Stroke awareness in a Brazilian Northeastern capital city and the burden of the COVID-19 pandemic

Conceito leigo sobre o acidente vascular cerebral (AVC) em uma capital do Nordeste brasileiro e o impacto da pandemia de COVID-19

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Abstract

Background   The delay in recognizing stroke symptoms is a significant obstacle to receiving acute treatment. Therefore, it is essential to understand the gaps in the knowledge about stroke among the general population and promote campaigns based on these gaps.

Objective   To investigate the general knowledge about stroke in a capital in Northeastern Brazil in a sample of individuals who attended a public hospital and the impacts of the coronavirus disease 2019 (COVID-19) pandemic on the use of emergency services.

Methods   We included patients older than 18 years of age and their family members and/or companions. After obtaining consent, the researcher presented a typical case of stroke, and the participants filled out a questionnaire divided into 2 sections: socio-demographic data and 15 questions about stroke detection and seeking health services and treatment.

Results   We included 154 individuals with a mean age of 44.45 ± 16.21 years. After presenting the case, 60.4% mentioned the acronym *AVC* (*acidente vascular cerebral*, or cerebrovascular accident [stroke], in Portuguese) as a possible explanation, and 54.5% reported that they would call the Mobile Emergency Care Service. However, 62.9%

Keywords
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► Health Education
► Risk Factors
► Knowledge

provided the incorrect telephone number for the Mobile Emergency Care Service or lacked knowledge of the accurate number. Regarding the risk factors for stroke, 27.9% did not know any of them, 65.5% were unaware of any treatment, and no reference was made to thrombolytic therapy. About their chosen conduct in the same case in the context of the COVID-19 pandemic, 98.1% of the participants would not change their behavior.

Conclusion   These results can assist in the planning of public policies and campaigns emphasizing the issue of risk factors and how to access emergency medical services in the state of Alagoas, Brazil.

Resumo

Antecedentes   O atraso no reconhecimento dos sinais do acidente vascular cerebral (AVC) é um dos principais obstáculos para receber o tratamento de fase aguda. Portanto, é importante compreender as lacunas no conhecimento da população sobre o AVC e promover campanhas de acordo com essas lacunas.

Objetivo   Investigar o conhecimento geral sobre o AVC em uma amostra de indivíduos acompanhados em um hospital público de uma capital do Nordeste brasileiro e o impacto da pandemia de doença do coronavírus 2019 (*coronavirus disease 2019* - COVID-19, em inglês) na utilização dos serviços de emergência.

Métodos   Foram incluídos pacientes acima de 18 anos e seus acompanhantes e/ou familiares. Após a assinatura do termo de consentimento, o pesquisador apresentou um caso típico de AVC, e os participantes responderam um questionário dividido em 2 partes: dados sociodemográficos e 15 perguntas sobre o reconhecimento do AVC, procura por serviços de saúde e tratamento.

Resultados   Foram incluídos 154 participantes com idade média de 44,45 ± 16,21 anos. Após a apresentação do caso, 60,4% mencionaram AVC como uma possível explicação, e 54,5% chamariam o Serviço de Atendimento Móvel de Urgência (SAMU). Entretanto, 62,9% erraram ou não sabiam o número do SAMU. Quanto aos fatores de risco de desenvolver AVC, 27,9% não sabiam identificar nenhum, 65,5% não conheciam qualquer tratamento, e não houve menção ao tratamento trombolítico. Com relação à conduta no mesmo caso, mas no contexto da pandemia de COVID-19, 98,1% dos participantes não mudariam sua conduta.

Palavras-chave
► Acidente Vascular Cerebral
► Educação em Saúde
► Fatores de Risco
► Conhecimento

Conclusão   Os resultados deste estudo podem auxiliar no planejamento de políticas públicas com ênfase em campanhas sobre os fatores de risco e o acionamento do SAMU em Alagoas, Brasil.

INTRODUCTION

Stroke is highly prevalent worldwide. It is considered the second leading cause of death and the third leading cause of death and disability combined globally.[1] In Brazil, the impact of stroke is also significant, with an incidence rate of 54.3 to 77 per 100 thousand inhabitants varying from the Southern to the Northeastern regions of the country.[2]

The delay in recognizing stroke symptoms is a significant obstacle to receiving acute treatment, as the impact of reperfusion on prognosis is time-dependent.[3,4] Arriving at a referral hospital more than 4.5 hours after the onset of symptoms, especially in female patients, has been associated with worse outcomes after 90 days.[5] These findings emphasize the importance of improving the healthcare network and promoting health education among the population.

