PROFILE OF PATIENTS WITH ISCHEMIC STROKE ACCIDENT IN A REGIONAL HOSPITAL IN THE INTERIOR OF PIAUÍ

ABSTRACT: Objective: To analyze the profile of patients diagnosed with ischemic stroke at a regional hospital. This is an epidemiological, retrospective, descriptive, and documental study with a quantitative approach. Methodology: The study population consisted of a sample of 70 patients diagnosed with ischemic stroke (IS). Results: The predominant age range was 61 to 80 years (41.4%), with a mean age of 68.39 ± 16.15 years. Regarding gender, 55.7% were male. Ethnically, 90% self-identified as mixed-race (pardo). The most prevalent comorbidity was systemic arterial hypertension (SAH), present in 87.5% of cases, followed by diabetes mellitus (DM) in 20.8%. As for clinical outcomes, 71.4% of patients showed improvement, while 28.6% succumbed. Thrombolytic therapy was administered in 10% of cases, with an average treatment initiation time of three hours and a hospital stay of 5.57 days. For the 90% who did not undergo thrombolysis, the average treatment initiation time was 14.87 hours, with a hospital stay of 7.29 days. Conclusion: This research identified trends consistent with the literature, highlighting that individuals over 60 years old with one or more chronic non-communicable diseases (CNCDs) are more susceptible to ischemic stroke.

Keywords: Ischemic Stroke; Thrombolytic Therapy; Tissue Plasminogen Activator

Introduction

The stroke is characterized by the abrupt onset of a neurological deficit, whether focal or global, lasting more than 24 hours, generally associated with a vascular etiology. This condition can be classified into two main categories: ischemic stroke (IS) and hemorrhagic stroke (HS). IS results from the obstruction of an artery responsible for cerebral blood supply, while HS arises from arterial blood extravasation into the brain parenchyma (1,2).

Stroke is the second leading cause of death and also a major contributor to survival with physical and/or cognitive disability worldwide, accounting for 5.5 million deaths and 116.4 million years of life lost, according to the Global Burden of Disease in 2016 (3). When not fatal, stroke causes disability in 45% of affected individuals, leading them to require home care after hospital discharge (4). Such effects may be temporary or permanent, predominantly impacting developing countries (5).

Stroke is the leading cause of disability in the global population and the second leading cause of death in Brazil. According to the Brazilian Stroke Society (SBAVE), 99,010 deaths due to stroke were recorded in 2020 (6).

It is noted that 70% of stroke survivors experience difficulties in performing daily activities and/or communicating verbally, with limited functional capacity. This is due to resulting muscle weakness, motor control disorders, balance alterations, and spasmodic events, all of which impair the individual's autonomy and social participation (7,19,20).

According to (8), non-modifiable risk factors for stroke include male sex, Black race, and advanced age, whereas modifiable factors include systemic arterial hypertension (SAH), diabetes mellitus (DM), and smoking.

The diagnosis of stroke begins with a medical history, followed by a physical examination and complementary tests. Treatment involves patient monitoring and stabilization, administration of thrombolytics and antiplatelet agents, and/or surgical intervention (9,21,22).

It is known that shorter hospital response time and symptom recognition are essential for clinical improvement in IS patients, regardless of the reperfusion treatment or severity. However, the therapeutic window for thrombolytic therapy is limited to 4.5 hours, making its administration impossible beyond this time, which directly affects the mortality rate (10).

Given the above, epidemiological surveillance is needed to understand the profile of stroke victims in the state of Piauí, specifically in Floriano, as no relevant information was found in the literature. To understand the context in which these patients live and to support the development of health promotion strategies associated with this condition, this study was conducted.

Thus, the objective was to analyze the profile of patients diagnosed with ischemic stroke at a regional hospital in the interior of Piauí.

Materials and Methods

Type of Study

This is a retrospective epidemiological study of a descriptive, documentary type, employing a quantitative approach.

Population and Sample

The study population consisted of 70 participants. The medical records of individuals over 18 years of age diagnosed with ischemic stroke (AVCi) were included. A total of 105 medical records were selected, of which 35 were excluded due to non-conclusive diagnoses of ischemic stroke and/or insufficient information that could compromise the research results.

