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EVALUATING THE EFFECTIVENESS OF SYSTEMIC ARTERIAL HYPERTENSION MANAGEMENT IN BRAZILIAN PRIMARY HEALTH CARE

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Abstract: The Objective is, to assess the effectiveness of primary health care (PHC) in managing systemic arterial hypertension (SAH) in Brazil, using secondary data from the e-SUS APS and the Vigitel survey from 2022 to 2025. This is an ecological, descriptive study based on time series analysis. Publicly available data were retrieved from the Primary Health Care Indicators Panel (e-SUS APS) and the Vigitel Brazil telephone survey, aggregated by macro-region. The main variable was the proportion of patients with SAH who received clinical follow-up in PHC, compared to the self-reported prevalence of hypertension. Data processing and statistical analyses were conducted using RStudio. From the first quarter of 2022 to the third quarter of 2023, there was a notable increase in the proportion of hypertensive patients receiving clinical follow-up across all Brazilian regions, especially in the Northeast, which reached 36%. Meanwhile, the self-reported prevalence of SAH remained stable, around 27%, with higher rates among women, the elderly, and individuals with low educational attainment. Despite progress, follow-up coverage still fell short, reaching less than 40% of the estimated hypertensive population. The findings suggest a growing responsiveness of PHC in addressing SAH in Brazil. However, a substantial gap remains between the epidemiological burden of hypertension and the actual reach of clinical management. Structural challenges persist in terms of equity, care continuity, and integration of health information systems, all of which limit the full potential of PHC to control SAH and prevent cardiovascular outcomes.

Keywords: Primary Health Care; Hypertension; Disease Prevention; Health Indicators; Vigitel; e-SUS APS.

INTRODUCTION

Primary Health Care (PHC) is the main entry point for users into Brazil's Unified Health System (SUS) and plays a central role in coordinating care within the Health Care Network (RAS). It is responsible for delivering a comprehensive set of services, including health promotion, disease prevention, diagnosis, treatment, rehabilitation, palliative care, and health surveillance, at both individual and collective levels. PHC is tasked with identifying the health needs of the population under its responsibility and generating positive impacts on both clinical and social determinants of health (Brazil, 2022).

In the current context, non-communicable chronic diseases (NCDs) represent the greatest challenge for PHC in Brazil and in many other countries. Despite significant structural and organizational improvements in recent years, persistent barriers remain related to infrastructure, financing, public policies, and workforce training. Key limitations include insufficient professional education, population aging, high physician turnover, fragmented health information systems, a lack of digitized clinical data, and weaknesses in performance monitoring and evaluation processes (Li, 2017).

Within this landscape, systemic arterial hypertension (SAH) stands out as a highly prevalent condition recognized as sensitive to primary care, meaning that its effective management at this level can reduce hospitalizations and deaths from preventable cardiovascular and cerebrovascular complications (Alafradique et al., 2009). However, managing SAH in PHC requires complex, integrated approaches, as it involves biological, social, and behavioral determinants. The effectiveness of care depends not only on evidence-based clinical practices but also on the strengthening of user-provider relationships, humanized care, and the active engagement of families and communities in self-care processes (DBHA, 2020).

To adequately address cardiovascular diseases (CVDs), PHC must rely on well-qualified multidisciplinary teams working through continuous care practices and management guided by health indicators. Despite the expansion of service scope and population coverage in recent years, significant structural and operational challenges remain to ensure equitable and resolutive care for individuals with CVDs at the primary care level (Brazil, 2022). The implementation of public policies promoting healthy lifestyles,alongside access to primary and secondary prevention strategies and timely treatment of cardiovascular events,is essential to tackle CVDs both in Brazil and globally (Précoma et al., 2019).

Systemic arterial hypertension (SAH) is one of the most significant non-communicable chronic diseases (NCDs) in public health, clinically defined by persistently elevated blood pressure levels in which the benefits of treatment,whether pharmacological or non-pharmacological,outweigh the potential risks. It is a multifactorial condition, involving complex interactions among genetic, epigenetic, environmental, and social determinants. According to Brazilian guidelines, SAH is diagnosed when systolic blood pressure (SBP) is equal to or greater than 140 mmHg and/or diastolic blood pressure (DBP) is equal to or greater than 90 mmHg, based on measurements taken in a clinical setting from the age of 18 onward (DBHA, 2020).

