Prevalence of stroke in patients aged 50–80 years attending emergency departments. A single-center observational study.

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Abstract

Introduction: Stroke is a neurological pathology that can be caused by cerebral ischemia or intracerebral hemorrhage. Modifiable risk factors include high blood pressure, smoking, diabetes, dyslipidemia, and heart disease. On the other hand, nonmodifiable risk factors include sex and age.

Methodology: This is a descriptive, nonexperimental, observational, cross-sectional, retrospective prevalence study. It was based on clinical and sociodemographic data obtained from clinical records from the AS-400 system of the Teodoro Maldonado Carbo Hospital. The information was filtered and tabulated in Microsoft Excel and then analyzed in IBM SPSS Statistics 26.

Results: A total of 7,652 clinical records were reviewed, of which 5,309 were eliminated due to exclusion criteria, resulting in a population of 317 patients and a sample of 175 patients. The average age of patients with stroke was 65 years, with 70--80 years being the most common age range, accounting for 41.7% of all patients. Male sex was the most prevalent type of stroke (62.9%), and ischemic stroke was the most common type of stroke during this period (64%).

Conclusions: The prevalence of stroke in patients between 50 and 80 years of age in the HTMC emergency room from 2021--2022 was 317. An increasing trend of stroke was observed as the patient's age increased; the most common symptom was hemiparesis, arterial hypertension was the leading risk factor, and the most frequent type of stroke was ischemia.

Keywords:

Stroke, cerebral infarction, prevalence, risk factors.

Abbreviations

ACV: cerebrovascular accident.
HT: Arterial hypertension.

Supplementary information

No supplementary materials are declared.

Acknowledgments

We want to thank the staff and patients of the Teodoro Maldonado Carbo Hospital of the Ecuadorian Social Security Institute, where the study was conducted.

Author contributions

María Valeria Aragundi Palacios: Conceptualization, investigation, writing – original draft, resources, software, supervision.
John Henry Tenorio Castillo: conceptualization, investigation, writing – original draft, resources, software, supervision.
Sunny Eunice Sánchez Giler: Methodology, Data curation, Formal analysis, Funding acquisition, Project administration, Validation, Visualization, Writing – review and editing.
All the authors read and approved the final version of the manuscript.

Funding

The authors funded the expenses of this research.

Availability of data and materials

The datasets used and analyzed during the present study are available from the corresponding author upon reasonable request.

Introduction

A cerebrovascular accident (CVA) is an acute neurological pathology that can be caused by two mechanisms: cerebral ischemia due to systemic hypoperfusion, thrombosis, or embolism, or intracerebral or subarachnoid hemorrhage. The ischemic mechanism is the most common in 80% of cases. In both the ischemic and hemorrhagic types, there is an imbalance between the oxygen required and the oxygen received; therefore, the basis of neuronal damage occurs due to hypoxia in brain tissue. Ischemic stroke is generated by the occlusion of a blood vessel that eventually causes ischemia in brain tissue; however, if this occlusion is momentary and resolves itself, it is a neurological entity called transient ischemic attack. This is defined by neurological symptoms that last less than 24 hours with complete resolution after the episode and do not present changes in the images. On the other hand, hemorrhagic stroke occurs when blood is extravasated into the cranial cavity, secondary to the rupture of a blood vessel, and can cause subarachnoid hemorrhage or intracerebral hemorrhage [1, 2].

The risk factors identified in epidemiological studies have been classified into modifiable and nonmodifiable factors. Among the nonmodifiable factors are age, sex, and race. Among the modifiable factors are high blood pressure, smoking, diabetes, dyslipidemia, and heart disease. Multiple studies have investigated the relationship between stroke incidence and patient age. One of them reported that in patients aged 41--50 years, 1.97% had a stroke, from 51--60 years 30.65%, from 61--70 years 22.61%, and finally, from 71--80 years, there was a prevalence of 29.74%, indicating that there is a higher prevalence among those aged 50--60 years. The close relationship between stroke and age is that the older the patient is, the greater the probability that they will suffer from comorbidities that cause plaque buildup in the arteries, stiffness of the blood vessel walls, and high blood pressure, among others. Sex is also a factor to consider because high estrogen levels offer cardiovascular protection, which could be the reason why, at menopausal age, women show an increased tendency to suffer a stroke and that men are always more likely to be affected [3, 4].

Similarly, in another study based on the age of onset of stroke, it was determined that the most vulnerable population was men, with a frequency of 59%, indicating that men are more likely to suffer from this pathology; in women aged 60--70 years, there was an increased tendency to develop a stroke, as opposed to the frequency that occurred at younger ages [5].

