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Oral health status of children seen at a paediatric neurology clinic in a tertiary hospital in Nigeria

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Abstract The study was carried out to determine oral health status and oral health needs of children presenting at the paediatric neurology clinic of the University College Hospital, Ibadan, Nigeria. Diagnosis of each child's disability was performed by the Consultant Paediatric Neurologist. Data on socio-demographic characteristics and previous history of trauma to the orofacial structures for each child were obtained and intraoral examinations were done using WHO guide lines. Sixty-one children were diagnosed within the period of study and highest proportion (44.3%) had epilepsy while 41.0% had cerebral palsy. Prevalence of dental caries and trauma were 11.5% and 39.3% respectively while 72.1% had good oral hygiene. Despite the relatively good oral health of the children under study, periodic dental recall appointments will be beneficial in order to supervise and evaluate oral health when early detection and prevention of lesions can be instituted.

Key words
Neurology,
Nigeria,
Oral health,
Paediatric

Introduction

Neurological disorders are diseases of the central and peripheral nervous system that is the brain, spinal chord, cranial nerves, peripheral nerves, nerve roots, autonomic nervous system, neuromuscular junction and muscles[1]. These conditions may be barely noticeable or may significantly impair daily functioning. They have been reported to be a major cause of disability in childhood, and children in the developing world are disproportionately affected[2]. Major factors in the aetiology of paediatric neurological disorder in the developing world have been reported to include poor obstetric care, poverty, infections, ignorance, inadequate immunization, malnutrition and poor living conditions[3–5], with their effects on children ranging from mild or easily treatable conditions such as attention deficit to more serious conditions such as spina bifida and multiple sclerosis. Children with such disabilities are at greater risk for health problems as they require extra help and rely on others to achieve and maintain good health. Oral health is no exception and a healthy mouth is one of the most important health needs for life.

These children are known to require prolonged care which often is expensive and this imposes considerable burden on the family, society and the government[6]. Common oral problems such as dental caries and gingivitis affect all children. But children with disabilities and special needs may either develop oral problems at an earlier age or with greater severity than other children[7]. This has been associated with impaired cognitive abilities, behavioural problems, impaired mobility, neuromuscular problems, uncontrolled body movements, gastroesophageal reflux or seizures[7]. These complications can be barriers to adequate oral care and put these children at higher risk for developing oral health problems. Oral health is an important aspect of general health in infants and children and imparts the quality of life and health outcomes.

This study was undertaken to determine oral

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Table 1 Distribution of neurological disorders and mean ages

Neurological disorders	n (%) of patients N = 61	Mean ages (years)
Epilepsy	26 (42.6)	8.6 ± 4.3
Cerebral palsy	22 (36.1)	6.8 ± 4.3
Cerebral palsy + Mental retardation	3 (4.9)	5.0 ± 2.6
Epilepsy + Mental retardation	3 (4.9)	6.0 ± 5.3
Others — Meningitis, Down's syndrome	7 (11.5)	6.2 ± 4.0

health status and needs of children presenting at the paediatric neurology clinic of the University College Hospital, Ibadan, Nigeria in view of the lack of data on this subject in Nigeria.

Materials and Methods

This study was carried out at the paediatric neurology clinic of the University College Hospital, Ibadan in the south-western part of Nigeria. Ibadan is the largest city in Nigeria with a population of about two million and the Hospital gets referral from all over the country. The dental awareness in the country is generally poor but it is a country of mixed socio-economic status.

All cases attending the clinic for the first time in the course of the study and who were evaluated by the paediatric neurologist were included. The data was collected between June and December 2008. The objective of the study was explained to the parents and those who gave their consent had their children examined afterwards.

Data were collected by means of a structured interviewer administered questionnaire. The socio-demographic characteristic of each patient was recorded and this included age, gender, father's occupation, mother's level of education and identity of the accompanying adult. The socioeconomic class was determined using occupational stratification[8]. For easy interpretation of results, social classes 1 and 11 were merged and they represent the high socioeconomic class while social class 111 represent middle class and socioeconomic class IV represent the low class.

