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# Abortion and race in Brazil, National Abortion Surveys 2016 to 2021

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**Abstract** *We examine racial differentials in abortion among women in Brazil using data from three editions of the Brazilian National Abortion Survey (PNA), 2016, 2019 and 2021. We test the difference in means in data from separate surveys, combined surveys without reweighting, and combined and reweighted surveys. We also use logistic models for the chance of having an abortion. The results indicate that there is a consistent racial differential in the three editions of PNA, with the percentage of abortions among Black women being higher than among white women. In the combined and reweighted surveys, among Black women of all ages the probability of having had an abortion is 11.03% while among white women it is 7.55%. This means a difference of 3.5 percentage points, which translates into a 46% higher probability for Black women, statistically significant values for a 5% interval. Logistic regressions produce similar results, with an average predicted probability of 12.61% for Black women and 8.90% for white women, also significant. Racial differences remain statistically significant for various combinations of PNA editions. However, in the separate surveys, the difference in means tests are only statistically significant in 2016. Black refers to the group formed by Black and Brown women (pretas and pardas). Due to the small sample size, it is not possible to say much about the differences with Asian and Indigenous women.*

**Key words** *Abortion, Color or race, National Abortion Survey, Brazil*

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## Introduction

Abortion is a common event in the lives of Brazilian women[1-9]. According to the National Abortion Survey (PNA) 2021, by the age of 40, one in seven women has had at least one abortion[7]. The magnitude of abortion, coupled with prohibitive criminal legislation for access, makes abortion a public health problem in Brazil. There are quantitative studies on abortion that explore the relationship between women's characteristics such as age, education and income, and abortion[10-15]. However, the relationship between racial inequalities and abortion deserves further exploration.

Individual barriers to accessing post-abortion care, for example, are more severe among Black women. Indicators such as time to start care or access to hospitalization are racially differentiated. Black women are also the ones who are most afraid of stigmatization when seeking health services and there is evidence of a higher prevalence among them[16-18]. Not surprisingly, Black women have a higher risk of abortion-related death[19]. Our objective is to examine the relationship between race and the chances of having an abortion.

In this article, we aggregate three editions of PNA to examine abortion according to women's color or race. The terminology *color or race*, as well as most of the racial categories used in this study, follow the terminology and classifications of IBGE, the Brazilian Institute of Geography and Statistics. The racial classifications used by IBGE, the terminology in Brazilian Portuguese and its translation to English require some explanation.

For decades IBGE classifies each individual into "color" classifications, which are indeed racial classifications: *Black, White, Brown, Indigenous* and *Yellow*, with "yellow" being a category that comprises Asians (originally designed to group Far-East Asians, not other Asians). The classification system is well-recognized in the population in general, which is important because IBGE uses self-classification in its data collection. However, the terminology may be disputed, particularly in what refers to *Asians*. We use IGBE's classification to allow for some degree of comparison with other data but translate *amarelas* (yellow) as *Asians* in this study. *Brown* is a translation of the term *parda*, which is an aggregative term for all racial mixes between Blacks and any other groups. The Portuguese nomenclature for the group formed by Black and Brown women (*pretas* and *pardas*) is *negras*, a non-derogatory term. However, given its negative connotation in English we translate it as *Black*. Most of the time we will use the term *Black* as a translation of *negras*. Because the translation creates an unavoidable duplication, make an explicit remark when we refer to Black women only (not to Black and Brown women).

The results indicate that abortion is a more common event among Black women than among white women, and that these racial inequalities are consistent over time. The small group sizes in the sample design of each PNA edition do not allow any statements to be made about women from other racial groups, such as Asian (yellow) or Indigenous women.

## Methodology

### Data

We used three editions of PNA, 2016, 2019 and 2021. The PNA editions used representative samples of the population of literate women aged 18 to 39 living in urban areas of the country. The 2019 PNA was limited to the Northeast Region (NE), as defined by the IBGE. All editions have the same sampling design, face-to-face interviewing by women interviewers, and use the ballot-box technique, where a form with the answers to sensitive questions is deposited in a ballot box. The samples were selected by conglomerates in three stages: in the first stage, selection of municipalities by the probability proportional to size method; in the second, selection of conglomerates formed by IBGE census clusters; in the third, selection in each conglomerate of a fixed number of the population with control quotas for age, level of education and occupational status. The samples were designed for a 2% margin of error at a 95% confidence level. The sample sizes are 2,002 in 2016, 1,008 in 2019 (Northeast Region) and 2,000 in 2021[2-4].

