

Clinical and Etiological Characteristics of Epilepsy in the Elderly: A Hospital-Based Study from a Tertiary Care Referral Center of Niamey, Niger

Hamid Assadeck^{1,2} Moussa Toudou-Daouda¹ Zakaria Mamadou¹ Mahadi Moussa-Konate³
 Fatimata Hassane-Djibo¹ Dijbo Douma-Maiga²

¹Department of Neurology, National Hospital of Niamey, Niamey, Niger

²Department of Medicine and Medical Specialties, Faculty of Medicine and Pharmacy, Abdou Moumouni University, Niamey, Niger

³Department of Neurology, General Reference Hospital of Niamey, Niamey, Niger

Address for correspondence Moussa Toudou-Daouda, MD, Department of Neurology, National Hospital of Niamey, PO Box 238, Niamey, Niger (e-mail: moussatoudou@gmail.com).

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Abstract

Objectives The aim of this study is to evaluate the management of epilepsy in the elderly at a tertiary referral center in Niger to obtain a comprehensive understanding to determine the intrahospital deficiencies to improve and to make recommendations in terms to improve the management of epilepsy in the elderly in Niger.

Materials and Methods We conducted a retrospective study at the Neurology Out-patient Clinic of the National Hospital of Niamey (Niger) over a period of 5 years from May 2013 to May 2018, collecting all cases of patients aged 60 years or over diagnosed with epilepsy by neurologists. From the registers of consultation, we collected and analyzed for each patient the demographic, clinical, etiological, and therapeutic data, as well as the outcomes during follow-up visits.

Results Of the 4,576 patients of all ages seen during the period of our study, we included 62 patients aged 60 years or over diagnosed with epilepsy with a hospital frequency of 1.35%. The mean age of patients was 65.82 ± 5.72 years (range: 60 and 83 years) with a predominance of the male sex (sex ratio at 1.6). Patients aged 60 to 64 years were the most represented (43.5%). Generalized tonic-clonic seizures were the most frequent (41.9%), followed by focal to bilateral tonic-clonic seizures (25.8%). All patients underwent electroencephalogram. Only 30 patients (48.4%) underwent brain imaging, and mainly brain computed tomography scan. The etiologies included poststroke epilepsy (25.8%), brain tumors (3.2%), cerebral toxoplasmosis (3.2%), and cerebral meningioma (1.6%). We found 41 cases (66.1%) of epilepsy without definite etiology and with an incomplete workup. Carbamazepine and phenobarbital were the only two antiepileptic drugs (AEDs) used.

Conclusion The present study shows limited access to newer generation AEDs and diagnostic tests of epilepsy in Niger. Considerable efforts should be made to facilitate for people living with epilepsy the accessibility to diagnostic tests and the newer generation AEDs to improve the quality of epilepsy management in Niger.

Keywords

- ▶ elderly
- ▶ epilepsy
- ▶ hospital-based study
- ▶ Niamey
- ▶ Niger
- ▶ sub-Saharan Africa



Introduction

Epilepsy is one of the most common chronic neurological diseases affecting > 50 million people worldwide of all ages regardless of gender, and regardless of their geographic and ethnic origin.¹ It constitutes a major public health concern in the world, particularly in developing countries, especially in sub-Saharan African countries. Nearly 80% of people worldwide living with epilepsy reside in developing countries.¹ The incidence of epilepsy increases substantially with age and peaks after the age of 80 years.² Epilepsy is the third neurological condition in the elderly following stroke and dementia.³ Nowadays, the proportion of the elderly in sub-Saharan Africa increases progressively because of the improvement in the quality of health care and consequently, an augmentation of cardiovascular, cerebrovascular, and neurodegenerative diseases and neoplasms, which increase the incidence of epilepsy in the elderly. Only a few studies had been published on epilepsy in the elderly in sub-Saharan Africa.⁴⁻⁶ In Niger, there are no epidemiological data on epilepsy in the elderly. Thus, we designed this study to evaluate the management of epilepsy in the elderly at a tertiary referral center in Niger to obtain a comprehensive understanding to determine the intrahospital deficiencies to improve and to make recommendations in terms to improve the management of epilepsy in the elderly in Niger.

