



## Impact of knowledge, attitudes, and sociocultural factors on school enrollment of children with epilepsy in Gabon

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### ABSTRACT

**Purpose:** Perceptions, beliefs and culture influence attitude towards epilepsy in sub-Saharan Africa. Misconceptions on epilepsy contribute to the persistence of negative attitudes in children with epilepsy particularly on their school enrollment. The aim of the study was to assess knowledge, attitudes, and sociocultural factors affecting schooling of children with epilepsy in Gabon.

**Methods:** Teachers and health workers from two urban and four rural localities of Gabon were assessed using a self-administered questionnaire.

**Results:** Overall 1310 subjects filled the survey questionnaire, including 813 teachers and 497 health workers. Knowledge on risk factors and suggestive signs of childhood epilepsy were globally poor. Misconceptions on etiology of epilepsy were significant with contagiousness (27.5%) and demonic possession (16.0%) representing the major prevalent idea about the origin of epilepsy in children. Attitudes of teachers and health workers towards schooling of children with epilepsy were positive (85.0%). However, more than half recommended enrollment of these children in specialized school programs. In multivariate analysis, education level (OR = 1.40; 95% confidence interval 1.01–1.81) and marital status (OR = 1.62; 95% confidence interval 1.18–2.22) were sociocultural factors likely to affect chances of school enrollment of children with epilepsy.

**Conclusion:** Understanding the influence of socio-cultural factors surrounding school enrollment of children with epilepsy could enhance public awareness campaigns about epilepsy and to improve school integration of these children.

### 1. Introduction

Epilepsy is a common disorder that occurs worldwide in all age groups and without distinction of gender. There are many superstitious beliefs in African counties about etiology of epilepsy [1–5]. In some of these countries, traditional healers, teachers, and students have linked epilepsy to spiritual attacks and witchcraft. Furthermore, epilepsy is widely believed to be transmissible by direct or indirect contact with body fluids of patients such as saliva and urine [6,7]. Therefore, children with epilepsy (CWE) are often stigmatized, withdrawn from school by their parents, or expelled from educational systems by school

authorities for fear of contaminating other children [8]. Many recent studies have reported the persistence of strong negative attitudes towards school attendance and social life of children with epilepsy [9–11]. Despite biomedical advances, negative public attitudes towards CWE are still widely prevalent. The stigma, social attitudes and discrimination against children with epilepsy are often more devastating and harmful than the actual disease itself [12].

Teachers and health workers (HWs) play a pivotal role in the community and in the life of families in which children with epilepsy may be part of the household. Having not received training in epilepsy, the involvement of teachers cannot be comparable to that of health

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professionals, however they are involved in education and health awareness for these children. School environment is the place where children spend most of their time during a critical period of their physical, social, and psychological development. Teachers, HWs, and parents often interact for maintaining or removing from school children with certain health disorders including epilepsy. Therefore, obtaining accurate and precise information on social and cultural beliefs around children with epilepsy requires involvement of teachers and HWs. Thus, their inputs may serve as markers for how their community perceives epilepsy in school age children. In addition, there are few knowledge, attitudes and practice (KAP) studies that have been performed simultaneously in these two occupational categories meaning education and health. The aim of this study was to assess the influence of socio-cultural factors of teachers and health workers regarding school enrollment of children with epilepsy in Gabon as well as their knowledge, attitudes.

## 2. Material and methods

### 2.1. Study site

The study was conducted in two urban and four rural areas of Gabon. The two urban areas were the third borough of Libreville and the city of Mouila while the four rural areas were the localities of Ndende, Lebamba, Moabi, and Mayumba. All study sites were randomly selected. All localities have been previously described [13].

### 2.2. Study design and procedure

The survey questionnaire developed in this study was designed based on similar studies and well-established approaches on knowledge, attitudes and practices conducted in many other countries [7,14,15]. Briefly, questions commonly used to study beliefs, attitudes, and practices were maintained. However, we added questions pertaining to risk factors and suggestive signs of childhood epilepsy. A particular emphasis was put on signs referring to spasms and myoclonus. We emphasized questions on school attendance and school registration records. The questionnaire was given to 50 randomly selected adult students on the campus of the University Omar Bongo in Libreville, Gabon. That initial and pilot test was conducted in order to correct wording in the formulation of questions in a way that would prevent any misunderstanding and thus prevent discrepancies between the intention of the question and the answer given by surveyed subjects. The possible answers to questions were: “yes; no; I do not know”. The final survey questionnaire had 19 items: eight items investigated knowledge and beliefs (Q1-8); seven items (Q9-15) investigated attitudes on seeking care, three questions (Q16-17) investigated attitudes of respondents toward school enrollment of CWE and the last question (Q19) addressed practices related to the management of a seizure event occurring in a child. The survey questionnaire is attached in the appendix.

