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Papers

Deaths from Severe Acute Respiratory Syndrome in Indigenous People in the State of Rio Grande do Sul (2020–2021)

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Abstract

During the new coronavirus pandemic in Brazil, the conflicting measures of the central government denying the severity of the issue, on the one hand, and of states and municipalities obeying health and epidemiological guidelines, on the other, exacerbated the already high vulnerability of the population. The insufficient and weak healthcare infrastructure to face the pandemic has affected especially those who are victims of intense socio-spatial exclusion, such as the indigenous population. In this sense, this article seeks to describe deaths from Severe Acute Respiratory Syndrome (SARS) in indigenous people in the context of the Covid-19 pandemic in Rio Grande do Sul, Brazil's southernmost state. It is an ecological, descriptive, and analytical study that uses an open database of deaths from SARS up until September 2021. Clusters and outliers of the indigenous population were mapped with the census sectors parameter, using the Anselin Local Moran's I model and the spatialization of demarcated indigenous lands. The relative risk of death of indigenous people compared to the white population in selected municipalities was calculated. The results indicate that deaths from SARS are disproportionate for indigenous people in clustered areas and that the relative risk of death in some municipalities with a high concentration of this population as compared to whites is especially high in the northern part of the state. Therefore, to adopt geostrategic measures to contain and repair the severe impacts of the Covid-19 pandemic is a pressing need.

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INTRODUCTION

Severe Acute Respiratory Syndrome 2 (SARS-CoV-2) was declared a Public Health Emergency of International Concern on January 30, 2020 by the World Health Organization (WHO). However, the way in which Brazilian states as well as regional and local governments tackled the Covid-19 pandemic revealed huge discrepancies and inequities in relation to WHO guidelines for disease control, especially those aimed at preventing transmission.

In many countries that saw controversial decisions by central governments (GELERIS et al., 2020; TANG et al., 2020), the severity of Covid-19 was even greater in vulnerable groups, especially communities victimized by intense socio-spatial exclusion, such as indigenous communities. In July 2020, an international movement unfolded after the publication of a news story denouncing the disappearance of four Yanomami children in the state of Roraima. Fatal victims of Covid-19, three of these children were buried in graves in a cemetery in the state capital Boa Vista, while the other body was found at the local Medico-Legal Institute (IML). The mothers, deprived of information about their babies, have exposed to the world the impact of this fatality on the socio-cultural organization of the victims' native village, located in Auaris, on the Venezuelan border. Since then, numerous scientific publications have portrayed and denounced the risk and vulnerability to which indigenous people have been exposed in the context of Covid-19 in Brazil (CUPERTINO et al., 2020; SILLS, 2020; PALAMIM et al., 2020; CHARLIER et al., 2020; MENTON et al., 2021; AMIGO, 2020; POLIDORO et al., 2021).

According to the Instituto Brasileiro de Geografia e Estatíastica (IBGE - Brazilian Institute of Geography and Statistics) there are around 900,000 indigenous people in Brazil (0.4% of the country's population), belonging to approximately 300 different ethnic groups (SANTOS, 2011). Despite the 1988 Constitution having provided the guidelines to guarantee land titling to indigenous peoples and the recently created Health Equity Policies (SOUTO et al., 2016), this population remains in a vulnerable position (OLIVEIRA, 2020; SANTOS et al., 2020).

The Constitution of 1988, one of the main achievements of the Brazilian Republic, guarantees health as a universal right and a duty of the State in its Article 196. With it, the perspective of a universal health system began to contemplate the indigenous populations after centuries of exclusion (PAIM et al., 2011). Despite this, the living conditions of these populations have been constantly exposed to situations of vulnerability (AYRES et. al., 2003; CURTICE & CHOO, 2020; CHARLIER et. al., 2020; PALAMIM et. al., 2020), given the inequities historically engendered at the intersections of race, ethnicity, and gender (ATUN et al., 2015; ALVES, 2016; WERNECK, 2016; POMPEU, 2019).

In Brazil, violations of the right to health towards non-white population are unceasing, and they are evidenced in scientific productions such as Anderson et al. (2016), Bidinotto et al. (2017), Wanzinack et al. (2019), and Cardoso et al. (2012). Health inequalities have historically plagued indigenous peoples (COIMBRA JUNIOR et al., 2013), and this was no different during the Covid-19 pandemic, whose impacts will certainly be experienced for decades to come.

