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## Abstract

**Introduction:** Epilepsy is the most frequent severe chronic neurological disease of various etiologies characterized by the repetition of seizures. It affects more than 50 million people worldwide. In developing countries (DEP), 80-90% of people do not have access to treatment, for several reasons.

**Goal:** Assess patient accessibility to antiepileptic drugs in Bangui.

**Methodology:** It was a 3-month cross-sectional prospective study, from October 1 to December 31, 2018, within all the pharmaceutical structures in Bangui, recognized by the Ministry of Health.

**Results:** We visited a total of 32 structures and interviewed a total of 32 people. The average age of the respondents was 29, with a female predominance of 65.6%. Most worked as cashiers or accountants. The majority had no epilepsy training (84.4%) and was only aware of the generalized tonic tone (65.6%). The main cause of epilepsy was brain damage (56.3 %). The non-contagiousness of the disease was recognized by 71.9% of the respondents. The majority of those surveyed considered epilepsy to be incurable (62.5%), even pharmacists. More than half of the structures were sales units (56.2%). Among the 32 structures visited, 19 had antiepileptic drugs (59.6%). Phenobarbital was the most available (53.1%) followed by Carbamazepine (37.5%), Valproic Acid (37.5%), and Phenytoin (9.4%). These 4 major antiseizure medication were mostly found in pharmacies. Phenobarbital was the most prescribed and the most in short supply. Drug stock outs were frequent and it took a long time to restock them. The cost of antiseizure medication was very high.

**Conclusion:** The lack of trained personnel, the inadequacy of pharmaceutical structures, the insufficient availability of antiepileptic drugs and their very high cost are factors limiting the accessibility of antiepileptic drugs for patients.

**Keywords:** Epilepsy- Therapeutic accessibility- Antiseizure-Pharmaceutical structures- Bangui, Central African Republic.

## Introduction

L'épilepsie est une maladie neurologique chronique sévère la plus fréquente, d'étiologies diverses caractérisée par la répétition des crises convulsives. Elle touche plus de 50 millions de personnes dans le monde. Dans les pays en voie de développement (PED), 80-90% des sujets n'ont pas accès au traitement, et ce pour plusieurs raisons.

## Objectif

Evaluer l'accessibilité des patients aux médicaments antiépileptiques à Bangui.

pileptiques à Bangui.

## Méthodologie

Il s'agissait d'une étude prospective transversale de 3 mois, allant du 1er octobre au 31 décembre 2018, au sein de toutes les structures pharmaceutiques de Bangui, reconnues par le ministère de la santé.

## Résultats :

Nous avons visité au total 32 structures et interrogé au total 32 personnes. L'âge moyen des répondants était de 29 ans, avec une prédominance féminine de 65,6%. La plupart exerçait la fonction de caissières ou des comptables. La majorité n'avait pas reçu de formation sur l'épilepsie (84,4%) et ne connaissait que la forme tonico-clonique généralisée (65,6%). La principale cause de l'épilepsie était la lésion du cerveau (56,3%). La non contagiosité de la maladie était reconnue par 71,9% des enquêtés. La majorité des enquêtés considérait l'épilepsie comme incurable (62,5%), même les pharmaciens. Plus de la moitié des structures étaient des unités de vente (56,2%). Parmi les 32 structures visitées, 19 détenaient des antiépileptiques (59,6%). Le Phénobarbital était le plus disponible (53,1%) suivi de la Carbamazépine (37,5%), Acide Valproïque (37,5%), et la Phénytoïne (9,4%). Ces 4 antiépileptiques majeurs se trouvaient pour la plupart dans les officines. Le phénobarbital était le plus prescrit et le plus en rupture. Les ruptures de stock des médicaments étaient fréquentes et le réapprovisionnement mettait beaucoup de temps. Le coût des antiépileptiques était très élevé.

## Conclusion

Le manque de personnel formé, l'insuffisance des structures pharmaceutiques, la disponibilité insuffisante des médicaments antiépileptiques et leur coût très élevé sont des facteurs limitant l'accessibilité aux médicaments antiépileptiques pour les patients.

**Mots-clés :** Epilepsie, accessibilité thérapeutique, antiépileptiques, structures pharmaceutiques, Bangui, Centrafricaine.