Information on previous trauma to the orofacial structures was also obtained. The diagnosis of each child's disability was obtained after the consultant paediatric neurologist had clinically evaluated the child. This included a detailed history, a thorough physical examination and relevant investigations.

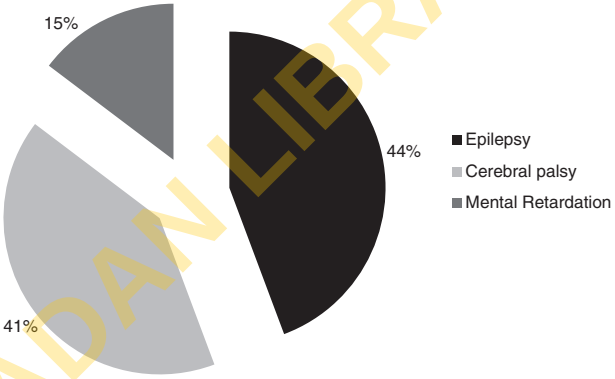

Fig. 1 Pattern of frequent diagnosis of paediatric neurological disorders as seen in the study

Intraoral examinations were done under natural lightening condition at the children outpatient clinic using WHO guidelines[9] and caries was diagnosed if frank cavitation was present on any tooth. Oral hygiene was determined using the Simplified Oral Hygiene Index (OHI-S) by Green and vermillion[10]. A modification was made in the selection of the recommended six index teeth in children who have not erupted them and thus teeth 55, 51, 65, 75, 71 and 85 were examined in very young children with full complement of primary dentition.

All the parents were given oral health education after the oral examination and this included at least twice daily oral hygiene measures using fluoridated toothpastes and a soft bristle brush, reduction in the consumption of cariogenic diet, close monitoring and supervision of children to prevent orofacial trauma and regular quarterly dental consultation.

Data obtained were analysed using SPSS version 16.0. Descriptive statistics was used to summarize the variables in the data set. Chi square test was employed to test association involving discrete data and level of significance was set at $P<0.05$.

Table 2 Socio-demographic variables of the patients

Variables	n (%)
Gender	
Male	35 (57.4)
Female	26 (42.6)
Age group (years)	
1–5	23 (37.7)
6–10	24 (39.3)
>10	14 (23.0)
Father's socioeconomic class	
High	41 (67.3)
Middle	10 (16.4)
Low	9 (14.8)
Father is late	1 (1.6)
Mother's education	
No education	3 (4.9)
<University/HND	42 (68.9)
≥University/HND	16 (26.2)
Accompanying adult	
Father	6 (9.8)
Mother	44 (72.1)
Both parents	3 (4.9)
Others	8 (13.1)

Table 3 Prevalence of oral health conditions in the studied children

Oral health condition	n	%
Dental caries		
Yes	7	11.5
No	54	88.5
Total	61	100
(Mean dmft = 0.18 Mean DMFT = 0.07)		
Orofacial trauma		
Yes	24	39.3
No	37	60.7
Total	61	100
Oral hygiene		
Good (0–1.5)	44	72.1
Fair (1.6–3.0)	8	13.1
Poor (>3)	9	14.8
(Mean oral hygiene = 1.07 ± 1.52)		

Results

A total of 61 newly diagnosis patients were seen over the study period. There were 35 (57.4%) males and 26 (42.6%) females. The mean age was 7.6 ± 4.3 years.

Although there were children with multiple disorders (Table 1), Fig. 1 shows the prevalence of the primary diagnosed neurological disabilities among the patients seen. The highest proportion (44.3%) of children had epilepsy, followed by cerebral palsy (41.0%) while the remaining patients (14.8%) had mental retardation either as a primary diagnosis or an associated problem. One child who had congenital visual and hearing impairment was included among mentally retarded. The mean ages of the three main diagnosed primary neurological disorders were 8.8 ± 4.3 years, 6.6 ± 4.2 years, 7.6 ± 4.3 years for epilepsy, cerebral palsy and mental retardation respectively.

