

# Anxiety and Depression Among Children With Epilepsy Attending in Neurology Department of Yalagdo Ouedraogo University Teaching Hospital (Ouagadougou, Burkina Faso)

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## Research Article

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# Abstract

## Background

Children with epilepsies (CWE) show an increased prevalence of comorbid depressive and anxiety disorders.

## Patients and Methods

We conducted a cross-sectional study on children with epilepsy aged 7 to 19 years attending neurology consultations at YOUTH during the period from May 06 to August 6, 2019. STAIc Anxiety Scale and Child Depression Inventory were performed in all the patients.

## Results:

The mean age of children with epilepsy was  $10.86 \pm 3.30$  years with male predominance. The mean STAIc score was  $34.71 \pm 6.58$ . Anxiety was observed in 42.2% of cases with male predominance. Anxiety was mild to moderate in 42.2% of cases. The risk factors for anxiety were the educational status ( $p < 0.01$ ) and epilepsy duration ( $p < 0.02$ ). The mean CDI score was  $11.66 \pm 5.76$ . Depression symptoms were observed in 26.7% of patients. Mild depression was present in all of cases. The risk factors for depression were the level of education ( $p = 0.01$ ) and the duration of epilepsy ( $p = 0.008$ ).

## Conclusion:

Anxiety and depression were common in children with epilepsy in Burkina Faso. The risk factors for anxiety and depression were educational status and epilepsy duration.

## Background

Epilepsy is a disease of the brain characterized by an enduring predisposition to generate seizures and by the neurobiologic, cognitive, psychological, and social consequences of seizure<sup>[1]</sup>. The incidence of epilepsy is higher in the youngest and oldest age-groups<sup>[2]</sup>. In children, the incidence of epilepsy is highest in the first year of life and declines to adult levels by the end of 10 years of age<sup>[3]</sup>. People with epilepsies (PWE) show an increased prevalence of comorbid depressive and anxiety disorders with frequencies between 30% and 50% of possible risk factors of anxiety and depression in children with epilepsy<sup>[4,5]</sup>. The prevalence of depression among children with epilepsy in different worldwide studies varies from 23% to 33%<sup>[6,7]</sup> and those of anxiety of 15 to 20%<sup>[8]</sup>. In sub-Saharan Africa, there are few studies that address depression and anxiety in patients with epilepsy despite the high prevalence of epilepsy<sup>[9,10]</sup>. To our knowledge, there are no studies in Burkina Faso on anxiety in patients with epilepsy. In the other hand, the only study carried out concerns adult patients with epilepsy. According to this study, there was a high prevalence of depression symptoms among adults patients with epilepsy attending in a tertiary hospital

of Ouagadougou (56%)<sup>[11]</sup>. The objectives of this study was to determine the prevalence of anxiety and depression in children with epilepsy in Burkina Faso.

## **Patients And Methods**

### **Study location**

Burkina Faso is a french speaking country located in West Africa without access to the sea. Its population was estimated in 2016 at 19,034,397 inhabitants. Ouagadougou is its capital and the largest city of the country. The city has public health infrastructures such as the Yalgado Ouédraogo University Hospital, Tengandogo University Hospital, Charles De Gaull Pediatric University Hospital, Bogodogo Hospital and many private health infrastructures. The department of neurology belongs to the department of medicine. It has been in existence since March 2003. Neurology department provides care for patients with neurological pathologies and pathologies with neurological repercussions. The neurology department has 23 inpatient beds spread over five wards.

### **Type of study**

This cross-sectional study was carried out in the neurology department of Yalgado Ouedraogo University Teaching Hospital, Ouagadougou, Burkina Faso.

### **Study population**

This study included children with epilepsy aged 7 to 19 years followed more than 3 months in outpatient's consultation. The consentient of parents was required to participate to the study. Exclusion criteria's included: (1) children with epilepsy with a history of depression or anxiety, (2) children with epilepsy with speech or memory disorders, (3) children with epilepsy treated with anxiolytic and / or antidepressant.

### **Sampling**

Our sample was non-random with systematic recruitment of children and adolescents with epilepsy followed on outpatient basis in the neurology department during the study period.

