

Trends in the prevalence of systemic arterial hypertension and health care service use in Brazil over a decade (2008-2019)

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Abstract *The global burden and the prevalence of systemic arterial hypertension (SAH) have increased over the last two decades, especially in low- and middle-income countries, and are a concern to health authorities. This study analyzed the prevalence of SAH reported by Brazilian adults in 2008, 2013, and 2019, and individual disease control in 2013 and 2019. Data from the National Household Sample Survey (2008) and National Health Survey (2013-2019) were employed. We calculated the disease's prevalence ratios using Poisson regression, adjusted for sociodemographic characteristics. Regarding health care and PHC organization indicators, we calculated proportions by gender, age group, ethnicity, and region. The results reveal persistent regional inequalities, with lower prevalence in the North and Northeast and higher prevalence in the Southeast and South. While the health care access and use indicators are positive, reflecting PHC improvements in recent years, we highlight the importance of adopting multifaceted SAH prevention and control strategies in the country.*

Key words *Systemic arterial hypertension, Prevalence, Health Care service use, Primary health care*

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Introduction

Systemic Arterial Hypertension (SAH), commonly known as high blood pressure, remains one of the main determinants of morbidity and mortality in the country and globally. SAH is the leading cause of cardiovascular disease and premature death¹. Although a causal relationship has not been established, studies show that hypertensive patients infected by the new coronavirus (SARS-COV-2) are more likely to develop unfavorable clinical outcomes such as the need for intensive care and death^{2,3}, which is a risk factor for the population and concern for health authorities with the increased exposure of risk groups and the ensuing pressure on health systems.

SAH economic costs can be measured both directly through spending on hospitalizations and use of health services, social security, and absenteeism, and indirectly, through the loss of quality of life measured by the DALY (Disability-Adjusted Life Years) and loss of productivity. Considering hospital admissions, outpatient care, and drug costs in 2018, Nilson *et al.*⁴ estimated SAH costs to the Unified Health System (SUS) at more than R\$ 2 billion per year. Furthermore, according to a study carried out in the city of São Paulo, SAH is among the primary diseases that, if eliminated, would bring more significant benefits to the elderly population regarding disability-free life expectancy⁵.

In Brazil, more than 38 million Brazilians aged 18 or over are diagnosed with the disease, according to the National Health Survey (2019). While there is an overall upward trend in SAH rates, this increase does not occur uniformly across economies. Middle- and low-income countries have shown more significant growth (31.5%) than high-income countries (28.5%)⁶. The increase in SAH prevalence reflects different aspects of people's living conditions. Population aging and the adoption of unhealthy lifestyles, with the prioritization of ultra-processed foods, alcohol consumption, tobacco use, and lack of physical activities, have contributed to this elevation. Other aspects such as knowledge, control, and treatment of SAH are also susceptible to individual and socioeconomic attributes⁷.

The prevention, control, and treatment of SAH require integrated and coordinated actions between the health system, health professionals, individuals, and the community. From the viewpoint of system organization and service provision, the Family Health Strategy (ESF) expansion from the 2000s onwards was an essential step in

curbing health inequalities and expanding access to PHC essential health care services. The positive results of the implementation of the ESF can be shown by lower mortality and hospitalizations due to PHC-sensitive conditions⁸. Special programs aimed at controlling the two conditions most prevalent in the Brazilian population were also implemented in this decade. Hiperdia, aimed at SUS users with Systemic Arterial Hypertension and Diabetes Mellitus, performs the registration and follow-up of these users and distributes the drugs needed for treatment in the PHC network^{9,10}. Also, the Brazilian Popular Pharmacy Program (PFPP) created in 2004 within the pharmaceutical care policy has benefited more than a third of hypertensive and diabetic patients, especially the most vulnerable strata, by providing at least one medication free of charge¹¹.

User participation in disease control is also a fundamental part of the process. The continuous and correct use of medication and the adoption of a healthy lifestyle reduce the likelihood of complications from the disease, resulting in a lower burden on health systems and better individual quality of life. However, low adherence to medications is seen as the primary failure in SAH control¹². The silent and often asymptomatic nature challenges the early diagnosis and treatment of SAH. It is not uncommon to report users who fail to seek medical care or discontinue treatment due to the absence of symptoms or normalization of blood pressure levels¹³. Other factors related to low adherence to medication measures are socio-demographic factors such as age, schooling level, income, user's understanding and perception of disease risks, bonds established between health professionals and users, and issues related to the organization of health systems¹²⁻¹⁴.

