ISSN: 2690-909X

Research Article

Advances in Neurology and Neuroscience

Recurrent Stroke in University Neurology Departments in Lomé (Togo, West Africa) in 2023-2024

Kossivi Apetse[1,5*], Alois Franklin Mondonga Issey[2,5], Achraf Adou Rahim Alimi[2], Komla Nyinevi Anayo[2,5], Abide Talabewui[3,5], Kodjo Agbeko Djagadou[4], Kokou Mensah Guinhouya[3,5], Komi Assogba[3,5], Mofou Belo[3,5] and Agnon Ayelola Koffi Balogou[2,5]

[1]*Neurology Department, Atakpame Regional Hospital,*

[2]*Neurology Department, Campus University Hospital,*

[3]*Neurology Department, Sylvanus Olympio University Hospital,*

[4]*Internal Medicine Department, Sylvanus Olympio University Hospital, University of Lome, Lome, Togo*

[5]*University Research Team "Nervous System," University of Lome*

[*]Corresponding Author
Kossivi Apetse, University Research Team "Nervous System" , University of Lome, Lome, Togo

Submitted: 2025, Sep 10; **Accepted:** 2025, Oct 13; **Published:** 2025, Oct 27

Citation: Apetse, K., Mondonga Issey, A. F., Adou Rahim Alimi, A., Anayo, K. N., Talabewui, A., et. al., (2025). Recurrent Stroke in University Neurology Departments in Lomé (Togo, West Africa) in 2023-2024. *Adv Neur Neur Sci, 8*(2), 01-06.

Abstract

Introduction: *Recurrent strokes are common and account for a significant proportion of the high morbidity and mortality rates associated with strokes worldwide. In Togo, where stroke remains a public health problem, we have no data on recurrent stroke. The aim of this study is to describe the frequency, subtypes, time to onset, and short-term progression of recurrent stroke in hospitals in Togo.*

Methods: *This is a series of 174 cases of recurrent stroke collected in the neurology departments of university hospitals in Lomé from January 2023 to April 2024. The diagnosis of stroke was made clinically and confirmed by brain imaging. The interview, follow-up records, and hospital medical records were used to characterize previous strokes and recurrences.*

Results: *Recurrences accounted for 9.8% of strokes. The average age of patients was 62.67 +/- 12.67 years, with a predominance of males (54%). The time to recurrence was 12 months in 65.5% of patients. The last stroke was ischemic in 84% of patients, 6.2% of whom had good compliance with antithrombotic therapy. The last follow-up neurology consultation was 3 to 6 months ago in 65% of patients. The ischemic subtype accounted for 78% of recurrences. Death occurred in 13.2% of patients. The factors contributing to recurrence were dominated by treatment discontinuation and, in some cases, inadequate secondary prevention treatment.*

Conclusion: *Most stroke recurrences are ischemic and occur in the context of non-compliance with secondary prevention treatment. Therapeutic education could help reduce the incidence of stroke recurrence.*

Keywords: Recurrence, Stroke, Togo

1. Introduction

Stroke remains a major public health concern worldwide, particularly in low- and middle income countries. Between 1990 and 2019, there was a 70% increase in the incidence of stroke, a 43% increase in stroke-related deaths, and a 102% increase in the prevalence of stroke. Today, it is estimated that one in four people will have a stroke in their lifetime [1]. By 2050, there are projected to be 21.43 million stroke cases, 159.31 million survivors, 12.05 million deaths, and 224.86 million disability- rected life years due to stroke worldwide [2]. Significant efforts are being made in primary and secondary prevention to reduce the mortality and morbidity of this condition, which disrupts the social and professional lives of millions of people [3-5]. However, recurrent strokes, defined as the occurrence of new episodes of stroke regardless of their form, location, or timing, are highly prevalent worldwide, ranging from 30% to 43% at 5 years. These recurrent events lead to prolonged hospitalizations, increased disability and costs, and higher mortality [6,7].