Data collection in all editions used two instruments, a questionnaire applied face-to-face, and a self-completed form applied with the ballot box technique, to ensure both effective secrecy and the perception of secrecy. Techniques such as the ballot box tend to be more adequate for researching sensitive topics as they avoid some of the underestimation that occurs due to self-restrain in face-to-face questionnaires[20-22]. The face-to-face questionnaire contained sociodemographic questions (age, schooling, family income, municipality status and size, religion, race, marital status, occupation, and children born alive). The interviewers were all women. The self-completed form deposited in the ballot box by the interviewee had

questions about abortion: abortion was identified by the question "Have you ever had an abortion?". There were also questions to identify the age of the first abortion, the age of the last abortion, the use of medication during the last abortion and the need for hospitalization during the last abortion. The two questionnaires were connected by encrypted codes to ensure confidentiality. Geographical information was also recorded (location, type, and size of the municipality). Households without a response or without literate women in the age group of the study were replaced by a random replacement sample. Field audits indicated that there were no relevant intercurrences in the surveys. Response rates were high.

The surveys were analyzed separately and in combination. For the joint analysis, the 2016, 2019 and 2021 data were combined and treated as if they expressed the sociodemographic structure of the 2021 population, in a total of 4,241 interviews. To do this, we adjusted the ages of the women interviewed in 2016 and 2019 to reflect their expected age in 2021 and then excluded from the sample those over the adjusted age of 39 (589 cases, 466 in 2016 and 123 in 2019). We created sample weights to maintain the proportions of the population observed in PNA 2021 by age group, education and employment status (the same variables used in the sample quotas) and also by region, municipality size and municipality type. In practice, this reweighting strategy treats the combined PNAs as if they were a single sample carried out in 2021. As in 2016 and 2019 there are combinations of region, education, age, occupation, municipality type and size that do not exist in 2021 (the opposite never happens), 180 additional cases were excluded (99 in 2106 and 81 in 2019). As having abortion is a permanent characteristic and the samples are representative each year, there is a bias towards underestimating any abortions carried out by women between the date of their interview in 2016 or 2019 and the date of the 2021 survey. We present results with and without the reweightings in the fifth table. The other tables use combined data without any kind of adjustment.

Color or race in PNA is identified by self-declaration in the face-to-face questionnaire and using the question "Now, I am going to ask you a question exactly as it is asked by the IBGE to classify the Brazilian population: Your color or race is... and the answer alternatives are White, Black, Brown, Yellow (Asian) or Indigenous".

**Procedures**

In the editions of PNA, the sample is designed with a margin of error of 2 percentage points (p.p.) for Brazil as a whole. As a result, estimates for population subgroups have very wide confidence intervals, especially in the case of small subgroups, so hypothesis tests of the difference in means have limited power. In 2021, for example, the distribution of women by color or race and the proportion of women who had abortions [in brackets] was white 26% [9%, n=47 cases], Black 19% [11%, n=40], Brown 51% [11%, n=109], yellow 3% [8%, n=5], Indigenous 1% [17%, n=4]. Black, in this paragraph, means Black women only, not the group formed by Black and Brown women (*pretas,* not the group *negras*). One single less case of abortion among the Indigenous women in the survey would be enough to invert the order and place them among the women with the lowest proportions.

Therefore, in order to assess racial differences in abortion, we divided the population (100%) into three groups: *Black* women (Black and Brown), *white* women (white only) and *other* women (*amarelas*/Asian and Indigenous). Unless stated otherwise, from this point on, all mentions to Black women comprise Black and Brown women. The proportions of Black, white and other women in the samples without reweighting are 62%, 34% and 5% in 2016 (n=2,002), 75%, 19% and 6% in 2019 NE (n=1,008) and 69%, 27% and 5% in 2021 (n=2,000). In the reweighted and age-adjusted samples, these become 60%, 37% and 4% in 2016 (n=1,536), 76%, 18% and 6% in 2019 (n=885), 68%, 28% and 5% in 2021 (n=2,000). Differences between groups are examined by difference in means tests applied to three types of data: separate surveys, combined surveys without reweighting, and combined and reweighted surveys.