The clinical manifestations that patients may present depend on the topography of the lesion, which is determined by the irrigation areas of the main cerebral arteries. In one study, the middle cerebral artery was identified as the most affected artery (57.3% of cases), followed by the posterior cerebral artery (26.7%). For signs and symptoms, hemiparesis is the most common sign of both ischemic and hemorrhagic stroke, followed by peripheral facial paralysis, dysarthria, headache, ataxia, and finally aphasia [6].

The morbidity and mortality of stroke have a significant impact on society, which is why it is essential to address this issue by conducting a study to measure the frequency with which stroke occurs in patients aged 50–80 years to determine the vulnerability of this age group and consider it in new patients to prevent this manifestation. For this reason, a regional third-level reference hospital was chosen to determine the prevalence of stroke in patients aged 50--80 years.

Materials and methods

Study design

This study is observational. The source is retrospective.

Scenery

The study was conducted at the Teodoro Maldonado Carbo Hospital of the Ecuadorian Social Security Institute in Guayaquil, Guayas Province, from January 2021 to December 2022.

Participants

Patients aged 50--80 years with a recent diagnosis of stroke treated in the institution's emergency department were included. No patients were excluded.

Variables

The variables were age; sex; the presence of comorbidities, such as arterial hypertension, atrial fibrillation, type 2 diabetes mellitus, and obesity; the topography of the lesion; and the presence of symptoms, such as headache, nausea, hemiplegia, hemiparesis, paresthesia, aphasia, dysarthria, ataxia, facial asymmetry, and hypoesthesia.

Data sources/measurements

The source was indirect; an electronic form was filled out from the AS400 institutional electronic medical record data. The following ICD-10 root codes were searched for inclusion in the study: I62--169. The ESC/ESH regulations of the European Society of Hypertension (ESH) and the European Society of Cardiology (ESC) were used to classify arterial hypertension.

Biases

The application of the participant selection criteria prevented observation and selection bias. To avoid interviewer, information, and memory bias, the principal investigator maintained the data using a guide and records approved in the research protocol. Two researchers independently analyzed each record in duplicate, and the variables were entered into the database once their concordance was confirmed.

Study size

The sample was probabilistic. In a population of 516,282 people between 50 and 80 years old in Guayaquil, the prevalence of cerebrovascular accidents is 200 cases per 100,000 inhabitants, representing 1032 possible cases. Using EPI info ™ (Stat Calc, Epi Info, CDC, Atlanta, Version 7.2.6 [October, 2023]), with an expected frequency of 15%, a confidence limit of 5%, and a confidence level of 95%, the sample size was 165 cases.

Quantitative variables

Descriptive statistics were utilized. The results are presented as frequencies and percentages. Scale variables were not transformed into categorical variables.

Statistical analysis

Qualitative variables are presented as frequencies and percentages. Proportions were compared with chi-square tests. The statistical package was IBM Corp.'s IBM SPSS Statistics for Windows, Version 26.0 (released in 2018). Armonk, NY: IBM Corp.

Results

Participants

A total of 175 patients were part of the study.

Main characteristics of the study group

There were 175 patients. The average age was 65.77 years ± 8.29 years. Concerning the most affected age group, the first defined range of 50--59 years was 26.3% (n = 46), the second range of 60--69 years was 32% (n = 56), and the last range of 70--80 years was 41.7% (n = 73) of the cases. The male population represented 62.9% (n = 110), whereas the female population represented 37.1% (n = 65).

Regarding the clinical manifestations, the following results were obtained: hemiparesis occurred in 73.1% (n=128) of the patients; dysarthria, 60% (n=105); facial asymmetry, 44% (n=77); headache, 43.4% (n=76); aphasia, 37.7% (n=66); nausea, 33.7% (n=59); hypoesthesia, 30.9% (n=54); hemiplegia, 29.1% (n=51); paresthesia, 20.6% (n=36); and finally, ataxia, 16.6% (n=29) (Table 1).

Table 1. Main characteristics of the study group.

