One month after the first record, all Brazilian states had already reported cases of the disease. The management of the pandemic crisis was fragmented between the three government spheres<sup>8</sup>, weaving the space of shared governance in the SUS. In the state of Rio Grande do Sul (RS), according to Secretaria Estadual de Saúde (State Health Department)<sup>9</sup>, the first case was registered on March 10<sup>th</sup>, 2020. Furthermore, given some territorial characteristics, such as climate, long border, and economy, among others, the state of RS was assessed by Fiocruz<sup>10</sup> as a risk zone, due to the greater overload of hospitalizations by Severe Acute Respiratory Syndrome (SARS) during the winter in southern Brazil.

During this period, public hospitals were already operating at maximum capacity, in a scenario of worn-out and underfunded structures. Due to the high demand for beds, measures were adopted such as the Controlled Distancing Model<sup>12</sup> and a flag system with mandatory protocols and specific criteria to be followed by different economic sectors<sup>13-14</sup>, thus aiming to contain the spread of the disease.

When it comes to regions, states, and municipalities, the crisis became even more impactful, as a large part of Brazilian municipalities did not have adequate infrastructure to care for patients with COVID-19, either because they did not have hospitals or because they only treated cases mild to moderate, or even due to limitation in the number of beds. As the number of cases increased across the country, the demand for hospital services grew abruptly, which raised concerns regarding the hospital's capacity to absorb this population<sup>15</sup>.

In this context, it was necessary to analyze the conditions of each municipality and identify which ones could meet such demands. Of the 32 municipalities covered by the 4<sup>th</sup> Regional Health Coordination (4<sup>a</sup> Coordenadoria Regional de Saúde - CRS), only 15 hospitals had beds to care for patients with COVID-19, with the Hospital Universitário de Santa Maria (HUSM)<sup>16</sup> the facility with the highest number of general, clinical and intensive care unit beds.

HUSM – the hospital in which the present study was carried out – is considered the largest public hospital in the central region of RS, serviced entirely by the SUS. It is a reference in urgent and emergency care for the population of the municipalities of the Central-West Region of RS, in addition to being characterized as a general, public<sup>17</sup>, and tertiary-level teaching hospital. Its purpose is based on professional training, developing teaching, and research and extension through assistance to the community in the area of health.

During the critical period of the COVID-19 pandemic, the hospital had approximately 403 beds for hospitalization and 20 adult ICU beds to care for patients with COVID-19, with 10 semi-intensive care beds intended for adult users coming from the Intense Care Unit post-stabilization of critical condition<sup>17</sup>.

In order to provide information that can support new administrative, management, and assistance technologies in the SUS service system, it is understood that epidemiological studies that evaluate the specificities of the population affected by COVID-19 are extremely important. In this way, the structuring, organization, and assistance of health services becomes possible from a perspective of the occurrence of new diseases, such as the pandemic

that began in 2020. Therefore, this study aimed to analyze the epidemiological and behavioral profile of users diagnosed with COVID-19 in a high-complexity hospital in the central region of the state of Rio Grande do Sul.

## **METHOD**

This study is a quantitative and retrospective analysis, of the descriptive nature, of medical records of users with a confirmed diagnosis of COVID-19, admitted to a teaching hospital in the central region of the state of Rio Grande do Sul.

The list of medical records was provided by the Medical Archive and Statistics Service (Serviço de Arquivo Médico e Estatística - SAME) of the hospital institution, after the project was approved by the Ethics and Research Committee with CAAE: 52260621.30000.5346, in compliance with the provisions of Resolution 510/2016 of the National Health Council.

The records provided by SAME were for the period from March 2020 to May 2022, totaling 26 months. Data collection took place through the electronic medical record called Aplicativo de Gestão dos Hospitais Universitários (AGHU), from November 2021 to July 2022, in a form pre-established by the researchers.

AGHU is the online document management system that, among other information, stores the medical records of users assisted at the hospital. It was implemented in all university hospitals in Brazil in the network Empresa Brasileira de Serviços Hospitalares (EBSERH). This application records all information regarding diagnosis, treatment, and outcome during users' hospitalization, with access restricted to authorized people.

