Racial Inequalities in the Health Establishment Access to the Treatment of COVID-19 in Brazil in 2020

Lídia Santos Silva, Raphael Barreto da Conceição Barbosa, João Paulo Lima, Julio Castro-Alves, Marcelo Ribeiro-Alves

[1] Fundação Oswaldo Cruz, Rio de Janeiro, RJ, Brazil.

2022

Abstract: *Racial inequalities shaped the risk of death in people admitted to hospitals due to COVID-19. This article assessed the association of financial barriers to access health services, race, and deaths in Brazil in 2020. We used data from the SIVEP-Gripe and CNES database. Adjusted logistic models included first-order interaction for race and financial barriers. The chance of death of black/biracial and indigenous people was up to 29% (South) and 78% (Midwest) higher when compared to whites, respectively. Policies should increase SUS financial support to ensure equity in access, and investments in actions to educate health workers against racism.*

***Keywords*:** *Health Inequalities; Health Access; Race; Brazil; Covid-19*

Área Temática: A PANDEMIA DO COVID-19

Funding: This research was funded by Inova-Fiocruz Program (VPPCB-005-FIO-20-2-45) to Marcelo Ribeiro-Alves and Inova-Fiocruz Program (VPPCB-005-FIO-20-2-61) to Julio Castro-Alves. The funders had no role in the conceptualization, analysis, interpretation, or decision to publish this manuscript.

1 Introduction

In Brazil, since the constitution in 1988, the state has assumed the responsibility for providing and financing all health services, aiming at universal and equitable access to health services. To meet the new role of the State, the Unified Health System ("Sistema ùnico de Saúde", SUS) was created. According to the principle of equity, access to health services should occur according to the need for care regardless of the socioeconomic status of individuals [12] [6]. However, this new framework of the Brazilian health system also allowed the presence of private insurance coverage through the supplementary health sector, which allowed double entry into the system mainly for more favored social segments. This institutional design, with the possibility of access to the public and private healthcare sectors, has been fostering health inequality among macro-regions and social segments throughout the country [9]. Although these inequalities are manifested by several dimensions of socioeconomic status [26], the racial dimension of access to healthcare remains a relatively understudied issue due to the lack of data on skin color in health surveillance systems—its absence being the product of an institutional racism practice [24] [5] [22].

Racism is a social determinant of the health-disease process, resulting from how in the course of history, the social structure has been organized in an unequal way and with a critical racial marker as an expression of this inequality, reserving the black and indigenous populations an accumulation of social and economic disadvantages. In health care, racism operates within the institutions/establishments, hindering

the access of certain groups and further accentuating inequities in health [23]. Access barriers can present themselves in different ways [27], such as (i) geographical barriers, related to the unavailability of services in specific locations and the need for displacement; (ii) financial barriers, which separate those who can afford to pay for certain health services, from those who are entirely SUS dependent; (iii) cultural barriers, as is the case of institutional racism, which manifests itself through discriminatory norms or behaviors adopted within these institutions, but which reflect the dynamics of the society in which they are inserted. Therefore, access is the result obtained from the organization of health institutions, in a more or less available way, to meet the population's health needs under their responsibility [27].

Since the beginning of the pandemic of COVID-19 in Brazil, studies have been dedicated to showing how the disease has unequally affected the population. Economic and sociodemographic factors, such as age, race, gender, income, education, and infrastructure of their households and neighborhoods have been shaping individuals' exposure and susceptibility to COVID-19, acting against vulnerable and marginalized groups [4] [17] [25]. Recent studies have shown evidence of a higher risk of death among black/biracial and/or indigenous people in hospitals due to COVID-19, when compared to white people [15] [21] [8]. This unequal risk of death in hospitals by race, according to these studies, could not be fully explained by demographic characteristics, clinical severity on arrival at the health establishment, or the location of the health establishment. Concurrently, there is a lack of studies approaching the importance of financial access barriers to health services as a factor to reinforce racial inequalities in the risk of death during the epidemic.

In this paper, we propose a reflection on the relationship between access to treatment for COVID-19 in health establishments of the public and private sectors overall and among the five regions of Brazil. Our results suggest the existence of racial barriers to access in the public health net and the private-sector net and cultural barriers manifested by institutional racism.

2 Methods

2.1 Data

2.1.1 Health Establishments (CNES)

The data on the health establishments were extracted from the base of the national registry of health establishments (CNES), available at http://cnes.datasus.gov.br/, referring to December 2020, the last period considered in our study. From the "Establishment"main file, we extracted the administration sector (i.e., public, private, and philanthropic) to which each health establishment belonged.

2.1.2 COVID-19 Microdata (SIVEP)

To obtain information on the pandemic of COVID-19 in Brazil, we used the SIVEP database, available at http://sistemas.saude.rj.gov.br/tabnetbd/dhx.exe?sivepgripe/sivep_gripe.def, containing individualized data of notification of severe acute respiratory syndromes, including those of infection by SARS-CoV-2. More specifically, we extracted from this base the information of patients aged 20 years or older who had their first symptoms by 2020-12-31 with a confirmed diagnosis of COVID-19. We extracted the variables comorbidities (comorbidities number related to health establishment), same municipality of health establishment (whether the patient was treated in the same municipality of residence), urban region, X-ray (whether or not the patient had an x-ray exam), tomography (whether or not the patient had a tomography exam), ventilatory support (whether or not the patient used ventilatory support), and ICU health establishment beds (whether or not the patient used the ICU). For the variable schooling, we used the categories illiterate (0 scholarship years), incomplete fundamental (5 scholarship years), complete fundamental (9 scholarship years), high school (12 scholarship years), and college (undergraduate).