In this context, this article presents the available evidence on SARS deaths in indigenous people from February 1, 2020 to September 14, 2021 in the state of Rio Grande do Sul. It seeks to assist the scientific community's call for action to reverse the trend that is decimating Brazil's indigenous peoples.

METHODOLOGY

This is an ecological, descriptive, and analytical study on SARS cases in indigenous people in Rio Grande do Sul. Data were extracted from OpenDataSUS (2021) on September 14, 2021. To compute the deaths, the variable "final case classification" was used, and the fields "deaths from other causes" and "deaths" were added since the former was added to the form only in 2021. The information collected comes from the municipalities where the users of the Unified Health System (SUS) reside.

Although some reported cases disclose the indigenous community (ethnicity) to which the data refer, we opted for the indigenous race/color variable since part of this population does not live in villages. For this reason, the data on ethnicity had a poor quality of completion and was belatedly included in Covid-19's monitoring information system. Nevertheless, the frequency of deaths in relation to the existing ethnicity data is also presented. In the municipalities where there were more than two notifications of indigenous deaths, the relative risk of indigenous deaths in relation to white people was also calculated, considering the

historical conflicts between these populations in the state.

Relative risk calculation and geographic database preparation were performed using the Statistical Package for the Social Sciences (SPSS/IBM®) software. The data on deaths were plotted in ArcGIS (Environmental Systems Research Institute); when the risk of death of the indigenous population in relation to the white population was greater than 1, the "increased risk" classification was adopted in the caption (95% CI). We also included the municipalities that had from 1 to 4 indigenous deaths and a risk lower than 1.

The population data used to develop the Anselin Local Moran's I spatial analysis model were extracted from the microdata of the 2010 IBGE Census. Information was processed based on indigenous race/color. The geographic extension parameter for model calibration was the political-administrative boundaries of the municipalities of Rio Grande do Sul. The model was run in ArcGIS and identified the existence of clusters with high or low values, in addition to spatial outliers.

According to Anselin et al. (2007), Anselin Local Moran's I spatial analysis model provides a means of assessing the significance of "local" spatial patterns. Combining the classification into four types of association indicates significant local clusters (High-High or Low-Low) or outliers (High-Low or Low-High). Thus, this model is an important tool to identify sites of interest and assess where the spatial distribution exhibits heterogeneity or homogeneity of the observed phenomenon (in this case, the indigenous population distribution and SARS notifications). This method is useful for measuring spatial concentration (ALMEIDA, 2012).

To identify the municipalities that concentrate the clusters and their proportion, we calculated the geometric intersection; the basis generated by Anselin Local Moran's I model was the input feature, and the political-administrative boundary of the municipalities was the identity feature.

In this article, we included only the maps of the localities where the *p*-value had statistical significance ($p < 0.05$, 95% significance level).

