

Pattern of neurological diseases as seen in outpatient children: the experiences from Orotta Referral Hospital Asmara, Eritrea.

Zemichael Ogbe MD (Paediatrician)¹, Peter Nyarang'o MBChB, MPH, MMed², and Jacob Mufunda MBChB, PhD, MBA².

Institutional Affiliation

1. Orotta Paediatric Hospital, Asmara, Eritrea.

2. Orotta School of Medicine, Asmara, Eritrea.

Correspondence to be sent to: Dr Zemichael Ogbe email address <ogbeze2005@yahoo.com>

Abstract

Objective: To determine the pattern of neurological diseases in children.

Methods: This was a prospective cohort study of paediatric patients reporting to the Paediatric Neurological Clinic at Orotta Referral Hospital with neurological diseases. The systematic evaluation of patients was carried out from 2002 to 2005.

Results: Altogether 736 children with age ranging from 3 months to 15 years being 61% boys and 39% girls, presented with different neurological disorders. Although the cases may have presented with more than one diagnosis (29.6%), the most frequent neurological diseases were epilepsy (25.9%), cerebral palsy (C/P) (19.3%) and post febrile neurological diseases (12.5%) and others. Out of all epileptic cases, grand mal (GTCS) (74%), partial seizures (5.6%), akinetic attacks (drop attacks) (5.6%) and petit mal (absence seizures) (3.2%) were the commonest types of epilepsy. In the majority of epilepsy (63.5%) no cause was found. There was no gender difference in all neurological disorders studied.

Discussion and Conclusion: Epilepsy is a common disease in children. The prevailing enigma that epilepsy is rare in children is an unfounded myth making it imperative for appropriate index of clinical suspicion whenever a paediatric patient presents with unusual clinical pattern. The increased number of epileptic cases at first attendance with age calls for aggressive treatment at the early stages when neurological deficits are likely to occur as the disease may have spontaneously permanent remission. The high number of cases with cerebral palsy and post febrile illness neurological diseases necessitates urgent preventive measures and appropriate management in the country.

Introduction

Recent studies have reported a high disease burden of neurological diseases among children. The information from some studies was generated from hospital patients while others have been derived from door to door surveys. There appears to be different patterns of neurological diseases in different settings. The commonest disorders are epilepsy, cerebral palsy, post febrile seizures, auditory and communication disorders¹.

Almu et al² reported a prevalence of epilepsy of 2.95% in the Zay Society, Ethiopia, the majority of which were of the grand mal type. The predominance of grand mal type was confirmed in Uganda³. In a house to house survey in rural Kenya¹ reported a prevalence of 4.1% which is a very high compared to the report from South Africa⁴ where a prevalence of 0.73% was documented. Post febrile convulsions were found to be frequent especially among preterm babies in Finland⁵. Some of the febrile seizures were related to infections such as severe malaria and persisting after the initial episodes of malaria, a study observed in Kenya⁶.

The second commonest neurological disorder in many settings is cerebral palsy whose global prevalence is about 2.5 per 1000 live births^{1,7,8,9,10}. Ndiaye¹¹ found a similarly high burden from cerebral palsy among children attending outpatient follow up in Dakar (2002). The varieties of cerebral palsy varied with geographical setting, for example they were more common in male than in female in India. The causes of C/P were known making C/P essentially preventable disease, with less than 20% being untraceable.

Other neurological diseases that present in childhood are speech and communication disorders often associated with C/P and post febrile illness in our study.

Despite an apparent large number of children with disabilities in developing countries especially in Africa, the majority of studies highlight the preponderance of neurological diseases among adults. As a result interventions targeted at reducing the burden of neurological diseases have tended to focus on those diseases in adults neglecting neurological diseases in children. Eritrea is no exception to this practice where neurological diseases are perceived to be more frequent in adults and consequently resources especially medical resources and provisions are appropriately directed for adult use.

In Eritrea there is no published information on the pattern of paediatric neurological diseases, despite a high rate of handicaps observed among children. The disease burden from neurological diseases in Eritrea is perceived to be low. In addition there is no effective paediatric physiotherapeutic centre in the country equipped to deal with them.

Our study, therefore describes the pattern of neurological diseases in children as seen in the Paediatric neurology outpatient clinic in Orotta referral hospital Asmara, over a three year period (September 2002-2005).

Methods Background.

A total of 736 children with neurological problems attended the out patient clinic in Orotta paediatric hospital during the period September 2002 to 2005.

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The Paediatric Neurology clinic in Orotta hospital serves the patients twice a week.

Most patients were received from the general out-patient clinic in Orotta Paediatric hospital following initial referral from different parts of the country with the majority coming from Asmara. There were a small number of patients who were referred directly from ENT and Ophthalmic specialists whose conditions were associated with neurological problems.

The data recorded in a register included the following; patients' age, sex, past medical history with emphasis on history of pregnancy and delivery, a general clinical evaluation, the diagnosis, the treatment given and the advice and the referral information given, mostly to physiotherapy.