Materials and Methods

Study Design

We retrospectively collected from the registers of consultation all patients aged 60 years or over diagnosed with epilepsy by Neurologists at the Neurology Outpatient Clinic of the National Hospital of Niamey (Niger) over a period of 5 years from May 2013 to May 2018. Until the beginning of the year 2018, this hospital was the sole largest urban and tertiary care referral center in Niger that had neurologists. People living with neurological diseases were generally referred to this referral center for specialized care before the year 2018. This hospital covers an area of 23,120.50 m² and comprises 36 buildings with a bed capacity of 790. Until this day, it attracts people from all corners of the country to seek medical care in various medical fields.

The study was approved by the Institutional Review Board of the Faculty of Medicine of Abdou Moumouni University of Niamey (Niger) in accordance with the Declaration of Helsinki.

Patients

The study included all patients aged 60 years or over that consulted at the Neurology Outpatient Clinic of the National Hospital of Niamey (Niger) for epilepsy. The diagnosis of epilepsy was made for all patients by neurologists according to the 2014 revised definition of epilepsy of International League Against Epilepsy (ILAE) official report: at least two unprovoked (or reflex) seizures occurring > 24 hours apart or one unprovoked (or reflex) seizure in individuals who have risk factors such as cerebrovascular disease, central

nervous system infection, and traumatic brain injury.⁷ For each patient, we collected from the registers of consultation the following information: age of diagnosis, gender, medical history, type of seizure, type of epilepsy, and antiepileptic treatment. All patients underwent electroencephalogram (EEG). Brain imaging (magnetic resonance imaging [MRI] or computed tomography [CT] scan) had not been performed in many patients because of limited access. Only 30 patients (48.4%) underwent brain imaging, and mainly CT scan of the brain. All patients received laboratory tests including standard biochemistry (fasting blood glucose, creatinine, urea, sodium, potassium, C-reactive protein, and transaminases), blood count, erythrocyte sedimentation rate, and serological tests for human immunodeficiency virus, syphilis, hepatitis B, and hepatitis C. Systemic immunological tests (soluble antinuclear antigen antibodies, antinuclear antibodies, anti-double-stranded deoxyribonucleic acid, etc.) and measurement of antineuronal antibodies were not performed. All patients were followed and evaluated during the period of the study by neurologists. The response to antiepileptic treatment was evaluated during the follow-up visits. We considered a patient to have poor drug compliance when epileptic seizures are well controlled in case of regular drug intake and then in case of recrudescence of epileptic seizures when drug intake is imperfect or irregular (drug intake jump).

Statistical Analysis

In the descriptive analysis of the data, patient characteristics were expressed as percentages for the qualitative variables and mean \pm standard deviation for the quantitative variables. The chi-squared test of Pearson was used to compare the proportions of the qualitative variables. The Student's *t*-test was used to compare two observed means. To examine the difference between several groups, we used one-way analysis of variation. Values of $p < 0.05$ were considered as statistically significant. All statistical analyses were performed with SPSS software version 20.0 (SPSS Inc., Armonk, New York, United States).

Results

Demographic Characteristics

During the period of the study, 4,576 patients of all ages consulted at the Neurology Outpatient Clinic of National Hospital of Niamey (Niger), among whom 62 patients aged 60 years or over had epilepsy with a hospital frequency of 1.35%. ► **Table 1** summarizes the demographic characteristics of the 62 patients. We included 38 men and 24 women with males-to-females ratio of 1.6. The patients were aged 60 to 83 years with a mean age of 65.82 ± 5.72 years. Patients aged 60 to 64 years were the most represented (43.5%). Cerebrovascular disease was the main medical history of patients (21%). We found no statistically significant difference between the mean age of men and women (66.16 ± 6.25 years for men vs. 65.29 ± 4.83 years for women, $p = 0.56$).

Clinical Characteristics

Generalized tonic-clonic seizures were the most frequent (41.9%) followed by focal to bilateral tonic-clonic seizures

Table 1 Demographic characteristics of patients (*n* = 62)

Variables	<i>n</i> (%)
Sex	
Males	38 (61.3)
Females	24 (38.7)
Sex ratio (males/females)	1.6
Age (years)	
Mean	65.82 ± 5.72
Range	60–83
Mean/males	66.16 ± 6.25
Mean/females	65.29 ± 4.83
60–64	27 (43.5)
65–69	16 (25.8)
70–74	14 (22.6)
>75	5 (8.1)
Past medical history	
Human immunodeficiency virus infection	1 (1.6)
Arterial hypertension	2 (3.2)
Arterial hypertension associated with diabetes	1 (1.6)
Cerebrovascular disease	13 (21)
Cerebral toxoplasmosis	1 (1.6)
None	44 (71)

(25.8%) (► **Table 2**). Hemiparesis and aphasia were the two associated clinical signs. Generalized tonic-clonic seizures and focal to bilateral tonic-clonic seizures were the most frequent in patients aged 60 to 64 years (► **Table 3**). We found no statistically significant difference between the mean age of patients with focal epilepsies and those with generalized epilepsies (67 ± 6.59 years versus 64.39 ± 4.1 years; $p = 0.074$).