2.1.3 Socioeconomic Information

To evaluate patients' socioeconomic environment, we made use of the variables Per Capita Household Income (average monthly family income per capita), Gini Index of household income, and "Bolsa Família"

Program (BFP) Beneficiary (% of the population of a municipality benefited by the BFP) obtained from the 2010 census (IBGE/Brazil).

2.1.4 Race

The Brazilian Institute of Geography and Statistics (IBGE), responsible for the population census, has five categories for self-declaration on the race/color question: black, brown, white, indigenous, and yellow. In this paper, we chose to use the IBGE categories with modifications. We opted to add individuals self-declaring as brown to the black category, which we called black/biracial. We added a new category, others, grouping people self-declaring as yellow and those that ignored the question of race/color.

2.2 Statistical Analysis

To determine whether racial inequalities in the health establishment access to the management of COVID-19 are associated with the lethality risk, we used generalized linear models with a logit link function. All models were adjusted for age, gender, race, education, same municipality health establishment, report delay (i.e., the number of days between the first symptoms and the notification of the SARS-CoV-2 infection), comorbidities, and macroregion. We also included a first-order race and health establishment administration sector interaction. There was no variable selection in any model. Measures of association were presented as odds ratios adjusted for confounders (aOR) and their 95% confidence intervals. As robustness checks, we used various measures to assess socioeconomic status. All statistical analyses were performed in R v.4.0.5 software, the 'lme4' library, and its dependencies.

3 Results

The extracted health establishment database (CNES) contained 376,221 establishments, and the notification data of severe acute respiratory syndromes (SIVEP) had 593,799 registries of individuals with confirmed infection from SARS-CoV-2. In merging the SIVEP and CNES databases, we reduced to 5,707 establishments with 590,102 individuals. A brief description of health establishments is given in Suppl. Table 1. We split the evaluation of patients' COVID-19 evolution in our study into three (Table 1): (1) by their self-declared race; (2) by the administration sector of the health establishment where they were treated; and (3) by the Brazilian macroregion of the health establishment where they were treated. The administrative sector was categorized as public or private, although there were also philanthropic health establishments. We opted to merge philanthropic and private health establishments since both have a legal private-sector nature, for non-profit and profit. As patients' evolution outcomes, we considered either discharge or death. The race was categorized as white, black/biracial, red/indigenous, and others. Of the 222,924 black/biracial patients, 12% declared themselves black and 88% brown. The category of others was also a merging. It combined people who self-declared yellow (1% of the sample population and 5% of the category others) and those that did not have their race declared (23% of the sample population and 95% of the category).

The distribution of patients with COVID-19 in Brazil between public (49%) and private (51%) administrative sector health establishments was very similar, and most of them did not die (68%). The racial distribution of the patients in the samples was equal to the national population, with whites (38%), blacks/biracial (38%) as the majority, and red/indigenous (n=1,649, $< 1\%$) as the minority. The racial distribution in Brazil differs by macroregion. The North and Center are macroregions where we can find the majority of indigenous villages (2% and 1%, respectively), while the South macroregion is predominantly white (80% of the patients treated with COVID-19). Similarly, the North and Northeast macroregions are predominantly black/biracial (76% and 57%, respectively) and others (13% and 32%, respectively). Regarding the characteristics of patients, many patients did not report their level of education (64% of the total SIVEP database), as already mentioned in the methodology. We noticed that patients who were treated in the private sector declared having more comorbidities (with 49% of patients declaring 1 or 2 comorbidities and 57% declaring at least 4) than those treated in the public sector (with 51% of patients declaring 1 or 2 comorbidities and 43% declaring at least 4). Despite that, deaths related to COVID-19 were more prevalent in the public sector (58%). The public sector also had

a higher mean report delay (10.93 against 9.57 in the private sector), with the self-declared white with the lowest mean number of days (9.09 days). Also, most patients treated in the private sector lived in urban areas (52%). 55% of COVID-19 patients traveled to another municipality to receive care despite the administrative sector.

When we evaluated COVID-19 patients' evolution by schooling years, we noticed that the higher schooling, the higher was the number of patients treated in private health establishments (representing 32% of illiterates and 75% graduates), and the lower was the mortality rate (representing 45% of illiterates and 80% graduates). Among people self-declared as illiterate, 68% were treated in public health establishments, of which 55% progressed to death. This was the highest incidence of deaths among all schooling years strata. In contrast, 75% of the undergraduates were treated in private health establishments, of which 80% recovered from COVID-19. Similar disparities were seen among races. Higher schooling was observed for white people (representing 34% of illiterates and reaching 67% of graduates), whereas lower schooling for black/biracial people (representing 59% of illiterates and 27% of graduates). Worthofnote, all red/indigenous people had 0 to 5 schooling years. At the same time that the private healthcare sector treated 65% of self-declared white people, 71% of all red/indigenous, and 65% of all black/biracial population in Brazil was treated by the public healthcare sector. COVID-19 deaths were more incidents in the North and Northeast Brazilian macroregions (39% in both), macroregions predominantly administered by public health establishments. In contrast, COVID-19's highest recovery rates were observed in the South (72%) and Center-East (75%) macroregions, with 75% and 42% of their healthcare net composed of private health establishments.