In sub-Saharan Africa, strokes are a major public health problem due to their incidence and morbidity and mortality rates. One of the particularities of strokes in sub-Saharan Africa is the high mortality rate related to limited infrastructure and resources, but also to cultural specificities [8]. The few studies on stroke recurrence report the same trend as in other countries around the world [9-11]. In Mali, the hospital frequency of stroke recurrence was 15.8% [9]. In Benin, the main causes of death after the first stroke were recurrence, accounting for 30.5% of causes [8]. In Togo, where stroke remains a major public health problem [12], no studies have focused on recurrent stroke. The main objective of this study is to describe the profile of recurrent stroke in neurological hospitals in Togo in order to better guide secondary prevention strategies after stroke.

2. Method

We conducted a series of case studies between January 1, 2023, and April 15, 2024, in the neurology departments of the Centre Hospitalier Universitaire (CHU) Campus and the CHU Sylvanus Olympio (CHU SO), the two largest of the three university hospitals in Togo, located in the capital, Lomé. These two departments treat an average of 1,500 and 400 strokes patients per year, respectively. The archiving of records is not computerized. However, hospitalization and follow-up data are recorded in an individual health record kept by the patient. Neither center has a neurovascular unit, and there is no dedicated stroke care pathway. Arterial recanalization therapies are not yet available in Togo. The costs of care are borne by patients, the majority of whom do not have health insurance coverage.

Patients aged 18 years or older, hospitalized for stroke with one or more previous strokes, the most recent episode of which was documented (date, type), were included. Strokes were diagnosed with certainty and confirmed by medical imaging (CT or MRI scan of the brain). Data were collected from individual survey forms created for this purpose. Information was gathered after verbal consent was obtained from health records, patient medical files, and patients and/or their caregivers in cases where the patient was unable to communicate clearly. The data collection was conducted by two investigators and consisted, on the one hand, of a census of the medical records of patients who had been hospitalized for stroke during the study period and, on the other hand, of follow-up of patients during their hospitalization.

All patients underwent the same protocol to study their sociodemographic, clinical, and paraclinical characteristics based on a complete review of the selected records, an interview, and a complete neurological examination to determine the date of stroke onset, cardiovascular risk factors, neurological and non-neurological signs, additional tests performed, treatment received in the neurology department, and clinical progress during hospitalization. Etiologies were grouped according to the TOAST classification [13]. Data collection was performed using Kobocollect software version 2.024.12, then processed and analyzed using Microsoft Excel version 2021 and Janovi 1.6.3 software. The results are presented as proportions for qualitative variables. The Chi2 test was used to compare qualitative variables, and One- -way ANOVA were used to compare quantitative variables. The α significance threshold was set at 5%.

Informed consent was obtained from the patients or their parents. The anonymity of the individuals was respected and the opinion of the ethics committee of the Faculty of Health Sciences gave its favorable opinion before the start of the work.

3. Results

3.1. General Data

3.1.1. Frequency of Stroke Recurrence

During the study period, 2,697 patients were hospitalized, 2,095 (77.7%) at the CHU Campus and 602 (22.3%) at the CHU SO, of whom 1,896 (70.3%) were for stroke. Of these, 186 (9.8%) had a recurrent stroke, of which 174 (9.2%) with usable records were included in this study.

3.1.2. Socio-Demographic Data

The demographic characteristics of the 174 patients are summarized in Table 1. The mean age of the patients was 62.43 + /- 12.44 years, with extremes of 33 and 95 years. Ninety-four patients (54%) were male and 80 patients (46%) were female, with a male-to-female ratio of 1.18.

	Number	Proportion(%)
Occupational status		
Employed	58	28.7
Self-employed	44	16.7

Retired	21	12.0
Unemployed	1	0.6
Level of education		
No schooling	49	28.2
Primary	62	35.6
Secondary	38	21.8
University	24	13.8
Not specified	1	0.6
Marital status		
Single	49	28.2
Divorced	62	35.6
Married	38	21.8
Not specified	1	0.6
Area of residence		
Urban	149	85.6
Rural	25	14.4

Table 1: Demographic Characteristics of 174 Patients Hospitalized for Recurrent Stroke, Togo, 2024

