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# Community pharmacists' knowledge, attitudes toward epilepsy and availability of antiepileptic drugs in Ouagadougou (Burkina Faso)

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## Abstract

**Background** The community pharmacists educate patients and their families concerning the development of adherence to their therapy, and then improving health-related quality of life for those patients. Our study aims to describe the management of epilepsy in pharmaceutical pharmacies in a low income country.

**Methods** This was a cross-sectional study carried out in the pharmaceutical pharmacies of the city of Ouagadougou during a period of 2 months, from November 15 to December 15, 2020.

**Results** Fifty six pharmacists with a mean age of  $41 \pm 12.73$  years were included in the study. Of them, 7.14% received specific training on epilepsy. Respondents with good knowledge about epilepsy were 48.21%. The level of "good knowledge" was significantly higher among respondents who had received specific training in epilepsy and among those with more than 15 years of experience as a dispensary pharmacist. The experience of more than 15 years was the factor significantly associated with a level of good knowledge about epilepsy. Regarding the seizure first aid management, the majority of pharmacists knew the attitudes of seizure first aid management by citing the lateral security position (83.9%). Phenobarbital was the most widely used antiepileptic drug in 96.43%. In 47.17% ( $n = 53$ ) of pharmacies, demand exceeded supply.

**Conclusions** Effort must be put on the supply of antiepileptic drugs and the training of health personnel.

**Keywords** Epilepsy, Pharmacists, Inventory, Knowledge, Practices, Burkina Faso

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## Background

The community pharmacists not only supply information to patients that help them understand their conditions and manage the treatment by giving self-care advice, but also educate patients and their families concerning the development of adherence to their therapy, and then improving health-related quality of life for those patients [1].

There were large differences in the availability of AEDs across countries. Unfortunately, in most of these countries, access to medicines remains very low. From 80% to 90% of the people with active epilepsy do not have access to treatment [2]. The prevalence of this therapeutic deficit is largely due to the non-availability of antiepileptic drugs (AEDs) [3]. Although first-line antiepileptic drugs frequently appear on national essential drug lists, their inclusion on these lists does not always guarantee that they are available in health care settings [4]. Pharmacists are important health professionals in counseling and monitoring patients with epilepsy (PWE), because they are easily accessible and know about pharmacotherapy, health education, and management of chronic diseases [5, 6]. Despite the important role of pharmacists, knowledge gaps in AED therapy among pharmacists were reported [7–9].

To our knowledge, very few studies have focused on the knowledge of Pharmacians on epilepsy, while their involvement is essential in the supply and dispensing of antiepileptic drugs. However, some studies have been done on the knowledge of pharmacy students about epilepsy [10, 11]. The situation seems to be the same in Africa. Indeed, a study carried out in Sudan in 2019 concluded that more than 85% of students in pharmacy had poor knowledge of diagnosis and treatment [12]. In Burkina Faso, a developing country characterized by insufficient human and material resources, studies have also shown that health workers have poor knowledge of epilepsy [13, 14]. However, no study has been carried out on the level of knowledge of pharmacists about epilepsy, although their role is essential in the management of the disease. Our study aims to describe the management of epilepsy in pharmaceutical pharmacies in a low income country.

## Methods

### Location of the study

Burkina Faso is a francophone country located in the heart of West Africa. It covers an area of 274,200 km<sup>2</sup> with an estimated population of 16, 248,558 in 2006 according to the general population census. It is bounded to the north and west by Mali, to the south by Togo and Ghana, to the southeast by Benin, to the southwest by the Ivory Coast, and to the east by Niger.

