ORIGINAL ARTICLE

GENDER-RACE INTERSECTIONALITY OF SUICIDE IN BRAZIL: ANALYSIS FROM 2012 TO 2020

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Highlights: (1) Intersectional social identities shape inequalities in suicide risk. (2) Hegemonic masculinity constrains self-care and help-seeking. (3) Prevention strategies must address structural racism and regional inequities.

PRE-PROOF

(as accepted)

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ABSTRACT

Objective: the study aimed to analyze, based on gender-race intersectionality, the cases of suicide in Brazil registered in the period from 2012 to 2020. Methods: ecological, descriptive, time-series epidemiological study with data from the Death Suicide Certificates, by federation unit, in Brazil from the Mortality Information System (SIM), in the period from 2012 to 2020, from DATASUS, in the period in November 2022. The variables marital status, education and the means used to consummate suicide and their correlation with intersectionality were analyzed. IBM SPSS software was used Statistics ® 23 for the analyses and LibreOffice Community 7.1.0.3 for graphics. Results: there was a sharper increase in suicide rates among non-white men from 2015 onwards compared to other intersectionality groups. These were mostly young, single, with low schooling and had the highest proportion of suicide cases by hanging in all years alone ($p<0.0001$). Conclusion: giving visibility to the potential of using intersectionality in the study of suicidal behavior allows guiding the implementation of targeted and effective public policies.

Keywords: Intersectional framing; sexual factors; racial factors; suicide.

INTRODUCTION

The concept of intersection between gender and race refers to a transdisciplinary theory that aims to apprehend the complexity of identities and social inequalities through an integrated approach (1-3).

In this context, the methodological theory of intersectionality seeks to analyze the complexity and inseparability of one social marker from another, allowing us to understand how social constructions prior to the existence of the subjects produce greater or lesser inclusions or exclusions (4-6) and how these markers can affect the health of the subjects.

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While gender disparities are evident in access to mental health care (7), their intersections with other factors, such as race, shape the extent and experience of physical and mental health (6,8,9).

Thus, suicide stands out as a possible serious outcome of mental health problems. Furthermore, this complex, polysemic and multifaceted phenomenon intrinsically reflects sociocultural determinants and stands out as a relevant public health problem, which claims more than 700 thousand lives each year in the world (10). It is characterized by being a self-inflicted human action with the intention of death. Its risk factors include the presence of mental health problems, exposure to family violence, a history of physical or sexual abuse, the presence of firearms in the home. They also include direct or indirect exposure to the suicidal behavior of others, as well as to environmental stressors such as socioeconomic inequities, which were accentuated after the COVID-19 pandemic (10-12).

Although global suicide rates are decreasing, with a 36% drop from 2000 to 2019, in the Americas there was a 17% increase in the same period (10,13). Brazil was the first country in Latin America to present National Guidelines for Suicide Prevention, in 2006, through Ordinance No. 1,876 of the Ministry of Health. Although the country still does not have a National Suicide Prevention Program, recommended by the WHO, in 2016 the Ministry of Health launched an Agenda of Strategic Actions for Suicide Surveillance and Prevention. This prioritizes the psychosocial determinants of health and the specificities of vulnerable populations and groups (14).

In the country, suicide coefficients in men were 3.8 times higher than in women, in the period from 2010 to 2019, results similar to those observed in most countries in the world (7). However, it is worth noting that the temporal trend of female suicides in the country was upward in the age group of 15 to 60 years, in the period from 1997 to 2015 and in most states of the Northeast Region, in the historical period from 1996 to 2018 (15). In the first year of the COVID-19 pandemic, an excess of 23% in suicide mortality was detected in women aged 30 to 59 years living in the North region and 40% in women over 60 years of age living in the Northeast region in relation to the rates predicted pre-pandemic (16).

Although in Brazil there is an apparent invisibility of suicide among black people, despite the existence of numerous studies with whites and indigenous people (17), recent

research observed a significant increase in suicide notifications in the Northeast region from 2013 onwards, accompanied by an increase in suicide rates among blacks from 2014 onwards (15).