Study Location

This study was conducted in a regional hospital located in the city of Floriano, Piauí, situated in the southern region of the state, which has approximately 62,036 inhabitants.

Data Collection

Data collection was conducted during the months of September and October 2023, focusing on medical records from November 2022 to July 2023 at Tibério Nunes Regional Hospital. An instrument structured by the researcher, based on the objectives to be achieved, was employed to facilitate the recording of the sociodemographic and clinical data of the patients as documented in their records.

The following variables were studied: age, sex, ethnicity, place of residence, residential zone, time interval between the onset of symptoms and hospital admission, comorbidities, smoking, alcohol use, year of hospitalization, duration of hospitalization, administration of thrombolysis, and outcomes.

Data Analysis

For data analysis, absolute and relative frequencies were utilized for qualitative variables, while means and standard deviations were calculated for quantitative variables. The Kolmogorov-Smirnov test was applied to determine whether the data followed a normal distribution. The association between the administration of thrombolysis and clinical outcomes with the patients' profiles was assessed using Fisher's Exact Test.

For the quantitative variables, the non-parametric Mann-Whitney U test was employed. The collected data were tabulated in a Microsoft Excel spreadsheet and subsequently analyzed using IBM Statistical Package for the Social Sciences version 22.0. A significance level of $p < 0.05$ was adopted.

Ethical Procedures

The research was conducted in accordance with the guidelines set forth in Resolutions 466/12, 510/16, and 580/18 of the National Health Council of the Ministry of Health, which pertain to research involving human subjects and emphasize the protection of the well-being of the participants, as well as respect for cultural, moral, religious, and ethical values.

The study was submitted to the Plataforma Brasil and underwent review by the Ethics Committee in Research of the State University of Piauí, receiving approval under opinion number 6,190,982 on July 19, 2023.

Results

Profile of Patients Diagnosed with Ischemic Stroke

Table 1 shows that the predominant age group is 61 to 80 years, comprising 41.4% of the sample. The mean age is 68.39 years, with a standard deviation of ±16.15. Patients over 81 years of age account for 25.8%. Regarding gender, 55.7% are male. In terms of ethnicity, 90% self-identify as mixed race (pardo). The majority, 90%, reside in Piauí, with 77.1% coming from urban areas.

Table 1. Sociodemographic Profile of Patients Diagnosed with Ischemic Stroke in a Regional Hospital in Rural Piauí, 2024.

Variables	n	%	Average ± DP
Age range			68,39 ± 16,15
Up to 40 years	3	4,3	
From 41 to 60 years old	20	28,6	
From 61 to 80 years old	29	41,4	
Over 80 years old	18	25,7	
Sex			
Feminine	31	44,3	
Masculine	39	55,7	
Ethnicity			
White	7	10,0	
Brown	63	90,0	
Place of residence			
Piauí	63	90,0	
Maranhão	7	10,0	
Residence zone			
Urbana	54	77,1	
Rural	16	22,9	

Source: Research data.

Clinical Profile of Patients with Ischemic Stroke

In Table 2, the average time interval between the onset of symptoms and hospital care was 13.69 hours, while the average length of hospital stay was 7.11 days. The most prevalent comorbidity was systemic arterial hypertension (SAH), with an incidence of 87.5%.

Table 2. Clinical Profile of Patients Diagnosed with Ischemic Stroke in a Regional Hospital in Rural Piauí, 2024.

Variables	n	%	Average ± DP
Smoking			
No	67	95,7	
Yes	3	4,3	
Alcoholism			
No	67	95,7	
Yes	3	4,3	
Time range			13,69 ± 16,41
Year of hospitalization			
2022	21	30,0	
2023	49	70,0	
Days hospitalized			7,11 ± 6,66
Comorbidities			
HAS	21	87,5	
DM	5	20,8	
Heart disease	3	12,5	
Carrying out thrombolysis			
No	63	90,0	
Yes	7	10,0	
Death			
Yes	20	28,6	
No	50	71,4	

Source: Research data.

Profile of Thrombolyzed and Non-Thrombolyzed Patients

In Table 3, patients who underwent thrombolysis had an average hospital treatment time of 3 hours, while those who did not receive thrombolysis had an average time of 14.87 hours. For patients who received thrombolysis, the length of hospital stay was shorter, with an average of 5.57 days.

