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Prevalence and pattern of sleep disorder among children with neurological diseases in University of Benin Teaching Hospital, Benin City, Nigeria.

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Abstract *Background:* Sleep disorders significantly affect the quality of life and may impair cognitive development. Sleep disorders are reported to be common in children with neurological diseases. However no report has evaluated the prevalence of sleep disorders among children chronic neurological diseases in Nigeria. This study therefore sort to determine the prevalence and types of sleep disorders among children with neurological diseases seen Child neurology clinic of University of Benin Teaching Hospital (UBTH), Benin City.

Subjects and methods: This was a questionnaire based cross sectional study. Parents/caregivers of children attending the Child Neurology Clinic of UBTH were recruited and a structured questionnaire was administered to evaluate the presence of sleep disorders in the children they have brought to the clinic. Response scale ranged from never, rarely, occasional, frequent and very frequent.

Children were judged to have sleep disorder if the symptom were present frequently or very frequently. Variables were aggregated as simple proportions and differences determine using chi-square test.

Results: One hundred and fifty children aged 17years and below consisting of 98 (65.3%) males and 52 (34.7%) were evaluated. The most common sleep disorders found include restlessness during sleep 68.7%, frequent awakening 66.0%, snoring 57.3%, excessive day time sleepiness 53.3% and sleep walking among others. Sleep disorders were more common in boys than in girls and those aged 5 years and below than older children.

Conclusion: Sleep disorders are very common among children with neurological diseases. These problems have great potential of further impairing cognitive development and quality of life in these children.

Key words: sleep disorder, children, neurological diseases, Benin City.

Introduction

Chronic neurological disorders in children are challenging conditions because of the emotional, physical, psychological and financial stress they place on the primary care givers and the society as a result of the enormous resources required to manage these children.¹ To benefit maximally and to live to the best possible quality of life, management of these children requires a holistic approach to identify

presence of other problems which may not be apparent except searched for by concerted effort. One such problem is sleep disorder.¹ Sleep problems among children with neurological disorders is reported to be extremely common.^{2,3,4} In Nigeria, very few people are aware of sleep disorders and even so their knowledge is limited to insomnia whereas disorders of sleep has expanded to include a lot of problems associated with sleep.

Lack of adequate and refreshing sleep may reduce day time alertness whereas problems such as sleep apnea may result in reduce oxygen supply to the brain and neuronal dysfunction which are capable of impacting negatively on cognitive development and function especially in children.^{4,5} For children with neurological diseases who are already faced with challenges of cognitive development and functioning, the presence of sleep disorders may further worsen their learning difficulty.

This study was therefore undertaken to determine the prevalence and types of sleep disorders among children with neurological diseases in Benin City and provide data for adequate intervention.

Patients and Methods

The study was carried out in the Child Neurology Clinic of the Department of Child Health, University of Benin Teaching Hospital, Benin City, Nigeria from October 2008 to November 2009. The University of Benin Teaching Hospital is a referral centre serving Edo, Delta, Kogi and Ondo States. The child neurology clinic runs once a week with an average of 6 new cases weekly and attends to patients 17 years of age and below.

New cases were consecutively recruited after informed verbal consent from their parents or care givers. A sleep disorder questionnaire developed by the Kosair's Pediatric Sleep Research Centre, Louisville, Kentucky, U.S.A was administered to parents/caregivers by research assistants who were House Officers rotating through the Department of Child Health. The questionnaires were administered after initial evaluation of the patients and before medication were started. Patients who were on medication with sedative effect such as diazepam and anti-epileptic drugs prior to presentation to the clinic were excluded from the study. Information from the sleep questionnaire was transferred to Microsoft excel sheet and checked for accuracy and then exported to SPSS 13.0 for descriptive analysis.

Results

A total of one hundred and fourteen children with neurological diseases were recruited consisting of 76 (66.7%) boys and 38 (33.3%) girls. The age of the children from 1 to 17 years with a mean of 5.5 ± 3.3 years. The mean age of boys was 5.8 ± 3.5 years while that for girls was 4.7 ± 2.6 years.

Majority of the children 65 (57%) were in the age group of 1–5 years while 40 (35.1%) were aged 6–10 years and 9 (7.9%) above 10 years respectively. The most common type of sleep disorder was restlessness during sleep which was present in 103 (68.7%) of children, followed by frequent awakening during sleep 99 (66.0%), snoring 86 (57.3%), excessive daytime sleepiness 80 (53.3%) and sleep walking 59 (39.3%). The relative frequency of the various types of sleep disorders among the study population is shown in Table 1.

Table 1. Relative frequency of type of sleep disorder among children with neurological diseases.

Type of sleep disorder	n	%
Restless during sleep	103	68.7
Frequent wakening during sleep	99	66.0
Snoring	86	57.3
Excessive day time sleepiness	80	53.3
Sleep walking	59	39.3
Talking during sleep	44	29.3
Nightmares	38	25.3
Habitual teeth grinding	28	18.7
Sleep apnea	13	8.7
Shake to breath during sleep	8	5.3
Head banging	14	9.3
Sit up during sleep	10	6.7
Shaken to breath during sleep	8	5.3

Among those who snore during sleep, 17 (11.3%) were habitual snorers while 69 (46.0%) were non-habitual snorers. Likewise, among those with excessive daytime sleepiness 45 (30.0%) were habitual daytime sleepers while 35 (23.3%) were non-habitual excessive daytime sleepers. 29 (19.3%) of those with sleep walking were habitual sleep walkers compared to 30 (20.0%) who were non-habitual sleep walkers. Eight (5.3%) of those with sleep apnea require shaking to breath during sleep. All the types of sleep disorders were more common among boys than girls although the differences were not statistically significant.