Tabela 1: Descriptive Analysis of Demographic Characteristics, Clinical Severity on Arrival at the Health Establishment, and Distance Between Home and the Health Establishment by Administrative Sector, Death outcome, and Race (Brazil, 2020

		Hospital Sector		Death		Race			
		Private	**Public**	**No**	**Yes**	**White**	**Black/biracial**	**Others**	**Indigenous**
Brazil		301147 (51%)	288955 (49%)	399900 (68%)	190202 (32%)	225606 (38%)	221924 (38%)	140923 (24%)	1649 (<1%)
Age	(19,40]	46116 (53%)	41529 (47%)	78882 (90%)	8763 (10%)	29960 (34%)	35111 (40%)	22260 (25%)	314 (<1%)
	(40,60]	102357 (52%)	92622 (48%)	155599 (80%)	39380 (20%)	71924 (37%)	74112 (38%)	48423 (25%)	520 (<1%)
	(60,80]	111871 (49%)	116825 (51%)	133637 (58%)	95059 (42%)	90182 (39%)	85701 (37%)	52265 (23%)	548 (<1%)
	80)	40803 (52%)	37979 (48%)	31782 (40%)	47000 (60%)	33540 (43%)	27000 (34%)	17975 (23%)	267 (<1%)
Gender	Female	132299 (51%)	128455 (49%)	179879 (69%)	80875 (31%)	101393 (39%)	96656 (37%)	62015 (24%)	690 (<1%)
	Male	168817 (51%)	160436 (49%)	219950 (67%)	109303 (33%)	124191 (38%)	125235 (38%)	78868 (24%)	959 (<1%)
	Indeterminated	31 (33%)	64 (67%)	71 (75%)	24 (25%)	22 (23%)	33 (35%)	40 (42%)	0 (<1%)
Race	White	146874 (65%)	78732 (35%)	154723 (69%)	70883 (31%)	225606 (100%)	0 (<1%)	0 (<1%)	0 (<1%)
	Black/birracial	76984 (35%)	144940 (65%)	142780 (64%)	79144 (36%)	0 (<1%)	221924 (100%)	0 (<1%)	0 (<1%)
	Others	76812 (55%)	64111 (45%)	101389 (72%)	39534 (28%)	0 (<1%)	0 (<1%)	140923 (100%)	0 (<1%)
	Indigenous	477 (29%)	1172 (71%)	1008 (61%)	641 (39%)	0 (<1%)	0 (<1%)	0 (<1%)	1649 (100%)
Education	0y	4818 (32%)	10176 (68%)	6771 (45%)	8223 (55%)	5120 (34%)	8871 (59%)	748 (5%)	255 (2%)
	5y	25957 (46%)	30875 (54%)	32049 (56%)	24783 (44%)	28793 (51%)	25403 (45%)	2349 (4%)	287 (1%)
	9y	19201 (49%)	19940 (51%)	24908 (64%)	14233 (36%)	19842 (51%)	17531 (45%)	1655 (4%)	113 (<1%)
	12y	38594 (57%)	28970 (43%)	50629 (75%)	16935 (25%)	34586 (51%)	27892 (41%)	4971 (7%)	115 (<1%)
	Graduated	25972 (75%)	8587 (25%)	27808 (80%)	6751 (20%)	21517 (62%)	9406 (27%)	3585 (10%)	51 (<1%)
	Unknown	186605 (49%)	190407 (51%)	257735 (68%)	119277 (32%)	115748 (31%)	132821 (35%)	127615 (34%)	828 (<1%)
Death	Yes	80605 (42%)	109597 (58%)	0 (<1%)	190202 (100%)	70883 (37%)	79144 (42%)	39534 (21%)	641 (<1%)
	No	186696 (56%)	146645 (44%)	333341 (100%)	0 (<1%)	132116 (40%)	117044 (35%)	83310 (25%)	871 (<1%)
	Unknown	33846 (51%)	32713 (49%)	66559 (100%)	0 (<1%)	22607 (34%)	25736 (39%)	18079 (27%)	137 (<1%)
Same Mun. Hoosp.	Yes	210738 (49%)	216114 (51%)	291550 (68%)	135302 (32%)	166261 (39%)	162337 (38%)	97131 (23%)	1123 (<1%)
	No	90409 (55%)	72841 (45%)	108350 (66%)	54900 (34%)	59345 (36%)	59587 (37%)	43792 (27%)	526 (<1%)
Mean of days from syntoms to notification		9.57	10.93	10.12	10.47	9.09	10.63	11.44	10.35
Comorbidities	1 to 2	104534 (49%)	108235 (51%)	166639 (78%)	46130 (22%)	73197 (34%)	81992 (39%)	56760 (27%)	820 (<1%)
	2 to 4	136983 (51%)	129991 (49%)	173796 (65%)	93178 (35%)	105376 (39%)	99786 (37%)	61166 (23%)	646 (<1%)
	>4	53563 (54%)	46120 (46%)	54838 (55%)	44845 (45%)	41974 (42%)	36563 (37%)	20985 (21%)	161 (<1%)
	(4, Inf]	6067 (57%)	4609 (43%)	4627 (43%)	6049 (57%)	5059 (47%)	3583 (34%)	2012 (19%)	22 (<1%)
Urban Region	rural/unk	43731 (47%)	48467 (53%)	60898 (66%)	31300 (34%)	27958 (30%)	33474 (36%)	29785 (32%)	981 (1%)
	urban	257416 (52%)	240488 (48%)	339002 (68%)	158902 (32%)	197648 (40%)	188450 (38%)	111138 (22%)	668 (<1%)
Macro Region	Midwest	26587 (42%)	36768 (58%)	47659 (75%)	15696 (25%)	13662 (22%)	28287 (45%)	20986 (33%)	420 (1%)
	Northeast	40005 (35%)	73284 (65%)	68603 (61%)	44686 (39%)	12633 (11%)	64630 (57%)	35845 (32%)	181 (<1%)
	North	9806 (22%)	34736 (78%)	27128 (61%)	17414 (39%)	4335 (10%)	33711 (76%)	5809 (13%)	687 (2%)
	Southeast	164036 (57%)	123424 (43%)	197815 (69%)	89645 (31%)	130095 (45%)	87756 (31%)	69407 (24%)	202 (<1%)
	South	60713 (75%)	20729 (25%)	58686 (72%)	22756 (28%)	64875 (80%)	7535 (9%)	8873 (11%)	159 (<1%)
Hospital Sector	Private	301147 (100%)	0 (<1%)	220542 (73%)	80605 (27%)	146874 (49%)	76984 (26%)	76812 (26%)	477 (<1%)
	Public	0 (<1%)	288955 (100%)	179358 (62%)	109597 (38%)	78732 (27%)	144940 (50%)	64111 (22%)	1172 (<1%)