Blood pressure classification follows progressively increasing risk categories. Optimal levels are defined as SBP below 120 mmHg and DBP below 80 mmHg. Normal levels range from 120–129 mmHg (SBP) and 80–84 mmHg (DBP). Pre-hypertension includes values between 130–139 mmHg (SBP) and 85–89 mmHg (DBP). SAH is classified into three stages: Stage 1 (SBP 140–159 mmHg or DBP 90–99 mmHg), Stage 2 (SBP 160–179 mmHg or DBP 100–109 mmHg), and Stage 3 (SBP ≥180 mmHg or DBP ≥110 mmHg) (DBHA, 2020).

Because it is often asymptomatic, SAH may go undiagnosed for long periods, increasing the risk of structural and functional damage to target organs such as the heart, brain, kidneys, and blood vessels. It is recognized as the leading modifiable risk factor for cardiovascular diseases (CVD), chronic kidney disease (CKD), and premature death, with an independent and linear association with such outcomes. Moreover, it often coexists with metabolic disorders such as dyslipidemia, abdominal obesity, glucose intolerance, and diabetes mellitus, which amplify its pathological burden and increase the complexity of care (DBHA, 2020).

Despite being easily diagnosed, having high prevalence, and the availability of effective and affordable therapeutic options, the clinical control of SAH remains suboptimal worldwide. The main barrier lies in its asymptomatic nature, which impairs risk perception and compromises treatment adherence.

Epidemiological evidence indicates that the risk of events such as coronary artery disease (CAD) and stroke increases progressively from blood pressure levels above 115/75 mmHg. Cohort studies have shown that for every 20 mmHg increase in systolic blood pressure (SBP) or 10 mmHg increase in diastolic blood pressure (DBP), the risk of cardiovascular mortality nearly doubles (Yano, 2018).

Global cardiovascular risk (CVR) stratification is an essential tool to estimate the probability that an individual aged 30 to 74 years will develop cardiovascular disease (CVD) within the next ten years. Systemic arterial hypertension (SAH) is among the risk factors (RFs) with the greatest relative impact in this calculation and is included in all major global risk equations, even though these models were not specifically developed for hypertensive patients (Précoma et al., 2019).

It is estimated that, in approximately half of all cases, the first clinical manifestation of atherosclerosis is an acute coronary event, such as myocardial infarction or sudden cardiac death. This highlights the importance of early identification of asymptomatic individuals at high risk, allowing for timely interventions and the establishment of appropriate therapeutic goals. To support this process, several risk scores have been developed based on longitudinal population studies and regression analyses, which substantially enhance the prediction of individual cardiovascular risk (Précoma et al., 2019).

These risk scores differ according to the population from which they were derived (e.g., sex, age, race/ethnicity), availability of preventive interventions, and selected outcomes. While some models estimate only cardiovascular mortality, others include non-fatal events such as myocardial infarction and stroke. Moreover, each calculator adopts different cut-off points to classify risk levels (low, moderate, or high), reflecting the epidemiological context and therapeutic policies of the originating country (Bazo-Alvarez et al., 2015).

Among the most widely used models are, Framingham Risk Score (1998): Derived from a predominantly white U.S. population; includes variables such as age, sex, total cholesterol, HDL, SBP, diabetes, and smoking. Predicts coronary death, non-fatal myocardial infarction, and angina (Wilson et al., 1998). SCORE (2003): Recommended by the European Society of Cardiology; estimates 10-year risk of cardiovascular death using data from over 200,000 European patients. Includes total cholesterol, HDL, SBP, smoking status, age, sex, and region-specific risk classification (Conroy et al., 2003).