Given this context, this study has two objectives. The first is to analyze the trend in the prevalence of SAH for the Brazilian population aged 18 or over in the 2008-2013-2019 period. We used data extracted from the National Household Sample Survey (PNAD) and the National Health Survey (PNS, 2013-2019) for this analysis. The second objective is to assess health care indicators for hypertensive patients. This part of the analysis is restricted to 2013 and 2019, as this topic was covered only by the PNS. A similar study analyzing this specific research module for 2013 has already been developed by Malta *et al.*¹⁵. We expanded the scope of analysis by incorporating the most recent statistics to monitor care development. Knowing the distribution of the disease in the national territory and issues relat-

ed to access, care, and treatment of the condition is fundamental to designing SAH prevention and control health strategies in the country, addressing issues related to the individual, health system, and community levels.

Methods

Study design and population

We used three nationwide population surveys carried out by the Brazilian Institute of Geography and Statistics (IBGE) in 2008, 2013, and 2019 to analyze the trend in the prevalence of SAH and health care indicators in the hypertensive population over 18. The 2008 National Household Sample Survey covered aspects related to health, access, and use of health services by Brazilians in its supplementary questionnaire. Given the need for more information on health indicators and the health system functioning in the country, in partnership with IBGE and the Oswaldo Cruz Foundation (Fiocruz), the Ministry of Health prepared a specific survey for this purpose. The National Health Survey, designed to be held every five years, went out in the field for the first time in 2013, with a second edition in 2019, allowing for a broader scope of issues related to health in the national territory.

PNAD adopts a stratified sampling plan with one, two, or three selection stages depending on the stratum¹⁶. In turn, the PNS adopts the sampling design of the IBGE Master Sample of household surveys, with a three-stage probabilistic sampling. First, the stratification of the primary sampling units is performed. Then, households are selected within each census tract from the National Register of Addresses for Statistical Purposes (CNEFE) by simple random sampling. Finally, a resident is selected within each household using simple random sampling to respond to specific thematic blocks. The minimum age of the selected resident differed between the two editions of the survey, 18 years in 2013 and 15 years in 2019¹⁷.

The PNS questionnaire is divided into three parts. The first addresses questions about the household and visits by endemic workers and are answered by the person responsible for the household. The second contains general information relating to all household residents, in which a resident aged 18 or over is responsible for all others. This first part of the research continues the PNAD Health Supplements. The third

part investigates specific themes such as characteristics of work and social support, perception of health status, accidents and violence, health and lifestyle habits, chronic diseases, women's health, prenatal care, oral health, and medical care, answered only by the selected resident^{17,18}.

Therefore, this study is divided into two methodological steps. In the first, we describe the trend in the prevalence of self-reported SAH in the Brazilian population between 2008 and 2019, according to sociodemographic characteristics. In the second stage, we describe the health care provided by the population that reported the presence of the condition in 2013 and 2019 (according to the Q module of the National Health Survey). While the questionnaire underwent some revisions between one edition and another, most of the questionnaire remained compatible with the first edition¹⁷.

Only individuals aged 18 or over were considered to ensure the comparability of results over the years. A total of 271,677 from the 391,868 individuals investigated in the PNAD were selected. In the 2013 PNS, 60,202 individuals aged 18 years or more were selected, and in 2019, 88,531 individuals of the 90,846 residents aged 15 years or more remained in the sample.

Study variables

The condition of self-reported SAH was obtained through the following question: “*Has a doctor ever told you that you have arterial hypertension (high blood pressure)?*” individuals who answered “yes” to the question were considered hypertensive.

Sociodemographic characteristics: gender; age group (18-29 years; 30-59 years; 60-64 years; 65-74 years; 75 years or more), ethnicity/skin color⁴ (white, black, and brown); schooling level (no education or incomplete elementary school, elementary school or incomplete high school, high school or incomplete higher education, and higher education); geographic region; area of residence (urban or rural).