According to the administrative organization, Burkina Faso can be divided into 13 regions, 45 provinces, around 351 communes and 8000 villages. Ouagadougou and Bobo Dioulasso are two largest cities in the country with a highly dense population. Currently, the health care supply is insufficient in the country. The average ratio is one doctor per 22,017 inhabitants, one state nurse per 4000 inhabitants and a midwife for 14,000 inhabitants for all the country. The overall death rate is 11.8% and the life expectancy at birth is 56.7 years. The city of Ouagadougou, the administrative and political capital of the country, has an area of 520 km<sup>2</sup>,

### Organization of the pharmaceutical sector

The data were provided by National Pharmacists Association in Burkina Faso. The country has a central buying office for essential and generic drugs which enables the availability of certain generic antiepileptic drugs in public health districts. In 2016, there were 10 Central Purchase of Generic Essential Drugs And Medical Consumables (CAMEG) sales offices, 70 distribution depots and 1689 Essential drug depots. In addition, in 2016 there were 29 wholesaler-distributors in Ouagadougou. In terms of drug delivery, in 2016 there were more than 274 private pharmacies including 165 Ouagadougou, 46 in Bobo-Dioulasso and 73 in the other localities of Burkina. In terms of training, there are 3 faculties of medicine and pharmacy which train pharmacists in Burkina Faso (University Joseph Ki Zerbo, University Nazi Bony, University Saint Thomas d'Acquin). There is not yet any specialist training for pharmacists in Burkina Faso. In terms of human resources; in Burkina Faso, in 2020, there were 701 pharmacists including 323 dispensing pharmacists, 66 wholesale distributors pharmacists, 292 administrative pharmacists, 20 biologist pharmacists.

### Study profile

We carried out a survey in pharmacies in the city of Ouagadougou during the period from November 15 to December 15, 2020.

### Study population

The survey included the pharmacists of the city of Ouagadougou regularly registered with the National Pharmacists Association, practicing in a pharmaceutical dispensary and having given their informed consent for the study. Pharmacy assistants, students and trainees in pharmacies who were not licensed at the time of the study were not included.

### Sampling

A community pharmacies in Ouagadougou were randomly selected for visits based on their geographical

distribution. Pharmacies in the city were divided into 11 geographical areas (i.e., north, south, east, and west). During our survey, there were 178 pharmacies in the city of Ouagadougou. Of them, 89 (50%) pharmacies were selected among a list of private pharmacies provided by the National Pharmacists Association. A typical community pharmacy in Burkina Faso usually operated by 1 licensed pharmacist.

## Data collection and analysis

### The questionnaire

The data were collected using a self-administered anonymous questionnaire comprising 38-items. The questionnaire included the following variables, as sociodemographic variables (sex, age, marital status), professional background and experience with epilepsy of pharmacist (number of years of experience as community pharmacists, training university of pharmacist base, specific training on epilepsy, Epileptics in the family, Having attended an epileptic seizure), professional practices of pharmacist (dispensation of antiepileptic drugs, number of prescriptions for antiepileptics received in the week, antiepileptic most requested, method of ordering antiepileptics, method of delivery of antiepileptics, method of storage, match between requests and supply, duration of antiepileptic drugs in pharmacies, cost of antiepileptics, most common side effects, level of relationships between pharmacists and epileptic clients) and knowledge-related variables (Definition of epilepsy, triggers factors of epilepsy, manifestations of epilepsy, etiologies of epilepsies, different types of epilepsy, monitoring of epilepsy treatment, complications of epilepsy, prevention of seizures; drugs contraindicated during pregnancy) and their attitude toward epilepsy (trades that can excercer the person epilepsy, epilepsy and sports practice, epilepsy and driving, epilepsy and stigmatization, food bans, attitudes in case of 1st crisis and post review). The questionnaire was anonymous, semi-structured in which the subject had to answer with <Yes, <No, <I do not know or to choose one or more answers among those which were proposed to him. Finally, some questions were open-ended. The questionnaire was made by the three authors of the article (DAA, OEW, S JNW). The initial questionnaire was pre-tested in 5 pharmacists to gauge the acceptability of the study and to assess their interest in the study. The questionnaire was validated by the National pharmacists Association of Burkina Faso. Table 1 gives the questionnaire.