Global Risk Score (GRS) of Framingham (2008): An updated version that includes additional variables such as antihypertensive treatment. Assesses the risk of coronary death, infarction, coronary insufficiency, stroke, transient ischemic attack, and heart failure (D'Agostino et al., 2008). ASCVD Risk Calculator (2013): Developed by the ACC/AHA, based on data from white and Black individuals in the U.S. Considers only major outcomes: coronary death, myocardial infarction, and stroke (both fatal and non-fatal) (Goff et al., 2013). MESA Score (2015): Derived from the Multi-Ethnic Study of Atherosclerosis; incorporates ethnicity and coronary artery calcium score in addition to clinical variables and family history of myocardial infarction (McClelland et al., 2015).

SBC Calculator (2019): Recommended by the Brazilian Society of Cardiology, based on the Framingham GRS. Adjusted cut-offs by sex and includes additional variables such as chronic kidney disease, diabetes with high LDL, subclinical atherosclerosis, or abdominal aortic aneurysm (Précoma et al., 2019).

Comparative studies have shown considerable variability between these tools. A study by Malta et al. (2021), using six different risk scores, revealed significant discrepancies in the proportion of Brazilians aged 45 to 65 classified as high risk, reaching up to 39% depending on the model. Agreement between tools was low in the high-risk category and higher for low/moderate risk, highlighting how the choice of instrument directly influences eligibility for pharmacological therapies such as statin use, as well as risk perception and cost-effectiveness of interventions (Malta et al., 2021).

Accurate identification of individuals with high CVR is essential to guide preventive interven- tions, including intensive counseling and early initiation of drug therapy,even in prehypertension stages. These strategies aim to reduce the occurrence of major cardiovascular events, particularly coronary artery disease and stroke, which remain among the leading causes of death in Brazil (Taylor et al., 2013; Whelton et al., 2018).

Thus, cardiovascular risk calculators are valuable tools for supporting clinical decision- making in Primary Health Care. However, the choice of which model to apply in Brazil remains a matter of debate, as there is still no risk score validated specifically for the Brazilian population that accounts for its unique ethnic, social, economic, and laboratory characteristics. This may impair the accuracy of risk estimates and result in misclassifications (WHO, 2016).

OBJECTIVE

To map the performance of Primary Health Care in the management of systemic arterial hypertension in Brazil, based on aggregated operational and population data, aiming to identify regional patterns, temporal trends, and potential gaps between the provision of care and the epidemiological burden..

METHODOLOGY

STUDY DESIGN

This is an ecological, descriptive-analytical time series study. The unit of analysis corresponds to Brazil's five macro-regions , North, Northeast, Southeast, South, and Center-West , as the selected indicators are available in aggregate form, without individual identification. The time frame spans from the first quarter of 2022 to the first quarter of 2025, totaling thirteen consecutive quarters, a period considered sufficient to capture the recent evolution of systemic arterial hypertension (SAH) follow-up actions within Primary Health Care (PHC) and their potential impact on self-reported prevalence and cardiovascular mortality.

The ecological design was chosen for its ability to allow regional comparisons and assess population-level trends using large-scale official secondary databases, enabling rapid and low- cost analysis. However, it is important to acknowledge the potential for ecological fallacy, as associations observed at the population level cannot be directly extrapolated to individuals; this limitation was considered during interpretation of the findings.

SAMPLING AND DATA COLLECTION

This study used only secondary data of public access, covering the period from January 2022 to March 2025. The sample included all available observations from the official sources consulted, with no selection criteria applied that could introduce sampling bias.

Initially, quarterly data for the indicator "proportion of people with systemic arterial hy- pertension (SAH) who had a clinical consultation and blood pressure measurement during the semester" were extracted from the e-SUS/PHC Indicator Dashboard maintained by the Brazilian Ministry of Health. As there was no native feature for direct export of data in .csv format, the regional aggregate values were manually transcribed into a spreadsheet, ensuring integrity of the proportions presented each quarter.

Subsequently, annual estimates of self-reported SAH prevalence were incorporated from the Vigitel Brazil system. The data were extracted from Table 1 of the system's official reports, covering the period from 2020 to 2023. Since the information is disaggregated by sociodemographic characteristics, national overall proportions were selected and used as general estimates to compare with PHC follow-up data.

Mortality data were not included, as the Cardiômetro platform initially considered as a complementary source did not provide accessible regionally disaggregated data suitable for this study's purpose.