The majority (67.3%) of the patients had fathers with high social class. The children were mainly accompanied to the Hospital by their mothers and most of their mothers were educated although the highest proportion had less than University or higher national diploma education (Table 2).

Six out of the 61 patients had delayed eruption, and out of these five were diagnosed with cerebral palsy and one was mentally retarded. Another patient with cerebral palsy had precocious eruption as he had already erupted all the permanent canines at age 7 years. No patient with epilepsy had any eruption disorder.

Other oral health conditions examined among the patients were dental caries, trauma to the orofacial region and oral hygiene status. The prevalence of dental caries and trauma among the patients were 11.5% and 39.3% respectively. Mean dmft/DMFT was 0.18/0.07.

A high majority of the patients (72.1%) had good oral hygiene (Table 3).

Tables 4, 5 and 6 related the three oral conditions with the neurological disabilities. However, history of trauma to orofacial tissues was more prevalent (44%) among the children with cerebral palsy (Table 3). Furthermore, dental caries prevalence was not so different among the children with different neurological disorders (Table 4) although these were not statistically significant.

From Table 5, oral hygiene status of majority of the children under study was good. The highest number (four out of nine) of patients with poor oral hygiene was seen among the subjects with cerebral palsy. Further result from the study showed that

Table 4 History of trauma to orofacial region among the studied children

Disorders	Trauma		
	Yes n (%)	No n (%)	Total N (%)
Epilepsy	10 (37.0)	17 (63.0)	27 (100)
Cerebral palsy	11 (44.0)	14 (56.0)	25 (100)
Mental retardation	3 (33.3)	6 (66.7)	9 (100)
Total	24 (39.3)	37 (60.7)	61 (100)

$\chi^2 = 0.42$, $P > 0.05$ NS

Table 5 Prevalence of dental caries among the studied children

Disorders	Caries prevalence		
	Yes n (%)	No n (%)	Total N (%)
Epilepsy	3 (11.1)	24 (88.9)	27 (100)
Cerebral palsy	3 (12.0)	22 (88.0)	25 (100)
Mental retardation	1 (11.1)	8 (88.9)	9 (100)
	7 (11.5)	54 (88.5)	61 (100)

$\chi^2 = 0.01$, $P = 0.99$

Table 6 Oral hygiene status of the studied children

Disorders	Oral hygiene status			
	Good n (%)	Fair n (%)	Poor n (%)	Total N (%)
Epilepsy	20 (74.1)	4 (14.8)	3 (11.1)	27 (100)
Cerebral palsy	17 (68.0)	4 (16.0)	4 (16.0)	25 (100)
Mental retardation	7 (77.8)	0 (0.0)	2 (22.2)	9 (100)
Total	44 (72.1)	8 (13.1)	9 (14.8)	61 (100)

$\chi^2 = 2.12$, $P = 0.71$

only 24.6% of the children were reported to do their daily oral hygiene measures themselves while parents or older adults assisted the remaining 75.4% with oral hygiene maintenance.

Discussion

Paediatric neurological disorders have been shown to constitute a major reason for paediatric specialist care in UCH, Ibadan, Nigeria, as one out of every five children attending the paediatric specialist clinic at the institution suffers from neurological disorder[2]. Although the age distribution of the children in this study differs from a previous study that analysed different disorders seen at a paediatric neurology clinic[2], both studies showed that children below 10 years constituted the majority of the cases seen, while the gender distribution of both studies are very comparable. The difference in the age distribution may be due to the difference in the study population of both studies. Epilepsy and cerebral palsy were identified as the leading paediatric neurologic disorders and this is consistent with previous reports from earlier studies[2,11–14] with epilepsy being the most common neurological disorder in children. This is in agreement with earlier studies[2,15]. It has been estimated that approximately 6 per 1,000 of the population in Europe have active epilepsy with 40% of cases occurring in children[16].