Table 2: Gender distribution of the more common sleep disorders among children with neurological diseases.

Sleep Disorders	Gender		Total	χ^2	P value
	Male n (%)	Female n (%)			
Restless during sleep	68 (66.0)	35 (44.0)	103	0.794	NS
Frequent awakening	64 (64.6)	35 (35.4)	99	1.451	NS
Snoring	57 (66.3)	29 (33.7)	86	0.080	NS
EDS	51 (63.8)	29 (36.2)	80	0.190	NS
Sleep walking	42 (71.2)	17 (28.8)	59	1.471	NS
Talk during sleep	31 (70.5)	13 (29.5)	44	0.721	NS
Teeth grinding	18 (64.3)	10 (35.7)	28	0.017	NS
Head banging	9 (64.3)	5 (35.7)	14	0.007	NS
Sleep apnoea	9 (69.2)	4 (30.8)	13	0.017	NS
Sit up during sleep	9 (90.0)	1 (10.0)	10	2.878	NS

EDS = Excessive daytime sleepiness.

NS = Not significant.

Table 3: Age group distribution of sleep disorders among children with neurological diseases

Sleep disorder	Age group			Total	χ^2	P value
	0 – 5 years n (%)	6 – 10 years n (%)	>10 years n (%)			
Restless during sleep	59 (57.3)	37 (35.9)	7 (6.8)	103	9.839	0.02
Frequent awakening	55 (55.6)	35 (35.4)	9 (9.0)	99	8.232	NS
Snoring	48 (55.8)	30 (34.9)	8 (9.3)	86	2.602	NS
EDS	45 (56.2)	25 (31.3)	10 (12.5)	80	1.142	NS
Sleep walking	31 (52.5)	20 (34.0)	8 (13.5)	59	1.884	NS
Talk during sleep	21 (47.7)	21 (47.7)	2 (4.6)	44	8.520	0.03
Teeth grinding	13 (46.4)	13 (46.4)	2 (23.2)	28	3.566	NS
Head banging	8 (57.1)	4 (28.6)	2 (14.3)	14	0.282	NS
Sleep apnoea	8 (61.5)	3 (23.1)	2 (15.4)	13	0.733	NS
Sit up during sleep	6 (60.0)	3 (30.0)	1 (10.0)	10	0.132	NS

EDS = Excessive daytime sleepiness.

NS = Not significant.

Discussion

This is the first study evaluating the prevalence of sleep disorders among children with neurological diseases in Benin City and perhaps in Nigeria to our best knowledge. The study reveals a high prevalence of various types of sleep disorders among this group of patients comparable to previous reports.^{2,5} Common among the sleep disorder in this study were restlessness during sleep, frequent awakening, snoring, excessive day time sleepiness, sleep walking (somnambulism), talking during sleep, nightmares and habitual teeth grinding.^{1,2,3,4}

Restlessness during sleep may be due to several factors ranging from environmental conditions such as ambient room temperature (which is high in our Environment), number of children sharing a bed,

Table 3 shows the distribution of the various types of sleep disorders among age groups. Restlessness during sleep was significantly more common in children aged 5 years or below 59 (57.3%) compared to 37 (35.9%) of those aged 6 - 10 years and 7 (6.8%) of those aged above 10 years respectively ($\chi^2 = 9.839$; $P=0.02$). Talking during sleep was significantly equally more common among children age 5 years and below and those aged 6 - 10 years than among those older than 10 years ($\chi^2 = 8.520$; $P = 0.03$). Though the other types of sleep disorders were more common among children aged 5 years and below than the other age groups the differences were not statistically significant.

poor sleep hygiene practices⁶ and the inherent neurological disease itself. However it may also indicate the presence of restless leg syndrome or the periodic limb movement disorder of sleep among this group of children. Restlessness during sleep may also be a contributing factor to the high prevalence of frequent awakening among 66% of the children in this study thus causing un-refreshing and fragmented sleep with consequent reduced daytime alertness.⁷ Snoring in children is to a large extent ignored in our environment and indicates obstruction to air flow in the upper airway due commonly to enlarged tonsils and adenoids or muscle weakness leading to the tongue falling backward into the pharynx as is seen in children with Down's syndrome.⁶

The importance of snoring lies in the fact that it may result in sleep apnea as revealed in this study with a high proportion of the children (57.3%) snoring during sleep and 13 (8.7%) suffering from sleep apnea.^{8,9} The implication of this in children with

already compromised neurological status is not far fetched. Snoring and sleep apnea often result in hypoxia and reduced oxygen supply to the brain. On a chronic basis this may lead to neuronal loss or poor development further impairing cognitive function. The high prevalence of excessive daytime sleepiness (EDS) among this group of children is the product of the effects of the various sleep disorders which result in fragmentation and un-refreshing sleep.^{7, 8, 9} Optimizing cognitive development to the best level possible is a very important key in the management of children with neurological diseases if they are to live to their fullest potential and high quality of life. Problems such as sleep disorders are usually pushed to the background or totally ignored in the management of these children.

Conclusion

sleep disorders are very prevalent among children with neurological diseases and capable of further impairing cognitive development in them. Concerted effort should be made to search and manage these problems during routine evaluation of these children to improve their quality of live and eliminate further impediments to cognitive development.

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