Health care variables among hypertensive patients: (%) of individuals who took medication for SAH in the last two weeks; (%) of individuals who received care for SAH in the last twelve months; (%) of individuals whose last visit was to the PHC Units and (%) of individuals whose last visit was to private clinics; (%) of individuals who were serviced by the Unified Health System (SUS); (%) of individuals who had requested tests and managed to perform all of them; (%)

who had a care plan agreement with health professionals (includes, for example, healthy eating, regular physical activity, and reduced salt intake). The variable was constructed as follows: if the individual answered “yes” to at least one of the questions from Q01801 to Q01808 in 2013 and Q018010-Q018017 in 2019; (%) of individuals who had all visits with the same doctor; (%) of individuals who had all visits with a specialist doctor or were referred to and managed to perform all visits with a specialist; (%) individuals who were hospitalized due to SAH or some other complication; (%) of individuals whose usual activities were severely or very intensely limited due to SAH.

ESF coverage variable: % of residents in households registered in the Family Health Strategy.

Analysis methods

Analyses were performed using Stata version 14.0 statistical software. The package for analyzing data from a complex sample (survey) was used for the higher accuracy of the estimators, which incorporates information from the sampling plan: primary sampling unit (PSU), stratum, and sample weights. Initially, the prevalence of SAH in the adult Brazilian population over 18 for 2008, 2013, and 2019 are presented. Then, the prevalence ratios of SAH for the three years were calculated using the Poisson method, adjusted for gender, ethnicity, age group, schooling level, region, and area of residence. The Poisson method for calculating prevalence has been used by other studies that point to a better fit of the model for frequent outcomes^{19,20}. Then, for the sample of individuals who reported the condition in 2013 and 2019, the proportions related to health care indicators and ESF coverage stratified by gender, age group, ethnicity, and region are presented. We used Pearson’s chi-square test adjusted for comparisons between years.

Results

Prevalence of systemic arterial hypertension in the Brazilian population

Table 1 shows the SAH prevalence results for Brazilian adults and the SAH prevalence ratios adjusted for sociodemographic characteristics. In 2008, 19.9% (CI₉₅: 19.7-20.1) reported a diagnosis of SAH, representing more than 26 million

Brazilian adults aged 18 or over, considering the expansion of the sample. Of the 60,202 individuals in 2013, 3.0% (CI₉₅: 2.7-3.2) never measured their blood pressure, and 21.3% (CI₉₅: 20.8-22.0) reported a diagnosis of SAH, which represents more than 31 million Brazilians. In 2019, 2.0% (CI₉₅: 1.8-2.2) never measured their blood pressure, and 23.9% (CI₉₅: 23.4-24.4) had a diagnosis of the condition, about 38.1 million Brazilian adults.

A higher prevalence of SAH among women is observed in the three periods analyzed, with growth among age groups. A higher prevalence is found among the self-declared black, followed by whites and browns. Regarding the level of education, the condition’s prevalence is higher among individuals with a lower schooling level. Among individuals with no education or with incomplete elementary education, 28.7% (CI₉₅: 28.3-29.0) reported the diagnosis of SAH in 2008, reaching 32.4% (CI₉₅: 31.2-33.6) in 2013, and 37.8% (CI₉₅: 36.9-38.7) in 2019. The distributions by geographic region and area of residence point to the highest prevalence in the Southeast and South regions and urban areas.

The prevalence ratios (PR) presented in the columns of Table 1 show that women are 2-3 times more likely to report a diagnosis of SAH than men even after adjusting for sociodemographic characteristics. Also, older individuals living in urban areas are more likely to report SAH. Concerning ethnicity/skin color, a difference between the years was observed regarding the group that self-declared brown.

In 2013, unlike other years, no statistical difference was observed in the prevalence between whites and browns. However, this difference is greater and statistically significant in all years among those self-declared black. Also, individuals with a lower schooling level are more likely to report SAH than those with higher education, except in 2013 for the category of high school and incomplete higher education, where the highest likelihood is not statistically significant. In the North region, residents of all other geographic regions are more likely to report a diagnosis of SAH, revealing a persistent pattern of regional inequalities.

Health care for the people with diagnosis of systemic arterial hypertension

The second part of the analysis is directed to individuals who claimed to have a diagnosis of SAH in 2013 and 2019. Table 2 presents the

Table 1. Prevalence (%) of systemic arterial hypertension reported in the population aged 18 or over and Prevalence Ratio (PR) of hypertension adjusted by sociodemographic and regional characteristics.