In Brazil, race's greatest inequality in lethality risk came from access to the health system, i.e., public health establishments had a higher lethality rate than the private ones in all macroregions, being more evident in the Southeast (aOR = 1.67 [1.64;1.7]) and Northeast (aOR = 1.74 [1.69;1.79]) macroregions. Brazilian macroregions are very diverse, particularly true when the health system is the main subject. According to Table 2, The South macroregions presented the slightest difference in lethality rates between public and private sector health establishments (aOR = 1.18 [1.14;1.23]). Among macroregions, we saw that the Southeast macroregion was the most regular, not showing significant relative lethality rates for the black/biracial individuals, even though people self-declared as white are more numerous than in any other macroregion. When comparing all races to self-declared white individuals, the self-declared red/indigenous had a higher relative lethality risk in all but the South macroregions, Even though they represent less than 1% of the overall sample (Table 1). The higher fatality rates for self-declared red/indigenous were observed in the Central (aOR = 1.78 [1.41;2.25]) and Northern (aOR = 1.35 [1.12;1.64]) macroregions, i.e., where they are more numerous. We have not observed increases in lethality rates in any macroregion for self-declared black/biracial individuals but in the South. In the South macroregion, they had 29% (22-37%) more chance of dying from complications of COVID-19 than self-declared white patients, regardless of the administrative sector of the health establishment that treated them.

Regarding the association of social and regional factors with the administrative sector of the health establishments involved in COVID-19 assistance in Brazil, we found that the lethality rate was 57% (55-59%) higher in the public sector when compared to the private and that among all races, the red/indigenous individuals were the most likely to die from complications of the COVID-19, 20% more than the self-declared white ones. When we crossed the administrative sector of the health establishment with race, we noticed that self-declared red/indigenous individuals treated in the private sector did not present a higher lethality risk than any other race, both nationally and regionally. We observed that macroregions where red/indigenous individuals are predominant, named North and Central macroregions, are also macroregions where private health establishments for COVID-19 were more scarce, i.e., representing only 22% of all health establishments in the North macroregions that treated the patients with COVID-19 (Table 1). Similarly, but exclusively for the South macroregion, self-declared black/biracial individuals had a higher lethality rate when treated in health establishments of the private sector (aOR = 1.35 [1.25;1.46]). Conversely, in health establishments of the public sector, self-declared black/biracial individuals had higher lethality rates than whites in all macroregions. This contrast was even more evident in the Northeast (aOR = 1.64 [1.53;1.75]), a macroregion where healthcare is almost entirely covered exclusively by the public health sector. When including the interaction of the race and health establishment administrative sector in models, self-declared black/biracial individuals had a mean increase in lethality rate of 35% compared to self-declared white individuals treated in private health establishments. In comparison, this lethality rate increase in public health establishments was 15%. When we observed self-declared back/biracial individuals in the South macroregions, we saw a higher lethality rate for those treated in private health establishments when compared to the public ones (aOR = 1.24 [1.12;1.37]). Disturbingly, in this same macroregion, we saw a mean lethality rate increase of 2.43 for self-declared back/biracial individuals relative to self-declared white individuals treated in the private sector.