### Procedure of collection

We surveyed pharmacies spread over the eleven geographical areas of the city of Ouagadougou. In each zone, we visited the pharmacies drawn at random. We

**Table 1** Sociodemographic and professional characteristics

	Study population (N= 56)	Percentage
Age group (years)		
< 30	12	26.1
30–51	23	50
> 51	11	23.9
Not reported	10	17.8
Sex		
Male	34	60.7%
Female	22	39.3%
Marital status		
Single	18	32.1
Married	35	62.5
Divorced	1	1.8
Not reported	2	3.6
Professional experience		
< 5	24	46.2
5–9	8	15.4
10–14	6	11.5
15–19	1	1.9
≥ 20	13	15.4
Not reported	4	7.1
Training university		
National	34	63
African	12	21.4
Others	8	14.3
Not reported	2	3.6

met all the pharmacists and then present them the authorization of Pharmacist National Association of Burkina Faso. All the pharmacists presented in the time of the visit were asked to answer the questionnaires at their workplace. After receiving their approval to participate to the study, they received the paper version of the questionnaire. Depending on their availability, the questionnaire was completed in the time of the visit or later and returned back. If the pharmacist was not available or absent, we take another appointment.

### Data entry and analysis

Data were obtained from national agency of pharmaceutical regulation and questionnaire of pharmacists. Data entry and analysis were carried out with a computer using Epi Info version 7 software allowing the calculation of frequencies, averages and comparison of variables. Statistical calculations were performed using the chi-squared test and the *p* value less than or equal to 0.05 was considered significant with a 95% confidence interval.

**Assessments**

We evaluated the level of knowledge of pharmacists according to their sociodemographic characteristics, their experience with epilepsy and their professional experience. For the knowledge items, the community pharmacists were awarded 1 point for each correct answer, 0 point for each wrong answer and each I do not know. Currently, there is no consensus on the cutoff that indicates adequate knowledge in a certain domain. In this study, scoring  $\geq 50\%$  in the knowledge test was used as in previous studies in which knowledge of pharmacists was tested [8, 15, 16]. Good knowledge  $\geq 5$ .

**Results**

**Frequency**

A total of 56 of 89 pharmacies were investigated, giving a non-response rate of 37.1%. Regarding the compliance of the questionnaire, 16 questions were not answered or 42.1% of the questions.

**Sociodemographic and experience with epilepsy**

Forty-six respondents provided their age. The mean age of pharmacists was  $41 \pm 12.73$  years, ranging from 24 to 69 years. The age group of 25–32 years was the most represented with a rate of 43.4%. Male gender was predominant in the study population (60.7%). About 62.5 per cent of pharmacists were married. The majority of pharmacists were trained at national universities (63%). Their professional experience as a dispensary pharmacist was  $10.13 \pm 9.86$  years, ranging from 1 to 40 years. Twenty four (46.2%) had professional experience under < 5 years. According to their familiarity of epilepsy, 31 (69.6%) pharmacists have already witnessed an epileptic seizure and 5 (7.1%) pharmacists had received specific training on epilepsy during professional workshop and seminar. Seventeen (30.4%) pharmacists had family history of epilepsy. Table 1 highlights the sociodemographic characteristics of study population.

**Table 2** Knowledge of pharmacists about triggering factors of epilepsy

Variable	Study population (N = 56)	
	Yes	No
<b>Triggering factors</b>		
Discontinuation of treatment	40 (71.4%)	16 (28.6%)
Alcohol	38 (67.8%)	18 (26.8%)
Stress	33 (58.9%)	23(41.1%)
Bright light	30 (53.6%)	26 (46.4%)
Emotion	26 (46.4%)	30 (53.6%)
Noise	23 (41%)	33 (58.9)
Tired	18 (32.1%)	38 (26.6%)