3.2. Characteristics of Previous Strokes Prior to Recurrence

The number of previous hospitalizations for stroke ranged from one (149 patients, 85.6%) to five (one patient, 0.6%). The last previous hospitalization for stroke was at the CHU-Campus for 112 patients (64.4%) and at the CHU-SO for 59 patients (33.9%). At the time of this last episode, 145 patients (83.3%) had had a ischemic stroke (IS) and 29 (16.7%) had had a hemorrhagic stroke (HS). For IS, the etiologies were undetermined in 93.1%, arteriosclerosis in 2.1%, and embolic heart disease in 4.8% of cases. The causes of hemorrhagic strokes were undetermined, in 72.4% of cases and hypertension in 27.6%. At the end of the last previous stroke episode, 79.3% of patients had a modified Rankin score ≥ 2.

3.3. Secondary Prevention Medical Treatment Before Recurrence

Of the 141 patients who had experienced a non-cardioembolic ischemic stroke, 23 (16.3%) were on antiplatelet therapy, of whom 15 (65.2%) had discontinued treatment. The main reason for non-adherence was negligence in 11 (47.8%) patients, lack of money in 3 (13.0%) patients, and unknown in 9 (39.1%) patients. The main modifiable cardiovascular risk factors known at the time of the episode prior to recurrence are presented in Table 2.

	Number (%)	**Patients receiving treatment (%)**	**Patients who had stopped treatment**	**Cause of treatment discontinuation n (%)**
High blood pressure	167 (96.0)	131 (78.4)	73 (55.7) of which 85% were secondary education level and above	Neglect: 56 (76.7) Lack of money: 17 (23.3)
Diabetes	49 (28.2)	39 (79.6)	19 (48.7) all with secondary education level or higher	Neglect: 10 (52.6) Lack of money: 9 (47.4)
Embolic heart disease	7 (4.0)	3 (4.3)	2 (66.7) all at primary education level	Lack of money: 2 (100.0)
Dyslipidemia	60 (34.8)	4 (6.7)	1 (25.0)	Neglect: 1 (100.0)
Smoking	7 (4.0)	-	-	-
Alcoholism	47 (27.0)	-	-	-
Sedentary lifestyle	10 (5.8)	-	-	-
Obesity	3 (1.7)	-	-	-
HIV infection	8 (4.6)	-	-	-
Sickle cell disease	1 (0.6)	-	-	-

Table 2: Main Known Cardiovascular Risk Factors at the Previous Episode in 174 Patients Hospitalized for Recurrent Stroke, Togo, 2024

3.4. Recurrent Stroke

3.4.1. Time Between the First Episode and the Current Stroke Episode

The time between the last follow-up visit and recurrence was 0-3 months, 3-6 months, or more than 6 months in 20 patients (11.5%), 113 patients (64.9%), and 38 patients (21.8%), respectively. In 65.5% of patients, the interval between the last two stroke episodes was more than 12 months (Table 3).

	Number	Proportion (%)
≤ 3	2	1.2
]3–6[	31	17.8
]6–12[	27	15.5
≥12	114	65.5

Table 3: Time in Months Between the Last Two Stroke Episodes in 174 Patients Hospitalized for Recurrent Stroke, Togo, 2024 (N=174)

3.4.2. Type of Stroke

IS was observed in 136 patients (78.2%) and HS stroke in 38 patients (21.8%). IS was the most common type in both the first and second episodes (Table 4).

Type of stroke in the episode prior to recurrence		Type of stroke at recurrence	
	Hemorrhagic stroke	Ischemic Stroke	Total
Hemorrhagic stroke	16 (9.20)	13 (7.47)	29 (16.67)
Ischemic Stroke	22 (12.64)	123 (70.69)	145 (83.33)
Total	38 (21.84)	136 (78.16)	174 (100.00)

Table 4: Type of Stroke at Recurrence According to the Type of Stroke in the Previous Episode in 174 Patients Hospitalized for Recurrent Stroke, Togo, 2024 (N=174)

The causes of stroke are presented in Table 5. Undetermined causes accounted for 72.1% of IS cases, while high blood pressure accounted for 86.8% of HS cases (Table 5).

