

## Educational Training of Epileptic Children in Dakar, Senegal

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### ABSTRACT

**Background:** Epilepsy is a chronic affection evolving neurologic manifestation and cognitive disorders. It is a real problem in African countries and mainly affects children who are subject to learning difficulties.

**Objective:** Evaluate the scholar course of children and adolescents with idiopathic epilepsy.

**Methods:** For one year and three months, a prospective, analytical and descriptive study was conducted among children and adolescents with epilepsy, aged 6 to 18, living in the Dakar region. A total of 149 subjects were collected including 80 epileptics. These were followed regularly at CHNU de Fann. The survey was conducted in the Neurology Department and in the schools of recruited patients.

**Results:** The results revealed that 45% of patients had school retardation; 73.7% of patients had learning difficulties which concerned several topics. Most of patients were bad in reading (50%). Among these patients, 21.3% and 17.5% had respectively hyperactivity with attention and concentration disorders. In addition, 63.6% of patients on combined therapy had learning difficulties, 15% of patients did not accept their disease and hardly live and 97.5% participated in sports as their classmates.

**Conclusion:** The education of patients with idiopathic epilepsy still faces obstacles and difficulties; with learning difficulties, neuropsychological disorders and psychomotor disorders. Subsequent studies on large populations should be conducted to better assess the impact of epilepsy on scholarship.

### Keywords

Epilepsy, Children, Schooling.

### Introduction

The epilepsy of the child is characterized by the dysfunction in the interaction of two main neurotransmitters: gamma-aminobutyric acid (GABA, inhibitor) and glutamate (exciter), even if its physiopathology remains largely unknown [1,2]. This is why the schooling of epileptic children still faces many obstacles and

difficulties whereas for most other chronic diseases of the child, it is well codified and accepted. For teachers, one case of epilepsy in the classroom gives more concern and concern than another condition [3]. Moreover, for the epileptic child, schooling is still too often disturbed with integration difficulties. Epileptic seizures are a handicap. Moreover, according to the literature review more than 50% of children developing epilepsy will manifest in the long term, academic difficulties, behavioral disorders, psychiatric disorders or a quality of life lower than that of children of the

same age [4]. In addition, other studies show significantly lower school performance and IQ in children with epilepsy [5]. Epilepsy can then become a hindrance to intellectual, psychological and emotional development, with an impact on the academic success and overall development of children and adolescents. In short, epilepsy is a real concern in the school environment, through the fear and rejection it generates.

In this context, if, as Jones and Hardy [6] remind us, different activating stimuli have different effects on the efficiency of cognitive processes, we can suggest that the educational pathway in children with epilepsy is characterized by academic delay, through the differentiated effects of the disease. It is with the aim of verifying this hypothesis that this work has been carried out, focusing on the influence of the severity of the pathology and the nature of the treatment, the level of studies on school failure in school children and epileptic adolescents of Dakar.

This would make it possible to identify the difficulties encountered by children with epilepsy in cognitive development, to analyze their impact on school learning and to propose a strategy to reduce the delay in children with epilepsy in sub-Saharan Africa.

## Subjects and Methods

### Topics

The study, prospective, analytical and descriptive, was carried out from 1st March 2014 to 1st May 2015 at the neurology department of the University and National Hospital Center (CHUN) in Fann (Dakar, Senegal) and in schools (primary schools, colleges). It involved 149 children and adolescents of both sexes: 80 epileptic subjects (44 girls and 36 boys), with a respective sex ratio of 0.82. The extreme ages are 6 and 18 years old. Epileptic patients were followed for at least two years in the Fann CHUN neurology department after diagnosis based on electroencephalogram (EECG) examination, medical interview on family history and anamnesis.

Patients attended non-specialized schools for children and adolescents with psychomotor developmental disabilities. During the study period, the treatment of this condition was monotherapy or bitherapy depending on the academic delay observed.

The inclusion of our patients has required the free and informed consent of a parent or guardian who has been living with the patient for at least two years. Behavioral information was collected from educational staff in the respective schools. In all cases, students attending educational institutions reserved for children and adolescents with psychomotor developmental disabilities were excluded. The information collected was recorded in an individual data sheet.

### Variables

They were socio-demographic (age, sex), pathology (information about epilepsy: type of epileptic syndrome, treatment), school age (starting age, frequency of academic delay according to the cycle of studies, nature of the disorders 'learning). The quality of life

of the patients was also taken into account; it was evaluated from the Lehman "quality of life interview" scale. Data on children's hyperactivity and attentional disorders were reported by parents and / or teachers.