Etiologies

An etiology was identified only in about one-third of patients (33.9%) (► **Table 2**). Among the identified etiologies, cerebrovascular disease was the most common. The other two-thirds of patients had no definite etiology, and the workup was incomplete. Only 30 patients (48.4%) underwent brain imaging and was normal in nine patients (14.5%). No patient received the measurement of antineuronal antibodies for autoimmune encephalitis. Poststroke epilepsy was the most frequent in patients aged 60 to 64 years (► **Table 3**).

Therapeutic Characteristics and Outcomes during Follow-Up Visits

Carbamazepine (CBZ) and phenobarbital (PB) were the only two molecules used in our patients (► **Table 2**). Only two patients (3.2%) had received a dual therapy associating CBZ and PB.

We did not have any cases of drug resistance in this study. However, we found 18 patients (29%) with poor drug compliance with persistent epileptic seizures. All 18 patients had no established etiological diagnosis, and the workup was incomplete.

Table 2 Clinical, etiological, and therapeutic characteristics as well as the outcomes of patients (*n* = 62)

Variables	<i>n</i> (%)
Seizure types	
Generalized myoclonic seizures	2 (3.2)
Generalized tonic-clonic seizures	26 (41.9)
Focal aware seizures	12 (19.4)
Focal impaired awareness seizures	6 (9.7)
Focal to bilateral tonic-clonic seizures	16 (25.8)
Associated clinical signs	
Hemiparesis	2 (3.2)
Aphasia	1 (1.6)
Clinical diagnoses of epilepsy	
Generalized epilepsies	28 (45.1)
Focal epilepsies	34 (54.9)
Electroencephalographic diagnoses of epilepsy	
Generalized epilepsies	22 (35.5)
Focal epilepsies	29 (46.8)
Normal electroencephalogram	11 (17.7)
Etiologies	
Cerebral meningioma	1 (1.6)
Poststroke epilepsy	16 (25.8)
Cerebral toxoplasmosis	2 (3.2)
Brain tumor	2 (3.2)
Not determined	41 (66.1)
Antiepileptic drugs	
Carbamazepine	45 (72.6)
Phenobarbital	15 (24.2)
Carbamazepine + phenobarbital	2 (3.2)
Outcomes during follow-up visits	
Seizure control	44 (71)
Poor drug compliance	18 (29)
Death	3 (4.8)
Stroke recurrence	2 (2.6)
Memory disorders	1 (1.6)

Two patients presented stroke recurrence. These patients were aged 60 to 64 years (► **Table 3**). We recorded three deaths among which one patient had died following a stroke recurrence.

Discussion

In this 5-year retrospective study, we evaluate the management of epilepsy in the elderly at a tertiary referral center in Niger to obtain a comprehensive understanding to determine the intrahospital deficiencies to improve and to make recommendations in terms to improve the management of epilepsy in the elderly in Niger. The age of 60 years or over is used to define the elderly in Niger. To remind, the life expectancy at birth of people from Niger is 61.8 years, and people aged

Table 3 Demographic, clinical, etiological, and therapeutic characteristics as well as the outcomes of the patients by age group

Variables	Age group				Total
	60–64	65–69	70–74	>75	
Sex					
Male	16	11	7	4	38
Female	11	5	7	1	24
Past medical history					
Human immunodeficiency virus infection	1	0	0	0	1
Arterial hypertension	1	1	0	0	2
Arterial hypertension associated with diabetes	1	0	0	0	1
Cerebrovascular disease	5	4	2	2	13
Cerebral toxoplasmosis	1	0	0	0	1
Seizure types					
Generalized myoclonic seizures	2	0	0	0	2
Generalized tonic-clonic seizures	13	7	6	0	26
Focal aware seizures	3	4	3	2	12
Focal impaired awareness seizures	0	1	3	2	6
Focal to bilateral tonic-clonic seizures	9	4	2	1	16
Etiologies					
Cerebral meningioma	1	0	0	0	1
Poststroke epilepsy	6	5	3	2	16
Cerebral toxoplasmosis	1	1	0	0	2
Brain tumor	2	0	0	0	2
Not determined	17	10	11	3	41
Antiepileptic drugs					
Carbamazepine	19	11	12	3	45
Phenobarbital	8	4	1	2	15
Carbamazepine + phenobarbital	0	1	1	0	2
Outcomes during follow-up visits					
Seizure control	21	10	10	3	44
Poor drug compliance	6	6	4	2	18
Death	2	0	1	0	3
Stroke recurrence	2	0	0	0	2
Memory disorders	0	0	1	0	1