All quarters with available data on the e-SUS/PHC dashboard were included in the analysis, even those marked as "preliminary." These cases were appropriately identified in the spreadsheets and considered in the consistency and sensitivity assessment of the results. Data consolidation was performed using a single spreadsheet in Microsoft Excel 365. Subsequently, the data were imported and processed in RStudio (version 2024.12.1+402 with R 4.3.1), where time series were structured, variables cleaned, and descriptive, trend, and exploratory correlation analyses conducted.

INVESTIGATED VARIABLES

Two primary variables were analyzed, both aggregated by Brazilian macro-region, covering the period from the first quarter of 2022 to the first quarter of 2025. The first variable corresponds to the proportion of individuals with systemic arterial hypertension (SAH) who were followed up in Primary Health Care (PHC). Operationally, this was defined as the percentage of individuals with an active SAH diagnosis who, during the reference semester, underwent at least one clinical consultation and had their blood pressure measured, as recorded in the "Chronic Conditions – Hypertension" indicator available in the e-SUS/PHC Indicator Dashboard provided by the Brazilian Ministry of Health. This variable was expressed as a continuous percentage value, calculated quarterly, and reflects the capacity of PHC to ensure regular clinical monitoring of hypertensive patients.

The second variable refers to the self-reported prevalence of hypertension among the adult population, obtained from the annual telephone-based survey VIGITEL Brazil. It represents the proportion of individuals aged 18 years and older who reported having received a medical diagnosis of hypertension. Annual estimates were provided for each Brazilian capital and subsequently aggregated by macro-region using weighted averages based on the estimated adult population for each year, according to intercensal data from the Brazilian Institute of Geography and Statistics (IBGE). This variable was also expressed as a percentage and was used to estimate the epidemiological burden of SAH in the general population, serving as an external reference to compare with the follow-up coverage in PHC.

Although initially planned, the clinical outcome of mortality from cardiovascular diseases was not included in the present analysis due to the unavailability of consolidated and regionally disaggregated data in the Cardiômetro database for the studied period.

DATA ANALYSIS

The organization, processing, and statistical analysis of the data were carried out using RStudio software (version 2023.06.1+524) with R language version 4.3.1. Initially, raw data from VIGITEL and the e-SUS/PHC Indicator Dashboard were arranged in Excel spreadsheets (.xlsx format), structured by quarter (for PHC data) and by year (for VIGITEL), disaggregated by Brazilian macro-region. These tables were then imported into the R environment, where they underwent standardization, cleaning, and transformation into long format to facilitate time-series analysis.

Next, auxiliary variables were created, and functions were applied to remove missing values and standardize numeric formats. With the data structured, the two datasets were merged using the variables "Year" and "Region", resulting in an integrated dataset containing, for each region and time period, the SAH prevalence (VIGITEL) and PHC follow-up proportion (e-SUS).

Using this unified dataset, temporal trends were explored through scatter and line plots, with smoothing applied via locally weighted regression (LOESS). Additionally, Pearson's correlation analysis was performed to assess the linear association between PHC follow-up proportions and self-reported hypertension prevalence across Brazilian regions. The results were presented graphically to facilitate visual interpretation of the relationship between variables over the quarters.

ETHICAL CONSIDERATIONS

This study exclusively utilized secondary, aggregated, and publicly available data from official sources such as the Ministry of Health's e-SUS PHC Dashboard and VIGITEL Brazil microdata, both of which are accessible without restriction or prior authorization. At no stage of the research was there any direct data collection from individuals or handling of personally identifiable information. Therefore, the investigation complies with the ethical guidelines established by Resolution No. 510/2016 of the Brazilian National Health Council, which exempts studies using public information and not involving direct participation of human subjects from review by a Research Ethics Committee. Nonetheless, all phases of data collection, processing, analysis, and dissemination were conducted with technical rigor and in adherence to the principles of research ethics, ensuring the integrity of the information and its exclusive use for scientific purposes.

RESULTS AND DISCUSSION

The analysis of aggregated data from 2020 to 2025 enabled the construction of a national overview of systemic arterial hypertension (SAH) in Brazil, structured around three key di- mensions: (1) the care process in Primary Health Care (PHC), (2) the population-level burden reflected by the disease prevalence, and (3) the expected potential impact on clinical outcomes.