### **Data collection and analysis**

The data were collected by SI during 3 months from May 6 to August 5, 2019. The information was obtained from consultation registry of senior neurologist. The interview of children was done in the presence of one of the parents.

### **1-4-1- Study variables**

The study included socio-demographic variables (age at inclusion, sex; place of residence, level of study), clinical, paraclinical and therapeutic variables (family history of epilepsy, age of onset of the first seizure,

mode of onset, circumstances of findings , type of seizure, frequency of seizures per month, triggering factors, aggravating factors, etiologies of epilepsy, EEG results, brain CT, date of start of antiepileptic medication, type of treatment, seizure assessment under treatment); variable related to anxiety (personal history of psychiatric disorders other than anxiety, family history of anxiety, family history of psychiatric disorder), variable related to depression (personal history of psychiatric disorder, familial depression)

### **1-4-2- Instruments**

We used the Child Depression Inventory scale translated into French (CDI)<sup>[12]</sup> for the assessment of depression. The CDI is a commonly used self-report measure of depressive symptoms for children 7–19 years of age. This scale has 27 items. Each item is rated from 0 to 2 (0: absent or normal for age; 1: moderate, 2: severe). The total score of the scale ranges from 0 to 54. The threshold of 13 is defined as pathological. The highest levels of depression are represented by the highest scores: 13-24: mild depression, 25-35: moderate depression, and 36-54: severe depression. The State-Trait Anxiety Inventory for Children French version (STAI-C) was used for the assessment of anxiety<sup>[13]</sup>. It includes a 20-item questionnaire. Each item is rated from 1 to 3. The total score of the scale ranges from 20 to 60. The threshold of 34 is defined as pathological. The higher levels of anxiety are represented by the higher scores: 34-42: mild anxiety, 43-51: moderate anxiety, and 52-60: severe anxiety.

### **1-4-3- Data Analysis**

The data collected was put on a microcomputer and analyzed by using Epi-info version. The level of significance analysis was  $p < 0.05$ .

## **Results**

### **2-1- Sociodemographic and clinical profile of participants**

Forty five children with epilepsy were included in the study, 21 (46.7%) adolescents and 24 (53.3%) young children. Their mean age was  $10.86 \pm 3.30$  years, ranging from 7 to 17 years. Twenty seven (60%) children were boys. Most children (73.3%) were living in urban areas. The mean duration of epilepsy was  $2.76 \pm 2.07$  years, ranging from 6 months to 8 years. The mean age of children at disease onset was  $6.29 \pm 3.69$  years. Thirty six percent (66.7%) of children had presented generalized and 33.3% focal epilepsy. The majority of children (93.3%) had done EEG and 17 (37.7%) cerebral scanner. The epilepsy types were idiopathic (13.3%), symptomatic (8.9%) and indetermined (46.7%). Sodium valproate (48.9%), lamotrigine (31.1%) and phenobarbital (22.2%) were the most AED used. The majority of them was treated with a monotherapy (64.4%) and 35.6% with a bitherapy. Fourteen (31.1%) children had no seizures during the last 3 months.

### **2-2- Prevalence of Anxiety and risk factors**

The mean STAIc score was  $34.71 \pm 6.58$ , ranging from 24 to 48. The mean STAIc score was  $34.96 \pm 7.27$  in boys and  $34.33 \pm 5.57$  in girls. Anxiety disorders were present in 19 (42.2%) patients. Among them, 12 (26.7%) had mild anxiety and 7 (15.5%) moderate anxiety. The prevalence of anxiety was respectively 33.3% in young children and 52.4% in adolescents. Factors related to anxiety were low educational status ( $p = 0.016$ ) and long duration of epilepsy ( $p = 0.02$ ). The sociodemographic and clinical factors of anxiety was summerized in the table I.

## 2-3- Prevalence of Depression and risk factors

The mean CDI score was  $11.66 \pm 5.76$ , ranging 3 and to 24. This score was  $11.85 \pm 6.17$  for boys and  $11.38 \pm 6.7$  for girls. Depression was present in 12 patients (26.7%). All of them had moderate intensity. The prevalence of depression was repectively 12.5% in young childreen and 42.8% in adolescents. Thirty-three patients (73.3%) had a score between 0–14. Factors associated with depression were low educational level ( $p = 0.01$ ) and duration of epilepsy ( $p = 0.008$ ). Table II presents the distribution of patients according to their socio-demographic and clinical characteristics.

