

NEUROLOGY APPLIED TO HEALTH EDUCATION

Neurologia Aplicada à Educação em Saúde

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RESUMO

O acidente vascular cerebral (AVC) é uma das principais causas de morbidade e mortalidade no mundo, associado a elevadas taxas de incapacidade e óbito, e na maioria dos casos relacionado a fatores cardiovasculares. A hipertensão arterial sistêmica (HAS) é o principal fator de risco modificável, contribuindo para o desenvolvimento de AVCs isquêmicos, hemorrágicos, lacunares e para demências. Diante da carência de ações educativas sobre os desfechos indesejados, identificou-se a necessidade de intervenção. Assim, objetivou-se promover educação em saúde, por meio da metodologia de ação-intervenção, em sala de espera de uma Unidade de Saúde da Família (USF), no sudoeste do estado do Pará. O público-alvo da ação foi composto por usuários do Sistema Único de Saúde (SUS) atendidos pela atenção primária à saúde (APS). A ação realizada por docentes e discentes de uma Faculdade Medicina, que visou melhorar o conhecimento público sobre sinais e sintomas da HAS, importância da investigação, diagnóstico, adesão ao tratamento, além de incentivar a melhoria de hábitos de vida, evitando, por exemplo, o tabagismo e o consumo de álcool. A comunidade entendeu claramente as informações transmitidas, demonstrando interesse e assimilação do conteúdo sobre HAS e AVC. Essa experiência reforça a importância das políticas públicas que promovam ações educativas na APS, pois o conhecimento da população é essencial para a prevenção de doenças crônicas.

Palavras-chave: Acidente Vascular Cerebral; Hipertensão Arterial Sistêmica; Prevenção.

ABSTRACT

Stroke is a leading cause of morbidity and mortality worldwide, associated with high rates of disability and death, and in most cases linked to cardiovascular factors. Systemic arterial hypertension (SAH) constitutes the main modifiable risk factor, contributing to the development of ischemic, hemorrhagic, and lacunar strokes, as well as dementia. Given the lack of educational initiatives addressing neurological outcomes associated with systemic arterial hypertension (SAH) and stroke, the need for an intervention was identified. Accordingly, this study aimed to promote health education through an action-intervention methodology conducted in the waiting room of a Family Health Unit (FHU) in the southwestern region of the state of Pará. The target audience comprised users of the Brazilian Unified Health System (SUS) receiving primary health care (PHC) services. The intervention, carried out by faculty and medical students, aimed to enhance public knowledge regarding the signs and symptoms of SAH, the importance of appropriate investigation, diagnosis, and adherence to treatment, as well as to promote healthier lifestyle habits, including the avoidance of smoking and alcohol consumption. The community demonstrated clear comprehension of the information provided, expressing interest and effectively assimilating the content related to SAH and stroke. This experience underscores the relevance of public policies that foster educational initiatives within PHC, as population-level knowledge is essential for the prevention of chronic non-communicable diseases.

Keywords: Stroke; Systemic Arterial Hypertension; Prevention.

INTRODUCTION

Systemic arterial hypertension (SAH) represents one of the major public health challenges worldwide, exerting a substantial impact on vital organs such as the heart, kidneys, and brain. Defined by sustained blood pressure levels equal to or greater than 140/90 mmHg, SAH is influenced by genetic predisposition and lifestyle factors, including smoking, alcohol consumption, high sodium intake, stress, physical inactivity, and dyslipidemias. Its prevalence increases progressively with population aging and occurs more frequently in men up to 50 years of age, while women over 50 years old and individuals with diabetes exhibit a higher risk of developing the condition. According to the Brazilian Society of Cardiology (SBC), hypertension is most prevalent among individuals over 65 years of age, with an estimated prevalence of approximately 61% in this population (Barroso *et al.*, 2021).

In addition to being a highly prevalent chronic condition, hypertension is the primary risk factor for stroke, one of the leading causes of mortality worldwide. Increases in both systolic and diastolic blood pressure are directly associated with a heightened risk of ischemic stroke (IS) and hemorrhagic stroke (HS). Evidence indicates that even modest reductions in blood pressure can substantially decrease the likelihood of these events (Alam *et al.*, 2024; Précoma *et al.*, 2019).

