

Methodological Considerations on Ethno-Racial Disparities and Blood Pressure Control

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Dear Editor,

We read with interest the Original Article by Euzébio et al.,¹ “Comparison of Blood Pressure Values and Antihypertensive Medications Used in Non-Afro-Descendant and Afro-Descendant Brazilians with Hypertension”, published in the *Arquivos Brasileiros de Cardiologia*. The topic is relevant given the ethnic-racial inequalities in cardiovascular outcomes in Brazil. However, some methodological and analytical aspects deserve consideration.

Initially, the operational definition of race/color requires caution. The dichotomy between “Afro-descendants” and “non-Afro-descendants,” by grouping individuals who self-identify as white, brown, and Asian into a single group, does not reflect the complexity of Brazilian racial classification according to the IBGE (Brazilian Institute of Geography and Statistics), and may introduce classification bias and dilute socially and clinically relevant heterogeneities.²

Concerning statistical methodology, the choice between parametric and non-parametric tests seems to stem from a post-hoc evaluation of statistical assumptions, rather than from an analytical strategy defined a priori.

Additionally, the regression models focus on the use of beta-blockers, without adequate adjustment for disease severity or formal analysis of interaction with race/color, which limits the clinical interpretation of the findings in light of contemporary guidelines.

Finally, although the study uses data from a multicenter national registry, it does not present a pre-specified multivariate analytical plan, relying instead on univariate comparisons or limited adjustments, without the simultaneous incorporation of fundamental variables such as comorbidities, therapeutic intensity, and care context. Population-based evidence demonstrates that structural and health system factors impact cardiovascular outcomes more than isolated demographic variables.³

In this context, despite the observed clinical differences, the study does not delve into the analysis of the social determinants of health, limiting the interpretation of the findings.⁴ Furthermore, the data collection period (2013–2015) imposes restrictions on extrapolating the results to current clinical practice.

We commend the authors for their initiative and hope that their considerations will contribute to the scientific debate on racial inequalities and hypertension control.

References

1. Euzébio MB, Vitorino PVO, Brandão AA, Barbosa ECD, Amodeo C, Feitosa A, et al. Comparison of Blood Pressure Values and Antihypertensive Medications Used in Non-Afro-Descendant and Afro-Descendant Brazilians with Hypertension. *Arq Bras Cardiol*. 2025;122(12):e20250316. doi: 10.36660/abc.20250316.
2. Dressler WW, Balieiro MC, Santos JE. Culture, Skin Color, and Arterial Blood Pressure in Brazil. *Am J Hum Biol*. 1999;11(1):49-59. doi: 10.1002/(SICI)1520-6300(1999)11:1<49::AID-AJHB5>3.0.CO;2-4.
3. Chor D, Ribeiro ALP, Carvalho MS, Duncan BB, Lotufo PA, Nobre AA, et al. Prevalence, Awareness, Treatment and Influence of Socioeconomic Variables on Control of High Blood Pressure: Results of the ELSA-Brasil Study. *PLoS One*. 2015;10(6):e0127382. doi: 10.1371/journal.pone.0127382.
4. Martins GK, Chaves VCC. Regional Disparities in Surgical Learning Curves and Maturity for Congenital Heart Surgery in Brazil's Public Health System: When Volume is Not Enough. *Cardiothoracic Surg*. 2026;34(2):1-10. doi: 10.1186/s43057-026-00186-4.

Keywords

Hypertension; Ethnicity; Methodology as a Subject; Health Status Disparities

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Reply

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Dear Editor,

We thank the authors of the correspondence for their interest in our article entitled “Comparison of Blood Pressure Values and Antihypertensive Medications Used in Non-Afro-Descendant and Afro-Descendant Brazilians with Hypertension” and for the reflections presented. We believe that scientific debate on racial inequalities in the control of hypertension is essential for the advancement of knowledge in this area.