## Discussion

This cross sectional study examined the prevalence and risk factors of anxiety and depression among children and adolescents with epilepsy aged of 7 to 19 years attending in neurology department of Yalgado Ouedraogo University Teaching Hospital.

### Anxiety and related risk factors

The prevalence of anxiety in children with epilepsy (42%) was similar to those observed by Falcone (40%)<sup>[14]</sup> but higher than that observed in litterature witch is ranging from 17% in the study of Russ (17%)<sup>[15]</sup> to 30 - 35% in the study Reilly<sup>[16]</sup>. The high prevalence of anxiety in our context could be explained by the fear of failing to have a seizure in public. Forty two percent of the children had mild to severe anxiety, as seen in the study of Baki et al in Algeria<sup>[17]</sup>, but higher than in the study of Williams et al in USA (23%)<sup>[18]</sup>. , supporting by sociocultural factors. The prevalence of anxiety among adolescents (10-19 years) and young children was 52.4% and 33.3% respectively. Accoding to our study, there was no relation between the age of child and the presence of anxiety, as reported in other studies<sup>[6,17]</sup>. Only Caplan et al in USA<sup>[19]</sup> found a significant link between age of child and presence of anxiety. The prevalence of anxiety among boys and girls was quite similar (57.8% and 52%). Indeed, our study did'nt found a link between gender and the presence of anxiety. In contrast, BİLGİÇ in Turkey had reported that boys had significantly higher scores of trait anxiety in comparison to girls<sup>[20]</sup>. The prevalence of anxiety was respectively 80% in children with secondary level, 45.4% in children with primary level and 0% in children who were dropped out of school. This finding could be explained by the fact that school-aged children are able to understand the disease. In oue study, educational status was associated to anxiety showing that children with secondary level were more anxious than children with primary level and those who were dropped out of school. This type of result was found by Yang in China<sup>[21]</sup>. Our study had found that prevalence of

anxiety was similar in children with generalized (46.7%) and focal epilepsy (40%). However, our study did not found association between type of epilepsy and anxiety, as seen in the study of Baki et al in Algeria.<sup>[17]</sup> The prevalence of anxiety was similar in children with long duration of epilepsy (42.9%) and those with short duration of epilepsy (40%). However, our study had found association between epilepsy duration and anxiety. Children with short duration of their epilepsy have more anxiety than those with long duration of their epilepsy, in contrast with the study of Oguz et al in Turkey<sup>[6]</sup>. This result could be explained by the fact that children were not experienced with the seizures. The prevalence of anxiety in children with free-seizure during the last 3 months was 51.6%, higher than for children with uncontrolled seizures. Children are afraid that the seizure will wake up at any time. Our study did not found association between anxiety and the control of seizures, in contrast with the study of Oguz et al. <sup>[6]</sup> who reported significant link between anxiety and non-seizure control. Children treated by dual AED had more anxiety than those who were treated by AED monotherapy (34.8% vs. 18.2%) without difference type of treatment and anxiety, as seen in the study of Etting et al (USA) <sup>[22]</sup>. However, polytherapy (being on more than one AED) has been associated with increased symptoms of anxiety <sup>[6,18]</sup>. Some studies have been reports suggesting the role of AEDs in causing or sometimes exaggerating anxiety<sup>[23,24]</sup>. Besides, withdrawal from long-term dependence on AEDs could also result in the development of anxiety as well as increase seizures in patients<sup>[25]</sup>