4 Discussion

This article questioned whether racial inequalities influenced the lethality risk of COVID-19 in Brazil. We found relevant inequalities of this nature against black/biracial and indigenous people compared to white. Although observed important regional particularities, the indigenous people were the most affected, even compared to black/biracial individuals. Moreover, the unequal racial burden of death from COVID-19 interacted with the administrative sector of the health establishments, either public or private. There was strong evidence of higher lethality risks in the public health sector compared to the private one. This phenomenon pervaded all macroregions of Brazil to different degrees. This differential lethality risk between public and private health sectors was responsible for most observed racial inequalities. Black/biracial and indigenous people are the most frequent users of the public health net and the more exposed to higher risks of death from COVID-19. However, again, there were substantial differences among macroregions in Brazil. In the South macroregion, the only macroregion where the

Tabela 2: Associations of COVID-19-related death estimated by multiple logistic models in Brazilian Macroregions among levels of Race and health establishments administrative sectors (Brazil, 2020)

		Brazil	Midwest	Northeast	North	Southeast	South
Race	White	-	-	-	-	-	-
	Black/birracial	1 [0.98;1.01]	0.97 [0.92;1.02]	0.93 [0.89;0.97]	0.95 [0.88;1.02]	1.01 [0.99;1.03]	1.29 [1.22;1.37]
	Others	0.8 [0.78;0.81]	0.8 [0.75;0.86]	0.82 [0.78;0.86]	1.04 [0.95;1.13]	0.71 [0.7;0.73]	1.09 [1.03;1.15]
	Indigenous	1.2 [1.07;1.34]	1.78 [1.41;2.25]	0.91 [0.66;1.26]	1.35 [1.12;1.64]	0.62 [0.44;0.88]	1.26 [0.86;1.87]
Hospital Sector	Private	-	-	-	-	-	-
	Public	1.57 [1.55;1.59]	1.22 [1.17;1.28]	1.74 [1.69;1.79]	1.47 [1.39;1.55]	1.67 [1.64;1.7]	1.18 [1.14;1.23]
Race by Hospital Sector	White:Private	-	-	-	-	-	-
	Black/birracial:Private	1.02 [1;1.05]	0.95 [0.87;1.03]	0.98 [0.91;1.05]	0.98 [0.86;1.12]	1.03 [1;1.06]	1.35 [1.25;1.46]
	Others:Private	0.73 [0.71;0.74]	0.91 [0.83;0.99]	0.82 [0.76;0.88]	0.78 [0.67;0.91]	0.63 [0.61;0.65]	1.06 [0.98;1.14]
	Indigenous:Private	1.08 [0.87;1.34]	1.37 [0.93;2.01]	1.4 [0.76;2.55]	1.31 [0.56;3.08]	0.6 [0.38;0.97]	0.96 [0.57;1.63]
	White:Public	1.51 [1.48;1.54]	1.3 [1.19;1.42]	1.82 [1.68;1.97]	1.37 [1.18;1.58]	1.57 [1.53;1.61]	1.15 [1.09;1.2]
	Black/birracial:Public	1.51 [1.48;1.54]	1.26 [1.17;1.36]	1.64 [1.53;1.75]	1.3 [1.15;1.47]	1.61 [1.57;1.65]	1.24 [1.12;1.37]
	Others:Public	1.33 [1.3;1.36]	0.95 [0.87;1.03]	1.49 [1.39;1.59]	1.68 [1.46;1.94]	1.31 [1.26;1.35]	1.11 [0.99;1.23]
	Indigenous:Public	1.89 [1.66;2.16]	2.69 [2.01;3.61]	1.4 [0.96;2.06]	1.88 [1.51;2.34]	1.01 [0.62;1.65]	2.43 [1.15;5.15]

*All adjusted models[95%IC] included Age, Gender, Race, Education, Same Mun. Hosp., Days from symptoms to notification, Gini Index, BFP Recipients, Household Per Capita Income, Comorbidities, Same Municipality of Hospitalization, Urban Region, ICU Hospital Beds and Macro Region (in Brazil regressions) where applicable.

black population (20.7%) is smaller than the white population (78.3%) (IBGE, 2010), we observed the more significant racial inequality in health. For black/biracial and indigenous people, even considering only patients treated at health establishments of the same administrative sector, both in public and private sectors, the lethality risk was substantially higher when compared to white individuals. To a lesser extent, there was also racial inequality against black/biracial people in the Southeast macroregion in private and public health establishments. In the Center and North macroregions, where red/indigenous people are more numerous, and most health establishments are public, there was a difference in the lethality risk against these races in the private health net. The Northeast macroregion was a particular case of this national trend. It was the only one to present a significant difference in the lethality rate of black/biracial people against whites in the public health net, but not in the private health net. It's worth noting that any of the differences described before can be attributed to demographic characteristics, clinical severity on arrival at the health establishment, or distance between home and the health establishment.

Unfortunately, due to the scarcity of open and adequate data in Brazil, there are almost no studies using analyses similar to those applied here to compare access, race, and inequalities in health. However, the existent pieces of evidence already produced are largely in accordance with our results. For instance, black women diagnosed with breast cancer who received care both in the private and public sector health establishments in the southeast zone of the sixtieth-largest city in Brazil, Belo Horizonte (MG), had a higher delay from diagnosis to therapy than white or biracial ones, increasing their risk of death [7]. Again, in the second-largest city in Brazil, Rio de Janeiro (RJ), black puerperal women receiving care at a public health establishment had worse prenatal and childbirth care when compared to biracial or white ones [19]; astonishing, even the use of anesthetics during deliveries was lower in these women. In the macroregion highlighted in our results, the South region, more precisely in two large cities, São Leopoldo and Pelotas, in the southernmost state of the country, Rio Grande do Sul, regardless of income and other socioeconomic status variables, the access to early detection exams for breast (mammography) and cervical (cervical cytology pap smear) cancer was lower to black women when compared to white [3].