Annually, stroke affects 17 million people, with approximately 6.5 million deaths. According to the report “Cardiovascular Statistics of the Brazilian Society of Cardiology”, around 23.93% of the Brazilian population has hypertension. The mortality rate from hypertensive diseases in Brazil reached the highest value in the last ten years, with 18.7 deaths per 100,000 inhabitants in 2021. This assessment is based on the final data from the Mortality Information System (SIM) for the year 2021 (Almeida *et al.*, 2023; de Oliveira *et al.*, 2024; Simão *et al.*, 2014).

Stroke is one of the leading causes of death and acquired disability worldwide. In 2019, it accounted for approximately 11% of global deaths, ranking as the second leading cause of mortality – a position expected to remain until 2030, according to estimates from the World Health Organization (Dietler *et al.*, 2019). In Brazil, stroke represents the main cause of death, with a significant impact in terms of both mortality and disability. It is noteworthy that around 85% of cases occur in developing countries, and one-third affect individuals within the economically active age group (Bertoluci *et al.*, 2017; Prêcoma *et al.*, 2019). In the state of Pará, data from the Primary Care Information System – (DATASUS) show that in August 2018, there were 98,780 registered people with systemic arterial hypertension (Brasil, 2019).

THEORETICAL FRAMEWORK

Definition, Epidemiological Classification, and Risk Factors for Stroke

Clinically, stroke is characterized by neurological deficits resulting from vascular injury in a specific brain region and may present with different etiologies (Minelli *et al.*, 2022). It is classified into ischemic stroke (IS), resulting from interruption of blood flow, and hemorrhagic stroke (HS), which includes subarachnoid hemorrhage (SAH) and intracerebral hemorrhage (ICH) (Radanović *et al.*, 2002). To broaden the concept, the term “Cerebrovascular Accident” has been expanded to “Encephalic Vascular Accident,” covering other encephalic structures beyond the brain (Pires; Gagliardi; Gorzoni, 2004).

The occurrence of stroke is strongly associated with a variety of risk factors that may be classified as non-modifiable – such as advanced age, male sex, and Black ethnicity – and modifiable factors, including systemic arterial hypertension (SAH), diabetes mellitus (DM), smoking, obesity, physical inactivity, and dyslipidemia (Boehme; Ezenwa; Elkind, 2017; GBD, 2024). SAH is considered the main cause of causal factors, responsible for a large portion of cases. Although it has genetic determinants, it can be controlled through healthy lifestyle habits such as regular physical activity, balanced nutrition, and maintaining a healthy weight (Bertoluci *et al.*, 2017; Rutten-Jacobs *et al.*, 2018).

Many risk factors contribute to stroke and other chronic diseases such as cancer and diabetes. Some cannot be modified (age, ethnicity, genetics, and sex). However, the most impactful preventive factors

depend on personal behavior: not smoking, avoiding alcohol and illicit drugs, maintaining a healthy diet and adequate weight, staying hydrated, engaging in regular physical activity, and controlling blood pressure and glucose levels (Boehme; Esenwa; Elkind, 2017).

Pathophysiology of Hypertension and Its Association with Stroke

Systemic arterial hypertension (SAH) is considered the primary modifiable risk factor for stroke because it significantly alters the physiology of cerebral circulation. Under normal conditions, the brain maintains stable blood flow through autoregulation, which compensates for pressure variations between 60 and 150 mmHg. However, in chronic hypertension, this mechanism shifts to higher levels, compromising vascular protection (Iadecola; Davisson, 2008; Johansson, 1999).

Persistently elevated pressure causes endothelial injury, promoting lipid deposition, atherosclerosis, thrombus formation, and arterial wall thickening and stiffness, which reduces vessel dilation and predisposes to ischemic stroke. Simultaneously, SAH leads to cerebral microangiopathy, fibrinoid necrosis, and fragility of penetrating vessels – especially in the basal ganglia and thalamus – increasing the risk of intracerebral and subarachnoid hemorrhage (Drożdż; Drożdż; Wójcik, 2023; Iadecola; Davisson, 2008).