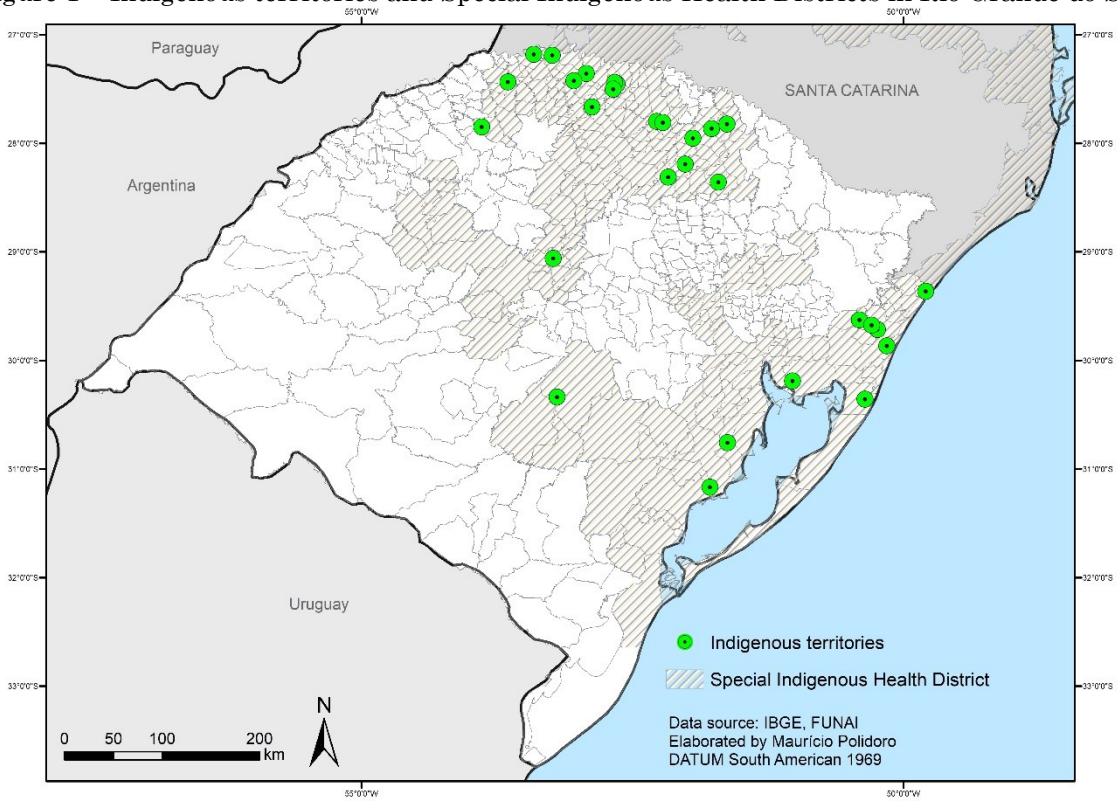
The spatial data on indigenous territories and Distritos Especiais de Saúde Indígena (DSEI - Special Indigenous Health Districts) were extracted from the Fundação Nacional do Índio (FUNAI - National Indian Foundation's) website (FUNAI, 2020). Since the FUNAI database did not contain information about the municipalities that comprise indigenous lands, the geometric intersection function was applied once more.

RESULTS

The first notification of an indigenous person's death from SARS occurred on May 13, 2020. By September 14, 2021, 43,403 deaths from SARS had been reported in Rio Grande do Sul: 82.1% (n = 35,649) in the white population, 9.3% (n = 4,044) in the black and brown population, 0.3% in the yellow population (n = 120)—considered by IBGE as any person of Eastern descent—0.2% in indigenous population (n = 72), and in 7.4% (n = 3,212) of the records the race/color was ignored. Missing data totaled 0.7% (n = 306).

Indigenous healthcare in Rio Grande do Sul is managed by the Distritos Especiais de Saúde Indígena do Interior Sul (DSEI-RS Special Indigenous Health District of the Southern Interior) and is decentralized from the Subsistema de Atenção à Saúde Indígena (SASI - Indigenous Health Care Subsystem) (Figure 1). According to the Ministério da Saúde (2020), this service organization model contemplates rationalized and qualified technical activities of indigenous health care and assistance, including sanitary practices.

Figure 1 – Indigenous territories and Special Indigenous Health Districts in Rio Grande do Sul