Brazil is one of the most unequal countries in the world, and some groups are more marked by inequities, which accentuate physical and psychological suffering in more vulnerable subjects (18).

Several studies address ethnicity, sex and gender in isolation in the understanding of suicidal behavior (13,15-17), but there are few studies that analyze it from the perspective of intersectionality. This indicates a gap in the way of understanding this phenomenon.

The article aims to analyze, based on gender-race intersectionality, the cases of suicide in Brazil registered in the period from 2012 to 2020.

METHOD

Study design

This is an ecological, descriptive, time-series epidemiological study.

Data collection

Death Certificates (DC) by suicide of residents of the Federation Units of Brazil, from the Mortality Information System (SIM), from the period from 2012 to 2020, from DATASUS and accessed in November 2022 (19), were used.

The DCs were extracted for tabwin® tabulation. The inclusion criteria were deaths of residents of any Federation Unit of Brazil whose underlying cause was classified with the codes X60-X84 (intentional self-inflicted injuries) or Y87.0 (sequelae of intentional self-inflicted injuries), according to the 10th revision of the International Classification of Diseases (ICD-10), which are considered causes of suicide. Declarations of children under 5 years of age and unknown age were excluded.

For the population data, the document "*Social Inequalities* by Color or Race in Brazil - 2nd edition" was considered. This includes population estimates based on self-declaration during the interview of the National Household Sample Survey (PNAD), using the division by race/color and sex from 2012 to 2021 (20).

Data processing

The data were imported into the Excel® program, version 13.0.

To construct the gender-race intersectionality variable, categories were created for race self-reported by skin color (white, brown, black, Brazilian indigenous, and Asian ancestry) and for sex (male or female). The variable race was grouped, for analysis purposes, into white and non-white (brown, black, Brazilian indigenous and Asian ancestry). Four categories of gender-race intersectionality were created: white men, non-white men, white women, and non-white women.

The mortality rate by specific cause was calculated by the ratio between the number of deaths and the estimated population of the period, considering a population of 100,000 inhabitants, which occurred in a previously established place and period.

The original sample consisted of 107,539 suicide records completed from 2012 to 2020 and after recoding, after discarding the unfilled fields of race/ethnicity and/or sex, it was composed of 105,076 deaths.

Time analysis

The data were imported into the *Join Point Regression Program*® software, version 4.6.0.0, for time series analysis. It performs a segmented linear analysis (analysis by inflection points or *join points),* with a logarithmic transformation of the values. It is assumed that if we have a line segment in such a way that the inclusion of a point is related to the inflection of the period, that is, the change in the slope of the line segment, it can explain, more adequately, the behavior of the data in the series. The Annual Percentage Change (APC) and the Average Annual Percentage Change (AAPC) were calculated, with a confidence interval of 95% (95%CI). These calculations allow you to evaluate the trend, which can be positive/increasing, negative/decreasing, or stationary. The results with $p<0.05$ were considered significant (21).

In the program, the mortality rate per specific cause was calculated again, with this being the dependent variable and each year the independent variable. The rates regarding gender and race/ethnicity intersectionality were analyzed in 04 groups and, for comparison purposes, two categories were created: no missing data and no missing data, referring to the mortality rates due to specific cause of all groups with data from the original database and after cleaning with the removal of notifications with blank fields. In order to observe the occurrence of suicide

during the year of the COVID-19 pandemic, a specific analysis was made for 2020, using the month of occurrence of death as an independent variable.

Statistical analysis

IBM SPSS Statistics® 23 *was used* for analysis and *LibreOffice Community 7.1.0.3* was used for graphs. Subsequently, deaths were analyzed each year, with the aim of identifying changes in suicide profiles over the period.

The variables intersectionality with marital status, education and the means used to consummate suicide were analyzed. The variable "means used" was grouped into eight categories, considering the highest frequencies presented in the descriptive statistics, in order to identify the correlation with intersectionality.