We also used logistic models to estimate the probability of having an abortion, controlling for the date (year) of the survey and age, as shown below:

$$logit(abortion) = \alpha + \beta_1 1\{race_i = black\} + \beta_2 age_i + \delta_t + \varepsilon_i$$

Where the dependent variable is the number of abortions, 1{.} is an indicator function, $age_i$ is the woman's age at the time of the survey, and $\delta_t$ are fixed effects for the year the survey was carried out. Due to the small number of cases of Indigenous and/or Asian women, we estimated

the logistic regressions only for the sub-sample of Black or white women, so that white women are the base category for the comparisons. All the logistic models use the combined data, but without reweighting or any other adjustment; that is why we controlled for the year in which the surveys were carried out.

## Results

In all three editions of PNA, the percentage of abortions among Black women was higher than among white women. Except for the 2016 PNA, the 2019 and 2021 editions show differences of less than 2 percentage points (p.p.) between the two groups, as shown in Tables 1, 2 and 3.

If each survey is taken separately, the racial gaps between Black women and white women in 2019 and 2021 are not statistically significant at a p-value of 5%. Only in 2016 is the gap significant, as shown in Table 4. On the other hand, when the editions of PNA are combined, most of the differences become statistically significant. When the three editions of PNA are combined and reweighted with the 2021 sample structure (n=4,241), all the racial differences between Black women and white women become statistically significant, with abortion being more frequent among Black women, as can be seen from the results in Table 5. Unlike in Table 4, in Table 5 the standard errors are conglomerated by municipality (i.e. allowing for intra-municipal correlation in the propensity to have an abortion).

**Table 1.** Had an abortion, according to color or race - PNA 2016.

| Color or race | Absolute frequency | | | Relative frequency | | |
|---|---|---|---|---|---|---|
| | No | Yes | Total | No | Yes | Total |
| White | 618 | 58 | 676 | 91.4 | 8.6 | 100.0 |
| Black | 1,056 | 178 | 1,234 | 85.6 | 14.4 | 100.0 |
| Other | 77 | 15 | 92 | 83.7 | 16.3 | 100.0 |
| Total | 1,751 | 251 | 2,002 | 87.5 | 12.5 | 100.0 |

Note: Black is a translation of *negras*, that is, Black and Brown (*pretas* and *pardas*) women. Color or Race is a translation of *cor ou raça*.

Source: 2016 PNA microdata.

**Table 2.** Had an abortion, according to color or race - PNA 2019.

| Color or race | Absolute frequency | | | Relative frequency | | |
|---|---|---|---|---|---|---|
| | No | Yes | Total | No | Yes | Total |
| White | 169 | 22 | 191 | 88.5 | 11.5 | 100.0 |
| Black | 665 | 95 | 760 | 87.5 | 12.5 | 100.0 |
| Other | 52 | 5 | 57 | 91.2 | 8.8 | 100.0 |
| Total | 886 | 122 | 1,008 | 87.9 | 12.1 | 100.0 |

Note: Black is a translation of *negras*, that is, Black and Brown (*pretas* and *pardas*) women. Color or Race is a translation of *cor ou raça*.

Source: PNA 2019 microdata.

**Table 3.** Had an abortion, according to color or race - PNA 2021.

| Color or race | Absolute frequency | | | Relative frequency | | |
|---|---|---|---|---|---|---|
| | No | Yes | Total | No | Yes | Total |
| White | 482 | 47 | 529 | 91.1 | 8.9 | 100.0 |
| Black | 1,233 | 149 | 1,382 | 89.2 | 10.8 | 100.0 |
| Other | 80 | 9 | 89 | 89.9 | 10.1 | 100.0 |
| Total | 1,795 | 205 | 2,000 | 89.8 | 10.3 | 100.0 |

Note: Black is a translation of *negras*, that is, Black and Brown (*pretas* and *pardas*) women. Color or Race is a translation of *cor ou raça*.

Source: PNA 2021 microdata.

**Table 4.** Test of differences between proportions of abortion according to color or race.

| PNA (without reweighting) | Proportion (abortion) | | Hypothesis testing | | | |
|---|---|---|---|---|---|---|
| | White | Black | Difference | Standard error | Z | Pr(\|Z\|>\|z\|) |
| 2016 | 0.086 | 0.144 | -0.058 | 0.016 | -3.712 | 0.000 |
| 2019 | 0.115 | 0.125 | -0.010 | 0.027 | -0.369 | 0.712 |
| 2021 | 0.089 | 0.108 | -0.019 | 0.016 | -1.223 | 0.221 |
| 2019 and 2021 | 0.096 | 0.114 | -0.018 | 0.013 | -1.345 | 0.179 |
| 2016 and 2021 | 0.087 | 0.125 | -0.038 | 0.011 | -3.434 | 0.001 |
| 2016 and 2019 | 0.092 | 0.137 | -0.045 | 0.013 | -3.336 | 0.001 |
| All years | 0.091 | 0.125 | -0.034 | 0.010 | -3.351 | 0.001 |