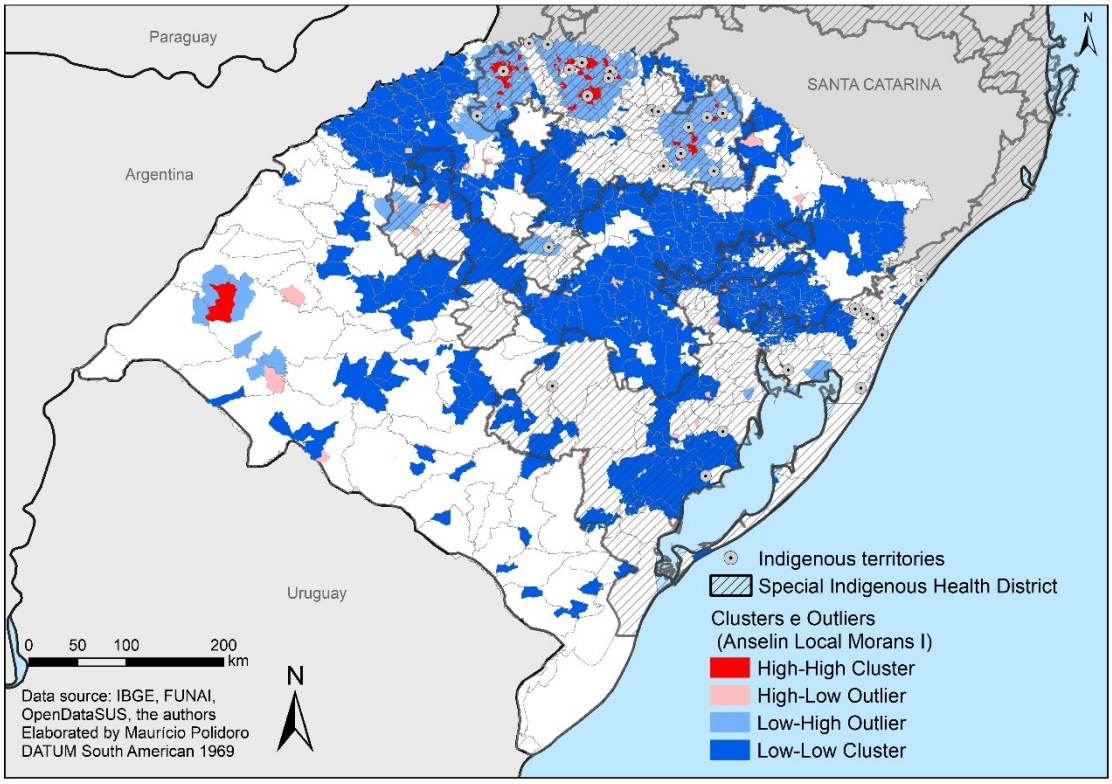


Source: The authors (2021). Adapted by FUNAI (2020).

The DSEI are organized by base poles and, although they do not perform health care activities, they are the primary support, including technical and administrative support, for the Multidisciplinary Indigenous Health Teams. These teams, in turn, work directly in the villages, which may be located in indigenous lands, carrying out health care activities such as collecting materials for examination, sterilization, immunization, collection and systemic analysis of data, epidemiological investigation, disease information, and cancer prevention (examination, collection, consultation). In addition, the DSEI have decentralized support facilities to store medicines and materials that are to be sent to the indigenous areas and must exercise epidemiological monitoring and multidisciplinary planning of specific actions in the indigenous territories. In Rio Grande do Sul, there are seven base poles with headquarters in the following municipalities: Porto Alegre, Barra do Ribeiro, Viamão, Osório, Passo Fundo, and Tenente Portela (Guarita base pole, in reference to Guarita Indigenous Land).

Based on the Anselin Local Moran's I spatial analysis model (Figure 2), it was possible to identify High-High clusters in over half of the territories of the following municipalities: Redentora, Tenente Portela, Nonoai, Faxinalzinho, Benjamin Constant do Sul, Três Palmeiras, Planalto, Santa Cecília do Sul, and Cacique Doble, all located in the north of the state. In these municipalities, the remaining territories are occupied by Low-High outliers. The High-High clusters, although in smaller proportion, were also identified in Vista Gaúcha, Frederico Westphalen, Planalto, Novo Xingu, Constantina, Ronda Alta, Rondinha, Rios dos Índios, Erebango, Charrua, Tapejara, Água Santa, and Sananduva. Only one High-High cluster was identified outside the north/northwest axis of the state, in Alegrete, bordering the municipalities of Itaqui and Uruguaiana, near the Argentina border (Figure 1). Although this area has a significant concentration of indigenous population, it is not covered by the DSEI.

Figure 2 – Clusters and outliers of indigenous population in Rio Grande do Sul, 2010.



Source: The authors (2021). Adapted by OpenDataSUS (2021)

Regarding the form of occupation of indigenous lands (Figure 2) and ethnic groups, we identified the following distribution in the mesoregions of Rio Grande do Sul:

- Central East: (1) declared land traditionally occupied by the Guarani ethnic group;
- Metropolitan region of Porto Alegre: (6) regularized lands traditionally occupied by the Guarani Mbya ethnic group, located in indigenous reserves; (3) regularized lands, (2) declared lands, and (1) land traditionally occupied by the Guarani ethnic group;
- Southeast: (1) declared land traditionally occupied by the Guarani ethnic group, and (1) regularized land traditionally occupied by the Guarani ethnic group;
- Northwest: (27) traditionally occupied indigenous lands, (18) by the Kaingang ethnic group, of which (11) are regularized, (4) are delimited, and (3) are declared; and (9) by the Guarani ethnic group, of which (5) are regularized and (4) are declared.