## Introduction

Epilepsy is a chronic brain condition that affects all populations of the world, regardless of race, religion, sex, age, or social status. It reaches more than 50 million people worldwide, including 10 million in Africa. The prevalence varies from 4-10% in developed countries, while in sub-Saharan Africa, it is estimated at 15% [1,2]. In the Cen-

tral African Republic, according to studies carried out in schools in Bangui and in the general population in Berberati in the west of the country, the prevalence of this condition varies from 2.8% o to 11.73% o [3,4]. If in developed countries, patients have easy access to antiseizure , in developing countries, 80-90% of epileptic subjects do not have access to treatment: Either by lack of infrastructure, or by insufficient availability of antiepileptic drugs, either due to the shortage of well-trained medical personnel or to traditional concepts on epilepsy. Antiepileptic drugs are not available for the majority of epileptics, for geographic, financial or cultural reasons [5]. Studies on the accessibility, availability and cost of medicines have been carried out in certain regions of the world [6-10]. In the Central African Republic, no information is available on the supply, availability and accessibility of antiepileptic treatment by patients. Thus, we carried out this work in order to assess the accessibility of patients to AE drugs in Bangui, capital of the country.

### Methodology

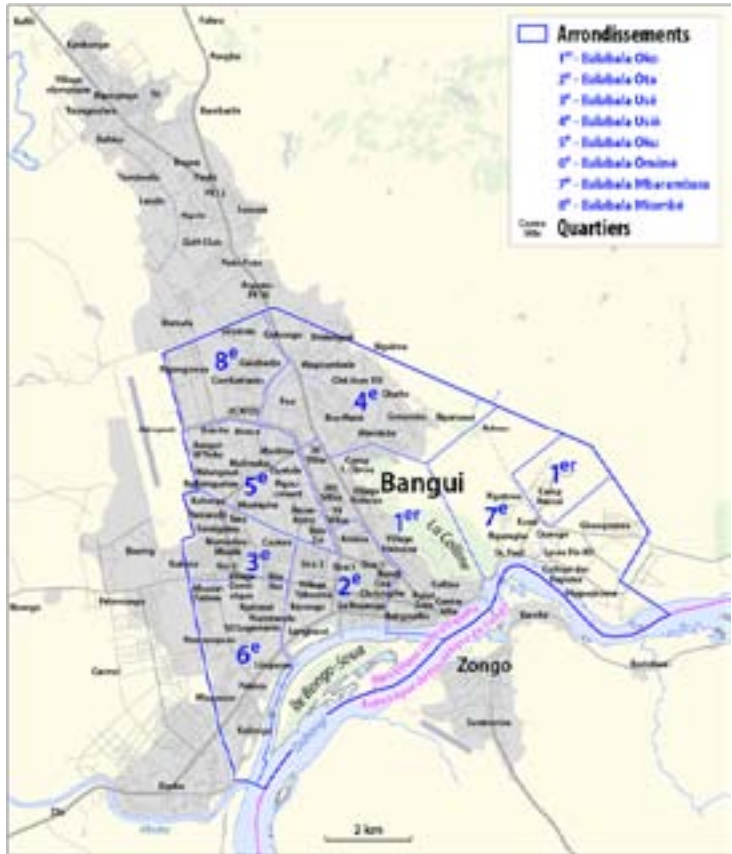
Our study took place in the city of Bangui, capital of the Central African Republic, located in the south of the country at 4° north latitude and 16° east longitude. The climate is equatorial and has a short dry season from December to March and a rainy season from April to November. The city of Bangui has 903,268 inhabitants, according to the 2018 projection, or 17.2% of the country’s population. It covers an area of 100 km2. The main economic activities of the city are based on commercial enterprises and market gardening; but the military-political events in the city have damaged the economic fabric. In terms of health, the city of Bangui is located in health region No. 7, divided into 3 districts:

- The Bangui I Health District: The Central District office is based in Lakouanga. Its area of responsibility covers the administrative districts of the 1st, 2nd and 7th Arrondissements.
- The Bangui II health district: The central district office is based in Beavers and covers the administrative districts of the 3rd, 5th and 6th Arrondissement.
- The Bangui III health district: The central district office is based in Bédé Combattant. Its area of responsibility covers the administrative districts of the 8 th, 4 th Arrondissement.

It is served by 4 central hospitals (National University Hospital Center of Bangui, Community University Hospital Center, University Hospital Center of Sino-Central African Friendship, Pediatric University Hospital Complex of Bangui), seven urban health centers distributed in the various districts of the city, private health centers and a clinic and several private medical offices.