	Number	Proportion (%)
Ischemic Stroke	***136***	
Embolic heart disease	18	13.2
Small artery disease	20	14.7
Undetermined cause	98	72.1
Hemorrhagic stroke	***38***	
High blood pressure	33	86.8
Undetermined cause	5	13.2

Table 5: Etiologies of the 174 Cases of Recurrent Stroke, Togo, 2024

3.4.3. Hospitalization Outcomes

Bronchopneumopathies were the most common complications (Table 6). Death occurred in 23 patients, representing a hospital mortality rate of 13.2% (10.4% for IS and 2.9% for HS) .

	Number	%
No complications	136	78.2
Bronchopneumopathy	23	13.2
Bronchopneumopathy and urinary tract infection 5	2.9	
Urinary tract infection	3	1.7
Pressure ulcer	3	1.7
Bronchopneumopathy and bedsores	2	1.2

Table 6: Complications in 174 Patients Hospitalized for Recurrent Stroke, Togo, 2024

4. Discussion

4.1. Limitations

This study encountered a number of difficulties. During data collection, we encountered cases where the information in the files was incomplete for the retrospective part. During the etiological research, the technical or financial inaccessibility of certain additional tests sometimes limited our investigations. However, this study, conducted in the two largest neurology centers in Togo, reflects the realities of a hospital system without specialized units, which makes the results particularly representative of resource-limited contexts.

4.2. Frequency and Type of Stroke Recurrence

During our study period, out of 1,896 stroke cases, 9.8% were recurrences. This frequency is similar to those reported by Sissoko et al. in Mali [9] and Dabilgou et al. in Burkina Faso [10]. The previous stroke episode was ischemic in 83.3% of cases and hemorrhagic in 16.7%. Recurrence was ischemic in 136 patients (78.2%) and hemorrhagic in 38 patients (21.8%). Thus, recurrences are predominantly ischemic and occur more frequently in patients who have had an ischemic stroke. These results are similar to those reported by Dabilgou et al. in Burkina Faso [10]. This reflects the complexity of secondary prevention after an ischemic stroke compared to that after a hemorrhagic stroke.

4.3. Socio-Demographic Data

- **Age and Gender of Patients**

The average age of patients was 62.43 years, ranging from 33 to 95 years. This result is similar to that of Sissoko et al [9], who reported an average age of 63 years. There was a predominance of males (54%). Our result is similar to that of Sissoko et al [9], who reported a male predominance of 51%. These characteristics are comparable to those of stroke patients in general in Togo [14,15].

- **Level of Education**

In this series, treatment discontinuation was observed even in patients with a high level of education. One would expect greater adherence to secondary care measures when the level of education is high, as reported in Burkina Faso [9] and China [16]. This trend will be better assessed through an analytical study, as this series only offers the possibility of exploratory analysis.

4.4. Time to Recurrence of Stroke

The time to recurrence was 12 months or more in 65.5% of patients, 3 to 6 months in 17.8% of cases, and 6 to 12 months in 15.5% of cases [10,17,18]. Previous studies have reported that the majority of recurrences occur within 12 months af f the stroke. The last follow-up consultation in neurology before recurrence was 3 to 6 months in 65% of cases. Therefore, patients should be monitored, particularly around one year after the stroke. This follow-up could be organized with local healthcare facilities to promote access for all patients.

4.5. Short-Term Progression

Bronchopneumopathies were the most common complications during hospitalization. Stroke recurrence increases the risk of pseudobulbar syndromes, leading to swallowing disorders that promote inhalation pneumonia [19, 20]. The mortality rate was 13.2%. This corresponds to the mortality rate for ischemic strokes in hospitals in Togo [12]. Our result is close to those of series from sub-Saharan Africa, which range between 10% and 13.5% [10]. Lekoubou et al. in Cameroon reported that recurrence increases the risk of death by 43% [11].