Notes: The results in the first three rows, 2016, 2019 and 2021, correspond to the samples observed each year for white and Black women; in the rows 2019 and 2021, 2016 and 2021, 2016 and 2019, the values correspond to the combination of two samples from different years, without reweighting. The line "All years" refers to the combination of all samples without reweighting. Standard errors were calculated as if the samples were simple random samples. Black is a translation of *negras*, that is, Black and Brown (*pretas* and *pardas*) women. Color or Race is a translation of *cor ou raça*.

Source: PNA 2016, 2019 and 2021 microdata.

**Table 5.** Descriptive statistics with and without data reweighting.

| PNA | Color or race | Point estimate | Standard error | 95% confidence interval |
|---|---|---|---|---|
| PNA 2021 observed (n=2,000) | White | 0.0888 | 0.0107 | 0.0676-0.1101 |
| | Black | 0.1078 | 0.0081 | 0.0917-0.1239 |
| | Other | 0.1011 | 0.0293 | 0.0431-0.1592 |
| | Total | 0.1025 | 0.0065 | 0.0896-0.1154 |
| PNA 2016, 2019 and 2021, with reweighting (n=4,241) | White | 0.0755 | 0.0076 | 0.0604-0.0905 |
| | Black | 0.1103 | 0.0067 | 0.0971-0.1234 |
| | Other | 0.1080 | 0.0229 | 0.0629-0.1532 |
| | Total | 0.0999 | 0.0054 | 0.0893-0.1106 |

Note: Black is a translation of *negras*, that is, Black and Brown (*pretas* and *pardas*) women. Color or Race is a translation of *cor ou raça*.

Source: PNA 2016, 2019 and 2021 microdata.

The reweighted combination alters the point estimates and, as a result, the differences become greater, with the proportion of Black women who have had an abortion being 3.5 p.p. higher than that of white women (Table 5). The ranges of the estimates for women classified in the IBGE's *yellow* and *Indigenous* categories are large enough to encompass the values estimated for any other racial group.

In the logistic regression model with the three PNAs combined, controlling for year and age, the average predicted probability for white women of all ages is 8.90%, compared to 12.61% for Black women. This difference is statistically significant, as Table 6 shows. Two of the other three sample combinations generate substantively identical results. The exception is the results for the sample combining the 2019 PNA with the 2021 PNA. In this case, the average marginal effect for Black women is still positive, but falls by half compared to the other models (2 p.p. against around 4 p.p. in the others), and is no longer statistically significant. This is because the biggest difference by color or race was observed in the 2016 PNA and the 2019 PNA sample is smaller than the others, as it only covers the Northeast region.

As this is a cumulative event, a woman's age affects her probability of having already had an abortion. For this reason, we also estimated the predicted probabilities for women aged 40 using a logistic model. The results are shown in Table 7. For Black women, the probability at the age of

**Table 6.** Probabilities predicted by the logistic model.

| PNA | Sample size | Probability of abortion | | Hypothesis testing | | | |
|---|---|---|---|---|---|---|---|
| | | White | Black | Difference | Standard error | Z | Pr(\|Z\|>\|z\|) |
| 2019 and 2021 | 2,862 | 0.0945 | 0.1144 | 0.0200 | 0.0118 | 1.6948 | 0.0901 |
| 2016 and 2021 | 3,821 | 0.0851 | 0.1263 | 0.0412 | 0.0105 | 3.9164 | 0.0001 |
| 2016 and 2019 | 2,861 | 0.0906 | 0.1380 | 0.0474 | 0.0130 | 3.6394 | 0.0003 |
| All years | 4,772 | 0.0890 | 0.1261 | 0.0372 | 0.0095 | 3.9106 | 0.0001 |

Notes: The probabilities for white and Black are the predicted averages in each sample; the difference is the average marginal effect in each sample. Standard errors conglomerated by municipality. Regressions do not use reweighted data but have controls for year of survey and woman's age. The results exclude Indigenous and Asian women. Black is a translation of *negras*, that is, Black and Brown (*pretas* and *pardas*) women.