As an inclusion criterion, the selection of medical records of users diagnosed with COVID-19 was established, in accordance with WHO guidelines<sup>5</sup>. To confirm the disease, a criterion was defined as the occurrence of a positive result for the real-time reverse transcriptase polymerase chain reaction (RT-PCR) examination of nasal and pharyngeal swab samples<sup>7</sup>. No minimum or maximum age was defined for data collection. Medical records of users who were in isolation and users who tested negative for COVID-19 were excluded from the study. In total, 807 medical records were analyzed, 143 of which were discarded (patients admitted with suspected COVID-19 but negative to tests) and 664 were validated for this research.

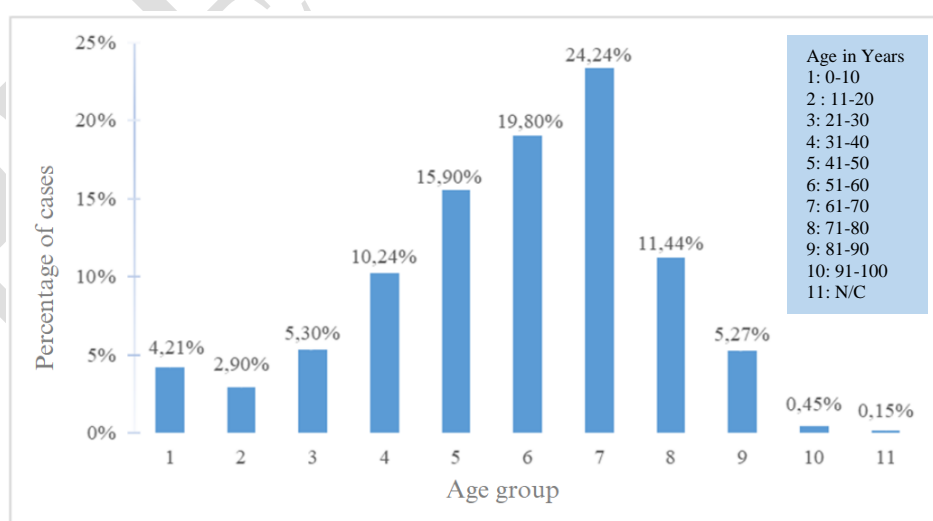
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Data collection was recorded in an Excel spreadsheet, constructed from sociodemographic, behavioral, and comorbidity variables listed in the National Operational Plan (Plano Nacional de Operacionalização - PNO) of Vaccination<sup>7</sup> against COVID-19 and in the National Immunization Plan (Plano Nacional de Imunização - PNI) of the Ministry of Health (Ministério da Saúde - MS). The data collected for this study included sociodemographic information such as gender, age, race, marital status, education, risk behavior – smoking, alcohol consumption – and behavioral habits – use of the COVID-19 vaccine. Categorical variables were presented as percentages. Continuous variables were presented as mean (standard deviation) with a 95% confidence interval and significance  $p < 0.05$ . The data were subjected to the Kolmogorov-Smirnov normality test. Data processing and analysis were performed using the SPSS Statistics for Windows program (IBM SPSS, 21.0, 2012, Armonk, NY: IBM Corp).

## RESULTS AND DISCUSSION

Of the 664 medical records analyzed, and, in relation to the age variable – as shown in Figure 1, 24.2% (N=161) of users were between the ages of 61 and 70 years old, followed by 8% (N=132) between 51 and 60 years old. From 0 to 10 years, the incidence was 4.21% (N=28). The youngest user was 1 month old (0.16 years), while the oldest user was 91 years old.

