

## Research Article

# Epidemiology of Stroke: A Senegalese Study

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## Keywords

• Stroke; Epidemiology; Senegal

## Abstract

Strokes is a public health problem due to their direct annual costs relating to hospital care, related fees and their indirect annual costs linked to the consequences of remaining disability. Stroke is one of the leading causes of morbidity and mortality worldwide. Therefore, epidemiological studies in different parts of the world are needed. The overall objective of this study was to describe the epidemiology of stroke of patients received at the neurology unit of the Retirement Care Center of Dakar in IPRES. It was a retrospective study conducted from January 2010 to April 2016, using patient's medical files. Among 1400 consulted patients, 275 (19.6%) were enrolled in our study. The mean age was  $71.8 \pm 8.7$  years old (extremes: 43-101) with a male predominance (66.2%). Concerning the brain CT-scan, 243 patients (88.4%) presented cerebral infarct. The main risk factors were high blood pressure HBP (80%), diabetes (17.1%) and history of stroke (14.2%). Frequent complications encountered were epilepsy (11.5%) and vascular dementia (8.7%), motor disability (6.5%) and stroke recurrence (6%). Approximately 22 deaths have been noted giving a lethality rate of 12.02%. Most patients (54,44%) experienced clinical improvement. Stroke represents a major public health problem. It is therefore necessary to fight against stroke by early diagnosis and management of risk factors including HBP, especially among the elderly.

## INTRODUCTION

Stroke is a public health problem due to the direct annual costs relating to hospital care, related fees and their indirect annual costs linked to the consequences of residual disability [1]. Stroke is one of the leading causes of morbidity and mortality worldwide [2]. Therefore, epidemiological studies on stroke in different parts of the world are needed [3]. More standardized care through stroke units and rehabilitation centers contributes to reduce mortality, dependence and institutionalization, even if progresses are still remaining [1]. Patients who visit the retirement care center constitute an aging population with a high risk of stroke and a high cost of care with high mortality. However, very little epidemiological data are available on this subject in Africa in particular in Senegal. The objective of our study was to describe the epidemiology of stroke at the Retirement Care Center of Dakar in IPRES.

## METHODS

We conducted a retrospective cross-sectional study from January 2010, to April 2016. We carefully recorded medical files of stroke patients followed as outpatient in the neurology unit of IPRES. We considered all patients who performed a brain CT-scan. We collected data related with the sociodemographic characteristics, paraclinical examinations, risk factors, as well as evolution. Data analysis was done using the software SPSS

21.0. The results were expressed as frequency and means with standard deviation. We also compared percentages and results were considered significant for a *p-value* < 0.05.

## RESULTS

## Descriptive study

During the period of our study, 1400 patients were followed in outpatient neurology unit. Among them, 276 cases presented a stroke. However, only 275 (19.6%) have been exploited due to the availability of brain CT scan.

Patients were aged from 43 to 101 years with a mean age of  $71.8 \pm 8.7$  years. The main age groups represented were 70-79 and 60-69 with respective percentages of 43.3% and 32.7%. We enrolled 182 men (66.2%) and 93 women (33.8%), with a sex ratio of 1.95 for men. 243 (88.4%) patients presented an ischemic stroke.

This study shows us that strokes appear at the age of 40 years and grow regularly up to 79 years for the hemorrhagic stroke and 89 years for ischemic stroke. Hemorrhagic stroke was frequent in the 70-79 and 60-69 age groups with 50% and 25% of hemorrhagic stroke patients. In ischemic stroke patients, the main age groups were 70-79 (42.4%), followed by 60-69 (33.4%). The difference between this age groups among hemorrhagic and ischemic stroke was not statistically significant (*p* = 0, 723).

## Analytical study

High blood pressure (HBP) was found in 29 (90.63%) hemorrhagic stroke patients and 191 (78.6%) of ischemic stroke patients. The difference was statistically significant ( $p = 0, 01$ ).