As shown in Table 1, the municipalities that showed increased risk of death compared to the white population were: Redentora, with R = 1.238 (CI 0.843 – 1.820); Charrua, with R = 2.386 (CI 1.129 – 5.042); and Tenente Portela, with R = 2.056 (CI 1.087 – 3.887). According to 2010 IBGE Census data, 43.91% (n = 1,524) of Charrua's population self-declares as indigenous, and 54.31% (n = 1,885) as white. The values are also significant in Redentora, where self-declared indigenous people account for 39.45% (n = 4,033) and whites for 48.44% (n = 4,952). In Tenente Portela, municipality with the second-highest risk of death among indigenous people compared to the white population, the Census totals 14.56% (n = 1,997) indigenous and 72.05% (n = 9,885) white people. The largest indigenous land in the state (Guarita) is located in these municipalities and concentrates Kaingang indigenous people.

Table 1 – Estimated risk of death among indigenous people compared to the white population in Rio Grande do Sul up until September 2021.

Municipality	Value	95% confidence interval (CI)	
		Lower	Higher
Charrua	1.238	0.843	1.82
Redentora	2.386	1.129	5.042
Tenente Portela	2.056	1.087	3.887

Souce: The authors (2021). Adaped by OpenDataSUS (2021)

Although the ethnicity field was included in the SARS notification form only in 2021, we highlight the prevalence of deaths among the Kaingang (n = 42). Among the Guarani, there were 3 deaths in total: 1 in Redentora (High-High cluster), 1 in Água Santa (High-High cluster), and 1 in Camaquã (Low-Low cluster). Among the Guarani-Mbya, 1 death was reported in the municipality of Guaíba, in the metropolitan region of Porto Alegre (no clusters and no outliers), and 1 in Osório (no clusters and no outliers). Among the Tupi, 1 death was reported in Porto Alegre (dispersed Low-Low cluster and High-Low outlier). Table 2 presents the Kaingang deaths per municipality and the clusters and outliers.

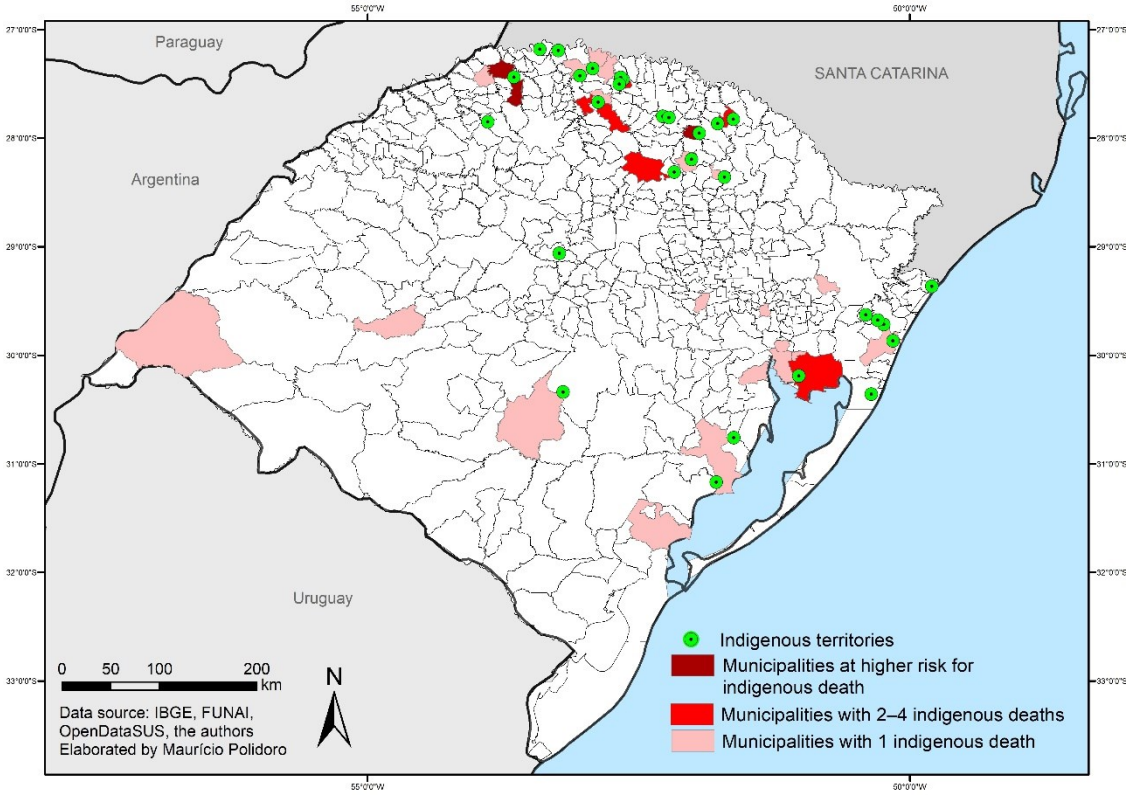
Table 2 – Municipalities with Kaingang deaths up until September 2021 and clusters and outliers.