60 years or over represent only 4.2% of the general population.⁸ We considered consequently in this study a patient as an elderly any patient aged 60 years or over. We study only the people aged 60 years or over living with epilepsy which consulted at the Neurology Outpatient Clinic of the National Hospital of Niamey (Niger).

The hospital frequency of epilepsy in the elderly in the present study was 1.35% that appeared to be low. Kuate-Tegueu et al⁵ reported in 2015 in two Urban Health Centers of Douala (Cameroon) a hospital frequency of patients aged 60 or over of 3.7% that is twice higher to that observed in our study. In a Malian hospital-based study in 2013,⁴ the hospital frequency of patients aged 60 or over was 1.31% (23/1,753) that is similar to our findings. In a door-to-door survey in Ecuador, Placencia et al⁹ reported a prevalence of epilepsy in the people aged 60 years or over of 1.27% for all ages

(92/72,121) and 15.3% (92/5,990) for ages superior or equal to 60 years. This observed difference could be explained by the fact that the methodology and the design are different between these studies.

We noted in this study a predominance of focal-onset seizures (54.9%). This predominance of focal-onset seizures has been reported previously in several studies.^{4,6,10,11} However, Kuate-Tegueu et al⁵ reported as far as they are concerned in Cameroon a predominance of generalized tonic-clonic seizures (44%). The high prevalence of focal brain lesions in the elderly explains this predominance of focal-onset seizures in these persons.

Only 30 patients (48.4%) had received brain imaging in this study because of its limited accessibility for the majority of patients. Among the identified etiologies of epilepsy in this study, cerebrovascular disease was the most common.

This predominance of cerebrovascular disease among the causes of epilepsy in the elderly has been reported previously in several studies.^{4-6,12,13} In 41 patients (66.1%), we did not find a definite cause. Of these 41 patients, only nine patients underwent brain imaging that was normal. Maiga et al⁴ in their study reported a proportion of epilepsies without a defined etiology of 18%, but these authors do not specify if the workup was complete or no in their patients. Chen et al¹⁰ reported as far as they are concerned autoimmune encephalitis as the most common identified causes followed by cerebrovascular disease. The same authors report a proportion of epilepsies without a defined etiology of 21.4%. In this study, the high proportion of the patients without defined etiology demonstrates the problem of the availability and accessibility of complementary examinations in the management of epilepsy in Niger.

We used only the first-generation antiepileptic drugs (AEDs) in our study (CBZ and PB). Similar results have been reported in previous studies in sub-Saharan Africa on epilepsy in the elderly.^{4,5} However, Chen et al¹⁰ reported, as far as they are concerned, the preferential prescription of newer generation AEDs (levetiracetam and oxcarbazepine). Newer generation AEDs are not only inaccessible in Niger, but also they are expensive for patients, which the majority of them do not have a source of monthly income. In addition, the prescription of these AEDs would increase the rate of poor drug compliance.

Our study has some limitations. First, as the study originates from a single center, the generalization of our findings may be limited. Second, the retrospective nature of the study explains why some details were not provided, especially profession, provenance (rural or urban), socioeconomic status, marital status, cultures, etc. Third, limited access to complementary examinations such as MRI or antineuronal antibodies explaining the high prevalence of epilepsies without definite etiology. Fourth, we did not compare in the study the group of the elderly with epilepsy to that of the elderly without epilepsy.

Conclusion

The study provides a description of demographic, clinical, and etiological characteristics of epilepsy in hospital elderly from Niger. These hospital findings permit to create a database on epilepsy in the elderly that will provide data for comparison with data of future studies on epilepsy in Niger. The study shows limited access to newer generation AEDs and diagnostic tests of epilepsy in Niger. Considerable efforts should be made in Niger, particularly at the National Hospital

of Niamey to facilitate for people living with epilepsy the accessibility to diagnostic tests and newer generation AEDs to improve the quality of epilepsy management in Niger. A prospective multicenter study is needed in Niger to determine the exact prevalence of elderly living with epilepsy and to improve the management of these patients.

Funding

None.

Conflict of Interest

None declared.

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