Table 3. Time from Symptom Onset to Hospital Care and Length of Hospital Stay According to Thrombolysis Administration in Patients Diagnosed with Ischemic Stroke in a Regional Hospital in Rural Piauí, 2024.

Variables			Time	Days of hospitalization
	n	%	Average ± DP	Average ± DP
Carrying out thrombolysis				
No	63	90,0	14,87 ± 16,89	7,29 ± 6,89
Yes	7	10,0	3,00 ± 0,82	5,57 ± 4,08
Total	70	100,0		

Source: Research data.

Table 4 highlights that the predominant age group is 61 to 80 years, with 4 (13.8%) of the thrombolyzed patients falling within this category. For those over 80 years of age, represented by 18 patients, they are unable to receive therapy due to their age range. Regarding gender, all 7 (17.9%) thrombolyzed patients are male. In terms of ethnicity, 6 (9.5%) self-identify as mixed race (pardo).

Table 4. Administration of Thrombolysis According to the Sociodemographic Profile of Patients Diagnosed with Ischemic Stroke in a Regional Hospital in Rural Piauí, 2024.

Variables	Carrying out thrombolysis		p-value
	No	Yes	
	n (%)	n (%)	
Age range			
Up to 40 years	2 (66,7)	1 (33,3)	0,171
From 41 to 60 years old	18 (90,0)	2 (10,0)	
From 61 to 80 years old	25 (86,2)	4 (13,8)	
Over 80 years old	18 (100,0)	-	
Sex			
Feminine	31 (100,0)	-	**0,015**
Masculine	32 (82,1)	7 (17,9)	
Ethnicity			
White	6 (85,7)	1 (14,3)	0,538
Brown	57 (90,5)	6 (9,5)	
Place of residence			
Piauí	59 (93,7)	4 (6,3)	**0,019**
Maranhão	4 (57,1)	3 (42,9)	
Residence zone			
Urbana	48 (88,9)	6 (11,1)	1,000
Rural	15 (93,8)	1 (6,3)	

Source: Research data. p-value = Fisher's exact

In Table 5, it is observed that 50% of patients over 80 years of age experienced death as an outcome. Regarding gender, the mortality rate for females is 38.7%, which is higher compared to 20.5% for males.

Table 5. Outcomes According to the Sociodemographic Profile of Patients Diagnosed with Ischemic Stroke in a Regional Hospital in Rural Piauí, 2024.

Variables	Death		p-value
	Yes	No	
	n (%)	n (%)	
Age range			
Up to 40 years	-	3 (100,0)	0,123
From 41 to 60 years old	5 (25,0)	15 (75,0)	
From 61 to 80 years old	6 (20,7)	23 (79,3)	
Over 80 years old	9 (50,0)	9 (50,0)	
Sex			
Feminine	12 (38,7)	19 (61,3)	0,115
Masculine	8 (20,5)	31 (79,5)	
Ethnicity			
White	1 (14,3)	6 (85,7)	0,664
Brown	19 (30,2)	44 (69,8)	
Place of residence			
Piauí	19 (30,2)	44 (69,8)	0,664
Maranhão	1 (14,3)	6 (85,7)	
Residence zone			
Urbana	17 (31,5)	37 (68,5)	0,529
Rural	3 (18,8)	13 (81,3)	

Source: Research data. p-value = Fisher's exact

Factors for performing thrombolysis

In Table 6, it is highlighted that all 7 patients who underwent thrombolysis did not die, however, 31.7% of patients who did not undergo thrombolysis had death as an outcome.

Table 6. Outcome according to the clinical profile of patients diagnosed with ischemic stroke in a regional hospital in the interior of Piauí, 2024.