Source: PNA 2016, 2019 and 2021 microdata.

**Table 7.** Predicted probabilities for 40-year-old women using the logistic model.

| PNA | Sample size | Probability of abortion | | Hypothesis testing | | | |
|---|---|---|---|---|---|---|---|
| | | White | Black | Difference | Standard error | Z | Pr(\|Z\|>\|z\|) |
| 2019 and 2021 | 2,862 | 0.1677 | 0.2003 | 0.0326 | 0.0197 | 1.6525 | 0.0984 |
| 2016 and 2021 | 3,821 | 0.1349 | 0.1957 | 0.0608 | 0.0160 | 3.8005 | 0.0001 |
| 2016 and 2019 | 2,861 | 0.1684 | 0.2472 | 0.0788 | 0.0220 | 3.5820 | 0.0003 |
| All years | 4,772 | 0.1535 | 0.2122 | 0.0588 | 0.0155 | 3.7975 | 0.0001 |

Notes: The probabilities for white and Black are the predicted averages in each sample; the difference is the average marginal effect in each sample. Standard errors conglomerated by municipality. Regressions do not use reweighted data but have controls for year of survey and woman's age. The results exclude Indigenous and Asian women. Black is a translation of *negras*, that is, Black and Brown (*pretas* and *pardas*) women.

Source: PNA 2016, 2019 and 2021 microdata.

40 is 21.22%, while for white women it is 15.35%, i.e. a difference of 5.88 p.p., which means a 38% higher probability for Black women.

## Discussion

There is a consistent racial difference in the three editions of PNA: the percentage of abortions among Black women is higher than among white women. However, this difference in each edition is relatively small. Taking the surveys separately, only in 2016 is it possible to say, unambiguously, that this difference is significant. However, when the editions of PNA are combined, most of the differences become statistically significant, allowing us to state with greater certainty that abortion is more frequent among Black women.

These are expected results, given that the samples of PNA editions were not designed to capture small differences. They are important results because they indicate that it is more likely that racial differences are not just sample fluctuations, i.e. that the results would tend to be statistically significant in the case of a larger sample.

The large gaps in the estimates of racial differences in relation to women classified in the IBGE's *Asian* (*yellow*) and *Indigenous* categories suggest that little can be said about these groups with the PNA data, i.e. no difference would be statistically significant. In the set of data from the 2016 to 2021 editions of PNA, with ages adjusted and reweighted to reflect the structure of the 2021 survey, Black women are more likely to have an abortion than white women.

## Conclusion

The results show a racial difference in the population, with abortion being more common among Black women than white women. Among Black women of all ages, the probability of having had an abortion is 11.03%, while among white women it is 7.55%, based on combined and reweighted data from the three PNA. It is difficult to as-

sess the magnitude of this difference: on the one hand, it is only 3.5 percentage points, but on the other, it means a 46% higher probability for Black women. These figures are statistically significant. Similar results are obtained in the logistic regressions, which do not use reweighting, but control for the year of the survey and age at the time of the interview. In the regression for women of all ages, the predicted average probability for Black women is 12.61% and for white women 8.90%; the predicted probabilities for women aged 40 are 21.22% for Black women and 15.35% for white women, i.e. a difference of 5.87 p.p. which means a 38% higher probability for Black women. It is worth reminding that *Black* is a translation of *negras*, that is, Black and Brown (*pretas* and *pardas*) women. It is not possible to say much about the differences between Asian and Indigenous women, treated as separate groups, due to the small sizes of these groups in the PNA samples.

Racial inequalities are consistent over time: they have the same direction in all editions of PNA, in all possible combinations of PNA editions and are maintained in the probability estimates with logistic models. This suggests that the difference exists and is not just the result of random sampling fluctuations, as might be assumed given the lack of statistical significance in some year-on-year comparisons.

The absence of statistical significance is expected. As the results are statistically significant when the editions of PNA are combined, this absence probably stems from insufficient sample sizes to capture moderate differences between population subgroups in isolation. Certainly, only a new PNA with a large sample could provide a more definitive answer on this matter.

## Collaborations

D Diniz and M Medeiros were responsible for designing and producing the PNA editions. D Diniz, M Medeiros and PHGF Souza were responsible for analyzing the PNA editions and racial inequality. D Diniz, M Medeiros, PHFF Souza and E Goés were responsible for preparing the argument, writing and reviewing the article.

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