This section is organized to reflect these three dimensions sequentially.

PROPORTION OF HYPERTENSION FOLLOW-UP IN PRIMARY HEALTH CARE

Between the first quarter of 2022 (2022 Q1) and the third quarter of 2023 (2023 Q3), a general upward trend was observed in the proportion of individuals with systemic arterial hypertension (SAH) receiving clinical follow-up in Primary Health Care (PHC), according to data from the e-SUS PHC dashboard (Figure 1). At the beginning of the time series, regional rates ranged from 16% to 21%, peaking between 29% and 36%, with the Northeast (36%) and South (34%) regions standing out.

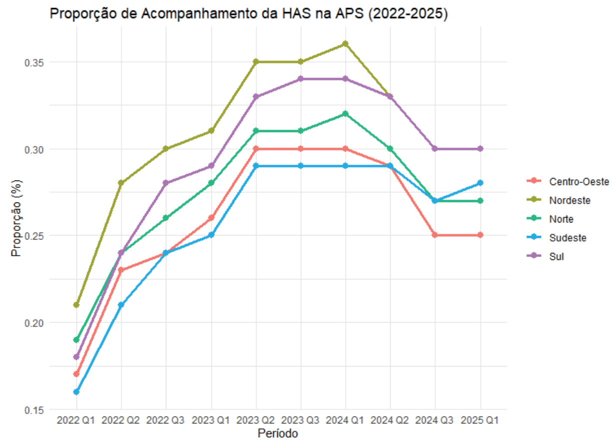

Figure 1. Legenda

This increase may reflect the strengthening of Family Health Strategy (FHS) teams, expanded adherence to chronic care protocols, and the growing use of the e-SUS PHC Dashboard as a tool for monitoring care delivery, which has contributed to more consistent data recording and reduced underreporting.

Despite this initial progress, a trend toward stabilization or decline was noted from 2024 Q2 onward in some regions, particularly the Central-West and Southeast. Contributing factors may include seasonal variations, staff turnover, reduced installed capacity, or weaknesses in data reporting workflows. The persistent national average below 35% underscores a critical point: despite structural advances, Brazilian PHC still struggles to provide regular follow-up for even half of individuals diagnosed with hypertension.

These findings align with recent literature. Vieira et al. (2023), using data from the National Health Survey, estimated that 32.3% of Brazilian adults are hypertensive, but only 54.4% of those on antihypertensive treatment achieve adequate blood pressure control—revealing a significant gap between diagnosis and clinical effectiveness. Complementarily, Albuquerque and Tomasi (2024) reported a decline in the quality of hypertension care between 2013 and 2019, particularly affecting low-income Black women served by the public health system, highlighting persistent structural disparities within PHC. Furthermore, Patriota and Marques-Vidal (2023) found that although 96.6% of hypertensive patients reported receiving guidance on salt reduction, the consumption of ultra-processed foods remains high, which limits the preventive impact of nutritional counseling.

Given this context, analyzing the proportion of patients receiving clinical follow-up serves as an important, albeit indirect, indicator of PHC's ability to mount an organized response to the challenge of hypertension. Nevertheless, the continued shortfall from ideal coverage levels suggests an urgent need for ongoing investment in workforce training, systematic monitoring, and territorial equity in care delivery.

SELF-REPORTED PREVALENCE OF HYPERTENSION (VIGITEL)

Data from the VIGITEL survey indicate that the self-reported prevalence of systemic arterial hypertension (SAH) in Brazil remained relatively stable between 2020 and 2023, ranging from 26.3% at the beginning of the series to 27.9% at the end of the period (Figure 2). This stability may be associated with the persistence of highly prevalent, modifiable chronic risk factors in the country, such as overweight, physical inactivity, high salt consumption, and population aging.