**This Table I :shows the Distribution of pharmaceutical structures in the city of Bangui. To be called in the previous text**

Districts	Pharmaceutical structures			Total
	wholesaler	pharmacy	sales units	
1 <sup>er</sup>	3	6	4	13
2 <sup>e</sup>	0	1	2	3
3 <sup>e</sup>	0	0	1	1
4 <sup>e</sup>	0	1	4	5
5 <sup>e</sup>	0	3	2	5
6 <sup>e</sup>	0	0	2	2
7 <sup>e</sup>	0	0	2	2
8 <sup>e</sup>	0	0	1	1
Total	3	11	18	32



**Figure 1: Administrative map of Bangui (districts and districts).**

It was a cross-sectional and exhaustive prospective study over a period of 3 months, from October 1 to December 31, 2018, covering all the pharmaceutical structures in Bangui recognized by the Ministry of Health. All subjects of both sexes with the qualification of heads of structures or dispensers of drugs were included. Not being part of the mini pharmaceutical kiosks and the drug sales structures having no sales authorization from the Ministry of Health. The data were collected using a previously established survey sheet, entered with Excel 2010 software, and analyzed with Epi info software version 3.5.4.

### Results

During this study, 32 structures were visited, including 17 public (53.1%) and 15 (46.9%) from the private sector. Most of the pharmaceutical structures visited were sales units (56.2%) followed by pharmacies (34.4%). In our series, 32 people were interviewed ranging in age from 25 to

60 years old. The most represented age group was 25 to 34 years old (43.7%). The average age was 29 years old. There was a female predominance (65.6%) with an F / M ratio of 1.9. Almost half of our respondents had less than 5 years of practice.

More than half of them (53%) were cashiers or accountants followed by pharmacists (31%) and state nurses (13%). As far as knowledge of epilepsy is concerned, 84.4% of those surveyed are not trained in epilepsy and 65.5% only knew about the generalized tonicoclonic crisis. For 71.9%, epilepsy is not a contagious condition. Etiologically, brain damage was cited in 56% of cases followed by hereditary causes (25%). The majority (62.5%) of those surveyed considered epilepsy to be an incurable condition. Most respondents (68.80%) admitted to giving advice to people with epilepsy. Phenobarbital (87.1%) was the most well-known antiepileptic drug in the survey, followed by Carbamazepine (51.68%). In terms of drug safety, 48% of those surveyed did not know if these drugs have been validated by the pharmaceutical management. The majority of respondents (65.7%) had no idea about the frequency of pharmaceutical management monitoring visits. For the availability of EAWs, among the 32 pharmaceutical structures visited, 19 (59.6%) held antiepileptic drugs at the time of the visit. The main molecules available were Phenobarbital in 17 structures (53.1%), Carbamazepine in 12 of them (37.5%), Valproic Acid in 12 structures (37.5%), Phenytoin in 3 pharmacies (9.4%). The AEs found in public structures were generics. It should be noted that among the 3 wholesalers visited; only one had antiepileptic drugs. During our survey, some pharmacies held more than one specialty of EA for the same active ingredient. Of the 19 structures that held AE, 15 often had stock outs, or (78.9%). The duration of stock-outs of AEs varied from 1 month or more than 2 months. The frequency of rupture was once per semester (40%) or once per year (40%) for the majority. The replenishment of AE could go up to more than 2 weeks in certain structures (73.3%). Phenobarbital was the most prescribed (73.7%) and most discontinued (63.2%) EA followed by Carbamazepine (31.6%) and Benzodiazepine (21.1%).

## Discussion

During this study about accessibility to antiseizure medications in Bangui, the most represented age group was 25 to 34 years old (43.7%) with an average age of 29 years. This result is close to that found in Mali [11] in the city of Kati (30 years old). On the other hand, inferior to certain data found in Africa [12-14]. This predominance of young people in our population could be explained by the fact that they are mainly represented in the general population [15].

We note in our work a female predominance of respondents (65.6%). This result is close to that found in Niger [14] and different from that found in Bangui [12] and Mali [11]. This could be explained by the emancipation and promotion of women in the field of work.

The duration of exercise in the profession was less than 5 years. It is lower than those reported for Kati in Mali [11] and Sakoiria in Niger [14]. The majority of respondents were neither pharmacists, state nurses (IDE), nor state

graduate midwives (SFDE). For the most part, there were cashiers or accountants. This shows the negligence of the managers of certain pharmaceutical structures who hire people, most often close relatives, who have no idea about the products they distribute to patients.

We found during our study that the majority of respondents (84.4%) had not received any training on epilepsy. But 65.6% were aware of the generalized tonicoclonic form. This result is close to those found in Mali [16,17] and lower than those of certain African authors in Bamako and Bangui [4,11,12,18]. This high percentage of knowledge of this generalized tonicoclonic form is justified by the fact that, on the one hand, this form is the most frequent in developing countries (developing countries), especially in sub-Saharan Africa (60%) [2,19], and on the other hand, CTCGs are remarkable and spectacular manifestations for patients and those around them and their diagnosis is easier to demonstrate even for a non-specialist in comparison with other clinically less expressive epilepsy attacks [20].