Variables	Average ± SD
Age	65.77 ± 8.29
By age group	**n (%)**
50 to 59 years old	46 (26.3%)
60 to 69 years old	56 (32.0%)
70 – 80 years	73 (41.7%)
Sex	**n (%)**
Man	110 (62.9%)
Women	65 (37.1%)
Demonstrations clinics	**n (%)**
Hemiparesis	128 (73.1%)
Dysarthria	105 (60.0%)
Facial asymmetry	77 (44.0%)
Headache	76 (43.4%)
Aphasia	66 (37.7%)
Nausea	59 (33.7%)
Hypoesthesia	54 (30.9%)
Hemiplegia	51 (29.1%)
Paresthesia	36 (20.6%)
Ataxia	29 (16.6%)

Frequency of risk factors

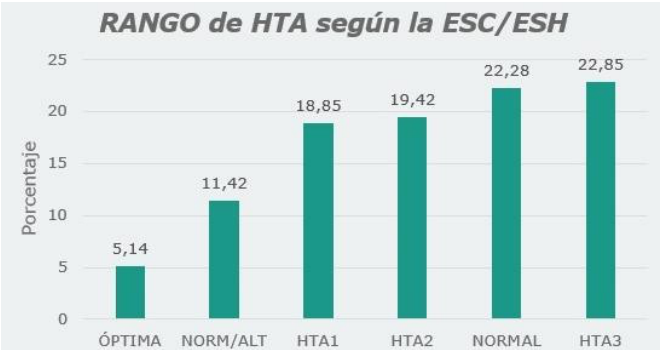
In terms of risk factors, 82.90% (n=145) of the participants suffered from arterial hypertension, 41.1% (n=72) had diabetes, 38.9% (n=68) had obesity, 37.7% (n=66) had Dyslipidemia, 32% (n=56) had previous stroke, and 12.6% (n=22) had a smoking habit. Finally, only 10.9% (n=19) had a history of atrial fibrillation (Table 2).

The classification of blood pressure at the time of admission was optimal for 5.14% of patients (n=9), standard for 22.28% (n=39), high normal for 11.42% (n=20), arterial hypertension (HTA) grade 1 for 18.85% (n=33), HTA grade 2 for 19.42% (n=34) and HTA grade 3 for 22.85% (n=40) (Figure 1).

Table 2. Frequency of the main factors of risk.

Risk factors	N	%
Hypertension arterial	145	82.90%
Diabetes Mellitus	72	41.10%
Obesity	68	38.90%
Dyslipidemia	66	37.7%
Previous stroke	56	32.0%
Consumption of tobacco	22	12.60%
Fibrillation handset	19	10.90%

Figure 1. Hypertension range in stroke patients.



ESC/ESH: European Society of Hypertension (ESH) and the European Society of Cardiology (ESC).

Types of stroke

The most prevalent type of stroke was ischemic in origin, affecting 64% (n=112) of patients, and 36% (n=63) were hemorrhagic. Among patients diagnosed with ischemic stroke, the National Institutes of Health Stroke Scale (NIHSS) score was 16.96% (n=19) for mild stroke, 68.75% (n=77) for moderate to severe stroke, 11.61% (n=13) for moderate to severe stroke, and 2.68% (n=3) for severe stroke (see Figure 4). Concerning the topography of the lesion, the following results were obtained from the main cerebral arteries: MCA, 62.8% (n=110); PCA, 19.51% (n=34); ACA, 14.27% (n=25); and finally, the basilar artery, 3.42% (n=6) (Figure 2). In terms of the degree of stroke, moderate stroke was the most prevalent (Figure 3), and the middle cerebral artery was the most affected (Figure 4).

Discussion

The current research assessed the clinical and epidemiological characteristics related to stroke. In this study, the average age was 65 at the sociodemographic level. The most vulnerable age range was 70 to 80 years (41.7%), which contrasts with the findings of Berna KP, whose average age was 60 years, and the most affected age range was 51 to 60 years (30.65%). Regarding the sex of the patients, both studies reported a higher prevalence of males, with 62.9% and 71.85%, respectively [3].

Based on the imaging and topographic findings, de Oliveira AJ concluded that ischemic stroke is the most frequent type, occurring in 56% of cases, and that the middle cerebral artery is the most affected, at 57.3%. This study revealed that ischemic stroke is the most common type, accounting for 64%, while the middle cerebral artery accounts for 62.8%. These results correlate with international literature indicating that ischemic stroke occurs in 80% of cases [6, 7].

Figure 2. Type of stroke.

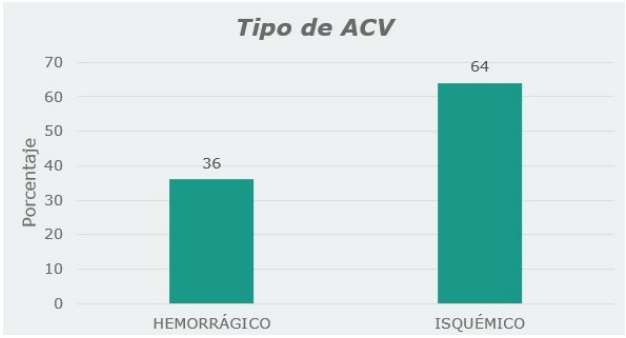


Figure 3. Degree of cerebrovascular accident.