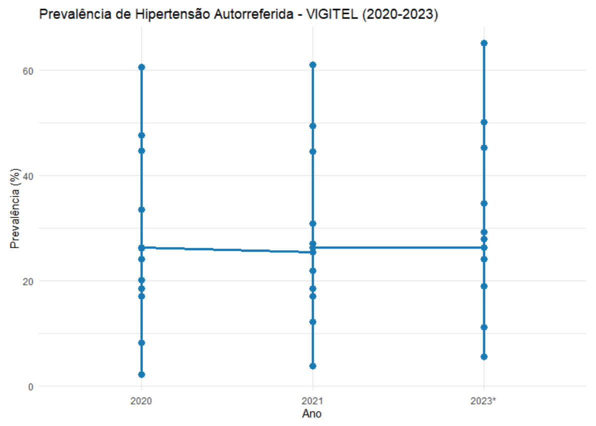

Figure 2. Legenda

These findings are consistent with recent global analyses. Data from the Global Cardiovascular Risk Consortium estimate that more than 50% of cardiovascular events can be attributed to just five modifiable factors, all of which are widely prevalent in the Brazilian population: hypertension, elevated body mass index, smoking, non-HDL cholesterol, and diabetes (Ciciliati, 2025).

Disaggregated data by sociodemographic characteristics reveal consistent patterns of inequality. In 2023, prevalence was higher among women (29.3%) compared to men (26.4%), among individuals with lower educational attainment (above 45% among those with only elementary education), and among the elderly (exceeding 60% in those aged ≥ 65), as shown in Table

1. These disparities reflect an unequal distribution of the hypertension burden, with greater concentration among socially vulnerable groups.

Variable / Year	2020	2021	2023*
Sex			
Male	24.1	25.4	26.4
Female	26.2	27.1	29.3
Age (years)			
18–24	2.3	3.8	5.6
25–34	8.3	12.2	11.2
35–44	18.5	18.6	19.0
45–54	33.6	30.9	34.7
55–64	47.6	49.4	50.1
≥ 65	60.6	61.0	65.1

Table 1. Legenda

This distribution is supported by international evidence. A study conducted in Iran found that variables such as education level, body mass index, and physical activity explained much of the difference in hypertension prevalence across social classes, with education alone accounting for up to 33% of this variation (Tabrizi et al., 2025). Similarly, a multicenter analysis involving 57 countries showed that, as economic development advances, cardiovascular risk tends to shift toward lower socioeconomic strata—particularly in middle-income countries like Brazil (Brindley et al., 2024).

In addition to social inequalities, factors related to treatment adherence also influence the magnitude of the problem. Studies conducted in Latin America suggest that low education levels, rural residence, and lack of formal health coverage are strongly associated with non-adherence to antihypertensive treatment (Intimayta-Escalante & Quintana-García, 2024). Although these findings are based on the Peruvian context, they are compatible with the Brazilian reality and suggest that vulnerable populations may have lower chances of achieving effective clinical control. Another relevant issue is the potential for underdiagnosis, especially among individuals with limited education or restricted access to health services. Since VIGITEL is based on self-reporting, it is plausible that the real prevalence of hypertension is underestimated. This gap hampers accurate assessment of healthcare demand and may create a mismatch between the epidemiological burden of the disease and the availability of clinical follow-up in PHC. National studies suggest that higher educational attainment is associated with better subjective health perception, greater cognitive reserve, and more effective treatment adherence, increasing the likelihood of early diagnosis and continued follow-up (Salomão & Hamdan, 2025).

Therefore, VIGITEL data not only confirm the persistent magnitude of SAH as a high-prevalence population health issue, but also highlight structural inequities and potential diagnostic coverage gaps that warrant targeted attention in health policy planning and regional resource allocation

CONNECTION BETWEEN PREVALENCE, FOLLOW-UP, AND POTENTIAL EFFECTIVENESS

Although the initial proposal of this study included an analysis of the effectiveness of follow-up for systemic arterial hypertension (SAH) through correlation with cardiovascular mortality outcomes, the lack of standardized and accessible regional death data made this analytical approach unfeasible. Given this limitation, the study instead focused on exploring the relationship between the volume of clinical follow-up in primary health care (PHC) and the estimated epidemiological burden of the disease, as represented by self-reported prevalence.