Municipality	Total number of deaths	Cluster and Outliers
Redentora	16	High-High cluster
Charrua	9	High-High cluster
Tenente Portela	8	High-High cluster
Ronda Alta	3	High-High cluster
Cacique Doble	2	High-High cluster
Benjamin Constant do Sul	1	High-High cluster
Constantina	1	High-High cluster
Estrela	1	Low-Low cluster
Planalto	1	High-High cluster

Source: The authors (2021). Adapted by OpenDataSUS (2021)

Regarding the prevalence of deaths in municipalities with clusters and outliers, there were also reports of indigenous deaths in municipalities without mapped indigenous lands, such as Uruguaiana (bordering Argentina), Pelotas (southeast), and Alvorada and Canoas (metropolitan region of Porto Alegre) (Figure 3).

Figure 3 – Classification of municipalities per indigenous deaths caused by Covid-19



Source: The authors (2021). Adapted by OpenDataSUS (2021).

DISCUSSION

In a study conducted with indigenous peoples in southern and southeastern Brazil, Praeli et al. (2020) found high percentages of diabetes mellitus when compared to the other regions of the country, in addition to the precariousness of health services and the extreme social vulnerability of this population. This situation is not restricted to Brazil: the United States, Australia, and Canada have reported that the death rates of influenza A, transmitted by the H1N1 virus, were three to seven times as high among indigenous people compared to the rates of the general population (NADAL, 2017).

The indigenous population in Latin America and the Caribbean is estimated at around 200 million; however, the censuses conducted are unreliable and there are contradictory methodological and conceptual issues (ALVES, 2002). Furthermore, there is also a lack of differentiated registries for both the indigenous and Afro-descendant populations, and impasses have to be faced even regarding how to define whether someone is indigenous.

Public health policies aimed at indigenous populations have been implemented at a slow pace. It was not until the second half of the 20th century, after the end of the civil-military dictatorship in Brazil, that pragmatic actions were implemented. From 1900 to 1986—when the 1st Conferência Nacional de Saúde Indígena (National Conference on Indigenous Health) took place—there were only two notable events: the creation of the Serviço de Proteção ao Índio (SPI - Indian Protection Service) in 1910, and the creation of FUNAI in 1967. The latter has also become responsible for indigenous health-related issues.

From 1985 onwards, it is also worth noting: the creation of the Comissão Interinstitucional de Saúde Indígena (CISI - Interinstitutional Commission on Indigenous Health) by the Conselho Nacional de Saúde (Brazilian Health Council) in 1991; the 2nd National Conference on Indigenous Health in 1993; the creation of SASI in 1999; the 3rd National Conference on Indigenous Health in 2001; the publication of the National Policy for the Health Care of Indigenous Peoples in 2002; the 4th National Conference on Indigenous Health in 2006; the creation of the Indigenous Health Working Group in the Ministry of Health in 2008; and the creation of the Secretaria Especial de Saúde Indígena (SESAI - Special Secretariat for Indigenous Health) in 2010, which in 2011 fully undertook the actions of indigenous health care and sanitation on indigenous lands. More numerous since 2000, these events follow the

third National Human Rights Plan as well as Brazil's alignment with the Durban Conference, in the wake of Brazilian geopolitical protagonism as a leader of the Global South at the United Nations (UN) (BRASIL, 2002).