Variables	Death		p-value
	Yes	No	
	n (%)	n (%)	

Time range			
Average ± DP	12,25 ± 8,56	14,26 ± 18,69	0,521[b]
Days hospitalized			
Average ± DP	7,55 ± 6,78	6,94 ± 6,67	0,906[b]
Comorbidities			
HAS	7 (33,3)	14 (66,7)	0,559[a]
DM	2 (40,0)	3 (60,0)	
Heart disease	-	3 (100,0)	
Carrying out thrombolysis			
No	20 (31,7)	43 (68,3)	0,180[a]
Yes	-	7 (100,0)	

Source: Research data. [a]Fisher's exact; [b]Mann-Whitney

Discussion

Profile of Patients Diagnosed with Ischemic Stroke

Regarding gender, the study revealed that 55.7% of the patients were male, with an average age of approximately 68 years. The sociodemographic characterization of this research is similar to a study conducted in Santa Catarina, Brazil, which demonstrated a higher prevalence of ischemic stroke among males, representing 59.6%, with an average age of 67 years (13).

In line with another study that reported a greater prevalence of ischemic stroke among males, where 55.6% of the cases were found in this group, it was noted that 66.7% of the participants were over 60 years old. This similarity may indicate a certain uniformity among the studied populations (2).

With respect to age group, there was a significant prevalence of ischemic stroke among individuals over 80 years of age, accounting for 25.7% of the cases. This finding is consistent with studies conducted by (14), which also highlighted that advancing age may influence the prevalence of stroke, as elderly individuals often present with more fragile health conditions, increasing susceptibility to stroke. Additionally, the lack of monitoring and control of pre-existing health conditions may further contribute to this increased risk.

Individuals of mixed ethnicity (pardo) comprised 90% of the sample, which aligns with a study by (10) that included a considerable sample of Afro-descendants (black and pardo accounting for 85.4%). The predominance of mixed-race individuals in this study underscores the importance of incorporating sociodemographic factors in the analysis of patients diagnosed with ischemic stroke.

The significant representation of 90% of the sample self-identifying as mixed-race in this research may be related to the predominantly mixed ethnic composition in the states of Piauí (68.5%) and Maranhão (65.4%), according to data from the Brazilian Institute of Geography and Statistics (IBGE) in 2022 (11).

Clinical Profile of Patients with Ischemic Stroke

The significant prevalence of systemic arterial hypertension (SAH), with an incidence of 87.5%, may be related as a risk factor for Stroke (AVE). This finding is supported by research conducted by (7), which reported a prevalence of 68.9% among patients diagnosed with SAH, highlighting it as one of the most common comorbidities in patients with ischemic stroke.

The results obtained from this study indicate a mortality rate of 28.6%. This finding contrasts with a study conducted in an intensive care unit in São Paulo, where 57.14% of patients affected by ischemic Stroke (AVE) resulted in death (15).

Profile of thrombolyzed and non-thrombolyzed patients

The study revealed that 10% of its population underwent thrombolytic therapy. This result is similar to a study conducted in the Central-West region of Brazil, where 11.8% of the 828 hospitalized patients received thrombolytic therapy. This similarity may indicate that there are conditions that prevent a higher percentage of individuals from being eligible for the therapy.

One of the most relevant conditions is the average time of hospital care, which contributes to the non-implementation of thrombolytic therapy. In this research, the average time of care reached approximately 15 hours for 90% of the sample. This period exceeds the recommended therapeutic window for thrombolysis, which is 4.5 hours.

It was not possible to establish a significant association between the implementation of thrombolytic therapy and clinical outcomes concerning the patients' profiles through Fisher's Exact Test.

Factors for the implementation of thrombolysis

The average time for thrombolysis found in this study was 3 hours, similar to the study by (16), which also reported an average of 3 hours for the procedure. Factors such as delays in

arriving at the hospital and an unsatisfactory door-to-needle time can influence the thrombolysis time.

The door-to-needle time in this research was prolonged and exceeded the recommendation set by the National Guidelines for the Treatment of Ischemic Stroke, which advises a time of less than 60 minutes. This increase in time is associated with delays in recognizing stroke symptoms by the population and, consequently, with delays in transportation to pre-hospital care. The prolonged time emerges as one of the main barriers to the implementation of thrombolysis in hospitals (18).

Ensuring the benefits of thrombolysis requires awareness from both the individual affected by the stroke and those around them to recognize the signs and symptoms early and seek health services immediately. Additionally, it is crucial to have an effective network of pre-hospital and intra-hospital care capable of accommodating the demand. This includes the need for agreements between various health services, the establishment of specialized units, and the promotion of ongoing professional training (10).