The work performed here was a cross-sectional study using a self-administered survey questionnaire. It was conducted from January 2013 to October 2013 at schools and health facilities located in the six selected study sites. At each occupational site being surveyed, all respondents received the survey questionnaire, which was requested to be completed on the same day before leaving their work, in order to limit communication between respondents. While collecting the completed questionnaires, we verified that all questions had been answered. Uncompleted or partially completed questionnaires were excluded from final analysis.

### 2.3. Data management and analysis

Data was analyzed using Stata, version 12 (Stata Corp., College Station, TX, USA). The sociocultural characteristics including age, years

of professional experience, and size of family were categorized and frequencies were determined. Descriptive analyses were done using percentages for categorical variables and means  $\pm$  standard deviations for continuous variables. Stepwise backward logistic regression was performed to determine effects of sociodemographic, perception, beliefs on contagiousness, on demonic origin and on malediction origin of epilepsy demonic origin on school enrollment of children with epilepsy. Independent variables were age, gender, zone of residence, occupation, experience, marital status, family size, level of education, type of school, and school enrollment acceptability. In all analyses the threshold for statistical significance was set at 0.05.

### 2.4. Ethical issues

Administrative authorization was obtained from the Ministry of Public Health of Gabon. That administrative authorization was then transmitted to local authorities on study sites (schools and health care facilities). In all instances, health center Managers and school Managers or Directors of institutions gave their consent for execution of the study on the site. Participation in the study was voluntary and a verbal consent was obtained from each respondent.

## 3. Results

### 3.1. Demographic characteristics

The survey questionnaire was administered to 1553 teachers and 763 HWs of which 945 responses were obtained from teachers while 577 responses were obtained from HWs. A total of 212 questionnaires were uncompleted including 132 from teachers and 80 from HWs. *In fine*, 1310 completed and valid survey questionnaire were obtained and analyzed. 912 (69.6%) of respondents lived in urban areas. It was also observed that 96.5% of all respondents had completed at least secondary school. Demographic and sociocultural characteristics of respondents are reported in Table 1 while data collection procedure is summarized in the Fig. 1.

### 3.2. Knowledge and beliefs of teachers and HWs about childhood epilepsy

About suggestive signs of epilepsy in children, less than half of respondents recognized some suggestive signs including sudden and brief

**Table 1**  
Demographic and sociocultural characteristics of surveyed teachers and health workers in Gabon, 2013.

Characteristics	Respondents Number (%) or mean $\pm$ SD
Occupation	
Teachers	813 (62.1)
Health workers	497 (37.9)
Age	40.1 $\pm$ 8 years <sup>*</sup>
Professional Experience	
Experience $\leq$ 10 years	744 (56.8)
Experience > 10 years	566 (43.2)
Gender	
Male	554 (42.3)
Female	756 (57.7)
Family size	
Children $\leq$ 4	785 (60.0)
Children > 4	525 (40.0)
Residence	
Urban	912 (69.6)
Rural	398 (30.4)
Education level	
Primary	46 (3.5)
Secondary	658 (50.2)
University	606 (46.3)

\* mean  $\pm$  SD.

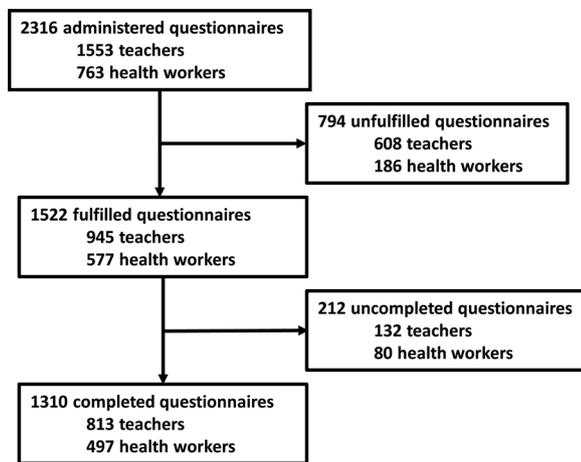


Fig. 1. procedure of the data collection among teachers and HWs, Gabon, 2013.