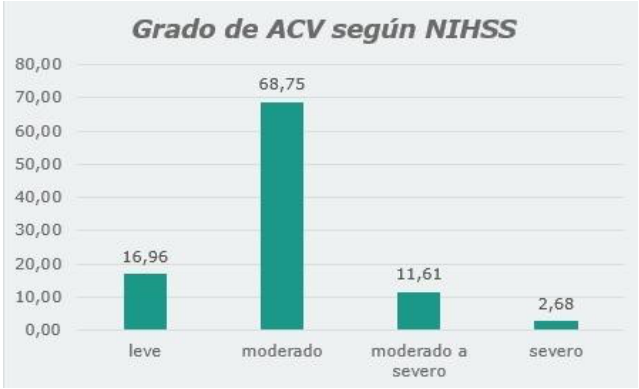
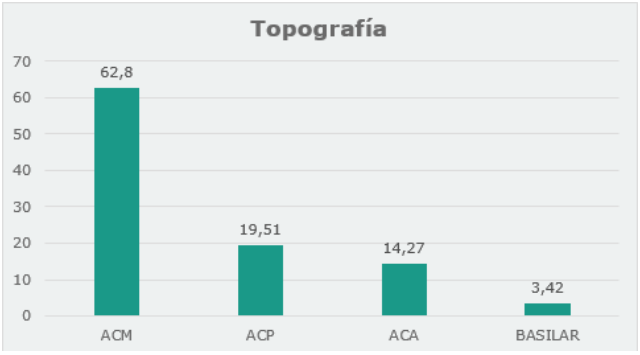


Figure 4. Topography of stroke lesion.



MCA: middle cerebral artery. PCA: posterior cerebral artery. ACA: Anterior cerebral artery.

Mendoza CR reported that the most frequent risk factors were arterial hypertension (61.3%), heart failure (56.2%), and atrial fibrillation (41.2%). In this study, arterial hypertension was identified in 82.90% of the patients, diabetes mellitus in 41.1%, and atrial fibrillation in 10.9%. The discrepancy in data on atrial fibrillation may be due to an insufficient diagnosis at the time of admission or to limitations of the cross-sectional study, in which future diagnoses from the clinical history were not collected [8].

To the clinical manifestations of stroke, Vera DE reported headache in 99% and paresthesia in 87% of cases as the clinical manifestations with the most significant impact. The present investigation revealed hemiparesis in 73.1% of the patients and dysarthria in 60% of the patients [9].

Notably, chronic kidney disease, anemia, and stroke often share common risk factors, such as diabetes and hypertension [10 - 13]. Anemia in chronic kidney disease may exacerbate the effects of other cardiovascular risk factors, further increasing the risk of stroke. However, the presence of kidney disease was not determined in the present study, and future research should focus on this.

Conclusions

In the present investigation, the prevalence of stroke in patients between 50 and 80 years of age in the HTMC emergency service from 2021--2022 was determined to be 317 patients. In terms of epidemiological characteristics, an increasing trend of stroke incidence was observed as the age of the patients increased, with the most affected age group being patients between 70 and 80 years of age. Demographically, the male sex had a greater inclination toward this pathology than did the female sex. This study revealed that the cardinal symptoms associated with clinical manifestations were hemiparesis, dysarthria, and facial asymmetry. The risk factors that were most frequently found in patients with stroke, arterial hypertension, diabetes, and obesity were identified as the main comorbidities. The stroke that was most commonly observed was of ischemic origin, mainly affecting the middle cerebral artery and causing a moderate neurological deficit in most patients.

References

1. Hankey GJ. Stroke. Lancet. 2017 Feb 11;389(10069):641-654. doi: 10.1016/S0140-6736(16)30962-X. Epub 2016 Sep 13. PMID: 27637676.

2. Feske SK. Ischemic Stroke. Am J Med. 2021 Dec;134(12):1457-1464. doi: 10.1016/j.amjmed.2021.07.027. Epub 2021 Aug 27. PMID: 34454905.

3. George MG, Tong X, Bowman BA. Prevalence of Cardiovascular Risk Factors and Strokes in Younger Adults. JAMA Neurol. 2017 Jun 1;74(6):695-703. doi: 10.1001/jamaneurol.2017.0020. PMID: 28395017; PMCID: PMC5559660.