In 2008, a study[6] on stroke awareness among the Brazilian population showed alarming results: 22% of the participants were unable to recognize any warning signs or symptoms of stroke, and only 34.6% knew the correct nationwide emergency telephone number in Brazil. Since then, tremendous efforts have been made to alert the population about the risk factors and to teach them to recognize the signs of stroke and its treatment. However, no data on stroke awareness is available in certain regions of the country. Additionally, the coronavirus disease 2019 (COVID-19) pandemic has harmed stroke treatment, leading to a decrease in admissions due to stroke and to the need to reorganize hospital services during the pandemic.

The main objective of the present study was to investigate the general knowledge about stroke in a capital city in Northeastern Brazil among a sample of individuals who

attended a public hospital, as well as the impacts of the COVID-19 pandemic on the use of emergency services.

METHODS

We conducted a cross-sectional study between June 2021 and February 2022. The participants included were patients older than 18 years of age and their family members and/or companions attending the medical outpatient clinic at Professor Alberto Antunes University Hospital of Universidade Federal de Alagoas, in the capital city of Maceió, state of Alagoas.

The selection of participants followed a semi-random approach, meaning outpatients were chosen randomly. The exclusion criteria were patients presenting with a cognitive or language disorder that would impair understanding and answering the questionnaire, as perceived by the evaluator; patients who did not speak Portuguese as their first language; and patients who had already filled out the questionnaire.

The study procedures were approved by the institutional Ethics in Research committee, following opinion number 35592620.8.2001.5013. Written informed consent was obtained from all participants.

The researchers explained the purpose of the study, its risks, and the benefits to all participants. After obtaining consent, the researchers presented the following clinical case: "Suppose you get home and are faced with the following situation: your relative just fell ill, and you go help him. As you approach, you notice that they are awake, but the left side of their body is weakened, their mouth is crooked, and their speech is slurred. Furthermore, they are unable to stand or walk on their own."

Following the case report, the participants filled out the questionnaire described in ►**Table 1**, which was adapted from the study by Pontes-Neto et al.[6] (2008). It was divided into 2 sections: the 1st was one sociodemographic data, including age, marital status, profession, health insurance, years of schooling, family income, and place of residence;[6]

the 2nd section included 15 questions about stroke detection and seeking health services and treatment.

After completing the application of the questionnaire, the researchers carried out an instructive educational activity, using a booklet to provide information about stroke concepts, main risk factors, the most recognized signs and symptoms and the telephone number of the Mobile Emergency Care Service (Serviço de Atendimento Médico de Urgência, SAMU, in Portuguese) (►**Supplementary Material S1**, online only https://www.arquivosdeneuropsiquiatria.org/wp-content/uploads/2024/05/ANP-2023.0265-Supplementary-Material-1.pdf).

Statistical analysis

All statistical analyses were performed using the IBM SPSS Statistics for Windows (IBM Corp., Armonk, NY, United States) software, version 23.0. Descriptive statistics were employed to present the sociodemographic characteristics (section 1 of the questionnaire). The continuous variables (age) were expressed as mean and standard deviation values, and the categorical variables (gender, marital status, years of schooling, occupation, and income), as absolute and relative frequencies. Section 2 of the questionnaire was composed of subjective answers. Only one of the authors (MTBM) analyzed all answers. The author listed all answers from each question of section 2 of the questionnaire (►**Table 1**) and searched for prespecified coded categories and predetermined words to facilitate data quantification. After this, the results were also presented as absolute and relative frequencies (►**Supplementary Material S2**, online only https://www.arquivosdeneuropsiquiatria.org/wp-content/uploads/2024/07/ANP-2023.0265-Supplementary-Material-2.docx).

RESULTS

A total of 154 individuals were included, 101 (65.5%) of whom were patients or relatives/companions at the general neurology outpatient clinic, and 53 (34.5%) were from other

Table 1 English version of the questionnaire applied in the study

1. What do you think is happening to your relative?
2. What would you do in this situation?
3. If you were going to remove your relative, where would be the most appropriate place to take them in this situation?
4. Considering the COVID-19 pandemic, would you take your relative to the same place?
5. If your relative got better after 30 minutes, would you still find it necessary to take them to this place?
6. What would be the most appropriate medical specialty to care for your relative in this situation?
7. Is there treatment for this medical condition? (If yes, what is it?)
8. What can be done to avoid this medical condition? Explain briefly
9. Have you ever had any training or education about what to do in this situation? (If yes, where?)
10. Do you have private health insurance?
11. What is the telephone number for the Mobile Emergency Care Service in Brazil?
12. Do you know the meaning of *AVC*?
13. Have you ever had a stroke?
14. Have you ever gone through a similar situation?
15. Do you know someone who has suffered a stroke? (If yes, who?)

outpatient clinics, such as endocrinology, ophthalmology, rheumatology, nutrology, general surgery. The mean age of the sample was of 44.45 ± 16.21 years, 120 (77.9%) participants were female, and 58 (37.6%) had 10 to 12 years of schooling. The demographic characteristics of the participants are described in ►Table 2.