To describe the categorical variables, the number and percentage of suicides were used, and for the continuous variables, the minimum, maximum, median, mean and standard deviation (SD) parameters were used. To verify possible associations between the nominal/categorical variables studied, Pearson's chi-square test was used. The proportions relative to the columns were compared using the test for two proportions, with Bonferroni correction for the level of significance. To compare quantitative variables, in relation to nominal/categorical variables, the Kruskal-Wallis test and the appropriate multiple comparison test were used. A value of $p<0.05$ was considered significant.

Ethical Considerations

According to Resolution No. 510/2016 of the National Health Council, studies of this nature are exempt from approval by the Human Research Ethics Committee, as they use information from publicly accessible databases.

RESULTS

The survey was conducted with 105,076 suicide records from 2012 to 2020, most of whom were men (78.6%), white (50.6%), single (54.5%), 0 to 7 years of schooling (55.1%), and suicide by hanging (68.2%) (Table 1).

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TABLE 1. Number and percentage of suicides in terms of year, race/color, sex, intersectionality, marital status, education, cause of people who committed suicide, from 2012 to 2020, in Brazil.

VARIABLE	N	%
YEAR OF DEATH		
2012	10.024	9,5
2013	10.234	9,7
2014	10.391	9,9
2015	10.937	10,4
2016	11.232	10,7
2017	12.422	11,8
2018	12.656	12
2019	13.414	12,8
2020	13.766	13,1
GENDER		
MEN	82.641	78,6
WOMEN	22.435	21,4
RACE/COLOR		
WHITE	53.161	50,6
NON-WHITE	51.915	49,4
INTERSECTIONALITY		
WHITE MAN	40.696	38,7
NON-WHITE MAN	41.945	39,9
WHITE WOMAN	12.465	11,9
NON-WHITE WOMAN	9.970	9,5
MARITAL STATUS		
SINGLE	53.246	54,5
MARRIED OR STABLE UNION	33.127	33,9

WIDOWER	3.891	4
SEPARATE	7.490	7,6
SCHOOLING(YEARS)		
0 TO 7 YEARS	44.646	55,1
OVER 8 YEARS OLD	36.363	44,9
CAUSE OF SUICIDE		
HANGING	71.664	68,2
FIREARM	8.669	8,3
INTOXICATION BY ALCOHOL OR OTHER PSYCHOACTIVE SUBSTANCES	5.898	5,6
PRECIPITATION	3.946	3,8
PESTICIDE POISONING	3.777	3,6
SHARP OR BLUNT OBJECTS	2.281	2,2
DRUG POISONING	2.030	1,9
OTHER	6.811	6,5

Source: prepared by the authors.

Throughout the time series, it is possible to identify an increasing trend, with suicide rates ranging from 3.84% per year in white men and non-white women to 4.12% in white women. It was also highlighted that the general curve of the general suicide mortality rate with and without the missing data overlaps (**Figure 1**).