flexion of the neck and limbs (37.2%), and the falling of objects held by the child (33.3%). Some respondents (0.4%) reported to not know whether a child with epilepsy necessarily had generalized tonicoclonic seizures. Loss of consciousness remained the most recognized suggestive sign of childhood epilepsy among the respondents (58.2%). Knowledge of risk factors that could increase chances of developing childhood epilepsy was limited in the surveyed population sample. As shown by recorded results, only 39.8% of respondents knew that cerebral infections could trigger epilepsy in children and only 24.9% of respondent reported that brain tumors could be a risk factor associated with occurrence of epilepsy in children.

Negative beliefs were prevalent among the participants. Over one quarter of respondents (27.5%) believed that epilepsy is contagious and 16.0% thought that epilepsy is related to demonic possession. Table 2 summarizes knowledge and beliefs of teachers and HWs about childhood epilepsy.

### 3.3. Teachers and HWs attitudes and practices towards childhood epilepsy

Our investigation shows that 85.0% of teachers and HWs surveyed would enroll children with epilepsy in school. However, 56.2% of respondents recommended enrollment of these children in a specialized school designed for children with intellectual disabilities. Attitudes towards seeking care for children with epilepsy were good. Nonetheless, nearly 40% of respondents reported to not know that epilepsy could be treated either by traditional medicine or modern medicine. Attitudes and practices towards childhood epilepsy are reported in Tables 3 and 4.

### 3.4. Sociocultural factors surrounding schooling of children with epilepsy

Gender, occupation, and beliefs such as epilepsy is related to “malediction” or epilepsy is a “demonic disease” were not associated with school enrollment of CWE. Other sociocultural characteristics such as age of respondents, area of residence, and years of professional experience were shown to be associated with chances of school enrollment of CWE. Univariate and multivariate analysis are reported in Tables 5 and 6 respectively.

## 4. Discussion

Our study showed that gender and beliefs related to epilepsy were not associated with the schooling of the children with epilepsy; specialized schools were the most recommended for their schooling and the level of education and marital status would positively influence the schooling of the children with epilepsy.

Table 2 Knowledge and beliefs of teachers and HWs about childhood epilepsy, Gabon, 2013 (n = 1310).

Questions	Respondents	
	Yes	No
At what age can occur epilepsy in a person?		
At any age	836 (63.8)	NA
In adulthood	11 (0.8)	NA
In childhood	256 (19.6)	NA
I don't know	207 (15.8)	NA
Is any child who has a seizure event always epileptic?	30 (2.3)	1,280(97.7)
Is the entire body necessarily shaking during epileptic seizure episodes in a child?	791 (60.4)	513 (39.2)
Which of the following signs may suggest an epilepsy episode in child?		
Laughter	83 (6.3)	1,227 (93.7)
Sudden and brief flexion of the neck and limbs	500 (37.2)	810 (61.8)
Brief and rhythmic muscle contractions	311 (23.7)	999 (76.3)
Falling of objects held by the child	436 (33.3)	874 (66.7)
Brief loss of consciousness	763 (58.2)	547 (41.8)
Is epilepsy a contagious disease?	360 (27.5)	379 (28.9)
If epilepsy is contagious, how is it transmitted?		
Through saliva	281 (21.5)	1,029 (78.5)
By eating in the same plate	76 (5.8)	1,234 (94.6)
Through urine	24 (1.8)	1,286 (98.2)
By sleeping on the same bed	4 (0.3)	1,306 (99.7)
By simple touch	5 (0.4)	1,305 (99.6)
Through the drool during seizures	265 (20.2)	1,045 (79.8)
Which of the following situations can cause epilepsy in children?		
Born in a state of apparent death	174 (13.3)	1,136 (86.7)
Born premature	63 (4.8)	1,247 (95.2)
Forceps delivery	116 (8.8)	1,194 (91.2)
Shaking the baby	94 (7.3)	1,216 (92.8)
Head trauma in a newborn, infant or a child	398 (30.4)	912 (69.6)
Cerebral infections in a newborn, an infant or child	552 (39.8)	788 (60.2)
Hydrocephalus	187 (14.3)	1,123 (85.7)
Brain tumors	326 (24.9)	941 (75.1)
In your opinion how do you consider epilepsy?		
Curse	82 (6.3)	1,228 (93.7)
Mental retardation	86 (6.6)	1,224 (93.4)
Demonic possession	210 (16.0)	1,100 (84.0)
Psychiatric disorder	241 (18.4)	1,069 (81.6)
Brain disease	571 (43.6)	739 (56.4)
Neurologic disease	760 (58.0)	550 (42.0)

NA: not applicable.