Variables	2008		2013		2019	
	%	PR (CI95)	%	PR (CI95)	%	PR (CI95)
Never had BP measured	-		3.0		2.0	
Reported hypertension	19.9		21.4		23.9	
Gender						
Male	16.4	1	18.1	1	21.1	1
Female	23.0	1.3 (1.3-1.3)	24.3	1.3 (1.2-1.3)	26.4	1.2 (1.1-1.2)
Ethnicity						
White	20.2	1	22.1	1	24.4	1
Black	24.7	1.3 (1.2-1.3)	24.2	1.1 (1.0-1.2)	25.8	1.2 (1.1-1.2)
Brown	18.6	1.0 (1.0-1.1)	20.0	1.0 (1.0-1.1)	22.9	1.1 (1.0-1.1)
Age group						
18-29	2.9	1	2.9	1	2.8	1
30-59	19.5	6.3 (6.0-6.6)	20.5	6.5 (5.6-7.5)	20.3	6.5 (5.6-7.6)
60-64	48.4	14.3 (13.5-15.0)	44.2	12.9 (11.0-15.2)	46.9	13.8 (11.8-16.3)
65-74	54.4	15.7 (14.9-16.5)	53.0	15.0 (12.8-17.6)	56.6	16.3 (14.0-19.1)
75 and over	57.1	16.0 (15.2-16.8)	55.0	15.2 (12.9-17.8)	62.1	17.3 (14.8-20.3)
Schooling						
No education and incomplete elementary school	28.7	1.5 (1.4-1.6)	31.1	1.4 (1.3-1.5)	36.6	1.5 (1.4-1.6)
Elementary school and incomplete high school	14.2	1.2 (1.2-1.3)	16.7	1.2 (1.1-1.4)	20.4	1.3 (1.2-1.5)
High school and incomplete higher education	10.6	1.0 (1.0-1.0)	13.4	1.0 (0.9-1.1)	15.4	1.1 (1.0-1.2)
Higher education	15.4	1	17.9	1	18.2	1
Area of residence						
Rural	18.9	1	19.8	1	23.2	1
Urban	20.1	1.1 (1.1-1.2)	21.6	1.1 (1.1-1.2)	24.0	1.1 (1.1-1.2)
Region						
North	14.1	1	14.4	1	16.8	1
Northeast	18.2	1.1 (1.1-1.2)	19.5	1.2 (1.1-1.3)	23.1	1.2 (1.2-1.3)
Southeast	21.7	1.3 (1.2-1.4)	23.3	1.3 (1.2-1.5)	25.9	1.4 (1.3-1.5)
South	21.0	1.3 (1.2-1.4)	22.8	1.4 (1.3-1.5)	24.5	1.3 (1.2-1.4)
Midwest	18.6	1.2 (1.2-1.3)	21.1	1.3 (1.2-1.4)	21.9	1.3 (1.2-1.3)
N	271.667	267.965	60.202	57.498	88.531	85.553

Note: Highlighted values were not statistically significant.

Source: PNAD (2008) and PNS (2013 and 2019).

health care indicators by gender. The proportion of individuals who took medication for SAH in the last two weeks was 81.6% (77.1% of men and 84.6% of women) in 2013 and 88% (84.2% of men and 90.7% of women) in 2019. Approximately 69.7% of individuals received medical care in 2013 (65.6% of men and 72.5% of women) and 72.2% (68.9% of men and 74.5% of women) in 2019. In the two years, around 65.6% (61% of

men and 68% of women) received care through the SUS. The PHC Unit was the place with the highest proportion of service sessions in the last care, approximately 46% for the two years. Then, the place with most service sessions was the private clinic. While the proportion of women assisted at the UBS was more significant than that of men in both periods, this relationship is inverted in private clinics, where the proportion of

men receiving care is more significant than that of women. In 2013, 56.5% (54.9% of men and 57.4% of women) had their last visit with the same doctor as in previous visits, while in 2019, the proportion was similar for both genders, approximately 52%. About 92% of individuals in 2013 and 90% in 2019 underwent all the required tests, with a similar proportion between genders in 2019. More than 95% of men and women received at least one recommendation from health professionals related to the healthcare plan in the two years. The proportion of those who consulted with specialists was also close between the two groups, approximately 87% in 2013 and 90% in 2019. The proportion of hospitalized individuals was 14% (12.5% of men and 14.9% of women) in 2013 and 12.7% (11.2% of men and 13.7% of women) in 2019. Regular activities were limited intensely or very intensely to 4.7% (4.2% of men and 5% of women) of individuals in 2013 and about 3% for both genders in 2019.