Regarding the etiology, 56.3% believe that epilepsy is due to brain damage. This result is almost similar to the data of certain authors in Africa [4, 11,13,16].

Regarding contagiousness, 71.9% thought that epilepsy is not a contagious disease. This is different from the study carried out in Berberati in the west of the Central African country and in Mali [4,16,21]. This difference could be explained by the fact that the people hired and placed at the level of pharmacies received health training and even if they did not follow modules on epilepsy, they at least heard of this affection during their internships in the various departments where they went. Furthermore, saliva was the main route of transmission, and 62.50% of those surveyed said that epilepsy is incurable. This strong belief in contagiousness and incurability demonstrates their under-information on epilepsy and encourages them to create a communication and information framework like the Central African League against epilepsy.

We noticed during our study that pharmacists think epilepsy is a non-contagious and incurable disease. This claim of incurability can be explained by the fact that they are content to provide medication to their patient and in no way care about their future. While collaboration should exist between clinicians, pharmacists and all health personnel on the future of people on treatment; whether related to adverse drug reactions or clinical course. This is one of the WHO pharmacovigilance regulations [22].

During this series, the four major antiepileptics were known to the respondents, phenobarbital was the best known (87.1%), some did not know any. This could be explained by the fact that some people had no idea about the medical management of epilepsy, since traditional treatment remains the first option for some in Africa.

During our study, 48% of the respondents declared that they did not know if the drugs were validated by the pharmaceutical management. In addition, 65.7% of the cases did not know about the follow-up visits. Ensuring the safety of medicines is one of the essential points of pharmacovigilance. It is the responsibility of the national govern-



ment to ensure that the medicines put on the market are safe, effective and of good quality, and that they are used properly. [22] According to the WHO, pharmacovigilance should be priorities in all countries where there is a public health program to fight the disease [22]. Unfortunately this is not the case in our country; Hence the risk of exposure of the population to the harmful consequences of the products on the organism.

During our investigation, the four major antiseizure medications (Phenobarbital, Carbamazepine, Valproic acid, Phenytoin and Diazepam, listed on the 12th list of essential medicines by the WHO [23] were found in 19 pharmacies (59.6%). This result is identical to that reported in Vietnam [6], with the exception of Phenobarbital used for drug addiction in this country which prompted the Vietnamese authorities to limit its accessibility drastically. It should also be noted that the respondents were not always health workers. The lack of knowledge about epilepsy and antiepileptics (AE) could influence our result. These 5 AEs are also available in all other African countries [24]. Their availability varied according to the pharmaceutical structures. The main source of availability of AEs was private structures, more specifically pharmacies.

In our study, Phenobarbital was the most available (53.1%) and the most prescribed (73.9%) EA, and its breakdown was 63.2% of cases. This result corroborates the data reported by certain African authors [25,26,27]. This explains why Phenobarbital is for WHO the anticonvulsant of choice in developing countries [28], where it is the most frequently prescribed drug for epilepsy [29]. In contrast to Antananarivo, Jost et al. found that Valproic Acid was the most available EA [7]. This result is similar to those reported in studies elsewhere [8,30]. In contrast, in Southeast Asia, Carbamazepine was the most widely available AE [6]. EA stock-outs were quite frequent and the structures took too long for replenishment.

The characteristics of the AEs available during our study were different. Most of them were not generics but specialty products. Phenobarbital was sometimes the only AE found in most sales units, in generic form. Generics were more affordable, sometimes free, especially Phenobarbital. The price of a tablet of Phenobarbital 100 mg in pharmacies (115.5 CFA francs) was three times the generic form (36.4 CFA francs). The latter is 7 times the price found in Benin [25] and 5 times in Togo [9]. But it remains the cheapest EA compared to the others. We find that the prices of these AEs are higher than those found elsewhere in Africa [31]. This is due to the isolation of the country, the very high taxes, the lack of competition in the market, the military-political crisis that the country has known for more than 10 years during which most of the infrastructure was destroyed.

## Conclusion

This study enabled us to note that there exist within the pharmaceutical structures of the capital certain unqualified personnel responsible for dispensing the drugs. Those with qualified personnel have not received training in epilepsy. The cost of AE drugs was very high compared to other countries in the subregion and in sub-Saharan Africa. This is a limiting factor in the accessibility of EI for

patients. Hence the need to put in place a policy of supply, quality control, and reduction in the cost of EI in order to relieve the suffering of the thousands of epileptics in the Central African Republic who seem to be left behind.

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