The historical delay in implementing public policies for indigenous people resulted in a significant burden for this population during the Covid-19 pandemic. In Rio Grande do Sul, we observed that the municipalities with a high concentration of indigenous people and demarcated lands presented an increased risk of death from Covid-19 among the indigenous population, a reflection of the negligence in defining and implementing health policies at all governmental levels.

One of the examples of the aforementioned delay is the National Policy for the Health Care of Indigenous Peoples, published only in 2002 (MINISTÉRIO DA SAÚDE, 2002) as the State's response to the claims of the indigenous movement. This document has established a health subsystem that operates in a different geographical perspective to organize health actions—the aforementioned DSEI (Figure 1).

Sousa et al. (2007) define a spatial unit as a dynamic, geographical, populational, and administrative ethnocultural space that is delimited and holds no direct relationship with the limits of the states and municipalities where the indigenous lands are located. This perspective follows the epistemological paradigm of indigenous peoples' knowledge since indigenous territories are spaces where, in addition to the influence of hegemonic Western values, the ancestral and spiritual knowledge prevails.

In Rio Grande do Sul, there are two DSEI: DSEI-Southern Interior (with headquarters in the state of Santa Catarina) and DSEI-Southern Coast (with headquarters in the state of Paraná). The state has six base poles, which are located in the municipalities of Barra do Ribeiro, Porto Alegre, Osório, Viamão, Guarita, and Passo Fundo. Since Ordinance 946 of 2015, resources have been allocated to these as well as other municipalities with indigenous populations, in order to improve the primary care provided to this group.

In this context, the Ministry of Health has a special secretariat for indigenous health, and the production of data on the indigenous population is part of an information system for indigenous health care (TAVARES, 2020). Currently, data from the Ministry of Health indicate 34 DSEI responsible for 760,350 indigenous people from 416 ethnic groups living in 6,238 villages. However, it is worth mentioning that criticism has been made towards the availability of data on indigenous health (REIS et al., 2019), which is considered a "black box" within health information systems.

Despite the advances of the indigenous population movement regarding constitutional rights, the current political scenario calls for a constant monitoring of government actions. After the inauguration of the current Brazilian president in January 2019, one of the first measures the Ministry of Health took was, aside from shredding equity policies (JUCÁ, 2019), to extinguish SESAI and the DSEI (CNS - CONSELHO NACIONAL DE SAÚDE, 2020). Still in 2019, the Articulation of Indigenous Peoples of Brazil reversed the presidential decree at the Federal Senate Human Rights Commission hearing. Nevertheless, the hygienist and homogenizing perspective that is hegemonic in the governmental sphere continues to advocate for the incorporation of health attention to indigenous peoples into the context of the general population. Such a perspective disregards the historical inequities that indigenous peoples have been suffering in the wake of the rising discourse of the "universal Brazilian," as mentioned by the Brazilian Minister of Education in the fateful ministerial meeting in April 2020, in which he stated that he hated "indigenous people" because there was only the "Brazilian people."

Another relevant issue concerns the monitoring of epidemiological data on these peoples during the pandemic. A nationwide emergency study conducted by the Ministry of Health did not investigate traditional peoples (UNITED NATIONS, 2020). Likewise, the national strategies to contain the pandemic did not bring guidelines for these communities, especially the indigenous ones, contrary to international health recommendations (HARMAN et al., 2020). Recent scientific evidence indicates that, due to inequity situations, the ones considered "ethnic minorities" are at higher risk for adverse outcomes during the new coronavirus infection (SZEFLER et al., 2020; KIRBY, 2020; SÁ, 2008). When any virus arrives in indigenous communities, there is a catastrophe situation and risk of the decimation of whole villages (CHAMBOULEYRON et al., 2011; MBEMBE, 2018). This is a recurrent situation in the set of measures that are either adopted or neglected by the Brazilian State and that make it possible to eliminate vulnerable people, a situation in which the State acts in an effective action of necropolitics (PARANHOS, 2021).