Thus, both thrombotic and hemorrhagic mechanisms are directly associated with hypertension. The INTERSTROKE study demonstrated that SAH accounts for approximately 34.6% of the attributable risk for stroke, rising to over 50% when blood pressure exceeds 160/90 mmHg (O’Donnell *et al.*, 2020; Zeng; Deng; Ding, 2017). The American Heart Association showed that modest reductions of 10 mmHg in systolic pressure and 5 mmHg in diastolic pressure can reduce stroke risk by up to 41% (Canoy *et al.*, 2022). In Brazil, approximately 86% of stroke patients were already hypertensive before the event (Marques *et al.*, 2019), reinforcing that hypertension – by promoting both ischemia and cerebral hemorrhage – is the most relevant factor for the development of this highly disabling condition.

Public Recognition of Clinical Signs and Symptoms

Stroke is a medical emergency requiring rapid diagnosis and intervention. Early recognition of symptoms can save lives and reduce long-term disability. The main signs and symptoms include unilateral weakness or numbness in the face, upper or lower limbs; mental confusion; speech or comprehension impairment; sudden loss of vision; balance and coordination disturbances; dizziness; and sudden, severe headache with no apparent cause (CDC, 2024). Speech impairment, difficulty moving one side of the body, imbalance, and visual loss are typical warning signs. Lack of recognition leads to delays in seeking medical care, which negatively impacts treatment and reduces recovery potential (de Faria *et al.*, 2024).

Considering the high mortality and disabling potential of stroke, public awareness of signs and symptoms can improve survival and

prognosis (CDC, 2024; Moraes *et al.*, 2021). The Brazilian Society of Cerebrovascular Diseases highlights essential warning signs such as sudden imbalance, coordination issues, dizziness, and gait disturbance.

A simple and effective tool to identify stroke is the **SAMU or F.A.S.T. Test**, which consists of:

- **F (Face):** Ask the person to smile – observe if one side of the face doesn't move;
- **A (Arms):** Ask them to raise both arms – one arm drifting down may indicate stroke;
- **S (Speech):** Ask them to speak or repeat a simple sentence – watch for slurred speech;
- **T (Time):** Time is critical – call emergency services immediately if any sign is present.

The stroke diagnosis is performed through imaging tests that allow identification of the affected brain region and the type of stroke. Computed tomography (CT) is the most commonly used imaging method for the initial evaluation of ischemic stroke and can reveal early signs of ischemia (Qari; Thafar, 2025; Trenkić *et al.*, 2022). Consequently, health education interventions play a critical role in disseminating evidence-based information and mitigating the negative health outcomes associated with systemic arterial hypertension and stroke.

METHODOLOGY

The methodology employed for health education promotion was the waiting-room action-intervention. This approach serves as an effective educational tool for health promotion, enabling both professionals and students to identify and understand the specific needs and vulnerabilities of the local community (Dias; Brito, 2019). Educational activities in waiting rooms allow the creation of a space for dialogue, exchange of experiences, personal engagement, and meaningful learning (Silva *et al.*, 2013). This method stimulates community interest in academic topics and provides participants with the opportunity to relate everyday situations, value their prior knowledge, learn, and promote health (Araújo *et al.*, 2024).

This educational intervention was conducted by medical students from the Federal University of Pará, Altamira campus, with the objective of promoting cardiovascular health, particularly regarding systemic arterial hypertension (SAH) and stroke (CVA). The project was implemented in Family Health Units in Altamira, targeting adult and elderly populations, and employed dynamic, interactive activities designed to enhance knowledge, foster awareness, and encourage the adoption of preventive health behaviors. By integrating evidence-based information with participatory educational strategies, the intervention aimed to contribute to the reduction of adverse cardiovascular outcomes in the community.

During the intervention, brochures and educational booklets containing accessible information on SAH and stroke prevention were

distributed. The development of these educational materials, including folders and booklets, were guided by the “Clinical Protocol and Therapeutic Guidelines – Systemic Arterial Hypertension” (Jones *et al.*, 2025), as well as other up-to-date references on cardiovascular health. The materials were designed didactically, employing simple language and illustrative elements to facilitate comprehension of the information presented.