Our study revealed that attitudes towards school enrollment of CWE were independent of gender, occupation, perception of epilepsy as being a demonic or a contagious disease. Similarly, there was no relation between school enrollment of CWE and the perception of that health condition as being curse-related. These results show the homogeneity of a population that shares the same beliefs, the same social and cultural experience, regardless of their level of education and their professional backgrounds.

In our study, more than three quarter of respondents resided in urban areas as observed in other African countries [16,17]. This result was in agreement with the unequal distribution of infrastructures between urban and rural areas in the country. Thus, the distribution of human resources follows that of infrastructures. In Laos, out of 50 selected hospitals, including 11 provincial hospitals, 9 District hospitals and 30 village health facilities, provincial hospitals contained 52% health workers [18].

Knowledge of respondents about epilepsy in children was fair. Overall, the suggestive sign of epilepsy that respondents (both teachers and HWs) would easily recognize in epileptic children was the brief loss of consciousness. This sign might frighten teachers and HWs who would perceive this as a risk of death. Our results are in agreement with several results of studies from developed and developing countries. Indeed, despite a good level of education, in Italy, the level of

**Table 3**  
Attitude of teachers and health workers towards care of children with epilepsy (n = 1,310).

Questions	Yes response numbers (%)
How would you advise parents of a child with epilepsy to seek treatment?	
To consult a pharmacist	03 (0.2)
To consult a physician	1,030 (78.6)
To consult a traditional healer	128 (9.8)
To consult a priest or pastor	87 (6.7)
I don't know	62 (4.7)
Which of the following would you recommend as first intention consultant?	
A pharmacist	8 (0.6)
A physician	1,121 (85.6)
A traditional healer	105 (8.0)
A priest or pastor	76 (5.8)
Can childhood epilepsy be cured using traditional medicine?	560 (42.8)
Can childhood epilepsy be cured using modern medicine?	560 (42.8)
How long could the treatment of epilepsy last?	
About a week	06 (0.5)
One month	14 (1.1)
Several months	212 (16.2)
Several years	330 (25.2)
Life time	308 (23.5)
I don't know	440 (33.5)
How would you administer the treatment to a child with epilepsy?	
The child would take drugs alone	11 (0.8)
The child would take drugs under the supervision of a sibling	19 (1.5)
The child would take drugs under the supervision of a parent	1,280 (97.7)
How would you verify that the child has taken the prescribed drugs?	
By asking the child	12 (0.9)
By checking the amount of remaining drugs	61 (4.7)
By making sure drugs are taken under the supervision of a parent	1,237 (94.4)

knowledge of teachers about epilepsy causes was not different from that of the general population [19]. A similar observation was made in a study involving nursing students and laboratory technicians in Cameroon and that of health workers in Laos and in Zambia [10,18,20]. However, the rate of respondents who thought that head trauma, brain infections and brain tumors were risk factors for epilepsy was higher than that observed in Zimbabwean teachers and Indian school teachers

**Table 4**  
Attitude of teachers and health workers towards school enrollment and management of seizing CWE (n = 1,310).