### **Prevalence of depression and associated risk factors**

Twenty six percent of children and adolescents with epilepsy had depression symptoms according to Child depression Inventory. This frequency is consistent with several clinical studies on depression in children with epilepsy, ranging from 12.7 to 36.5%<sup>[16,26]</sup>. For those using Child depression Inventory, the prevalence of depression was ranging from 12 to 32%<sup>[27,28]</sup>. However, our results were higher than those observed by Yang in China (16.9%)<sup>[21]</sup> and Russ in USA (17%) <sup>[15]</sup>. The differences between studies could be explained by the characteristics of the population studies (size, inclusion criterias, depression scales and sociocultural characteristics). Twenty six percent of depressed children had mild depression (100%), higher than in the study of Adewuya et al in Nigeria (28.43%)<sup>[29]</sup>. Sociocultural factors could explained theses differences. The prevalence of depression in adolescents (11-19 years) was higher than those of young children (7-10 years): 42.8% vs 12.5%). This result was similar to those of Oguz et al. in Turkey who reported more depression in the 12- to 18-year-old patients compared to children aged of 9-10 years by using Children Depression Inventory scale<sup>[6]</sup>. According to several authors, depression score was more frequent in old children ( $\geq 11$  years)<sup>[6,19,30]</sup>. While our study did not find a link between depression and children's age, several authors reported that depression was higher in adolescents and older groups<sup>[6,19,30]</sup>. According to gender, the prevalence of depression in girls was higher than to boys (27.8% vs 25.9%), in line with the study of Caplan in USA<sup>[19]</sup>. This situation could be explained by psychosocial and behavioral problems are more likely in epileptic girls than boys, especially in adolescents<sup>[31]</sup>. In our context, adolescent girls were exposed to excision, painful menstruations and forced marriages. There was no association between gender and depression, in line with several pediatric studies<sup>[32]</sup>. In a study,

Bilgiç et al in Turkey had found more depression score in boys than in boys<sup>[20]</sup>. Although depression was most frequent in children residing in towns than in rural areas (30.3% vs 16.7%), without differences between the two regions. This result suggest that children residing in towns may have additional anxiety coming from parent's stress. The prevalence of depression was significantly similar in children with short epilepsy duration (<5 years) than those with long duration of epilepsy ( $\geq 5$  years): 28.6% vs 20%. Only two studies had reported that long duration of epilepsy is likely correlated factor for developing depression in children<sup>[6,33]</sup>. This result could be explain by the fact of an inaugural post diagnosis depression (hope of healing). Regarding the seizure types, children with focal and generalized epilepsy had equal prevalence of depression level (26.7%). As some studies, we did not found link between depression and seizure types<sup>[6,16,17]</sup>. In contrast, several authors reported that focal epilepsy is more significantly associated with depression than generalized epilepsy<sup>[19,30,33,34]</sup>. Children with controlled seizures during the last 3 months had more depression than those who had uncontrolled seizures (35.5% versus 7.1%), in line with the study of Oguz et al. <sup>[6]</sup>. However, our study did not found significant relationship between seizures control and depression level. The prevalence of depression in children treated by polytherapy was elevated than those of children treated by monotherapy (34.8% vs 18.2%) without difference between the two groups. Several authors had reported that depression was significantly higher in patients receiving more than one AED, compared to monotherapy<sup>[6,29,33]</sup>. The possible justification might be due to serious adverse effect, cost of drug and drug interaction. Indeed, Plioplys stated that the depressogenic effect of AEDs cannot explain development of depression in children perse; suggesting this effect to be related to the side effects of individual drugs<sup>[35]</sup>. In addition, Brent et al demonstrated a much higher prevalence of major depression in epileptic children treated with phenobarbital comparatively to carbamazepine<sup>[36]</sup>. In our study, this medication was used alone or in combination in a significant proportion of children with epilepsy (22.2%).

### **Strenght and limitations of the study**

This cross-sectional study is the kind one of studies on anxiety and depression in children with epilepsy in Burkina Faso. However, he had several limitations, according to the small size of the population study, the nature of the study (cross-sectional) and the nature of the questionnaire who is hetero-administered. Our study did not determine parental factors associated with children depression (family history of mental diseases, family history of epilepsy, number of children in the family, socioeconomic characteristics of the family, ect... ..).

### **Conclusion**

Anxiety and Depression were common in patients with epilepsy in Burkina Faso. The study found high level of anxiety and depression among them. The risk factors related to anxiety and depression were educational level of children with epilepsy and epilepsy duration. The majority of children with epilepsy had mild or moderate intensity of anxiety and depression.