102 (37%) patients performed an electrocardiogram (EKG). The EKG was normal in 57 and abnormal in 45 patients. However, some patients presented multiple cardiac abnormalities on EKG. The main cardiac abnormality was atrial fibrillation, found in 31% of cases. Trans-thoracic cardiac ultrasound was done in 94 (33.4%) patients and the results were abnormal in 54 patients. Results showed dilated cardiomyopathy among 8 patients. Doppler ultrasound of neck vessels was done in 97 patients and the results were abnormal in 47 (47.4%) patients. It was essentially carotid stenosis found in 19 (7%) cases.

The risk factors found were HBP (80%), diabetes (17.1%), history of stroke (14.2%), smoking (7.6%), alcohol consumption (2.9%), cardiopathy (1.5%), dyslipidemia (1.1%) and obesity (0.4%).

We also found past medical history of epilepsy, dementia, breast cancer, cerebral amyloid angiopathy, chronic obstructive pulmonary disease, cataract, glaucoma, prostatectomy, and femoral neck fracture were found in 0.4% each.

The association of HBP to other risk factors has been analyzed. 14.5% of cases were hypertensive and diabetic, 2.5% were hypertensive and alcoholics and 0.7% were hypertensive and smoker.

For ischemic stroke, aspirin, statins and antihypertensive drugs were frequently prescribed. While statins and antihypertensive drugs were mainly prescribed for hemorrhagic stroke. All patients underwent physiotherapy.

Regarding evolution, 66.5% of patients appeared regularly in control consultations. Many patients (54,44%) experienced clinical improvement with a good motor and phasic recovery.

The complications encountered were epilepsy (11.5%), vascular dementia (8.7%), motor sequelae (6.5%) and stroke recurrence (6%). About 22 deaths have been noted meaning 12% of lethality rate. Mortality were more frequent for hemorrhagic (15.6%) than ischemic stroke (6.99%), and more frequent for men (6%) than women (2%).

## DISCUSSION

We conducted this study in the neurology unit of the Retirement Care Center of Dakar supported for different pathologies. For example, on a population of 1400 patients, we had found a prevalence of 19.6%. This result is significantly lower than a Togolese study where a prevalence of 32.9% was found [4]. In Togo, the study was done in a specialized center of neurology, where all neurological diseases were referred.

In Senegal, according to Ndiaye et al, [5], strokes are the leading neurological conditions representing more than 30% of

hospitalizations in neurology department. A Senegalese [6] study carried out in 2016 at the Dakar neurology department found a prevalence of 31.7% very close to the hospital prevalence in Togo.

In our study, 88.4% of cases presented ischemic stroke, this is close to the prevalence of a Palestinian study that found 82.3% of ischemic stroke. HBP was the main risk factor (90.63%) which is higher than study conducted in Senegal that found 69.7% [7]. Our study was conducted in a geriatric population where hypertension is more common. In Gabon, a rate of 81.9% of hypertension has been noted in stroke patients [7]. We found a male predominance a sex ratio of 1.95. Male predominance has been found in a review conducted by Appelros et al [8].

In our study, 11.6% of the patients had embolic cardiac disease. Among these diseases, atrial fibrillation (36%) was mainly found. Most of African studies found proportions ranging from 23 to 54, 16%, while the European series found lower rates from 5.35 to 13.60% [9-11]

The main complications encountered were epilepsy (11.5%), vascular dementia (8.7%), motor sequelae (6.5%) and stroke recurrence (6%). In England in 1997, Burns et al. [12] reported a frequency of 11.5% of post-stroke seizures which increased with age. It is worth noting that the brain vascular lesions increase the risk of seizures and epilepsy. They are involved in at least third of epilepsies occurring after 60 years and thus represent the most frequent cause of epilepsy in this age group.

## CONCLUSION

At the end of this work, we noticed that strokes represent a major public health problem with serious consequences and disabling sequelae. It is necessary to fight against stroke by early diagnosis of risk factors including hypertension, especially among the elderly. A large-scale sensitization about these risk factors and stroke warning signs will contribute to reduce the burden related to this condition.

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