Initially, regarding the operational definition of race/color, we recognize that racial classification in Brazil presents a high degree of sociological, historical, and biological complexity. In this sense, race should be understood as a social construct that influences access to resources, exposure to risk factors, and health outcomes.¹

The present study did not aim to establish conceptual criteria for the definition of Afro-descendants, but rather to operationalize this variable in a methodologically consistent manner based on data available in the First Brazilian Registry of Arterial Hypertension.² Thus, individuals who self-identified as Black were adopted as the group of interest, while the other participants were grouped as non-Black.

This strategy was not intended to simplify the complexity of racial categorization in Brazil, but to ensure methodological consistency and analytical coherence. In the Brazilian context, race/color classification follows the pattern established by the Brazilian Institute of Geography and Statistics (IBGE),³ based on self-declaration in the categories white, black, brown, yellow, and indigenous. As widely discussed in the literature and presented in this study, the aggregation of the black and brown categories is used to compose the so-called black population, reflecting not only phenotypic aspects, but also historical, social, and structural processes that influence health inequalities.¹

The decision to analyze the self-declared Black population in isolation is based on consistent evidence demonstrating greater social vulnerability and worse health indicators in this group, including a higher prevalence of hypertension, less access to health services, and worse clinical outcomes.^{1,4-7} This approach allows for greater sensitivity in identifying inequalities, avoiding the dilution of effects in broader groupings.

Additionally, the choice of self-declared black individuals is supported by international epidemiological literature, in which this population is more consistently used as a representation of Afro-descendant individuals, favoring comparability between studies.¹

In the fields of social sciences and public health, analytical strategies based on the dichotomy between “whites” and “non-

whites” are frequently used to highlight structural inequalities. Studies by the Institute for Applied Economic Research demonstrate the use of this logic as a relevant analytical tool for understanding social and racial inequalities.⁸

Similarly, the present study adopted the categorization between “black” and “non-black,” considering its central objective of understanding the clinical and therapeutic specificities in the black population. This strategy not only increases analytical sensitivity but also contributes to making visible historically neglected inequalities, thus configuring itself as an approach aligned with confronting structural racism in the scientific field.

In light of contemporary recommendations for scientific communication, describing individuals by regional ancestry—such as African—is considered appropriate when based on formal research, and specifying geographic origin is recommended whenever possible.⁹ In this sense, the use of the term “Afro-descendant” in the study title was intentional, aiming for alignment with international literature, while the analysis was conducted based on self-declaration as Black, according to database availability.

About statistical methodology, the choice between parametric and non-parametric tests was based on a prior assessment of the data distribution, using normality tests and graphical inspection, as described in methodology.¹

Checking the distribution of data is an essential step in statistical analysis. The indiscriminate use of parametric tests, often motivated by convenience, is recognized as a source of error and can generate erroneous inferences when their premises are not met.¹⁰

In this context, the use of non-parametric tests in situations of non-normality represents an appropriate methodological choice, since these methods do not depend on the same assumptions and reduce the risk of incorrect conclusions.¹⁰ Although they have lower statistical power, they prioritize the validity of inferences.

Therefore, choosing a statistical test based on the distribution of the data is not an arbitrary or purely post hoc decision, but rather a necessary technical adjustment to ensure analytical rigor.

Regarding the regression models, the analysis was conducted based on the variables available in the registry, and it was not possible to include variables such as disease severity or broader social determinants in a standardized way, which was recognized as a limitation of the study.

The use of beta-blockers was analyzed as a variable of clinical interest in an observational context, without the intention of establishing causality, but rather to identify patterns of use.

Letter to the Editor

Regarding the analytical plan, although not formally described as pre-specified, it followed classic epidemiological principles, including descriptive analyses, bivariate comparisons, and multivariate regressions.