# Abbreviations

AED: antiepileptic drug

CT: computed tomography

EEG: electroencephalogram

CDI: Child depression inventory

CWE: Children with epilepsy

PWE: People with epilepsy

USA: United states of America

STAI-C: State-Trait Anxiety Inventory for Children

YOUTH: Yalgado Ouedraogo University Teaching Hospital

# Declarations

## **Ethical Approval and consent to participate**

This study was approved by the Ethical board of medical school of Joseph Ki Zerbo University and the local ethical Committee of Yalgado Ouedraogo University Teaching hospital. Informed consent was obtained from a parent of children with epilepsy. All the methods have been performed in accordance with the Declaration of Helsinki.

## **Availability of data and materials**

All the data and materials were available with the corresponding authors

## **Competing interests**

The authors do not report any conflict of interest.

## **Funding: no funding**

## **Authors contributions**

AAD, BB, AD, IS and JMAK had contributed to the data collection or processing, analysis or interpretation, literature research and writing.

CN, KK and JK had contributed to concept and design of the study



All the authors read and approved the final manuscript.

## Knowledge

I want to wish Mrs Zongo L Carine Patricia for translation

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## Tables

<b>Table I: Children anxiety related to children with epilepsy characteristics</b>				
Variable	Population study (N = 45)	Presence of anxiety (n = 19)	Absence of anxiety (n = 26)	P value
<b>Age of children (years)</b>				
7-9	24	8 (33.3%)	16 (66.7%)	0.52
≥10	21	1 & (52.4%)	10 (47.6%)	
<b>Gender of child</b>				
Boys	27	12 (44.4%)	15 (55.5%)	0.71
Girls	18	7 (38.9%)	11 (61.1%)	
<b>Place of residence</b>				
Rural	12	3 (25%)	9 (75%)	0.15
Urban	33	16 (48.5%)	17 (51.5%)	
<b>Educational status</b>				
Not yet started or dropped out	7	0	<b>7 (100%)</b>	<b>0.016</b>
Primary level	33	15 (45.4%)	18 (54.5%)	
Secondary level	5	4 (80%)	1 (20%)	
<b>Type of epilepsy</b>				
Generalized	30	12 (40%)	18 (60%)	0.34
Focal	15	7 (46.7%)	8 (53.3%)	
<b>Epilepsy duration (years)</b>				
<5	35	15 (42.8%)	20 (57.1%)	0.02
≥5	10	4 (40%)	6 (60%)	
<b>Number of AED</b>				
One	22	7 (31.8%)	15 (68.2%)	0.17
Two	33	12 (36.4%)	11 (33.3%)	
<b>Seizures frequency during the last 3 months</b>				
No seizure	31	16 (51.6%)	15 (48.4%)	0.24
Peristance of seizure	14	3 (21.4%)	11 (78.6%)	



<b>Table II: Children depression related to children with epilepsy characteristics</b>				
<b>Variable</b>	<b>Population study (N = 45)</b>	<b>Presence of depression</b>	<b>Absence of depression</b>	<b>P value</b>
<b>Age of children (years)</b>				
<10	24	3 (12.5%)	21 (87.5%)	0.09
≥10	21	9 (42.8%)	12 (57.1%)	
<b>Gender of child</b>				
Boys	27	7 (25.9%)	20 (74.1%)	0.89
Girls	18	5 (27.8%)	13 (72.2%)	
<b>Place of residence</b>				
Rural	12	2 (16.7%)	10 (83.3%)	0.36
Urban	33	10 (30.3%)	23 (69.7%)	
<b>Educational status</b>				
Not yet started / dropped out	7	1 (14.3%)	6 (85.7%)	<b>0.01</b>
Primary level	33	7 (21.2%)	26 (78.8%)	
Secondary level	5	4 (80%)	1 (20%)	
<b>Sixteen types</b>				
Generalized	30	8 (26.7%)	22 (73.3%)	0.49
Focal	15	4 (26.7%)	11 (73.3%)	
<b>Epilepsy duration (years)</b>				
<5	35	10 (28.6%)	25 (71.4%)	<b>0.008</b>
≥5	10	2 (20%)	8 (80%)	
<b>Number of AED</b>				
Monotherapy	22	4 (18.2%)	18 (81.8%)	0.07
Bitherapy	23	8 (34.8%)	15 (65.2%)	
<b>Seizures frequency during the 3 months</b>				
No seizure	31	11 (35.5%)	20 (65.5%)	0.1
Peristance of seizure	14	1 (7.1%)	13 (92.8%)	