**Knowledge of epilepsy**

Regarding to triggering factors of seizures, most pharmacists cited discontinuation of antiepileptic drugs (71.4%), use of psychoactive substances (67.8%) and stress (58.9%). About 71 per cent of pharmacists (71.4%) had correctly answered the question about triggering seizures (Table 2). The main causes of epilepsy were heredity (75%), head trauma (69.6%) and brain tumors (60.7%). About sixty seven percentage of pharmacists had correctly answered the question regarding the causes of epilepsy (66.7%). Table 3 highlights the responses of pharmacists about causes of epilepsy. Regarding the monitoring of the efficacy of antiepileptic treatment, 37 (66.1%) pharmacists cited the absence of active seizures, 25 (44.6%) the plasma dosage of antiepileptics and 17 (30.3%) the electroencephalogram. Sixty per cent of pharmacists correctly answered the question regarding monitoring elements for the effectiveness of antiepileptic treatment (Table 4). Of complications from epilepsy, 54 (96.42%) pharmacists cited intellectual disability, 30 (53.5%) depression and 29 (51.8%) anxiety. All patients had correctly answered the question about the complications of seizures Respondents with good knowledge about epilepsy were 48.2%. All pharmacists had not answered the questions relating to the definition of seizures, the pathophysiology of seizures, the types of seizures were not answered by all

**Table 3** Knowledge of the causes of epilepsy

Causes of epilepsy	Yes	No
Heredity	42 (75%)	14 (25%)
Traumatic	39 (69.6%)	17 (30.3%)
Tumors	34 (60.7%)	22 (39.3%)
Stroke	27 (48.2%)	29 (51.8%)
Cerebral toxoplasmosis	23 (41.1%)	33 (58.9%)
Vascular malformations	22 (39.2%)	34 (60.7%)
Neuro-malaria	15 (26.7%)	41 (73.2%)
I do not know any causes	11 (19.6%)	45 (80.3%)
Diabetes	10 (17.9%)	46 (82.1%)
Menses	7 (12.50%)	49 (87.5%)

**Table 4** Frequency of surveillance items chosen by respondents

Monitoring device	Yes	No
Seizure control	37 (66.1%)	19 (33.9%)
plasma dosage of antiepileptics	25 (44.6%)	31 (55.3%)
Electroencephalogram	17 (30.3%)	39 (67.8%)
I do not know any	15 (26.8%)	41 (73.2%)
BP control	8 (14.3%)	48 (85.7%)
Temperature control	3 (05.4%)	53 (94.6%)

**Table 5** Factors associated with pharmacists knowledge

Factors	Study population (N=56)	Good knowledge n (%)	OR (95% CI)	p value
Sex				
Female	22	9 (40.90)	0.162 [0.21–1.82]	0.42
Male	34	18 (52.94)		
Experience				
> 15 years	14	4 (28.57)	4.28 [1.13–16.27]	0.03
≤ 15 years	38	14 (36.84)		
Training university				
National	34	15 (44.12)	0.53 [0.17–1.62]	0.40
Others	22	12 (60)		
Epilepsy training				
Yes	4	4 (100)	ND	0.047
No	52	23 (44.23)		
Presence of epilepsy in the entourage				
Yes	17	8 (47.06)	0.94 [0.30–2.93]	0.57
No	39	19 (48.72)		
Number of anti-epileptic prescription per week				
≤ 4	42	18 (42.86)	0.41 [0.12–1.46]	0.22
> 4	14	9 (64.29)		

pharmacists. The level of good knowledge was significantly higher among respondents who had received specific training in epilepsy ( $p=0.047$ ) and among those with more than 15 years of experience as a dispensary pharmacist ( $p=0.03$ ). After logistic regression, the level of good knowledge was correlated with professional experience of the pharmacist ( $p=0.01$ ). Table 5 shows the factors associated with pharmacist's knowledge about epilepsy.

#### Attitudes toward epilepsy

Regarding the seizure first aid management, the majority of pharmacists knew the attitudes of seizure first aid management by citing the lateral security position (83.9%). Not all pharmacists responded to questions related to work, sport, driving, epileptic stigma, dietary bans, pregnancy and contraception for women with epilepsy.