4. Wan S, Dandu C, Han G, Guo Y, Ding Y, Song H, Meng R. Plasma inflammatory biomarkers in cerebral small vessel disease: A review. CNS Neurosci Ther. 2023 Feb;29(2):498-515. doi: 10.1111/cns.14047. Epub 2022 Dec 7. PMID: 36478511; PMCID: PMC9873530.

5. Schäfer A, Flierl U, Berliner D, Bauersachs J. Anticoagulants for Stroke Prevention in Atrial Fibrillation in Elderly Patients. Cardiovasc Drugs Ther. 2020 Aug;34(4):555-568. doi: 10.1007/s10557-020-06981-3. PMID: 32350792; PMCID: PMC7334273.

6. Lopes RP, Gagliardi VDB, Pacheco FT, Gagliardi RJ. Ischemic stroke with unknown onset of symptoms: current scenario and perspectives for the future. Arq Neuropsiquiatr. 2022 Dec;80(12):1262-1273. doi: 10.1055/s-0042-1755342. Epub 2022 Dec 29. PMID: 36580965; PMCID: PMC10658507.

7. Mendelson SJ, Prabhakaran S. Diagnosis and Management of Transient Ischemic Attack and Acute Ischemic Stroke: A Review. JAMA. 2021 Mar 16;325(11):1088-1098. doi: 10.1001/jama.2020.26867. PMID: 33724327.

8. Gidey K, Hailu A. A Prospective Study of Stroke Characteristics, Risk Factors, and Mortality in a Tertiary Hospital of Northern Ethiopia. Int J Gen Med. 2023 Nov 3;16:5051-5061. doi: 10.2147/IJGM.S433353. PMID: 37942476; PMCID: PMC10629449.

9. Garza-Alatorre G, Carrion-Garcia AL, Falcon-Delgado A, Garza-Davila EC, Martinez-Ponce de Leon AR, Botello-Hernandez E. Characteristics of Pediatric Stroke and Association of Delayed Diagnosis with Mortality in a Mexican Tertiary Care Hospital. Neuropediatrics. 2021 Dec;52(6):499-503. doi: 10.1055/s-0041-1731802. Epub 2021 Jul 14. PMID: 34261144.

10. Abril J, Sanchez J. Características de la enfermedad renal crónica en el Ecuador desde el año 2009 hasta el año 2012. [Tesis] Universidad de Cuenca, Ecuador: 2014. dspace

11. Mora-Bravo FG, Torres PTM, Campoverde NR, Carcelen GLB, Mancheno JCS, Tipanta ÁCS, Perez-Grovas H, Abarca WPR. Blood pressure control with active ultrafiltration measures and without antihypertensives is essential for survival in hemodiafiltration and hemodialysis programs for patients with CKD: a prospective observational study. BMC Nephrol. 2025 Jan 17;26(1):30. doi: 10.1186/s12882-025-03948-0. PMID: 39825259; PMCID: PMC11742504.

12. Rivera-González SC, Pérez-Grovas H, Madero M, Saavedra N, López-Rodriguez J, Lerma C. Identification of impeding factors for dry weight achievement in end-stage renal disease after appropriate kidney graft function. Artif Organs. 2014 Feb;38(2):113-20. doi: 10.1111/aor.12133. Epub 2013 Jul 25. PMID: 23889479.

13. Mora-Bravo F, Muñoz J. Impaired Reconversion of Bone Marrow in Nuclear Magnetic Resonance in Patients with Chronic Renal Disease. Curr Med Imaging. 2021;17(10):1256-1261. doi: 10.2174/1573405616999201118140832. PMID: 33213332.

Statements

Ethics committee approval and consent to participate

The bioethics committee of the Faculty of Medical Sciences, Catholic University of Santiago de Guayaquil, Guayaquil, Ecuador, approved the study.

Consent to publish

This information was not needed because the present study did not publish images, radiographs, or specific patient studies.

Conflicts of interest

The research has no financial interests or conflicts of interest.

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Editor's Note

The Journal Actas Médicas (Ecuador) remains neutral concerning jurisdictional claims in published maps and institutional affiliations.

Received: October 1, 2024.
Accepted: January 29, 2025.
Published: February 4, 2025.
Editor: Dr. Mayra Ordoñez Martínez.

How to cite:

Aragundi M, Tenorio J, Sánchez S. Prevalence of stroke in patients aged 50-80 years treated in the emergency room. A single-center observational study. Actas Médicas (Ecuador) 2025;35(1):20-26.

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