In total, 149 participants gave explanations for the clinical case. The most common term mentioned was the acronym *AVC* (*acidente vascular cerebral*, or cerebrovascular accident [stroke], in Portuguese), by 93 (60.4%) participants, followed by the term *derrame* ("apoplexy", in Portuguese), cited by 29 (18.8%) participants, *convulsão* ("seizure", in Portuguese), mentioned by 15 (9.7%) participants, and *infarto* ("infarct", in Portuguese), by 10 (6.5%) participants. Most (96; 62.3%) subjects did not know the correct meaning of the acronym *AVC*.

When presented with the scenario of a close relative showing warning signs of stroke (►Table 1, question 2), 84 (54.5%) participants reported that they would call the SAMU,

46 (29.8%) would take their relative to a hospital, and 24 (15.5%) would perform other actions, including waiting for the patient to improve, seeking help from a neighbor, giving a massage, turning the relative's head, and pulling their tongue. For question 3 ("If you were going to remove your relative, where would be the most appropriate place to take them in this situation?"; ►Table 1), most (115; 77.7%) participants would take their relative to the hospital, 29 (19.6%) would take them to an emergency unit service or a basic health unit, and only 3 (2%) would not take them anywhere.

Regarding their chosen conduct in the same situation but during the COVID-19 pandemic (►Table 1, question 4), 151 (98.1%) participants said they would not change their behavior. In comparison, 3 (1.9%) would alter it due to fear of contracting the coronavirus. After 30 minutes, if their relative showed improvement (►Table 1, question 5), most (124; 80.5%) considered taking the patient to some health service.

When asked about the specialty responsible for treating the health problem in question, 74 (48.1%) participants identified the neurologist, while 19 (12.3%) mentioned the cardiologist, and 51 (33.1%) were unable to answer. About the treatment, 101 (65.5%) were unaware of any treatment, 27 (17.5%) believed there might be some medication, and 16 (10.3%) participants cited rehabilitation/physiotherapy. No reference was made to thrombolytic therapy.

►Table 3 describes the 204 answers on how to avoid the health issue in question. A healthy diet was the most cited preventive measure (59; 38%). Only 27 participants (17.5%) mentioned exercise, 22 (14.3%) mentioned blood pressure control, 16 (10.4%) mentioned stress management, 5 (3%) mentioned alcohol and tobacco avoidance, and 3 (1.9%), cholesterol management.

When questioned if the participants received any education or training on the topic, only 24 (15.5%) individuals reported they had received some information about stroke: 11 participants (7.1%), from the companies they work for, 4 (2.6%), from professional courses, 5 (3.2%), from health services, 3 (1.9%), during college or school, and 1 (1.2%), from television. Additionally, only 12 (7.8%) participants had previously experienced a stroke, 85 (55.2%) had faced a

Table 2 Demographic characteristics of all participants (*n* = 154)

Characteristics		Participants (*n* = 154)	%
Age in years:mean ± standard deviation		44.45 ± 16.21	
Gender	Female	120	77.9
	Male	34	22.1
Marital status	Single	74	48.1
	Married	61	39.9
	Divorced	13	8.4
	Widower	6	3.9
Years of schooling	Illiterate	4	2.6
	1–4	46	29.9
	5–9	13	8.4
	10–12	58	37.6
	> 13	32	20.7
Occupation	Employed	81	52.5
	Unemployed	40	25.9
	Housewife	24	15.5
	Retired	9	5.8
Income (in monthly minimum wages)	< 1	69	44.8
	1–3	66	42.8
	3–6	15	9.7
	> 6	3	1.9
	Not declared	1	0.6
Search for medical assistance	Public	141	91.6
	Private	13	8.4
Private health insurance	Yes	7	4.5
	No	147	95.5

Table 3 Answers on how to avoid the medical condition

	N = 204	%
Consumption of healthy foods	59	38.3
Regular exercise practice	27	17.5
Control of high blood pressure	22	14.3
Control of stress	16	10.4
Control of cholesterol	3	1.9
Avoiding alcohol consumption	5	3.2
Avoinding smoking	5	3.2
Consult outpatient medical services	24	11.7
Does not know	43	27.9

similar situation, and 140 (90.9%) knew someone who had already suffered a stroke.

Regarding knowledge of the telephone number (192) for the SAMU, 56 (36.3%) provided the correct number, 42 (27.2%) were unsure, and 56 (36.3%) were wrong, citing other numbers, such as 190 (28; 18.2%), 193 (13; 8.4%), and 191 (5; 3.2%). ►**Supplementary Material 2** (online only) describes the coded categories for all answers to the questionnaire.