Regarding health care indicators by self-reported ethnicity/skin color, 84.7% of whites and less than 80% of blacks and browns took medication in 2013, while the proportions were

89.4% for whites, 88.0% for blacks, and 86.5% for browns in 2019. In 2013, the proportion of those who received medical care was close for the three groups, around 70%, and approximately 72% among whites and browns, and 74.7% among blacks in 2019. Attendance by the SUS in the two years was above 70% among blacks and browns, and it did not reach 60% in the period among whites. Blacks and browns had a higher proportion of visits to the UBS than whites in the two years. Among whites, private clinic care was 31.8% in 2013 and 38.6% in 2019, whereas it did not reach 20% in 2013 and was around 20% in 2019 among blacks and browns. The last visit was carried out with the same doctor from previous visits for 62.3% of whites and about 51% of blacks and browns in 2013 and for 56.7% of whites and less than 49% of blacks and browns in 2019. More than 90% of whites took all the required tests in both periods, while the proportions were 85.9% and 90.7% in 2013 and 87% and 88% among blacks and browns in 2019, respectively. For the three groups, more than 96% in 2013 and around 95% in 2019 received recommendations from health professionals regarding the health-

Table 2. Health care indicators for individuals with systemic arterial hypertension by gender.

Variables	2013			2019		
	Total (%)	Men (%)	Women (%)	Total (%)	Men (%)	Women (%)
Took hypertension medications in the past two weeks	81.6	77.1	84.6	88.0	84.2	90.7
Received care for hypertension in the last 12 months	69.7	65.6	72.5	72.2	68.9	74.5
Treatment place						
PHC Unit	46.0	40.9	49.2	45.8	41.8	48.5
Private clinic	24.5	27.7	22.5	28.8	32.3	26.5
SUS service	65.6	61.0	68.5	65.6	61.3	68.5
Last visit with the same doctor from the previous visits	56.5	54.9	57.4	51.9	52.3	51.7
Took all the requested tests	91.9	92.2	91.8	89.6	90.5	89.0
Agreement of care plan with health professionals	96.5	96.7	96.4	95.1	95.2	95.0
Did all the visits or was referred and visited specialists	87.3	86.9	87.6	90.4	90.5	90.2
Has sometimes been hospitalized because of hypertension or complications	14.0	12.5	14.9	12.7	11.2	13.7
Usual activities are limited due to hypertension, either intensely or very intensely	4.7	4.2	5.0	3.0	3.1	3.0

Note: Bold values were not statistically significant when comparing the years using Pearson's chi square test adjusted to the 5% level.

care plan. Visits with specialists were performed by more than 90% of whites in the two years, by 80.9% of blacks and 84.6% of browns in 2013, and about 88% of blacks and browns in 2019. A total of 13.3% of whites and approximately 15% of blacks and browns were hospitalized due to SAH in 2013 and 11% of whites and about 14% of blacks and browns in 2019. In 2013, about 4% of whites and blacks and 5% of browns responded that SAH limits their usual activities intensely or very intensely, while in 2019, this limitation occurred for 2.2% of whites and almost 4% of blacks and browns (Table 3).

Considering health care indicators by age group, an increase is observed in the proportion of individuals who took medication for SAH in the two years, reaching 92.3% and 96.7% for those aged 75 years or more in 2013 and 2019, respectively. In 2013, 60.6% of individuals aged 18-29, 68.3% of those aged 30-59, and more than 70% among those aged 60 and over received medical care, while the proportions were 62.9% among those aged 18-29 and above 70% among those aged 30 and over in 2019. The proportion of individuals receiving care at the UBS increased with age in the two years, except for the group aged 75 years or more, which presented a lower proportion than those aged 30-74. On the other hand, private clinic care was higher among those aged 75 or older. Concerning the indicator of the last visit carried out with the same doctor in the previous consultations, an increase was observed between the age groups, with the proportion above 60% in 2013 and above 55% in 2019 for groups aged 65 years and over. In the two years, the proportion of individuals aged 60 or more who underwent all the required tests and visited specialists was greater than 90%. While the recommendations of health professionals concerning the care plan have high proportions among all age groups in the two years, this indicator was higher for the group aged 60-64. The proportion of those hospitalized or who reported that SAH severely or very severely limited the performance of usual activities was lower among the group aged 18-29 in the two years and higher among the group aged 75 or more (Table 4).