4.6. Risk Factors for Stroke Recurrence

Hypertension was the most common modifiable risk factor found in 96% of patients. Before recurrence, 78.4% of patients were on antihypertensive treatment, of whom 55.7% had discontinued treatment. In African series on stroke recurrence, hypertension remains the most commonly reported factor. For example, Sissoko et al [9] reported a proportion of 76% of hypertensive patients, 71% of whom were not receiving antihypertensive treatment. This reflects inadequate management and non-compliance with antihypertensive treatment during secondary prevention in our context. The main reason for treatment discontinuation was negligence in 77% of patients and lack of money in 13% of patients. In this study, a similar finding was made regarding diabetes and dyslipidemia. However, these factors are well known as risk factors for recurrent stroke [21-23]. It is therefore imperative that healthcare providers become more involved in raising patient awareness in order to achieve better compliance with secondary prevention treatments. In addition, action is needed to make these treatments accessible to the population.

Nearly 13% of patients who suffered recurrent IS had embolic heart disease, while less than 5% of patients were taking anticoagulants at admission. This proportion remains underestimated, as embolic heart disease accounts for approximately 27% of IS in sub-Saharan Africa [24, 25]. This reflects the inadequacy of secondary prevention, probably linked to the difficulties of etiological research into strokes in our context. This has also been observed in Guadeloupe [26], hence the need to encourage thorough investigation of cardioembolic causes during the first ischemic strokes. Thus, the factors contributing to recurrence are dominated by non-compliance with treatment and, in some cases, inadequate secondary prevention treatment.

5. Conclusion

Stroke recurrence is common in hospitalization in our context, with a proportion similar to that reported in the literature. Recurrences are mainly ischemic and occur more frequently in patients who have had an ischemic stroke in the past. The factors contributing to recurrence are dominated by non-compliance with treatment and, in some cases, inadequate secondary prevention treatment. Therapeutic education could help reduce the incidence of recurrent stroke. A collaborative sub-regional case-control analytical study would enable the importance of these factors in the occurrence of recurrent stroke to be assessed.

References

1. Yasufuku, Y., & GBD 2021 Stroke Risk Factor Collaborators. (2024). Global, regional, and national burden of stroke and