#### Availability of antiepileptics in the pharmacies

Currently, eight antiepileptic drugs have been available in pharmacies, all sold as originator brand. The most widely available antiepileptics in the survey pharmacies were phenobarbital (96.4%), carbamazepine (87.5%) and sodium valproate (82.1%). Table 2 gives the list of drugs

**Table 6** Availability of AED in survey pharmacies

Antiepileptics	Study population (N=56)	%
Phenobarbital	54	96.4
Carbamazepine	49	87.5
Valproate	46	82.1
Lamotrigine	24	42.8
Gabapentin	8	14.2
Pregabalin	3	12.5
Phenytoin	2	3.6
Vigabatrin	2	3.6

available in the survey pharmacies. Forty pharmacies (71.4%) ordered their antiepileptics from foreign suppliers. For all pharmacies, periods of anti-epileptic drug shortages were frequent during the months of April, May, June and August of each year. Relative to drug dispensation, the number of antiepileptic prescriptions dispensed per week averaged  $13.6 \pm 4.4$  ranging from 4 to 60. According to 53 (47.2%) pharmacists, the demand exceeded of antiepileptic drugs exceeded the supply of care. All antiepileptics were sold in specialties, except phenobarbital and carbamazepine which were sold in generics and specialties. The price of antiepileptics varied from 136.4 francs (phenobarbital) to 23,975 francs per box (gabapentin). Table 6 highlights availability of AED in survey pharmacies.

#### Discussion

This cross-sectional study examined the knowledge of pharmacist about epilepsy, as member of medical staff and their management of epilepsy in the context of low income country. Our study showed that pharmacists had a poor level of general knowledge about epilepsy (48.2%). This insufficient knowledge of epilepsy in our context are probably a consequence of a lack of training on epilepsy and AEDs, particularly in clinical aspects of epilepsy. Indeed, few of them (7.1%) had received continuing education on epilepsy in the past 6 months. The lack of trained pharmacists became evident. This low rate could be explained on one hand by the fact that learned societies organize little specific training on epilepsy for the benefit of pharmacists and on the other hand by the lack of interest of pharmacists in vis-à-vis of these trainings, because it does not relate to their daily practices. There was a lack of knowledge of pharmacists on certain clinical aspects, such as the definition of an epileptic seizure, the pathophysiology of seizures and the classification of epileptic seizures. The level of knowledge of pharmacists was associated with their familiarity about epilepsy. Our study revealed that dispensary pharmacists had a high level of familiarity about epilepsy. This

degree of familiarity (69.6%) was supported by previous community-based studies in Ethiopia (79.7%) [17] and in Nigeria (83.8%) [18]. Moreover, the level of knowledge of pharmacists was correlated by experience as a dispensary pharmacist. Twenty four (46.2%) had professional experience under <5 years. The pharmacists showed a high knowledge level regarding certain issues. Indeed, most pharmacists (71.4%) were aware of the risk of the interruption of the antiepileptic treatment for the patient (worsening of the seizures). This interruption may be the result of the patient but also of the pharmacist in the event of a shortage of antiepileptic drugs. The break periods of the antiepileptics corresponded to the warmest periods of the year, with the corollary of the destruction of the active ingredient of the drug due to storage conditions. In addition, these climatic conditions would promote the reduction of the epileptic threshold, thus promoting the appearance of seizures, hence the increased demand for antiepileptic drugs. In addition, pharmacists were well-informed about the plasma dosage of antiepileptic drugs. The majority of pharmacists had a good attitudes regarding to first aid management of seizures (83.9%); this could save his client before help arrives. Our study did not allow us to know the attitudes of pharmacists in relation to the psychosocial aspects of epilepsy which could hinder the dispensing of antiepileptic drugs (work, sport, driving, pregnancy and contraception, stigmatization of people with epilepsy, prohibited food). Relative to the availability of antiepileptics, all pharmacies surveyed had antiepileptics available during the survey period. This is high compared to several studies in Central African Republic (45%) [19], in Zambia (50.9%) [20] and in Southern Vietnam (57%) [21]. The difference with the 3 studies is that our study was more recent. Regarding the number of AED available in pharmacies, our study found eight AED available, higher than in Central African Republic [19]. Among these AED, phenobarbital (96.4%) was the most available, in agreement with Yangatimbi et al. in Central African Republic (51.3%) [19] and Chomba in Zambia (24.3%) [20]. However, carbamazepine (94%) was most available in Vietnam [21], while sodium valproate and carbamazepine were the most available drugs, respectively, in Madagascar [22], This molecule offers a favorable cost/effectiveness ratio that is lower than that of any other antiepileptic. Lamotrigine was available in 42.8% of pharmacies. Due to the foeto-toxicity of sodium valproate, this drug has become essential in the care of women of childbearing age. Regarding the dispensation of AED, 47.2% of the pharmacists said that the demand for antiepileptic drugs exceeded the pharmaceutical supply. Antiepileptic drug dispensing was low, approximately  $3.4 \pm 2.10$  prescriptions dispensed per week. This situation could be