It is important to highlight that part of the racial differences described in our results, referring to the case of the South and, to a lesser extent, the Southeast, cannot be attributed to demographic characteristics, clinical severity on arrival at the health establishment, or even distance between home and the health establishment. By exclusion, we are convinced that the results are due to racism. Authors such as Fanon et al. (2018) [13] and Almeida et al. (2019) [1] emphasize racism's ability to shape subjectivities and highlight how this process occurs—either by the construction of a racist social imaginary, operated by the media, the cultural industry, and the educational system, which historically dehumanizes black and indigenous populations and presents them in a subordinate position, by racism expressed in the actual inhumane conditions in which part of these populations survive, or by the subordinate conditions

they are forced to accept in order to guarantee their nourishment, which "enters eyes inside"and becomes converted into ideas.

As previously mentioned, social conflicts are reproduced inside institutions, since they make up society. In health establishments it is no different, racism is able to shape the social unconscious, so that "the 'normal' life, affections and 'truths'"are permeated by it, not depending on "a conscious action to exist"(ALMEIDA, 2019, p. 64) [1]. One way to modify the reproduction of these behaviors is the inclusion of topics such as racism, the health of the black population, and the health of the indigenous population in the formative processes of health courses and in the continuing education of workers in the area.

Several points deserve further discussion to bring other valuable lessons in promoting public health policies. First, the preexistent geographic distribution and the unequal access to Brazil's public and private health nets had a critical impact on the COVID-19 burden. The distribution of the ICU (Type 3)—used to treat severe SARS-COV-2 infections—among macroregions was uneven, mainly centered on prosperous Southwest and South macroregions. The South and Southeast have a prevalence rate of 2 and 1.5 ICUs per 100,000 inhabitants, respectively, while in the North, this prevalence rate is 0.03 [10]. This imbalance in ICU coverage across the Brazilian territory imposes geographic barriers to access ICUs. In addition, despite the number of ICUs being approximately equivalent in public and private health nets, just after the beginning of the pandemic, the private-sector net expanded the availability of ICUs (Type 3) at a rate faster than the public-sector net [11], increasing the ICU availability gap between the two administrative sectors. The physical scarcity of ICUs in some macroregions made it impossible for many people to access them, but the financial barrier also reinforced this trend. Only 28.5% of the Brazilian population has medical or dental private health insurance [16]. Even so, the distribution is very uneven among macroregions and racial and social-economic segments of the population. The prosperous macroregions, South and Southeast, concentrate private health insurances to the detriment of the poorest macroregions, North and Northeast. Similarly, considering people with access to private health insurance, 41.5% are black/biracial, and 38.8% are whites [16], whereas, in the general population, 56.2% are black/biracial and 42.2% white [18]. As shown, this larger picture previous to the pandemic was reproduced during the sanitary emergency. Vulnerable segments were strongly affected in terms of the burden of COVID-19, such as deprived macroregions and historically disadvantaged races. Second, a key point of our evidence was the higher lethality risks in public health establishments compared to private ones. This reality cannot be well evaluated without considering the health financing structure in Brazil. In 2019, the domestic general health expenditure was approximately 9.6% of the Gross Domestic Product (GDP) [20], of which 60% was destined for the private health administrative sector. However, only 28.5% of Brazilians have access to private health insurance [16], evidencing the inequality reality of the access to health services in Brazil. Besides, there are significant distortions in health care assignments of the public and private health administrative sectors. The public health system offers a wide range of products/services to the population, for instance, the immunization programs, disease preventive campaigns, research for the development of new treatments and protocols, as well as a structure to organize the national health system, such as the National Health Surveillance Agency, National Research Ethics Commission, or National Commission for Incorporation of Technologies. Thus, public sector costs are more spread out to meet the many competing public health assignments. Consequently, the public-sector health net, in addition to being highly underfunded, is also over-demanded, given that, in theory, it is responsible for the care of 71.5% of the Brazilian population [16]. Given this scenario, it is not surprising that health establishments in the public administrative sector had relatively lower service effectiveness when compared to health establishments in the private administrative sector, which was materialized by the difference in lethality risk during the COVID-19 pandemic.

Our evidence suggests that an effective measure to shorten the gap between races and regional inequalities in health in Brazil is to increase financing for the public health administrative sector. The pandemic experience emphasized the strong dependence of the public health sector on the most vulnerable population and in the poorest macroregions of Brazil. Unfortunately, we are observing an adverse scenario in the Brazilian health financing structure, especially after the beginning of the implementation of macroeconomic austerity policies adopted in 2015. Although total health expenditures had increased as a proportion of GDP during this period, public financing has reduced its share compared to the private sector. The persistence of this trend can further increase racial inequalities in health.