its risk factors, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021. The Lancet Neurology, 23(10), 973-1003.
2. Cheng, Y., Lin, Y., Shi, H., Cheng, M., Zhang, B., Liu, X., ... & Xie, W. (2024). Projections of the stroke burden at the global, regional, and National levels up to 2050 based on the global burden of disease study 2021. Journal of the American Heart Association, 13(23), e036142.
3. Chin, J. H. (2012). Stroke in sub-Saharan Africa: an urgent call for prevention. Neurology, 78(13), 1007-1008.
4. O'donnell, M. J., Xavier, D., Liu, L., Zhang, H., Chin, S. L., Rao-Melacini, P., ... & Yusuf, S. (2010). Risk factors for ischaemic and intracerebral haemorrhagic stroke in 22 countries (the INTERSTROKE study): a case-control study. The Lancet, 376(9735), 112-123.
5. O'Donnell, M. J., Chin, S. L., Rangarajan, S., Xavier, D., Liu, L., Zhang, H.,& Yusuf, S. (2016). Global and regional effects of potentially modifiable risk factors associated with acute stroke in 32 countries (INTERSTROKE): a case-control study. The lancet, 388(10046), 761-775.
6. Mozaffarian, D., Benjamin, E. J., Go, A. S., Arnett, D. K., Blaha, M. J., Cushman, M., ... & Turner, M. B. (2016). Heart disease and stroke statistics—2016 update: a report from the American Heart Association. circulation, 133(4), e38-e360.
7. Oza, R., Rundell, K., & Garcellano, M. (2017). Recurrent ischemic stroke: strategies for prevention. American family physician, 96(7), 436-440.
8. Adoukonou TA, Agbétou M, Kossi OR, Gnonlonfoun DD, Houinato D, et al.. Prognosis of stroke in West Africa. French Language Neurology Days 2020, Sep 2020, Lyon, France. pp.S135, ⟨10.1016/j.neurol.2020.01.015⟩. ⟨hal-02937593⟩
9. Sissoko AS, Cissé A, Coulibaly T, Diallo SH, Koné Z, Djimdé SO, Maïga Y, Guinto CO. Clinical and paraclinical aspects of stroke recurrence at CHU Point G (Bamako). Health Sciences and Diseases. 2020. 21(8): 100-104.
10. Dabilgou AA, Dravé A, Kyelem JMA, Zoungrana R, Napon C, Millogo A, Kaboré J. Frequency of recurrent stroke in Burkina Faso: an observational hospital-based study of 6 months. Pan Afr Med J. 2021 Oct 19;40:108.
11. Lekoubou, A., Nkoke, C., Dzudie, A., & Kengne, A. P. (2017). Recurrent stroke and early mortality in an urban medical unit in Cameroon. *Journal of Stroke and Cerebrovascular Diseases, 26*(8), 1689-1694.
12. Kumako V, Apetse K, Agba L, Damelan K, Belo M, Balogou A. Morbidity and mortality of cerebrovascular accidents in TOGO. Revue neurologique Elsevier Masson. 2023.
13. Adams H, Bendixen B, Kappelle L, Biller J, Love B, Gordon DL, et al. Classification of subtype of acute ischemic stroke. Definitions for use in a multicenter clinical trial. TOAST. Trial of Org 10172 in Acute Stroke Treatment. Stroke 1993; 24(1):35-41.
14. Balogou AK, Apetse K, Bayo M. Strokes in hospitals in Togo: Journal of Epidemiology and Population Health 72 (2024) 202644.
15. Assogba K, Belo M, Folly E, Apetse K, Kombate D, Ekouevi K et al. Epidemiology, risk factors, type and outcome of stroke in health care facilities of Lomé, Togo: A prospective study. Science Journal of Public Health 2015; 3(1): 25-30.
16. Che B, Shen S, Zhu Z, Wang A, Xu T, Peng Y, Li Q, Ju Z, Geng D, Chen J, He J, Zhang Y, Zhong C. Education Level and Long-term Mortality, Recurrent Stroke, and Cardiovascular Events in Patients With Ischemic Stroke. J Am Heart Assoc. 2020 Aug 18;9(16):e016671.
17. Burn J, Dennis M, Bamford J, Sandercock P, Wade D, Warlow C. Long-term risk of recurrent stroke after a first-ever stroke. The Oxfordshire Community Stroke Project. Stroke. 1994 Feb;25(2):333-7.
18. Hankey GJ, Jamrozik K, Broadhurst RJ, Forbes S, Burvill PW, Anderson CS, StewartWynne EG. Long-term risk of first recurrent stroke in the Perth Community Stroke Study. Stroke. 1998 Dec;29(12):2491-500.
19. Guyomard V, Fulcher RA, Redmayne O, Metcalf AK, Potter JF, Myint PK. Effect of dysphasia and dysphagia on inpatient mortality and hospital length of stay: a database study. J Am Geriatr Soc. 2009 Nov;57(11):2101-6.
20. Song W, Wu M, Wang H, Pang R, Zhu L. Prevalence, risk factors, and outcomes of dysphagia after stroke: a systematic review and meta-analysis. Front Neurol. 2024 Jul 17;15:1403610.
21. Zuber M. Risk factors for recurrent stroke. Eurotext.1997; No. 9: 543-9.
22. Kolmos M, Christoffersen L, Kruuse C. Recurrent Ischemic Stroke – A Systematic Review and Meta-Analysis. J Stroke Cerebrovasc Dis 2021;30:105935.
23. Wong Y-S, Tsai C-F, Ong C-T. Risk factors for stroke recurrence in patients with hemorrhagic stroke. Sci Rep 2022 ;12 :17151.
24. Mboup MC, Sarr SA, Dia K. Etiological aspects of ischemic strokes in Senegal. Pan African Medical Journal. 2015; 22:201.
25. Gnonlonfoun D, Adjien C, Gnimavo R, Goudjinou G, Hotcho C, Nyangui Mapaga J, Sowanou A, Gnigone P, Domingo R, Houinato D. Ischemic stroke due to embolic heart diseases and associated factors in Benin hospital setting. J Neurol Sci. 2018 Apr 15;387:124-128.
26. Flemin F. Epidemiology and risk factors for stroke recurrence at Guadeloupe University
27. Hospital between 2019 and 2021. Neurosciences [q-bio.NC]. 2023. dumas-04938455