We also recognize the central role of social determinants of health in cardiovascular inequalities, including factors such as income, education, and access to health services^{1,6,11}

Finally, regarding the data collection period (2013–2015), we acknowledge limitations in extrapolating the data to current clinical practice. Nevertheless, the data remain relevant for understanding structural health inequalities in Brazil.

We commend the readers for their contributions and reiterate that qualified scientific dialogue is fundamental to the advancement of knowledge in this area.

References

1. Euzébio MB, Vitorino PVO, Brandão AA, Barbosa ECD, Feitosa ADM, Malachias MVB, et al. Blood Pressure Control and Anthropometric Differences in Afro-Descendants and Other Ethnic Groups in Hypertensive Brazilian Populations. *Glob Heart*. 2025;20(1):60. doi: 10.5334/gh.1448.
2. Jardim PC, Souza WK, Lopes RD, Brandão AA, Malachias MV, Gomes MM, et al. I RBH - First Brazilian Hypertension Registry. *Arq Bras Cardiol*. 2016;107(2):93-8. doi: 10.5935/abc.20160120.
3. Instituto Brasileiro de Geografia e Estatística. Identificação Étnico-Racial da População, por Sexo e Idade: Resultados do Universo. Rio de Janeiro: IBGE; 2023.
4. Mendes PM, Nobre AA, Griep RH, Guimarães JMN, Juvanhol LL, Barreto SM, et al. Association between Perceived Racial Discrimination and Hypertension: Findings from the ELSA-Brasil Study. *Cad Saude Publica*. 2018;34(2):e00050317. doi: 10.1590/0102-311X00050317.
5. McEvoy JW, McCarthy CP, Bruno RM, Brouwers S, Canavan MD, Ceconi C, et al. 2024 ESC Guidelines for the Management of Elevated Blood Pressure and Hypertension: Developed by the Task Force on the Management of Elevated Blood Pressure and Hypertension of the European Society of Cardiology (ESC) and Endorsed by the European Society of Endocrinology (ESE) and the European Stroke Organisation (ESO). *Eur Heart J*. 2024;45(38):3912-4018. doi: 10.1093/eurheartj/ehae178.
6. Akinyelure OP, Jaeger BC, Oparil S, Carson AP, Safford MM, Howard G, et al. Social Determinants of Health and Uncontrolled Blood Pressure in a National Cohort of Black and White US Adults: The REGARDS Study. *Hypertension*. 2023;80(7):1403-13. doi: 10.1161/HYPERTENSIONAHA.122.20219.
7. Barroso WKS, Rodrigues CIS, Bortolotto LA, Mota-Gomes MA, Brandão AA, Feitosa ADM, et al. Brazilian Guidelines of Hypertension - 2020. *Arq Bras Cardiol*. 2021;116(3):516-658. doi: 10.36660/abc.20201238.
8. Souza NBA, Oliveira JJA. Políticas Sociais: A Classe Trabalhadora Entre o Direito a Contradição. In: Carvalho CC, editor. *Desafios Contemporâneos e Serviço Social: Reflexões Críticas sobre Políticas Sociais e Capitalismo*. Bauru: Cultura Acadêmica; 2025. p. 20-40.
9. Flanagan A, Frey T, Christiansen SL; AMA Manual of Style Committee. Updated Guidance on the Reporting of Race and Ethnicity in Medical and Science Journals. *JAMA*. 2021;326(7):621-7. doi: 10.1001/jama.2021.13304.
10. Nahm FS. Nonparametric Statistical Tests for the Continuous Data: The Basic Concept and the Practical Use. *Korean J Anesthesiol*. 2016;69(1):8-14. doi: 10.4097/kjae.2016.69.1.8.
11. Barroso WKS, Batista SR, Vitorino PVO, Sousa ALL. Influence of Racial Composition on Blood Pressure Control in the Brazilian Population: The Need for New Perspectives Beyond Drug Treatment. *Arq Bras Cardiol*. 2022;118(3):623-4. doi: 10.36660/abc.20220063.



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