It is fundamental to revise and highlight the federal government's role in increasing exposure to the SARS-CoV-2 virus during the pandemic, particularly among indigenous and black/biracial groups of people. There were at least two milestone moments. The first one was the direct cash transfer program "Auxílio Emergencial para Pessoas em Situação de Vulnerabilidade" (EA) targeting informal workers and vulnerable populations. At first, there was a dispute between the federal government and the National Congress over the value of the benefit. While the initial proposal from the federal government was R$ 200.00 per person/month, the National Congress defended the implementation of the program with a value three times higher. Due to pressure from public opinion, the program was created with values suggested by the National Congress. Although not directly designed for black/biracial nor indigenous, the AE could, in theory, benefit these populations overrepresented in low-income segments of society. However, the government initially only opened a website and an app for people to apply for the AE electronically, excluding millions of eligible Brazilians who lacked access to the internet and/or formal identification, i.e., an official identification with a photo or the Individual Taxpayer Number (CPF). This situation became so dramatic that later, in April 2020, Federal Justice suspended the requirement for CPF to request the program assistance [28], although the channel for an application to EA continued to exclude some segments, such as indigenous people and 'quilombolas' (i.e., groups with their own cultural identity originally formed in the times of slavery in Brazil by enslaved people who, being deprived of their freedom took refuge in the 'quilombo', a place that sheltered runaway slaves). The second one, targeting indigenous, 'quilombolas', and other 'traditional communities,' the National Congress approved a bill to promote a new law for providing water and other hygiene and cleaning products, but the president of the republic vetoed the bill [14]. After some days, the Federal Court of Justice established equivalent law to guarantee assistance to these populations [2].

The study has limitations. First, a key variable, race, is self-declared. Besides, the concept of race in a mixed population like Brazil does not exactly match the definition of race in other studies or countries. For instance, the category black/biracial as the sum of black and brown people is widespread in Brazil and is defined in the Statute of Racial Equality (Law No. 12288/2010)— however, as stated earlier, the IBGE classifies as brown the descendants of the interracial relationships, a concept widely misunderstood. Second, a large share of the COVID-19 suspects did not self-declare as belonging to any race. 20% of our sample comprises the category "other,"which includes "not self-declared"patients. On this topic, it is noteworthy that only in 2017 did the question of race/color become mandatory in SUS forms (Ordinance 344, February 1, 2017). Until then, its use was optional, limiting the production of epidemiological data that would allow analyses that reflect the black population's real health and disease conditions. We can affirm that the nearly three decades (between the creation of the SUS and the publication of Ordinance 344) without collecting race/skin color data were an expression of institutional racism and contributed to maintaining racial inequities in health. Third, we opted to add the data from philanthropic health establishments to those from private health establishments since both have a private sector legal nature, nonprofit and for-profit, respectively. Despite providing a significant volume of SUS services, philanthropic health establishments differ from public ones in several aspects, such as, for example, in the bureaucracy. While public administration health establishments must comply with federal law 8.666/93 on the forms of hiring personnel, companies, and services and on the purchase of inputs and equipment, philanthropic health establishments can perform these transactions with the agility and flexibility typical to any private company. However, it is worth noting that there are ICUs in philanthropic hospitals reserved for SUS, making it impossible to distinguish which type of funding was carried out for each patient.

5 Conclusion

Racism was an important social determinant of the health-disease process during the period under analysis in the study. Being part of the black/bi-racial or indigenous population increased their lethality risk in all macroregions of the country, regardless of the legal nature of the health establishment.

Overall, the results point to the need for investment in actions that guarantee, in fact, equity in the SUS. The inclusion of themes such as racism and the health of historically vulnerable populations (e.g., black/bi-racial and indigenous populations) in the curricula of biomedical courses, as well as in the continuing education activities of health care workers, is fundamental to the reduction of health inequities.

It is through education that the process of denaturalizing the racism instilled in our subjectivities begins.

Furthermore, the adequate financing of the SUS and the strengthening of the participation of black and indigenous movements in the instances of social control of the system, such as in local, municipal, and state councils, and in the National Health Council, is fundamental to guarantee that the needs of these populations are considered in the multi-year Health Policies and that, above all, these needs, which are also rights, are met.

Referências

[1] Silvio Almeida. *Racismo estrutural*. Pólen Produção Editorial LTDA, 2019.

[2] R. AZEVEDO. *STF decide manter medidas de proteção a indígenas na pandemia*. 2020. URL: https://noticias.uol.com.br/colunas/reinaldo-azevedo/2020/08/05/stf-decide-manter-medidas-de-protecao-a-indigenas-na-pandemia.htm (acesso em 05/08/2020).

[3] Fernanda Souza de Bairros et al. "Racial inequalities in access to women's health care in southern Brazil". Em: *Cadernos de Saúde Pública* 27 (2011), pp. 2364–2372.

[4] Pedro Baqui et al. "Ethnic and regional variations in hospital mortality from COVID-19 in Brazil: a cross-sectional observational study". Em: *The Lancet Global Health* 8.8 (2020), e1018–e1026.

[5] Rita Helena Borret et al. ""A sua consulta tem cor?" Incorporando o debate racial na Medicina de Famıélia e Comunidade: um relato de experiência". Em: *Revista Brasileira de Medicina de Famıélia e Comunidade* 15.42 (2020), pp. 2255–2255.