DISCUSSION

The present is the first study to assess stroke awareness in the state of Alagoas, Brazil. The findings showed that most participants could identify a case of stroke and would call the SAMU. However, more than 60% provided incorrect information or needed to learn the right phone number. More than one quarter (27.9%) of the sample demonstrated unfamiliarity with stroke risk factors, and most were unaware of any stroke treatment, with none mentioning thrombolytic therapy. Regarding their conduct when faced with scenario of a close relative showing warning signs of stroke, but during the COVID-19 pandemic, nearly 98% of the individuals indicated they would not alter their behavior.

In the present study, most participants mentioned the acronym *AVC*, unlike in the study by Pontes-Neto et al.,[6] in which the word *derrame* was the most mentioned. However, most of the sample did not know the correct meaning of *AVC*. Therefore, despite the increase in the number of campaigns held throughout Brazil and in Alagoas[7,8] to increase awareness of the meaning of the term *AVC*, the population still had difficulty defining it.

Several studies[9–12] have shown the effectiveness of stroke awareness campaigns regarding the detection of stroke signs and the intention to call emergency medical services. A Brazilian prospective cross-sectional study[13] conducted in the context of the World Stroke Campaign in 2016 showed that 47.9% of the participants did not know how to define stroke, only 18.1% listed three or more stroke symptoms, and 29.03% listed three or more risk factors. This study[13] also showed that people with low levels of schooling (incomplete Elementary School) were 6.1 times more likely to have poor knowledge. Pontes-Neto et al.[6] demonstrated that people with higher education called emergency medical services more often.

We found similar results, indicating that many participants did not know about the risk factors and stroke prevention. Furthermore, despite intending to contact emergency medical services, most were unaware of the correct number to dial. This data highlights the low level of health education among the sample. Despite being monitored by a reference health service, the data suggest little time is dedicated to prevention and health education during consultations. Additionally, there needs to be more emphasis on prevention and healthy lifestyles during the campaigns, as well as more investments in these fields on the part of the Brazilian government. Hypertension, for example, is one of the main modifiable risk factors for stroke, and it has a high prevalence in the Northeast region, but, at the same time, it is the risk factor with the lowest adequate control index.[14]

Mobile emergency services face numerous challenges in Brazil, including the need to adapt protocols to limited budgetary resources and the evident need for greater public awareness about their role.[15] A recent study[16] showed the significance of reorganizing prehospital emergency services, significantly reducing door-to-needle time and other time metrics. However, a crucial aspect of prehospital care hinges on recognizing stroke signs and symptoms and deciding to call mobile emergency services. The findings of the present study reveal a weakness regarding this aspect and underscore the need for investment in campaigns that emphasize the prehospital stage.

Educating children can be a great strategy, as they can teach these concepts to their families and remember them throughout their adult lives. FAST Heroes is a global school-based stroke educational campaign that educates children and their extended family (parents/guardians, grandparents) about stroke symptomatology and the necessary actions to take in response to stroke.[17]

Recently, the effectiveness of this project was assessed in several countries, and the authors found positive results in Brazil. Before the campaign, only 39% of parents chose "Call the ambulance" for all three stroke symptoms, and, after the campaign, the rate rose to 77%. The authors also asked about the phone number for national emergency medical services; before the campaign, 58% responded correctly, and, after the campaign, 92%. However, it is essential to emphasize the need for more investment in stroke awareness campaigns in Brazil based on the poor knowledge of our population about this disease.[17]

The results of the present study suggest the need to hold awareness actions in three major areas:

- prevention of risk factors and healthy lifestyle habits;
- the population needs to know the correct number for the SAMU; and
- the population needs to know that there is a treatment for stroke, and it is time-dependent.

It is essential to consider some limitations to the present study. The sample is only representative of part of the capital of Alagoas. Patients or companions from a public university hospital were included, and most were followed up at the general neurology outpatient clinic. This was not considered a bias, most participants did not have a diagnosis of stroke and were undergoing treatment for other neurological diseases. However, it is worrying, and it must be highlighted that, even though they were in a health service, many participants could not recognize essential aspects of one of our population's most prevalent and disabling diseases.

In conclusion, the present study found that most participants could identify a case of stroke and would call the SAMU, but most did not know the correct number. An essential portion demonstrated unfamiliarity with stroke risk factors, and most were unaware of any stroke treatment, with none mentioning thrombolytic therapy. These results can assist in planning public policies and campaigns

emphasizing the risk factors and how to access the SAMU in the state of Alagoas, Brazil.

Authors' Contributions
LJAR, MTBM, RGP: data curation, formal analysis, investigation, methodology, and writing –review and editing; SMR, OMPN, ER: conceptualization, formal analysis, project administration, and writing – review and editing; JAOB: data curation, formal analysis, investigation, methodology, writing of the original draft, and writing – review and editing.

Support

Conflict of Interest
The authors have no conflict of interest to declare.

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