**Figure 1** – Age range of users diagnosed with Covid-19.



**Source:** Prepared by the authors (2023).

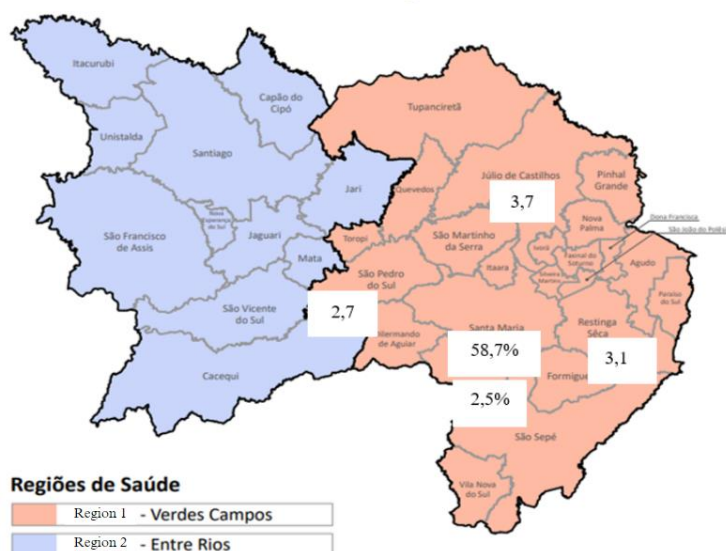
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In relation to the regions that comprise the 4<sup>th</sup> CRS which recorded a higher incidence of hospitalization, it was decided for this study to emphasize the first five (5) municipalities with the highest incidence of COVID-19 cases that required hospital admission in the established period. The Hospital Universitário de Santa Maria – the location of this research – is linked to the 4<sup>th</sup> Regional Health Coordination (4<sup>a</sup> Coordenadoria Regional de Saúde - CRS), covering a total of 32 municipalities. As it is a highly complex hospital, during the pandemic period its activities were designed to assist users affected by COVID-19, including hospitalization units, intensive treatment units, and support units. Santa Maria (RS) was the one that recorded the highest number of hospitalizations, reaching 58.7% (N=390) users, followed by Júlio de Castilhos with 3.7% (N = 25), Restinga Sêca with 3.1% (N=21), São Pedro do Sul with 2.7% (N=18) and São Sepé with 2.5% (N=17) users, as shown in Figure 2.

According to data from the epidemiological bulletin of the State Department of Health of Rio Grande do Sul<sup>9</sup>, As of May 31<sup>st</sup>, 2022, 2,435,883 cases of the disease had been registered, of which 39,550 resulted in death. Santa Maria recorded 74,149 cases in the same period, with 935 users dying<sup>9</sup>.

**Figure 2** – Health Regions covered by the 4<sup>th</sup> CRS.

### 4<sup>a</sup> Coordenadoria Regional de Saúde



**Source:** Adapted by authors from the Rio Grande do Sul Health Department.

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Table 1 shows the sociodemographic data analyzed, namely nationality, gender, marital status, and ethnicity. The predominance of hospitalization in terms of nationality showed that users hospitalized with a positive diagnosis for COVID-19 in the period referred to comprise the absolute majority of Brazilians, totaling 99.09% (N=658). Users of other nationalities totaled four (4) born in South American countries and two (2) with no nationality data in their medical records.

When it comes to the gender variable, 56% (N=365) were male and 44% (N=299) were female. When relating gender to the prevalence of positive cases in the state of Rio Grande do Sul (RS) and in the cities of Porto Alegre and Santa Maria<sup>9</sup>, a higher proportion of infected females was observed. However, it was possible to verify that, although studies indicate that females present a higher number of infections, the highest proportion of hospitalized patients found by this study corresponds to males, being 9.93% higher than female hospitalizations.

The differences in the predominance of male hospitalizations<sup>19</sup> appear to be associated with biological factors, such as immunological and cellular composition differences between the sexes, in addition to behavioral factors, such as tobacco use. In another study<sup>20</sup>, the authors point out that, in addition to these factors, the elements that also encourage male vulnerability about COVID-19 concern occupational exposure, due to family provision and men not seeking health services.

In terms of marital status, the data demonstrate that the majority of hospitalized patients were married at the time of admission, totaling 46.08% (N=306), followed by 32.68% (N=217) who were single, 9.18 % (N=61) divorced, 9.03% (N=60) widowed and 3.01% (N=20) without recording this information in the medical records.

In the ethnicity variable, the study revealed that 91.4% (N=607) were of white race, followed by 4.96% (N=33) of black race, accompanied by 2.86% (N=19) of black race/mixed race, 0.15% (N=-1) indigenous and 0.6% (N=4) of users did not have this information recorded in the medical record.