In Rio Grande do Sul, the low quality of information on SARS became evident with the 0.7% (n = 306) missing data, in addition to the

mistakes in the completion of notifications regarding the ethnicity of indigenous people hospitalized with SARS.

This scenario is further compounded by the problem of the demarcation of indigenous lands, which puts this population in a situation of misery and leads to a strong presence of indigenous people in camps with no infrastructure located in urban areas. These situations are often used to create stereotypes and perpetuate prejudice and stigma against these peoples, based on ignorance about indigenous participation in the history of Rio Grande do Sul (RIBEIRO et al., 2018).

Despite the efforts to consolidate SUS, the principle of equity is still far from being a reality in local health services, which are affected by the great precariousness of public services in the state. Pontes et al. (2020) point out that, despite the creation of SASI, the scenario of inequalities and unfavorable health indicators for indigenous peoples persists, with chronic problems that expose the precariousness of services, the high turnover of professionals, and issues such as the difficulty in implementing and operationalizing the principles and guidelines of the National Policy for the Health Care of Indigenous Peoples in the primary care services.

If systematic and urgent actions are not taken, this scenario may be further aggravated for the indigenous people living in northwestern Rio Grande do Sul. The increased risk of death from SARS presented in this article proves this to be a critical situation. Moreover, the history of legal instability concerning land titling and the lack of territorial security against the onslaughts of squatters haunts generations of indigenous people.

During the Covid-19 pandemic, historical problems have also become more evident and intensified, rendering the lack of a comprehensive attention and care that considers the particularities and socio-spatial contexts of indigenous people an irrevocable fact in the deaths announced and sanctioned by the State.

CONCLUSION

In this article, we sought to present the process of exclusion of the indigenous population during the new coronavirus pandemic. Northern and northwestern Rio Grande do Sul—regions that have been the stage of land conflicts for decades—formed a death belt with the highest concentration of deaths.

As previously described, the spatial concentration of the new coronavirus as a risk of immediate decimation and disruption of indigenous communities in Rio Grande do Sul is a serious matter and accelerates the historical elimination of indigenous peoples, whose existence is not supported even by the fundamental rights of the Brazilian Magna Carta.

The Covid-19 pandemic has demanded an articulated action between the central government, the states, and the municipalities, which had not yet been achieved between the subsystem and other federal entities before the pandemic. With the health crisis, issues related to Brazilian federalism that had not been addressed in regard to indigenous health have also become more pressing, such as autonomy, protection, defense, and cooperation. The limitations in the access to health care—which had already been aggravated before the pandemic by the precariousness of the welfare state due to the outsourcing of services—compromise the decision-making autonomy of the DSEI while increasing the lack of transparency of information that enables the mobilization of the civil society, academic community, and public opinion. Outsourcing also compromises the principle of comprehensive and differentiated healthcare for a population with specific and heterogeneous cultural characteristics. The management actions of health care policies must consider traditional care practices.

While ideological disputes that oppose political and government action, on the one hand, and scientific advice for confronting the pandemic, on the other, continue to escalate, the indigenous population remains in the middle of these conflicts. The specificity of the spatial, social, and cultural organization of this population is denied by a universalizing discourse that reifies the historical strategies for maintaining inequalities. The death and contamination rates of Covid-19 among indigenous people should be immediately addressed with strategic, articulated, and urgent actions by all federal entities.

Despite its limitations regarding the quality of the available data on SARS, this study has demonstrated that there has been a disproportionate number of indigenous deaths in territories clustered by indigenous populations. Special attention must be paid to aspects related to how the notification form is filled out and to the lack of standardization of some fields (such as ethnicity and neighborhoods). The lack of knowledge of some health professionals about the indigenous

ethnicities in Rio Grande do Sul or the lack of awareness about the importance of race/color/ethnicity in the health conditions of the populations corroborates the quality and availability of reliable information on race/color and ethnicity of these populations.

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AUTHORS' CONTRIBUTION

Maurício Polidoro conceived the study, collected and texted the data and wrote it. Jéssica Camilo de Sousa Rosa Paranhola the text data and wrote. Francisco Mendonça conceived the study and wrote the text. Daniel Canavaese conceived the study and wrote the text.