It is essential to highlight the need for educational efforts within health services and the community to promote awareness of the main signs and symptoms of Stroke (AVE). The aim is to emphasize the importance of seeking immediate specialized care to ensure a rapid and adequate response to the initial signs and symptoms of stroke (16).

LIMITATIONS OF THE STUDY

It is important to note that the study has limitations due to being conducted in a single institution with a small number of participants, which may interfere with potential correlations and generalizations. Furthermore, the lack of standardization in the information contained in the physical medical records is a limiting factor, as there is missing pertinent information regarding the clinical status of the patients.

CONTRIBUTION TO PRACTICE

Study conception and/or design: Samuel Marques da Silva; Data collection, analysis, and interpretation: Samuel Marques da Silva; Manuscript writing and/or critical revision: Samuel Marques da Silva, Maria Luzinete Rodrigues da Silva, Héryka Laura Calú Alves; Approval of the final version to be published: Samuel Marques da Silva, Maria Luzinete Rodrigues da Silva, Héryka Laura Calú Alves.

Conclusion

EThis study analyzed the profile of patients diagnosed with Ischemic Stroke in a regional hospital in the interior of Piauí. The study concluded that the average age of participants was 68.39 ± 16.15, with the majority being male at 55.7%, and individuals of mixed race (pardo) representing 90% of the population.

The most prevalent comorbidity was systemic arterial hypertension (SAH), with an incidence of 87.5%, followed by diabetes mellitus (DM) at 20.8%. In terms of outcomes, 71.4% of cases showed improvement, while 28.6% resulted in death.

The average time to hospital treatment was 3 hours for 10% of the patients who underwent thrombolysis, with an average hospital stay of 5.57 days. On the other hand, for the patients who did not undergo the thrombolysis procedure, representing 90%, the average time to hospital treatment was 14.87 hours, with an average hospital stay of 7.11 days.

Training and capacity-building for healthcare professionals, with an emphasis on the diagnosis of stroke, along with widespread dissemination, guidance, and education for the population on the importance of seeking specialized services, have the potential to significantly reduce the time it takes for patients to arrive at the hospital. This preservation of the therapeutic window for the use of thrombolytics increases patients' chances of accessing thrombolytic therapy.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Option 2:

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name,

version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

1.

2.

3.

References

1- Brazil. Ministry of Health. Department of Health Care. Department of Strategic Programmatic Actions.

Care guidelines for the rehabilitation of people with stroke [Internet]. Brasília: Ministry of Health; 2013 [cited 2023 Jun 01]. Available from: https://bvsms.saude.gov.br/bvs/publicacoes/diretrizes_atencao_reabilitacao_acidente_vascular_cerebral.pdf

2- Szymanski P, Fernandes Neto IMDL, Moreira CFS. Analysis of the intravenous thrombolysis procedure in patients with ischemic stroke. Rev. Soc. Bras. Clin. Med. 2022;20(1):14-21.

3- Costa GVS, Romeo ALB. Epidemiological profile of deaths from stroke in Brazil between 2007 and 2016: a national database study. Rev. Med. 2021;100(4):335-42.

4- Silva DN, Melo MFX, Duarte EMM, Borges AKP. Nursing care for stroke victims: Integrative review. REASONS. 2019;36:e2136.

5- Jolliffe L, Lannin NA, Cadilhac DA, Hoffmann T. Systematic review of clinical practice guidelines to identify recommendations for rehabilitation after stroke and other acquired brain injuries. BMJ. 2018;8(2):e018791.

6- Scavasine VC, Costa RT, Zétola VHF, Lange MC. Iscore, useful prognostic tool for patients with acute ischemic stroke treated with intravenous thrombolysis: a validation study. Arq. Neuropsiquiatr. 2023;81(2):107-11.