RESULTS AND DISCUSSIONS

During the activity conducted at the Jatobá Family Health Unit, we conducted, together with our classmates, an educational intervention on the theme: “Hypertension and Stroke: Prevention is the Best Solution! Take Care of Your Heart: Say No to High Blood Pressure!”

We were warmly welcomed by the unit’s multidisciplinary team and the local community, which created a favorable environment for the activity and facilitated the exchange of knowledge. Before implementing the project, we had expected that it would enhance our understanding of arterial hypertension and its relationship with stroke. Furthermore, we believed that a direct and informative approach during the educational campaigns would strengthen our ability to establish a trusting relationship with the assisted population.

The images, in Figure 1, presented below constitute part of the visual materials developed for our extension project. Among these, an informational banner provides essential guidance on Systemic Arterial Hypertension (SAH) and Stroke (CVA), specifically designed to facilitate health education in a clear, accessible, and engaging manner. These materials aim not only to convey critical health information but also to actively promote awareness and preventive behaviors within the target population.

Figure 01 – Waiting-room health education session



Source: Author’s own files (2025).

We had also expected that the campaigns would lead to a significant increase in community awareness regarding the importance of blood pressure control and the adoption of healthy habits, such as balanced nutrition and regular physical activity. Another important objective had been to identify cases of undiagnosed hypertension, enabling appropriate guidance and referrals, thus contributing to the reduction of untreated hypertension rates.

Upon implementation of the project, we observed that the community clearly understood the information conveyed, demonstrating interest and assimilation of the content on hypertension and stroke. This positive response indicated that the educational intervention had been effective in increasing participants' knowledge, contributing to greater awareness of the importance of blood pressure control and stroke prevention.

We had also hoped that the project would help reduce modifiable risk factors for cardiovascular diseases, promote behavioral changes, and ensure that all individuals, regardless of socioeconomic status, had access to the necessary information and resources for cardiovascular health care.

As medical students, figure 2, this experience proved essential for deepening our knowledge on a topic that remains among the leading causes of death worldwide. Additionally, it prepared us for the future by enhancing our communication skills with patients and strengthening the doctor-patient relationship, which is crucial for successful healthcare delivery.

Figure 02 - The medical students and the professor who conducted the waiting-room intervention



Source: Author's own files (2025).

This experience reinforced the importance of public policies that promote educational actions within primary healthcare units, as empowering the population is essential for preventing chronic diseases

such as hypertension, which is directly linked to stroke—one of the main causes of mortality in the country. Moreover, educational initiatives contributed to reducing healthcare costs associated with avoidable complications.

In conclusion, we believed that actions such as this should become more frequent and systematically integrated into Primary Care routines, as health education is an indispensable tool for promoting the population's well-being and quality of life. The experience at the Jatobá Family Health Unit strengthened our commitment to preventive medicine and highlighted the positive impact that awareness can have on collective health.

CONCLUSION

Systemic arterial hypertension and stroke represent major public health challenges due to their high prevalence and substantial impact on morbidity and mortality. The educational intervention conducted demonstrated that promoting knowledge of risk factors, warning signs, and preventive strategies is essential for increasing community awareness and enhancing self-care practices. Initiatives of this nature strengthen the population's capacity to adopt healthy behaviors and seek appropriate treatment, thereby contributing to a reduction in the rates of uncontrolled hypertension and, consequently, the incidence of stroke.

Furthermore, the involvement of medical students in this activity facilitated the development of essential competencies for future professional practice, particularly in the areas of physician-patient communication and health promotion. These findings underscore the importance of sustaining and expanding educational initiatives within primary healthcare units, integrating them into routine Primary Care practices to achieve improved outcomes in the prevention and management of hypertension and its complications.

Community engagement, when combined with the support of healthcare professionals, constitutes an effective strategy for promoting quality of life and mitigating the impact of these conditions on the population of Altamira and the surrounding region.

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