### Statistical analysis

After data entry on Epi info 3.5.3, they were processed on SPSS 20 (SPSS Inc., Chicago, IL). The results of the quantitative variables were presented in terms of mean and frequency. Qualitative variables were presented as frequency and percentage. The Chi-square test of Pearson was used for the comparison of qualitative variables. The statistical significance perceived between 2 percent p1 and p2 was examined from formula<sup>8</sup>:

$$t = \frac{[\arcsin\sqrt{p_1} - \arcsin\sqrt{p_2}]}{D}$$

Where D is equal to the square root of:  $820.8 (n_1 + n_2) / n_1 n_2$

The percentages p1 and p2 are associated with the numbers n1 and n2. The value 820.8 is a parametric constant related to the transformation of the percentages in arcsinus. The significance level for all tests was 5%.

### Operational Definitions

The academic delay was defined by a repetition of two classes during a course of studies.

The child was considered:

- Low in dictation when the mean score obtained during the period was less than 5/10;
- Hyperactive, according to parents and teachers when the latter did not complete his school tasks or duties, touched everything, moved in all directions without resting during the day.

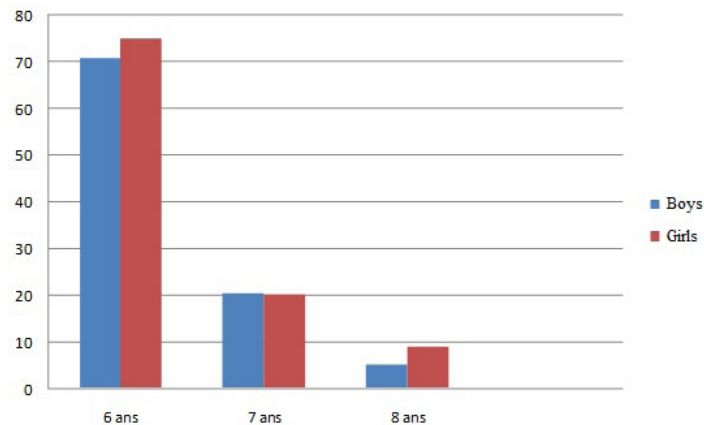
The DSMV includes two classes of epilepsy:

- Idiopathic epilepsy;
- Non-idiopathic epilepsy.

### Results

We have collected 80 patients. The average school age of our study population was 6.2 years for ages 6-8 and a 6-year age group (75%) (Figure 1); Four patients (5%) had delayed schooling. The majority of our patients (56.3%) were enrolled in primary school. Fifty of our patients (62.5%) had idiopathic generalized epilepsy and (37.5%) idiopathic focal epilepsy. The most common epileptic syndromes were: centro-temporal paroxysmal epilepsy (33.3%) of all RCTs and child absence epilepsy (20%) of all EGIs (Table 1). In our series, 36 patients (45%) had a school delay among which, 21 patients (58.3%) had to repeat once and 15 patients (41.7%) twice. Almost all patients (73.7%) in our study had learning difficulties. Our patients (50%) were weak in dictation. We noted 28 patients (44.5%) on monotherapy and 7 patients (63.6%) on dual therapy were lagging behind (Table 2). Parents reported hyperactivity in 14 patients (17.5%), attention disorders were found by teachers in 17 patients (21.3%). For patients, the parents refused to meet the teachers because they did not want them to know about their

children's illness. Fifteen percent of the patients did not accept their illness and lived with difficulty. 97.5% of the patients practiced a physical and sports education like their peers.



**Figure 1:** Age of onset of enrollment by sex.

Epileptic syndromes		Frequency (n)	Percentage (%)
EGI	EAE	10	20,0
	EAA	8	16,0
	EMJ	1	2,0
	Othera	31	62,0**
	Total 1	50	62,5**
EFI	EPCT	10	33,3
	EPO	1	3,3
	Otherb	19	63,4**
<b>Total 2</b>		30	37,5
<b>Total</b>		80	100

**Table 1:** Distribution of patients by type and epileptic syndrome.

**Abbreviations:** EGI: Idiopathic Generalized Epilepsy; EAE: pilepsy Absence of the Child; EAA: Epilepsy Absence of Teenager; EMJ: Juvenile Myoclonic Epilepsy; EFI: Idiopathic Focal Epilepsy; EPCT: Epilepsy with Centro-temporal Tip; EPO: Idiopathic occipital Epilepsy type Panyiotopoulos; Othera: Idiopathic Generalized Epilepsy whose Epileptic Syndrome remains Undetermined; Otherb: Idiopathic Focal Epilepsy whose Epileptic Syndrome remains Undetermined.