Table 5 shows the distribution of health care indicators and ESF coverage by main regions of the country. We highlight the lower proportion of individuals who had a visit in the last 12 months in the Midwest, not reaching 70% in any of the two years. The Southeast was the region with the lowest proportion of individuals hospitalized due to complications of SAH in the two

years, while the Northeast was the region with the highest proportion of hospitalizations in 2013, and the Midwest in 2019. SUS was more frequent among the North and Northeast residents, while the Southeast had the lowest proportions both in 2013 and 2019. The population coverage of the ESF was more significant in the Northeast and South and lower in the Southeast in the two years.

Discussion

This study investigated the prevalence of SAH and health care indicators among hypertensive individuals aged 18 years or over. We used the self-reported SAH measure, which, while somewhat limited due to selectivity, is considered a good measure in population studies²¹. The results of prevalence ratios adjusted for sociodemographic characteristics for 2008-2013-2019 showed that the prevalence is higher among women, older people with low schooling, and residents of the South and Southeast regions, as reported by previous studies^{22,23}. Regarding health care for the hypertensive population, the indicators showed promising results, highlighting medical care coverage in the last 12 months and the high proportion of users who reported using the medication in the last two weeks, above 80% in both years.

The search for health care represents, in part, aspects of need, but factors related to the offer contribute to facilitating or hindering access. The expanded ESF from the 2000s onwards was a new PHC strategy in the country, centered on the family and the community, and was one of the significant advances of the SUS due to its fundamental role in increasing access to health services and improving health care indicators²⁴, emphasizing the work of family health teams, which contribute to the good results achieved²⁵ through health promotion educational actions, guidance on the use of medical services, and other surveillance and health promotion strategies. In 2008, 47.7% of households in Brazil were registered by the ESF. In 2019, this percentage was 60.0%, representing an increase of 6.4 percentage points compared to 2013. The population coverage of the ESF increased from 50.9% in 2008 to 56.1% in 2013 and 62.6% in 2019. Among households registered for at least one year, the proportion of monthly visits by family health team members to households was 47.2% in 2013 and 38.4% in 2019 (results not shown).

Table 3. Health care indicators for individuals with systemic arterial hypertension by ethnicity/skin color.

Variables	2013				2019			
	Total (%)	White (%)	Black (%)	Brown (%)	Total (%)	White (%)	Black (%)	Brown (%)
Took hypertension medications in the past two weeks	81.6	84.7	79.6	78.5	88.0	89.4	88.0	86.5
Received care for hypertension in the last 12 months	69.7	70.1	70.4	69.4	72.2	71.5	74.7	72.1
Treatment place								
PHC Unit	46.0	41.4	50.0	50.9	45.8	39.4	51.9	50.7
Private clinic	24.5	31.8	16.4	17.3	28.8	38.6	20.0	21.3
SUS service	65.6	57.0	77.8	73.4	65.6	55.3	74.6	73.6
Last visit with the same doctor from the previous visits	56.5	62.3	50.8	50.5	51.9	56.7	48.8	48.2
Took all the requested tests	91.9	94.1	85.9	90.7	89.6	91.6	87.0	88.0
Agreement of care plan with health professionals	96.5	96.7	96.6	96.3	95.1	95.4	95.2	94.6
Did all the visits or was referred and visited specialists	87.3	90.8	80.9	84.6	90.4	92.8	87.9	88.3
Has sometimes been hospitalized because of hypertension or complications	14.0	13.3	15.2	14.5	12.7	11.0	13.6	14.2
Usual activities are limited due to hypertension, either intensely or very intensely	4.7	4.4	4.0	5.2	3.0	2.2	3.5	3.6

Note: Bold values were not statistically significant when comparing the years using Pearson's chi square test adjusted to the 5% level.