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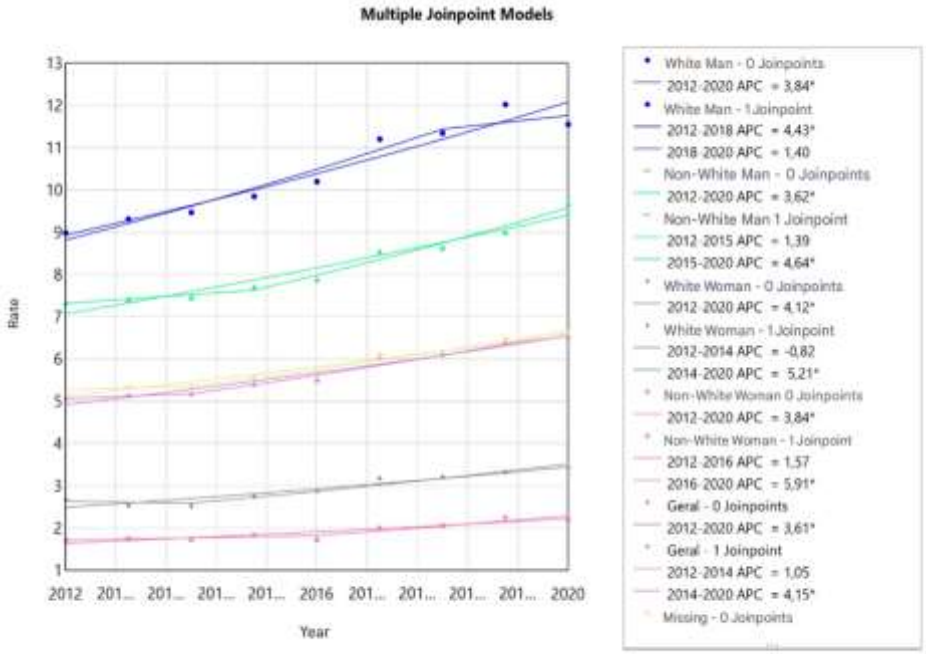
FIGURE 1. Time series of the specific mortality rate by suicide (100,000 population) considering intersectionality, race and sex, from 2012 to 2020, in Brazil.



Source: prepared by the authors.

In the case of non-white men, the occurrence of stationarity was observed from 2012 to 2015 ($p>0.05$). An inflection point was identified this year, in which the group had an annual increase of 4.64% until 2020, higher than the other groups under analysis.

When analyzing the data year by year, it was observed that, from 2018 onwards, non-white men continued to be the majority, followed by white men, but the difference between the groups increased, notably in 2020. This year, there were 42.1% of the cases carried out by non-white men and 36.4% by white men.

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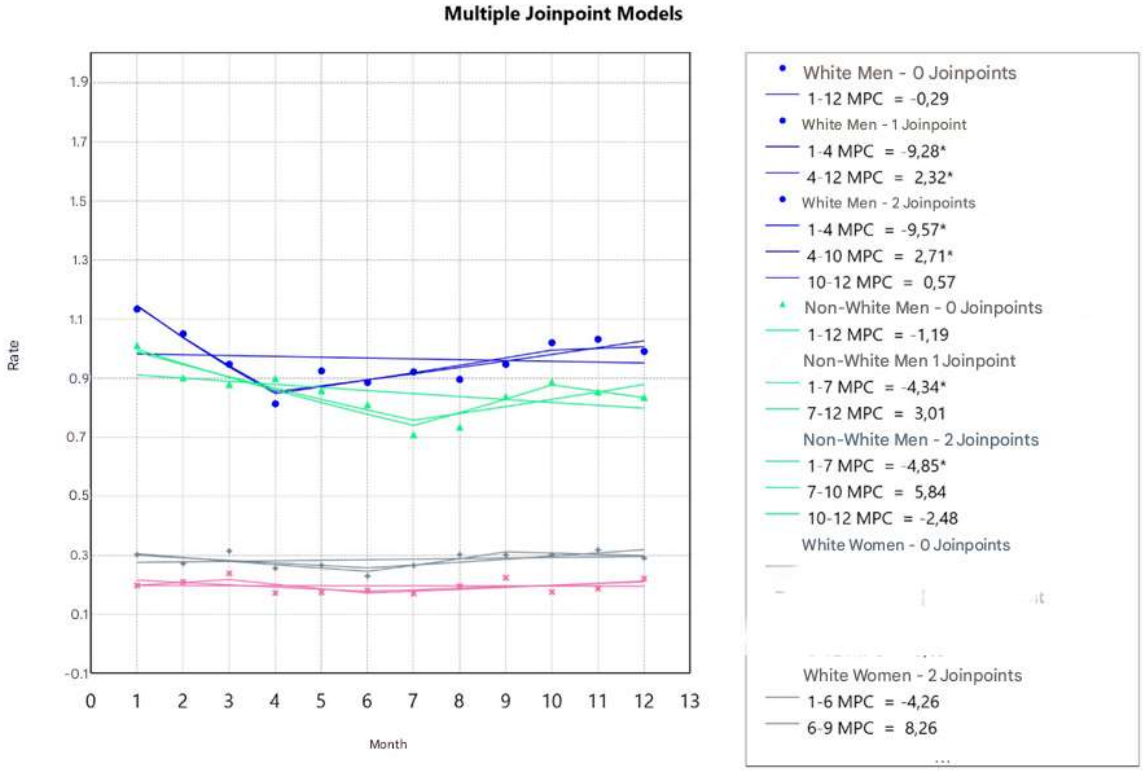
FIGURE 2. Time series of the suicide-specific mortality rate (100,000 population) considering Intersectionality, race and sex, in 2020, in Brazil.