According to epidemiological data from SES/RS (2022)<sup>21</sup>, in the self-declaration of the first 149 deaths, the white race prevailed, followed by black and brown races. However, the information contrasts with data from London<sup>22</sup>, where hospitalizations of black individuals prevailed. About Brazil, specifically the State of Rio Grande do Sul, in the 21<sup>st</sup> week of 2022<sup>23</sup> the ethnicity declared in deaths in the state showed a prevalence of black race.



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According to Ordinance No. 344/2017 of February 1<sup>st</sup> (p.1) of the Ministry of Health, “collecting the color question and filling in the field called race/color will be mandatory for professionals working in health services, to respect the health user's self-declaration criteria, within the standards used by the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística - IBGE) and who appear on health information system forms as white, black, yellow, mixed race or indigenous”, as well as “include the issue of race/color in all data collection instruments adopted by public services and health research with those affiliated or contracted by the SUS”<sup>24</sup>.

**Table 1** – Sociodemographic data of Covid-19 users central region Rio Grande do Sul.

<i>Variable</i>	<i>Frequency</i>	<i>Relative Frequency (%)</i>
<b>Nacionalidade</b>		
<i>Brasilian</i>	658	99.09
<i>Colombian</i>	1	0.15
<i>Uruguayan</i>	2	0.30
<i>Venezuelan</i>	1	0.15
<i>Information not recorded in the medical record</i>	2	0.30
<b>Gender</b>		
<i>Male</i>	365	54.96
<i>Female</i>	299	45.03
<b>Marital Status</b>		
<i>Single</i>	217	32.68
<i>Married</i>	306	46.08
<i>Divorced</i>	61	9.18
<i>Widowed</i>	60	9.03
<i>Information not recorded in the medical record</i>	20	3.01
<b>Ethnicity</b>		
<i>White</i>	607	90.4
<i>Indigenous</i>	1	0.15
<i>Brown/Mixed color</i>	19	2.86
<i>Black</i>	33	4.96
<i>Information not recorded in the medical record</i>	4	0.60

**Source:** Prepared by the authors (2023).

Regarding education, 36.45% (N=242) users mentioned having incomplete primary education, followed by 20.5% (N=135) who had completed High School. Furthermore, 18.9% (N=126) of the records did not have this information. It is possible to observe a higher

percentage of hospitalizations due to COVID-19 in the population with low education, a finding that solidifies the SES/RS statistics, in which the fatality proportion includes users who have less education.

Studies that corroborate these data include the States of Pará<sup>25</sup>, Espírito Santo<sup>26</sup>, and Rio Grande do Sul<sup>27</sup>, which also showed a higher prevalence of contamination and hospitalization by COVID-19 in the population with low education. The level of education<sup>28</sup> brings with it important social descriptions of the cases, in addition to reflecting the socioeconomic conditions, which can be seen as determinants of health and well-being, making it possible to indirectly analyze their employment and income conditions, access to health services, as well as such as eating, hygiene, and behavioral habits<sup>29</sup>.

About alcoholism, 93% (619) declared that they were not alcoholics, while 7% (45) reported being addicted users of alcoholic beverages. With regard to lifestyle habits, of the 664 medical records analyzed, 16.2% (N=108) had a smoking habit and 83.7% (556) declared that they were not smokers. There is a higher incidence of smokers compared to alcohol drinkers, which was also evidenced by another study carried out in Pernambuco<sup>29</sup>, as well as Passo Fundo/RS<sup>30</sup>, where smoking had a higher prevalence about alcoholism.

Scientific evidence<sup>31</sup> proves a worse outcome for the evolution of respiratory complications from COVID-19 in smokers, although the proportionality rate for smokers is considered low.

Therefore, the harmful consumption of nicotine and alcoholic substances leads to injuries and illnesses that may be associated with the imminent risk of contagion and worsening of COVID-19, given behavioral habits and organic health conditions. Studies<sup>32</sup> show that tobacco consumption is related to the worsening of the development of the disease caused by SARS-CoV-2, since cardiovascular diseases or respiratory diseases, in addition to presenting a worse outcome among smokers, have been associated with a worse prognosis in people with COVID-19.

One of the reasons why the increase in health risk behaviors can be explained - including the increase in cigarette and alcohol consumption - is the social restrictions imposed by the pandemic, associated with its stressful effects - such as sadness and anxiety, fears regarding the future, job insecurity and risk of death<sup>33</sup>.