explained by the high costs of the antiepileptics sold but also to frequent shortages. There was no local pharmaceutical manufacturing of antiepileptic drugs in Burkina Faso and 71.4% of pharmacies imported their antiepileptic drugs from foreign suppliers. Furthermore, 90% of the medicines available in sub-Saharan Africa are imported from outside [23]. However, treatment breaks in antiepileptics are common in our context (more than 3 months per year), in line with the study of by Yangatimbi in Central African Republic who found a rupture of AED once per trimester (40%) and once a year (40%) [19]. Our study showed that 16.1% of the pharmacies dispensed AEDs without prescription, in lower frequency than in Vietnam (21%) [21]. The causes of this practice may be the lack of knowledge of sellers who did not receive any healthcare training and the patient's length of service in the pharmacy. In Vietnam, one of the causes of this practice was the lack of knowledge of the person present in the outlet [21].

### Strengths and limitations of the study in the outlet

The study had several limitations. Some questions, although authorized by the order of pharmacists, were not answered by all pharmacists who considered that they were reserved for prescribing physicians (aspects related to adverse effects, indications of antiepileptic treatments depending on the type of epileptic seizures, antiepileptic drugs contraindicated during pregnancy). Then, the reluctance of some pharmacists to take part in our survey. The unavailability of some pharmacists during our visit; and they advocated contacting us after answering the questionnaires.

### Recommendations

We recommend to the Central Purchasing Generic Essential Medicines, to strengthen the supply of antiepileptics to compensate for frequent ruptures in the pharmacies. At the National Order of Pharmacists, we recommend strengthening the continuing education of pharmacists on epilepsy. Finally, to pharmacists, we recommend communication between pharmacists themselves, on one hand, and between them and prescribers on the frequent ruptures of antiepileptic drugs and therapeutic alternatives. It is also important to instruct pharmacists to ensure proper storage conditions, delivery of antiepileptic drugs, and prescription renewal.

### Conclusions

Our study found that pharmacists had a poor level of knowledge about epilepsy. The availability of AED in the pharmacies visited was high but expensive.

**Abbreviations**

AED	Antiepileptic drugs
CAMEG	Burkina Faso's central buying office for essential and generic drugs
MEG	Generic and essential medicines
PWE	People living with epilepsy

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**Author contributions**

DAA, OE, DA, KJMA, SWJNW had contributed to the data collection or processing, analysis or interpretation, literature research and writing of the study. DAA, NC, MA, KK, KJ had contributed to concept and design of the study. All the authors read and approved the final manuscript.

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**Availability of data and materials**

All the data and materials were available with the corresponding authors.

**Declarations****Ethics approval and consent to participate**

This study was approved by the Ethical Board of the Medical School of Joseph Ki-Zerbo University and the Pharmacist National Association of Burkina Faso. The confidentiality of patient's data was taken into account.

**Consent for publication**

Not applicable.

**Competing interests**

The authors do not report any conflict of interest.

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