[6] Paula Braveman. "Health disparities and health equity: concepts and measurement". Em: *Annu. Rev. Public Health* 27 (2006), pp. 167–194.

[7] Ana Lúcia Lobo Vianna Cabral et al. "Vulnerabilidade social e câncer de mama: diferenciais no intervalo entre o diagnóstico e o tratamento em mulheres de diferentes perfis sociodemográficos". Em: *Ciencia & saude coletiva* 24 (2019), pp. 613–622.

[8] Vitória Berg Cattani et al. "Risk assessment and rationalization of health resource allocation: Lessons from the Brazilian COVID-19 cohort in 2020". Em: *Preventive Medicine Reports* 26 (2022).

[9] Helena Mendes Constante, Gerson Luiz Marinho e João Luiz Bastos. "The door is open, but not everyone may enter: racial inequities in healthcare access across three Brazilian surveys". Em: *Ciência & Saúde Coletiva* 26 (2021), pp. 3981–3990.

[10] Danielle Conte Alves Riani Costa et al. "Oferta pública e privada de leitos e acesso aos cuidados à saúde na pandemia de COVID-19 no Brasil". Em: *Saúde em Debate* 44 (2021), pp. 232–247.

[11] Dorival Fagundes Cotrim e Lucas Manoel da Silva Cabral. "Crescimento dos leitos de UTI no paıés durante a pandemia de Covid-19: desigualdades entre o público x privado e iniquidades regionais". Em: *Physis: Revista de Saúde Coletiva* 30 (2020).

[12] Anthony J Culyer e Adam Wagstaff. "Equity and equality in health and health care". Em: *Journal of health economics* 12.4 (1993), pp. 431–457.

[13] F Fanon. "Racismo e cultura". Em: *Revista Convergência Crítica* 13 (2018).

[14] Brasil de Fato. *Bolsonaro veta acesso facilitado a auxílio emergencial e água a indígenas na pandemia*. 2020. URL: https://www.brasildefato.com.br/2020/07/08/bolsonaro-impoe-16-vetos-ao-plano-emergencial-contra-covid-em-territorios-indigenas (acesso em 08/07/2020).

[15] Jairo Fernando Taufick França. "A COR DA PANDEMIA–UM ESTUDO SOBRE A MORTALIDADE POR COVID-19 ENTRE BRANCOS E NEGROS NO BRASIL THE COLOR OF PANDEMIC-A STUDY OF COVID-19'S MORTALITY RATE AMONG WHITE AND BLACK PEOPLE IN BRAZIL". Em: (2021).

[16] Instituto Brasileiro de Geografia e Estatıéstica. *Pesquisa nacional de saúde: 2019: informações sobre domicıélios, acesso e utilização dos serviços de saúde: Brasil, grandes regiões e unidades da federação*. 2020.

[17] Pedro C Hallal et al. “SARS-CoV-2 antibody prevalence in Brazil: results from two successive nationwide serological household surveys”. Em: *The Lancet Global Health* 8.11 (2020), e1390–e1398.

[18] FUNDAÇÃO IBGE. *PNAD Pesquisa Nacional por Amostra de Domicıélios*. 2019.

[19] Maria do Carmo Leal, Silvana Granado Nogueira da Gama e Cynthia Braga da Cunha. “Desigualdades raciais, sociodemográficas e na assistência ao pré-natal e ao parto, 1999-2001”. Em: *Revista de saude publica* 39 (2005), pp. 100–107.

[20] World Health Organization. *National Health Accounts*. 2021.

[21] Igor Tona Peres et al. “Sociodemographic factors associated with COVID-19 in-hospital mortality in Brazil”. Em: *Public Health* 192 (2021), pp. 15–20.

[22] Ministério da Saúde (BR). *Guia de implementação do quesito Raça/Cor/Etnia*. 2018.

[23] Ministério da Saúde (BR). *Política Nacional de Saúde Integral da População Negra uma política do SUS*. 2013.

[24] SBMFC. *GT de Saúde da População Negra: manifestação sobre ausência de dados da COVID 19 desagregados por raça-cor*. 2020. URL: https://www.sbmfc.org.br/noticias/gt-de-saude-da-populacao-negra-manifestacao-sobre-ausencia-de-dados-da-covid-19-desagregados-por-raca-cor/ (acesso em 30/05/2022).

[25] Julio Silva e Marcelo Ribeiro-Alves. “Social inequalities and the pandemic of COVID-19: the case of Rio de Janeiro”. Em: *J Epidemiol Community Health* 75.10 (2021), pp. 975–979.

[26] Célia L Szwarcwald, Paulo RB Souza-Júnior e Giseli N Damacena. “Socioeconomic inequalities in the use of outpatient services in Brazil according to health care need: evidence from the World Health Survey”. Em: *BMC health services research* 10.1 (2010), pp. 1–7.

[27] Cláudia Travassos e Mônica Silva Monteiro de Castro. “Determinantes e desigualdades sociais no acesso e na utilização de serviços de saúde”. Em: *Polıéticas e sistema de saúde no Brasil* 2 (2012), pp. 183–206.

[28] UFF. *COVID-19: Suspensão na exigência da regularização do CPF*. 2020. URL: http://nephu.sites.uff.br/2020/04/17/covid-19-suspensao-na-exigencia-da-regularizacao-do-cpf/ (acesso em 17/04/2020).