Although Nigeria is a third world country and the income is generally low, it is also a country with mixed socioeconomic strata. Clinical experience has shown that more of the high and middle social classes visit tertiary health care institutions in Nigeria as observed in this study. This may be due to the high cost of health care services in Nigeria as this may prevent those from lower socioeconomic class from visiting tertiary institutions.

A general view of the oral health status of the children under the present study showed a good oral health condition. Eruption disorder either in the form of delayed or accelerated eruption has been identified as a common oral health problem seen in children with special needs[1]. The occurrence of these therefore is not surprising although it was observed in very few children. Eruption pattern in these children still needs to be monitored since none of them had full complement of their permanent dentition.

A high proportion of the children were caries free with very low mean dmft/DMFT. This is in contrast with an earlier report especially for epileptic children where workers reported that factors related to epilepsy particularly antiepileptic medications may increase the risk for caries[17]. This low caries prevalence is also a reflection of the good oral hygiene observed in the present study where over 70% of the children had good oral hygiene. This may be as a result of the assistance which most of these children received from parents and other older adults during their daily oral hygiene procedures. Contrary to the finding in this study, very few children in Riyadh had good oral hygiene[18]. An oral

health survey of children with special needs found that approximately 5% of the children required urgent referral for professional oral hygiene advice or treatment to avoid irreversible damage to the tissues[19]. Children with poor motor coordination such as those under study may not be able to clean their own teeth or use the usual brushing and flossing methods and they are at greater risk for health problems as they rely on others to achieve and maintain good health. Oral health is no exception. Some children with neurological disorders may require support for activities of daily living and if this is not given irrespective of their ages may lead to their developing poor oral hygiene due to limited manual dexterity. In addition, tooth brushing and other oral hygiene practices were observed to be difficult for some carers because of behavioural problems associated with neurological disorders especially epilepsy and learning disabilities. There is therefore a need for training of children and their carers in good oral hygiene practices. In the present study, the carers need to be encouraged so that the good oral hygiene established in the children will be maintained.

Almost 40% of the children under study have had trauma to their orofacial structure. Higher proportions were seen among children with cerebral palsy and epilepsy. Trauma of the face and mouth have been documented to occur more frequently in children with cerebral palsy probably due to their poor neuromuscular co-ordination[20]. Although a lower proportion of trauma to orofacial structures was seen among children with epilepsy, it is comparable with the findings of Ogunbodede *et al.*[21] where 46% of patients with epilepsy have injured their anterior teeth. The difference in proportion is probably due to the difference in ages of patients studied in the two studies. Interestingly, none of the parents in the present study claimed to have placed hard object between the teeth to prevent tongue biting during seizures as reported by Ogunbodede *et al.*[21] as this might also account for a higher figure observed in this earlier study. But it can be concluded that the key predictor of dental injury in children with seizure was severity of the seizure.

The role of care givers for this group of children cannot be overemphasised. Care providers who care for these children individually are also responsible for the care of their mouths. The present study showed that majority of the children were accompanied by educated mothers to the hospital. The role of these mothers in preventing oral health problems needs to be emphasised since the hall mark of management is prevention. The education of mothers or guardians (caregivers) in terms of the patient's regular dental visits and early intervention when there are problems is an essential aspect of ensuring good oral health in these children. Caregivers' awareness of oral health and the prevention of oral diseases have an important and lasting impact on children's oral health and health related behaviour. It is important to recognize that care givers are the first line of defence against the development of oral diseases in their children.

In conclusion, the oral health of the children under study was found to be generally good despite reports of previous studies. These children can benefit from periodic dental recall appointments, in order to supervise and evaluate their oral health when early prevention of lesions can be instituted since they are high risk individuals.

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