Immunization against the SARS-CoV-2 virus was identified, in this study, as a behavioral habit, making it possible to verify that, of the 664 medical records surveyed, only

3% (N=19) of users reported having received at least one (1) dose of the vaccine, while 97.% (645) appeared in the medical records as information not collected.

The United Kingdom was the first country to begin immunization against COVID-19, on December 8<sup>th</sup>, 2020, with groups at risk for the disease as a priority, initially with the vaccine<sup>34</sup>, Pfizer/Biotech, and subsequently with Oxford/AstraZeneca. In Brazil, on January 17<sup>th</sup>, 2021, ANVISA released for emergency use in the country the vaccines produced by the Butantan Institute, in partnership with the Chinese laboratory Sinovac and AstraZeneca/Fiocruz<sup>35</sup>.

The vaccination campaign against COVID-19 in Brazil began on January 18<sup>th</sup>, 2021, however, due to the low availability of vaccines against the disease on the global market, the Ministry of Health (MS) needed to determine in the National Vaccination Operationalization Plan against COVID-19 (Plano Nacional de Operacionalização da Vacinação contra COVID-19 - PNO) the organization for distribution and use to priority groups which initially include workers, institutionalized people (those residing in nursing homes) aged 60 or over, institutionalized people with disabilities and the indigenous population in villages<sup>36</sup>.

Regardless of the technology used to develop vaccines, whether from the inactive virus or viral vectors, the data on the efficacy and safety of vaccines against COVID-19 are extremely positive and should be made known not only to the scientific community, but also to the general population, in the sense of greater engagement in facing the pandemic.

About recording patient data, as well as their care, it is important to highlight that this is characterized as a means of communication between healthcare teams. By recording information, professionals are taking responsibility for the information that can be accessed for evaluation, teaching, research, communication, defense and prosecution consultations between professionals<sup>25</sup>. According to Resolution No. 1,638/021 of the Federal Council of Medicine<sup>37</sup>, the medical record is defined as a single document consisting of a set of recorded information, generated from facts, events, and situations about the patient's health and care. provided, being of a legal, confidential, and scientific nature.

In this sense, information is obtained from the patient's report and technical observation, and must be organized in a systematic way, which allows it to be used by the team whenever necessary. The medical record is a legal document, and blots, dashes, erasures, or phrases erased with liquid correctives are not permitted, without making the necessary corrections, at the risk of losing their legal value.

Therefore, the electronic medical record was created to facilitate records, integrate teams, and facilitate communication about the patient's general condition. However, this study found many incomplete or unregistered records<sup>38</sup>, which makes it difficult to validate some information.

## **FINAL CONSIDERATIONS**

COVID-19 represented a historic global milestone for public health. Within the Brazilian context, the virus spread differently in all regions of the country. This study carried out in the central region of the state of Rio Grande do Sul, provided a descriptive analysis of the epidemiological and behavioral profile of users diagnosed with Covid-19 in a highly complex hospital. The sociodemographic variables collected complemented this study, namely: gender, age, race, marital status, and education, in addition to behavioral variables: risk habits (smoking and alcohol consumption) and behavioral habits (immunization against COVID-19).

The study revealed the following conditions associated with hospitalizations due to COVID-19 in the period researched: predominance of the age group between 61 and 70 years of age, male, Brazilian nationality, married, white ethnicity, and with a low level of education. About lifestyle habits, there was a higher incidence of smokers compared to alcoholics. Regarding immunization – identified as a behavioral habit – there was a low incidence of immunized people, which raises the question of whether the information was not recorded due to difficulty in accessing the GHU system, due to negligence on the part of professionals or the fact that it was an exhausting period. regarding assistance and this information was not considered important at the time. It is deduced that a portion of these patients have received the vaccine and this information has not been reported and recorded in the medical record. It is expected that this research will contribute to future studies, supporting conduct and care protocols, as well as the research findings are expected to be a starting point for planning future prevention, awareness, control, treatment, and rehabilitation actions for facing possible pandemics in the future.

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SOCIODEMOGRAPHIC AND BEHAVIORAL PROFILE OF PATIENTS WITH COVID-19  
IN THE CENTRAL REGION OF RIO GRANDE DO SUL

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