	Normal n (%)	Delays n (%)	Total n (%)	t	p
Monotherapy	37 (54,4)	31 (45,6)	68 (85,0)***	0,72	>0,05
Combination therapy	4 (33,3)	8 (66,7)	12 (15,0)	1,11	>0,05
Total	41	39	80		

**Table 2:** Correlation between academic difficulties and nature of treatment.

## Discussion

Learning disabilities were observed and attested by academic delay in 45% of patients. Overall, 73.7% of our patients had learning disabilities. In 21.3% and 17.5% of patients in our cohort there was hyperactivity with attention and concentration disorders. These results, which are consistent with those published by some authors, show that 45 to 72% of children have learning disabilities [6-8]. They highlight the impact of epilepsy on the schooling of

children. This would explain the difficulties in our patients.

Idiopathic epilepsy is considered benign with less impact on cognitive functions. Conversely, non-idiopathic epilepsy is severe with severe neuropsychological disorders [8]. It should be expected that the majority of our patients will have normal schooling. However, our study showed that 48.8% of patients with idiopathic generalized epilepsy and 33.3% of idiopathic focal epilepsy had academic difficulties.

Ndiaye and Mbonda [9-10] reported that 34.1% and 49% of children with idiopathic epilepsy had academic difficulties. Their observations thus relativize the notion of the benignity of idiopathic epilepsies. Jeong You, et al. [11] also noted that children with idiopathic epilepsies, although with normal intelligence, had a reduced memory capacity and psychomotor slowness. This can significantly affect schooling and disrupt schooling.

On the other hand, learning difficulties could also be due to the action of antiepileptic drugs. For example, phenobarbital is recognized as having an impact on children's learning and cognition [12]. On the other hand, carbamazepine and sodium valproate would lead to attention disorders and slow ideation [13]. Nevertheless, these two molecules would induce fewer cognitive disorders than phenobarbital. Despite its proven side effects, phenobarbital is the molecule most used in our countries because of its accessibility and low cost. Its aspects could explain some cases of learning disabilities in our patients. In addition, polytherapy may increase deleterious effects. Indeed, Bulteau, et al. [14] report that the sometimes necessary combination therapy leads to an increase in the cognitive disorders associated with learning disabilities, thus contributing to academic delay. This was observed in 63.3% of our patients. If the school allows psycho-affective fulfillment and conditions the socio-professional future of children, the child with epilepsy is most often subject to academic integration difficulties in more than 50% of cases [6-11]. These difficulties are of various origins: 1) medical (associated with the frequency of crises and resulting absenteeism); 2) cognitive (represented) by attention, concentration and assimilation disorders; 3) psychosocial (related) to anxiety, demotivation and relationship problems [11-13]. In our study, epilepsy was poorly experienced in 15% of patients. Indeed, they felt different from others and anxious to participate in school activities for fear of making a crisis. In addition, the mockery of children with epilepsy by their classmates, overprotection by parents, fear caused by the dramatic course of the crises, are the main and dramatic reasons for the backwardness of schooling. These factors constitute obstacles to their development. Parents often experience severe anxiety when their child has a seizure. They tend to develop an anxious behavior, experiencing a need to overprotect their child [15]. The perception of the disease could thus justify the absenteeism of epileptic students in school.

Moreover, in our patients because of the attentional disorders, the educational performance decreased, causing the failures in the school. However, some justified these failures by the disease, suggesting the notion of secondary benefit in the epileptic patient.

Finally, a good social and educational integration was found in our patients, and participated in sports activities. The practice of physical activity is indeed a factor of psychological equilibrium and an important factor of social integration. Moreover, in the Czech Republic, Komarek and al. [16] found 55% participation in sports activities. These findings underscore the continuing restriction of epileptic children. Some authors believe that sports such as swimming, parachuting, boxing, high jumps can be dangerous for the child with epilepsy [17], even if these observations are qualified by other studies [18].

## Conclusion

The schooling of Dakar schoolchildren and college students presenting with epilepsy still encounters many obstacles and difficulties. For the child with epilepsy, schooling is still too often disrupted with learning difficulties, neuropsychological disorders and psychomotor disorders. For this reason, information, education and awareness activities, family and educators in schools should place special emphasis on learning disabilities. It is then necessary that any decline in academic performance should alert the teacher, the family and the medical team. This may be a sign of poorly diagnosed, unbalanced and poorly controlled epilepsy by drug therapy. Therefore, more appropriate measures need to be implemented to remedy and readjust school-based learning objectives in these patients.

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