Source: prepared by the authors.

During the first year of the Covid-19 pandemic, there was a reduction followed by an increase in suicide rates for white men, with a turning point in April 2020, and for non-white men, with a turning point in July 2020 (**Figure 2).**

In the comparison of **age in relation to intersectionality**, the Kruskal-Wallis test, there was a significant difference, $p<0.001$, between the four categories of intersectionality. Non-white women and non-white men had the lowest medians, 35 and 37, respectively. However, it was observed that the age mode of non-white women is the lowest: 17 years, in relation to all other categories (white man: 38, non-white man: 30, white woman: 53).

Only in the years 2016, 2017 and 2019 did the distribution of the median ages differ significantly among all intersectionality groups ($p<0.0001$), maintaining the pattern observed in the analysis of the entire period. In the other years, there was no statistically significant

difference between the groups of white men and white women, nor between the groups of non-white men and non-white women. The median age of the cases of suicide committed by non-white people was lower than that of the cases committed by white people in all years ($p<0.0001$).

The chi-square test found that there is an association between marital status, education (years) and cause of suicide with the intersectionality of sex x race/color, $p<0.001$.

Regarding **marital status,** the highest number of suicides occurred among single non-white men (45.9%) and among married/common-law couples (44.2%), widowed (37.6%) and separated (47.1%) white men. Regarding **education,** the highest number of suicides occurred among those up to 7 years of age in non-white men (47.5%) and among those aged 8 years or older in white men (43.0%). Regarding the **causes of suicide**, the highest number of suicides occurred by hanging in non-white men (43.6%), by firearms in white men (55.3%), by intoxication by alcohol or other psychoactive substances in non-white men (32.2%), by precipitation in white men (39.4%) and by intoxication with medication in white women (38.5%) (Table 3).

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Table 2. Number and percentage (relative to the total of the line) of suicides by sociodemographic characteristics and cause of suicide by intersectionality

In bold the highest percentages in each category.

	Intersectionality								p
	White man		Non-white man		White woman		Non-white woman		
Variable	n	%	n	%	n	%	N	%	
Marital status									**<0.001**
Single	18312	34,4	24.434	**45,9**	5.013	9,4	5.487	10,3	
Married/Common-law Partnership	14.642	**44,2**	11.555	34,9	4.214	12,7	2.716	8,2	
Widower	1.462	**37,6**	902	23,2	993	25,5	534	13,7	
Separate	3.530	**47,1**	1.871	25	1.502	20,1	587	7,8	
Education (years)									**<0.001**
0 to 7 years	15.209	34	21.208	**47,5**	3.866	8,7	4.363	9,8	
Over 8 years old	15.652	**43**	11.161	30,7	5.972	16,4	3.578	9,8	
Cause of suicide									**<0.001**
Hanging	27.923	39	31.245	**43,6**	6.610	9,2	5.886	8,2	
Firearm	4.798	55,3	2.984	34,4	622	7,2	265	3,1	
Intoxication by alcohol or other psychoactive substances	1.605	27,2	1.898	**32,2**	1.293	21,9	1.102	18,7	
Precipitation	1.555	**39,4**	977	24,8	1.038	26,3	376	9,5	
Pesticide poisoning	963	25,5	1.498	**39,7**	531	14,1	785	20,8	
Sharp or blunt objects	1.031	**45,2**	855	37,5	259	11,4	136	6	

Drug poisoning	484	23,8	296	14,6	782	**38,5**	468	23,1
Other	2.337	**34,3**	2.192	32,2	1.330	19,5	952	14

Source: prepared by the authors.