7- Meireles CV, Ferreira SF, Avelino PR, Menezes KKP. Effects of virtual reality training on the motor coordination of the upper limbs of individuals after stroke: a systematic review with meta-analysis.
Fisioter Pesqui. 2022;29(1):11-21.
8- Santos LB, Waters C. Epidemiological profile of patients affected by stroke: integrative review. Braz J Dev. 2020;6(1):2749-75.
9- Barella RP, Duran VAA, Pires AJ, Duarte RO. Profile of care for patients with stroke in a philanthropic hospital in the south of Santa Catarina and feasibility study for the implementation of the stroke unit. ACM arch. catarin. med. 2019;48(1):131-43.
10- Sampaio ES, Leitão TS, Neves NCF, Maciel ML, Moraes MA, Mussi FC, et al. Factors associated with early arrival time in patients with ischemic stroke. Science. Nurse. 2022;28:1-11.
11- Research Directorate, Coordination of Household Sample Surveys. Continuous National Household Sample Survey - Continuous PNAD. Brazilian Institute of Geography and Statistics [Internet]. Brasília: IBGE; 2022 [cited 2023 Jun 03] Available from: https://cidades.ibge.gov.br/brasil/pi/pesquisa/10070/64506.
12- Ministry of Health. Ordinance no. 665/2012. Provides for the criteria for qualifying hospital establishments as Emergency Care Centers for Patients with Cerebral Vascular Accident (CVA), within the scope of the Unified Health System (SUS), establishes the respective financial incentive and approves the Stroke Care Line [Internet]. Brasília: Ministry of Health; 2012 [cited 2023 Jun 01]. Available from: https://bvsms.saude.gov.br/bvs/saudelegis/gm/2012/PRT0665_12_04_2012.html

13- Sartoretto ER, Silva GS, Schein AE, Madeira K. Contraindications to the use of thrombolytics in patients affected by ischemic stroke in a highly complex hospital in the south of Santa Catarina between 2012 and 2014. Arq. Catarin. Med. 2019;48(1):108-17.

14- Saito FA, Cavasana RF, Corrêa MG, Paula LB. Epidemiological profile on stroke in the city of Araçatuba. BEPA, Bol. epidemiol. paul.2022;19(128):9-31.

15- Mata KA, Cassavia CSP, Junior JM. Description of the epidemiological profile: patients hospitalized for stroke in an intensive care unit. Res Soc Dev. 2022;11(3):e9511326170.

16- Nascimento KG, Chavaglia SRR, Pires PS, Ribeiro SBF, Barbosa MH. Clinical outcomes of patients with ischemic stroke after thrombolytic therapy. Acta Paul Enferm. 2016;29(6):650-7.

17- Ministry of Health. Clinical Protocol and Therapeutic Guidelines for Acute Ischemic Stroke [Internet]. Brasília: Ministry of Health; 2021 [cited 2024 Jan 03]. Available from: https://www.gov.br/conitec/pt-br/midias/consultas/relatorios/2021/20211230_relatorio_recomendacao_avci_agudo_cp110.pdf

18- Filho Oliveira J, Martins SCO, Neto Pontes OM, Longo A, Evaristo EF, Carvalho JJF, et al. Guidelines for the treatment of acute ischemic attacks – Part I. Arq Neuropsiquiatr. 2012;70(8):621-29.

19. Poupore N, Strat D, Mackey T, Brown K, Snell A, Nathaniel TI. Cholesterol reducer and thrombolytic therapy in acute ischemic stroke patients. Lipids in Health and Disease. 2020 Dec;19:1-4.

20. Zhou Y, Yan S, Song X, Gong Y, Li W, Wang M, Yin X, Hu B, Lu Z. Intravenous thrombolytic therapy for acute ischemic stroke in Hubei, China: a survey of thrombolysis rate and barriers. BMC neurology. 2019 Dec;19:1-9.

21. Trepet, G. and Radzikhovska, N. (2021) “Ischemic Stroke in COVID-19: A Systematic Review”, Journal of Pharmaceutical Research International, 33(60B), pp. 2412–2420. doi: 10.9734/jpri/2021/v33i60B34893 .

22. Yudawijaya, Agus, Ruth Arthesya Nauli Basa Sihombing, Christina Roseville Lasma Aritonang, and Patria Adri Wibhawa. 2024. “Risk Factor Profile of Ischemic Stroke Patients”. Asian Journal of Medicine and Health 22 (10):102-10. https://doi.org/10.9734/ajmah/2024/v22i101107.