Questions	Respondents	
	Yes	No
Would you enroll your child in school if suffering from epilepsy?	1,114 (85.0)	196 (15.0)
In what type of school would you enroll your CWE?		
Public school	136 (10.4)	NA
Catholic school	47 (3.6)	NA
Protestant school	280 (21.4)	NA
Private school	48 (3.6)	NA
Specialized school for children with intellectual disability	736 (56.2)	NA
I don't know	63 (1.8)	NA
If you were a School Manager or Director, would you allow children with epilepsy to enroll in your school?	924 (70.5)	225 (17.2)
What would you do to assist a child with epilepsy who is having a seizure episode?		
I would pull his/her tongue	79 (6.0)	1231 (94.0)
I would remove offensive objects around	802 (61.2)	508 (38.8)
I would protect his/her head from trauma	930 (71.0)	380 (29.0)
I would put his/her neck in hyperextension (to keep ventilation on)	725 (55.3)	585 (44.6)
I would put an object between the teeth (piece of wood or spoon)	1007 (76.9)	303 (23.1)
I would loosen the collar of the shirt and the belt	154 (11.8)	1156 (88.2)
I would take objects out of his/her mouth	579 (44.2)	731 (55.8)
I would take him/her quickly to a hospital	668 (51.0)	642 (49.0)
I would wait for return to consciousness	576 (44.0)	734 (56.0)

NA: not applicable.

and Italian teachers from Sicily while it was similar to that of Nigerian teachers and less than that reported in Italian primary school teachers [20–25]. Knowledge on perinatal risk factors, and some suggestive signs of epilepsy such as spasms, focal seizures remained limited. About the treatment, an equal rate of respondents (42.8%) thought that epilepsy could be treated by modern or traditional medicine. This rate was higher than the one reported in Togo, where only 30% of caregivers recognized the possibility to cure epilepsy using medicines [3]. Beliefs are still dominated by misconceptions such as the contagiousness of epilepsy, the action of a demonic spirit and confusion between epilepsy and psychiatric disorders. Cultural influence, low use of individual reading, lack of training of HWs, and lack of awareness about epilepsy could explain negative beliefs.

In our study, even if more than half of the respondents recommended specialized school programs for children with epilepsy, attitudes of teachers and HWs towards school enrollment were positive. Teachers and HWs are potential parents of CWE, they would not object to enroll their children, nor to withdraw them from school. Enrollment attitude was similar to what had been observed in England, Greece and in Korea, while they were opposed to those found in Nigeria and Sudan where more than half of the teachers would not desire to enroll children with epilepsy [26–30].

Despite good practices when facing a seizing child, we found a persistence of harmful practices such as putting an object in the mouth of the child to prevent tongue biting. Respondents seem to be unaware of the danger of putting an object between the teeth of a seizing child. HWs have several responsibilities including diagnosis, treatment, and to inform patients and their parents. Failing to know the role of perinatal risk factors of childhood epilepsy is a source of mismanagement and diagnostic delay [31,32]. Upon diagnosis of epilepsy, HWs may be able to provide correct information to parents and to reduce comorbidities through proper care. Conversely, diagnosis delay could lead to persistence of incorrect beliefs and cause parents to seek care through traditional healers and priests to appease their anxiety. The lack of proper knowledge among HWs about childhood epilepsy would inevitably have a negative impact on information and health promotion. Awareness and knowledge level must be optimized among caregivers because the lack of awareness and knowledge in caregivers would contribute in the perpetuation of misconceptions in the community.

In the multivariate analysis, education level and marital status were predictive of socio-cultural factors of schooling of CWE. Studies have shown that people with a high level of education are more likely to

**Table 5**  
Univariate analysis of sociocultural characteristics in relation to school enrollment of children with epilepsy (n = 1310).

Characteristics	School enrollment (number (%))		P value
	Yes	No	
Age			
Age ≤ 39 years	630 (88.1)	85 (11.9)	
Age > 39 years	484 (81.3)	111 (18.7)	0.010
Gender			
Male	467 (84.3)	87 (15.7)	
female	647 (86.6)	109 (14.4)	0.590
Residence			
Urban	794 (87.1)	118 (12.9)	
Rural	302 (80.4)	78 (19.6)	0.002
Occupation			
Teachers	691 (85.0)	122 (15.0)	
Health workers	423 (85.1)	74 (14.9)	0.954
Experience			
Experience ≤ 10 years	646 (86.8)	98 (13.2)	
Experience > 10 years	468 (82.7)	98 (17.3)	0.010
Family size			
Family size ≤ 4 children	684 (87.1)	101 (12.9)	
Family size > 4 children	430 (81.9)	95 (18.1)	0.009
Marital status			
Single	434 (81.0)	102 (19.0)	
Couple	680 (87.9)	94 (12.0)	0.001
School level			
Primary	35 (77.8)	10 (22.2)	
Secondary	539 (81.8)	120 (18.2)	
University	540 (89.1)	66 (10.9)	< 0.001
Contagiousness			
Yes	294 (81.7)	66 (18.3)	
No	322 (85.0)	57 (15.0)	
Don't know	498 (87.2)	73 (12.8)	0.060
Malediction			
Yes	67 (81.7)	15 (18.3)	
No	1,047 (85.3)	181 (14.7)	0.300
Demonic			
Yes	174 (82.9)	36 (17.1)	
No	940 (84.3)	160 (14.5)	0.330
Type of school			
Catholic	126 (92.6)	10 (7.4)	
Protestant	42 (89.4)	05 (10.6)	
Public	272 (97.1)	08 (2.9)	
Private	44 (91.7)	04 (8.3)	
Specialized	593 (80.67)	143 (19.4)	
Don't know	37 (58.7)	26 (41.3)	< 0.001
Enrollment acceptability			
Yes	876 (94.8)	48 (5.2)	
No	119 (52.9)	106 (47.1)	
Don't know	119 (73.9)	42 (26.1)	< 0.001