A joint analysis of these two dimensions reveals a pattern of relative coherence between the system's response and population need, especially up to the third quarter of 2023. The proportion of individuals followed up in PHC grew substantially in several regions, including the historically underserved Northeast. This expansion signals a progressive gain in PHC responsiveness to the challenge of hypertension, even though population prevalence remained relatively stable over the same period.

This divergence between the expansion of care and stable prevalence suggests that the increase in follow-up has not yet translated, in the short term, into a perceptible reduction in the disease burden. This is expected in contexts of epidemiological transition, where structural changes in the health system take time to produce measurable effects in population outcomes. Furthermore, as the study did not assess individual clinical indicators such as blood pressure control or treatment adherence, it is not possible to claim a direct impact on morbidity and mortality.

Both national and international literature support this interpretation. A review by Pereira et al. (2025) highlights that the Hiperdia Program—an important milestone in organizing care for SAH and diabetes within Brazilian PHC—achieves better results when integrated with continuous educational activities, regular medication supply, and care management support. Simply scheduling appointments does not guarantee care quality or clinical effectiveness.

At the same time, interventions focused on continuous education of health teams have shown a positive impact on resolving and following up chronic conditions, including SAH. The use of technologies such as e-SUS APS and automated monitoring dashboards has also become a strategic tool to enhance traceability, support clinical decision-making, and promote continuous population surveillance.

However, the reach of these initiatives still faces significant barriers, especially related to the structural and regional heterogeneity of the SUS (Brazilian Unified Health System). Differences in team composition, Family Health Strategy coverage, availability of supplies, and local management capacity directly affect PHC performance and limit its uniform application across the national territory.

Comparisons with international experiences emphasize the complexity of the issue. In Portugal, even with a well-structured primary care network, only 63% of hypertensive patients followed up in PHC achieved controlled blood pressure levels (<140 mmHg), according to a recent study (Sousa et al., 2024). This finding reinforces that regular follow-up is a necessary but not sufficient condition: effectiveness requires integration of continuous care, pharmacological support, health education, and management of associated comorbidities such as obesity and diabetes.

Therefore, while this study does not allow direct measurement of the clinical effectiveness of SAH follow-up, the results point to significant progress in PHC's response capacity. They also highlight the need to consolidate this response through integrated, equitable practices that are sensitive to regional inequalities, in order to transform care coverage into effective disease control.

CONCLUSION

This study revealed that, although Brazil's Primary Health Care (PHC) system has made progress in terms of coverage and structuring of care for systemic arterial hypertension (SAH), significant gaps still remain between the epidemiological burden of the disease and the system's capacity to respond. A growing trend was observed in the proportion of clinical follow-ups between 2022 and 2023, particularly in historically more vulnerable regions such as the Northeast, indicating improvements in the organization of work processes and the use of information technologies, such as the e-SUS APS Dashboard.

However, despite these advancements, care coverage rates remain below ideal levels, with less than 35% of the hypertensive population being followed up, which points to limitations in the continuity of care. The stability in self-reported SAH prevalence during the analyzed period, alongside the persistence of social and behavioral determinants, suggests that the gains in follow-up have not yet translated into effective population-level control of the condition.

Furthermore, the analysis demonstrated that sociodemographic inequalities—such as low ed- ucational attainment, population aging, and socioeconomic vulnerability—continue to negatively influence diagnosis, treatment adherence, and clinical outcomes. This highlights the need for more equitable and culturally sensitive strategies in the planning of health actions.

In light of the above, it is recommended that PHC be continuously strengthened as a priority strategy to address hypertension in Brazil. This includes investments in team training, expansion of the Family Health Strategy, integration of clinical management tools, reinforcement of educational initiatives, and promotion of regional equity in resource distribution. The systematic use of cardiovascular risk scores, adapted to the profile of the Brazilian population, should also be encouraged to guide preventive and therapeutic actions with greater precision.

Finally, the importance of improving the quality and availability of health data is emphasized, with a focus on standardizing indicators and incorporating clinical outcome metrics such as blood pressure control and avoidable mortality—so that future studies may assess the effectiveness of PHC actions in reducing cardiovascular morbidity and mortality.

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