The chi-square test found that there is an association between marital status, education (years) and cause of suicide with the intersectionality sex x race/color in all years surveyed, $p<0.001$, although the differences found are not similar to those found when considering the entire period, 2012 to 2020.

The correlation between schooling and intersectionality remained the same in each of the years separately, with a higher proportion of white men among the cases with higher schooling and of non-white men among the cases with lower schooling, but separately in the years 2014, 2015 and 2016, the proportion between white men and non-white women did not present a statistically significant difference, at the level of 5%.

Non-white men had the highest proportion of suicide cases by hanging in all years alone ($p<0.0001$), as well as by intoxication by alcohol and psychoactive substances, but the latter differed significantly from the proportion of non-white men only in 2014. White men had the highest proportion of suicides by firearm or explosives in all the years analyzed separately ($p<0.0001$). White women led the cases of suicide due to drug poisoning in all years of the study period, although the proportion did not differ significantly from non-white women in any of the years.

DISCUSSION

The time series showed a sharper increase in suicide rates among non-white men from 2015 onwards compared to other intersectionality groups. Among these, the majority were young and single and the means most used by this group were hanging and intoxication by psychoactive substances. Notably, in the first year of the Covid-19 pandemic, there was a change in the pattern of suicide rates committed by men in relation to women, with a temporal distinction observed between white men and non-white men.

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Multiple social identities such as race, color, gender, sexual orientation, and geographic location, mediated by social and structural discrimination, interact in the production of different suicide risks (22). In this context, the increase in suicide rates among non-white, young, and single men in relation to other intersectionality groups corroborates an association of several risk factors, including low quality of life and inequity in access to health, related to structural racism present in Brazil and also observed in studies in other countries(23, 17). Men's attitudes towards self-care are related to their experiences and hegemonic patterns of masculinity, such as the denial of weakness and the rejection of help (24).

In addition, men apparently suffer more markedly from unemployment and culturally seek less support from health services, including services that treat alcohol and other substance dependence (25). However, these variables do not affect men in a homogeneous way, and sociodemographic variables, especially race, may influence. This fact may be related to the observation of a higher proportion of non-white men who commit suicide through intoxication by psychoactive substances.

Socioeconomic inequities are evidenced by intersectionality (22, 6). The permanence of the patterns of education, means used and age groups among the intersectionality groups over the years studied denotes that the factors associated with the relative increase in suicide rates in non-white men, observed from 2015 onwards, do not affect these parameters.

The race/skin color variable also generates important hierarchization and social implications, and is at the top of the chain of effects of socioeconomic differences (26). Black people tend to have lower income and lower education (6), in addition, non-white individuals show the worst results for several health indicators (27). These racial inequalities are generated at all stages of life through complex mechanisms interacting with other social markers.

In this context, the intersectionality of gender and race enters as a marker of *social status*, which would be expressed in individual and contextual indicators (4). Thus, young black men find in the social structure situations of inequality, segregation and marginalization, which constitute an important part of the production and reproduction of their identities (28). It is worth noting that daily racial discrimination significantly increases depressive symptoms and suicidal ideation (29). That said, and returning to the complexity of suicide as a phenomenon permeated by biological, social, cultural and economic determinants, it is understood that the

analysis of suicide from the perspective of intersectionality is appropriate and should be further explored in further research.

Because they are also part of a group considered a minority, black men may be susceptible to the consequences of racism. Reinforcing this, a study conducted in the United Kingdom found that being part of a marginalized group is associated with greater psychological distress, worse physical and mental functioning, as well as lower satisfaction with life and worse self-perception of health (30).