**Table 6**  
Sociocultural variable predictive of school enrollment of CWE in Gabon, 2013.

Sociocultural characteristics	Schooling of CWE		
	Odd Ratio	95% CI	p value
Residence	0.63	0.45-0.87	0.006
Age	0.66	0.48-0.92	0.015
Education level	1.40	1.01-1.81	0.037
Marital status	1.62	1.18-2.22	0.003
School type	0.58	0.50-0.69	< 0.001

CI: Confidence interval; CWE: children with epilepsy.

enroll CWE compare to people with low education level [19,33]. Educated people would improve their knowledge through several sources including television, newspapers, and medical visits, thereby gradually correcting their understanding of the disease and shifting away from prevalent community beliefs. However, because cultural beliefs improve slowly, their evolution would require much time and maintaining awareness campaigns becomes therefore necessary [3].

In our study, we show that marital status would influence positively schooling of CWE. This result could be explained by the difficulty in a single-parent household to care for a CWE with regard to the impact of this disease in the lives of parents and siblings [13].

The residence and type of school seemed not to be in favor of schooling of CWE. Indeed, school structures are established according to the population density. In Gabon, public schools are the most common, followed by denominational schools (Catholic and Protestant). Given the strong demand of specialized school to enroll CWE, it is not surprising that in the absence of these structures, and in absence of laws for equal education opportunity, CWE are not given the same chance of enrollment. Therefore, their enrollment would remain random and vary depending on attitude of parents, perception, and sensitivity of the head teacher.

Interestingly, age of respondents did not appear to be favorable to school enrollment of CWE as if younger respondents were less apprehensive about epilepsy in school age children compared to their older counterparts. Surprisingly, there was no significant difference between teachers and health workers as of their opinion towards school enrollment of CWE. Overall, we show that years of experience in the job is a factor affecting chances of school enrollment of CWE. According to our data, the longer the experience in the job, the least likely the respondent would support school enrollment of CWE. That observation is contradictory to that made in previous studies conducted in teachers, studies in which it was demonstrated that teachers with longer experience were more likely to accept children in their class and had good knowledge of epilepsy [19,34,35]. The discrepancy observed in our study may be related to the inclusion of two professional groups in which experience could differently affect the perception of school enrollment of CWE. Health workers who have experienced neurocognitive changes in the course of epilepsy could be refractory to get CWE enrolled in schools. This approach would balance that of teachers who will get to know better the children in their schools.

This study presents some limitations: based on self-administered questionnaire, responses were most likely to be subjective. Therefore, this could cause skewed data. Furthermore, it was difficult to obtain data from non-respondents.

## 5. Conclusion

Insufficient knowledge about epilepsy, persistence of misconceptions, and school inaccessibility are obstacles to the development and social integration of CWE. Since teachers are at the front stage to see epileptic seizures in children, particularly absence seizures, proper information should be provided in order to improve their ability to react appropriately. An assessment performed by a multidisciplinary team involving Family Physicians, Pediatricians, Psychologists, and Child Psychiatrist seems to be essential to secure a proper development and social integration of CWE. Such assessment should be done prior to school enrollment. Furthermore, a monitoring during school sessions would allow to better adapt school access to individual child neurocognitive profile and would allow a better understanding of the need for specialized schools in Gabon.

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