Source: PNS (2013 and 2019).

Despite the promising results presented, there are still many challenges related to improving the control and treatment of SAH in the country. In a study including 44 low-income countries, Brazil performed well in SAH management compared to other countries, but the authors do not rule out the possibility of a high underdiagnosis²⁶. Considering different measures of SAH, Malta et al.²⁷ reported the following prevalence among Brazilians in 2013: 21.4% by the self-reported criterion, 22.8% by blood pressure measurement, and 32.3% by the measured pressure or report of medication use.

Women continue to have a higher prevalence of SAH compared to men, reinforcing the "health-survival paradox in the male-female relationship", which is a term designated in the literature of health gender difference to emphasize that, although they live longer than men, women have more morbidity and seek health services more. Possible explanations for the apparent contradiction involve biological factors, differential exposure to risk, psychological, and socio-economic factors²⁸. At the same time, by seeking

health services more often, women are more likely to obtain a clinical diagnosis of the condition.

On the other hand, studies that use blood pressure measurement instead of clinical diagnosis report a higher diagnosis among men and groups with lower socioeconomic status²⁹, suggesting the presence of underdiagnosis for this population. An indication of this is that the main complaint among men is related to flexible hours and the time available to seek medical care³⁰. Also, the disease's asymptomatic nature can also lead younger individuals with more difficulty or not feeling the need to seek medical services to not obtaining the diagnosis.

The results also point to persistent regional inequalities. For example, the high prevalence in the South and Southeast over the years may reflect so many demographic factors, as these regions have a higher proportion of older adults²⁷, such as regional inequalities regarding the structure and provision of services since residents of the South and Southeast have greater access to health services than residents of other regions³¹.

Table 4. Health care indicators for individuals with systemic arterial hypertension by age group.

Variables	2013						2019					
	Total (%)	18-29 (%)	30-59 (%)	60-64 (%)	65-74 (%)	75 and over (%)	Total (%)	18-29 (%)	30-59 (%)	60-64 (%)	65-74 (%)	75 and over (%)
Took hypertension medications in the past two weeks	81.6	35.4	77.2	88.7	91.5	92.3	88.0	40.3	83.2	93.2	95.2	96.7
Received care for hypertension in the last 12 months	69.7	60.6	68.3	72.1	73.0	71.1	72.2	62.9	71.1	74.3	73.6	73.1
Treatment place												
PHC Unit	46.0	36.1	46.8	45.6	47.4	43.0	45.8	47.1	45.5	48.2	47.8	41.3
Private clinic	24.5	17.5	23.9	25.5	24.2	29.3	28.8	17.6	28.0	28.3	29.0	33.6
SUS service	65.6	67.0	66.2	65.7	66.4	61.1	65.6	77.7	66.1	67.3	66.0	59.7
Last visit with the same doctor from the previous visits	56.5	39.8	55.0	55.2	60.1	63.0	51.9	37.6	49.6	53.4	55.1	56.1
Took all the requested tests	91.9	88.5	89.9	91.7	95.2	96.3	89.6	86.9	88.0	91.2	90.2	92.6
Agreement of care plan with health professionals	96.5	94.1	96.7	97.7	96.9	94.7	95.1	93.4	95.3	95.7	95.2	94.0
Did all the visits or was referred and visited specialists	87.3	67.0	84.6	92.8	93.0	89.8	90.4	77.9	88.4	92.0	92.6	93.3
Has sometimes been hospitalized because of hypertension or complications	14.0	6.9	12.6	15.3	15.9	17.9	12.7	10.7	11.9	14.1	12.4	14.6
Usual activities are limited due to hypertension, either intensely or very intensely	4.7	2.1	4.7	4.2	4.2	6.4	3.0	2.9	3.1	2.9	2.6	3.3

Note: Bold values were not statistically significant when comparing the years using Pearson's chi square test adjusted to the 5% level.

Source: PNS (2013 and 2019).

Conclusion

Continuous and integrated responses in networks remain a challenge for health systems. This problem is not restricted to Brazil but also observed in other countries, including developed countries³². Recent evidence shows deficiencies in the longitudinality and comprehensiveness of care for users with SAH³³. The strengthening of bonds between health professionals and users, the establishment and training of health professionals, and the shared information between professionals through the adoption of electron-

ic medical records and well-established referral and counter-referral mechanisms are some of the challenges faced in PHC, besides the difficulties in specialized care and diagnostic services³⁴.