As an example of this potential, one can observe the results of a recent survey carried out in schools in São Paulo. This investigated the presence of suicidal ideation in students and found a high prevalence, but did not observe an association with gender and race, variables that were analyzed separately. The same study detected an association with studying on the night shift, a fact that implies the presence of other probable risk factors, such as worse socioeconomic conditions (31), which could also be evidenced from an analysis of the gender/race intersection. Suicide prevention strategies, therefore, should address structural racism and its institutional manifestations (32).

Corroborating our results, a study conducted in the United States revealed that, between 1991 and 2017, suicide attempts increased by 73% among black adolescents, while injuries resulting from these attempts increased by 122% among black boys (33). These data show a worrying worsening of suicidal behaviors in this group and reinforce the urgency of formally integrating structural racism into prevention strategies. Such integration is essential to elucidate the social mechanisms that contribute to this scenario and to strengthen public health efforts aimed at the etiology of suicide among racialized populations (34).

It is noteworthy that, in the present study, the inflection point for the increase in suicide rates in non-white men in the time series occurred in 2015, marked by the effects of the global economic crisis that began in 2014. There was an increase in unemployment rates and the beginning of a period of low economic growth and a strong oscillation in the level of unemployment in the following years (35), notably after the Covid-19 pandemic. And the impacts of the crisis affect the population unequally, being more evident for people with informal jobs, with low income, and who live in precarious areas with little or no access to basic housing and health conditions (36). Thus, the present research was able to capture the impact

of psychosocial determinants for suicide from the analysis of gender-race and how some intersectionality groups suffer more from these inequities.

In this context, in 2015 the Yellow September campaign was instituted in Brazil, as a strategy for universal prevention of suicidal behavior, following a global trend. Some studies have sought to identify the impacts of similar campaigns, ranging from modest results (37) to undesirable effects (38). A time series study carried out in the state of Ceará from 2009 to 2019 identified stability in the general trend of suicide rates after the beginning of the Yellow September campaign, but with an increase in the age group of 15 to 29 years and stabilization in the age group of 60 to 79 years after its beginning, it may mean a different effect of the campaign among young and old (28).

For health surveillance, the reduction of inequities through the construction of intersectoral public policies that understand their social determinants is a constant challenge for defining strategies and priorities for public health intervention (39). According to the results of this research, we can identify as another niche of investigation a possible difference in the impact of campaigns like this between the various categories of intersectionality.

In the first year of the Covid-19 pandemic, a Brazilian study showed an overall reduction of 13% in suicides in Brazil in the first ten months, although this pattern was not homogeneous across age groups. In the North and Northeast regions, excess suicides were observed in both sexes, especially in the age group of 60 years and over, in relation to what was expected for the period in pre-pandemic projections (16). It can be inferred from the results of the present survey, which covered all 12 months of the year, that the pattern of suicide rates among white and non-white men changed between the first and second waves of the pandemic, and that regional inequities can be crossed by inequities at the gender/race intersection.

This research contributes to giving visibility to the potential of using intersectionality in the study of suicidal behavior and for society to work together with public agencies on coping strategies.

It is worth noting, however, that this is a research carried out using secondary data. This implies limitations due to the recognized underreporting that exists globally (28) and data that cannot be verified. In addition, the time series analyzed consisted of only nine years, and it is necessary to expand it by contemplating longer periods to evaluate long-term behavior. However, studies evaluating suicide in the context of intersectionality are scarce. In addition,

as this is a research with a large sample of all age groups, of both sexes, distributed across all regions of the country, this study presents an important contribution to the theme of social markers, from the perspective of intersectionality, in Brazil, a developing country, permeated by so many social inequalities.

Therefore, it is suggested that complementary analyses of larger series be carried out on a continuous basis, aiming to identify changes in the behavior pattern of the phenomenon.

CONCLUSION

Studying suicidal behavior from the perspective of intersectionality makes it possible to identify probable more vulnerable profiles, in a perspective of greater complexity, in order to guide the implementation of targeted and effective public policies. For the purposes of conception and planning, these groups need to be less generic, less abstract, which contemplate the subjective singularity of the subjects that compose them.

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