We also highlight the need for actions to sensitize people about the disease and the risks involved with users, reinforcing the importance of continued drug treatment and the adoption of healthy lifestyles. The implementation of the *Hiperdia* and *Farmácia Popular do Brasil* programs were undoubtedly important initiatives in expanding access to medicines. However, the lack of information about the correct use of medi-

Table 5. Health care indicators for individuals with systemic arterial hypertension and population coverage of the health ESF by region.

Variáveis	2013						2018					
	Total (%)	North	Northeast	Southeast	South	Midwest	Total (%)	North	Northeast	Southeast	South	Midwest
Took hypertension medications in the past two weeks	81.6	72.0	78.4	83.8	83.8	79.8	88.0	81.9	87.5	88.8	89.6	86.2
Received care for hypertension in the last 12 months	69.7	71.9	67.9	71.6	68.4	64.9	72.2	74.7	71.9	73.0	70.8	68.5
Treatment place												
PHC Unit	46.0	49.8	45.2	45.0	48.6	46.8	45.8	50.6	48.4	41.5	53.2	46.1
Private clinic	24.5	17.9	18.8	27.7	25.1	25.9	28.8	20.9	21.2	34.0	28.2	29.4
SUS service	65.6	70.5	73.7	61.5	64.9	64.4	65.6	72.2	74.2	60.1	66.5	64.0
Last visit with the same doctor from the previous visits	56.5	44.2	46.7	61.5	59.8	56.2	51.9	42.6	47.2	54.9	55.9	48.1
Took all the requested tests	91.9	88.7	87.1	93.7	93.9	92.5	89.6	87.8	86.9	90.0	92.6	91.3
Agreement of care plan with health professionals	96.5	95.6	96.1	96.7	96.9	96.6	95.1	96.2	95.3	94.9	94.7	95.3
Did all the visits or was referred and visited specialists	87.3	88.2	81.6	88.3	91.9	86.6	90.4	86.4	87.4	91.8	90.3	91.2
Has sometimes been hospitalized because of hypertension or complications	14.0	14.9	16.1	12.7	14.5	13.3	12.7	14.4	13.8	11.5	12.8	15.0
Usual activities are limited due to hypertension, either intensely or very intensely	4.7	5.0	5.5	4.1	5.0	4.6	3.0	4.1	3.6	2.6	3.2	2.8
% of residents in households registered with the ESF	56.1	53.4	68.1	48.2	58.5	54.5	62.6	62.2	73.3	54.6	67.6	60.1

Note: Bold values were not statistically significant when comparing the years using Pearson's chi square test adjusted to the 5% level.

Source: PNS (2013 and 2019).

cation and the relativized risks by users due to the lack of symptoms and blood pressure control lead to failures or complete treatment abandonment. Also, the complex medication regimen, the bond between professionals and users, and factors related to demand and supply are significant predictors of adherence^{9,10,13,14}.

The high prevalence of risk factors in the lifestyle of the Brazilian population also deserves attention³⁵. The abyss between the agreement of care plans and the effective modification of

harmful lifestyles by individuals hinders prevention and increases the risk of complications from SAH. However, the responsibility for lifestyle changes should not be credited solely to the individual, but the responsibility of the State party underlying the process of change, providing, for example, public places suitable for the practice of physical activities and developing appropriate public policies for healthy eating.

Finally, an aggravating factor for the Brazilian health system is the economic crisis and a

deteriorating fiscal framework. In the 2000s, as a continuation of a policy initiated in the mid-1990s, we observed a crucial political orientation aimed at prioritizing PHC, with the creation of successive incentives and growth in budget implementation for primary care³⁶. However, as of 2015, we noticed a shift in the economic policy,

with state and municipal governments adopting a fiscal austerity agenda to respond to the economic crisis, directly impacting social and health spending. The deleterious effects of this policy on health outcomes can translate into multiple dimensions in the individual and social sphere³⁷.

Collaborations

All authors participated equally in the conception and design of the research, statistical analysis and interpretation of data, writing of the manuscript, critical review of the manuscript regarding important intellectual content until approval of the final version.

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