Case definitions and diagnosis

- A seizure was defined as single event of brief loss of consciousness with or without motor activities and may be due to a transient abnormality that will not recur (eg, Hypoglycaemia).
- Epilepsy: was defined as a condition of unprovoked recurrent seizures. The classification of epilepsy in this study was based on seizure description alone, according to the international classification of Epileptic Seizures of 1981. EEG is not so far available in the country to entertain the revised classification of epilepsies and epileptic syndromes 1989.
- Febrile seizures were diagnosed as seizures occurring between 3months-6 years of age, associated with fever but without evidence of CNS infections. Seizures with fever in some children with previous afebrile seizures are excluded.
- Cerebral Palsy was diagnosed if there was evidence in the past medical history specifically in perinatal period of brain insult, such as low Apgar score at 5 minute(<7), delayed crying soon after birth and/or evidence of Hypoxic Ischemic Encephalopathy (HIE), hyperbilirubinemia with signs of Kernicterus and neonatal sepsis or meningitis.
- Post febrile illness neurological problems, in most cases if preceded by febrile illness within 2-4 weeks.
- Presumptive mental retardation: considers the obvious clinical observation, medical history of the child as narrated by his parents specifically on the adaptive behaviour, social adequacy and school (Kindergarten) performance of the child. IQ test was not entertained as we do not have standard IQ test specifically suitable for our culture.
- Problems in speech and language acquisition: considers the inability of a child to phrase purposeful words or combine two words to convey meanings that can't be communicated with a single word by age 2 years or absence of verbal exchange with another person by age 3.5 years.

Statistical Analysis

Data was collected using Access data base and analysed using SPSS software. Descriptive statistics were computed using proportions. Trends were graphically presented and associations were assessed using chi-square test.

Results

A total of 736 children were seen over a period of 36 months of whom 61.1% were boys. Their ages ranged from 3 months to 15 years. There was no significant difference in sex in all age categories ($p=0.907$)

(Table 1).

Table 1. Distribution of the cases.

	Male	Female	All cases
<1 year	7.3%	7.1%	7.2%
1.00 - 1.99	18.7%	20.5%	19.4%
2.00 - 2.99	11.0%	9.9%	10.6%
3.00 - 4.99	20.7%	17.7%	19.5%
5.00 - 9.99	25.9%	27.2%	26.4%
>10.0	16.5%	17.7%	16.9%
Total	100.0%	100.0%	100.0%

Epilepsy, cerebral palsy, post febrile illness neuro-problem, speech and language problems, recurrent febrile seizures, mental retardation and Down's syndrome as principal diagnoses consisted of 88.5% of all cases (Table 2). 29.6% of the patients had multiple diagnoses.

Table-2: Frequency of neurological conditions

	Male	Female	Total cases	% Cases
Epilepsy	159(64.3%)	89(35.7%)	247	25.9%
Cerebral palsy	113(61.4%)	71(38.6%)	184	19.3%
Post febrile illness Neuro-problems	68(57.1%)	51(52.8%)	119	12.5%
Speech and language problems	66(63.4%)	38(36.6%)	104	10.9%
Recurrent febrile Seizures	61(67.7%)	29(32.3%)	90	9.4%
Presumptive Mental Retardation excluding Downs syndrome cases	36(60%)	24(40%)	60	6.3%
Down's Syndrome	26(63.4%)	15(36.6%)	41	4.3%
Post trauma neuro-problems	19(65.5%)	10(34.5%)	29	3.0%
Movement disorder (Sydenham chorea)	2(15.4%)	11(84.6%)	13	1.4%
Migraine	6(60%)	4(40%)	10	1.0%
Post meningitis neuro-problem	5(55.5%)	4(44.4%)	9	0.9%
Breath holding spells	4(66.6%)	2(33.3%)	6	0.6%
TORCH disease	4(80%)	1(20%)	5	0.5%
Infantile Autism	3(75%)	1(25%)	4	0.4%
Congenital Hydrocephalus	4(100%)	-	4	0.4%
Miscellaneous	17(60.7%)	11(39.2%)	28	2.9%
Total	593(80.5%)	361(49.0%)	954	100.0%

Further analysis of the epileptic children revealed that there was a male:female ratio of 1.8:1. A total of 247 children were diagnosed as having epilepsy and were classified according to the criteria of the International League against Epilepsy(19819). The predominant type of seizure was Grand mal (GTCS), occurred in 74% of the cases and mixed drop attack and myoclonic seizure 0.4% was the least common type (Table 3).

Table 3. Types of Epilepsy

Types of seizures	M	F	Total	Total in %
GTCS(Grand mal)	114	69	183	74%
Partial Seizures	7	7	14	5.6%
Drop Attacks (Akinetic or Atonic)	12	2	14	5.6%
Absence (Petit mal)	5	3	8	3.2%
Mixed GTCS and Drop Attacks	5	2	7	2.8%
Infantile spasm (Salaam attack)	6	1	7	2.8%
Myoclonic seizures	3	2	5	2.0%
GTS	3	1	4	1.6%
Mixed GTCS and Myoclonic seizures	2	2	4	1.6%
Mixed Drop Attack and Myoclonic seizures	1	-	1	0.4%
TOTAL	158	89	247	100%

According to the international classification 63.5% of the epileptic children were idiopathic type of seizure where the cause of seizure could not be established and 36.5% were symptomatic. The most common cause of symptomatic seizures was due to the events during perinatal period accounting for 13.3% (Table 4).

Table 4. Causes of Epilepsy

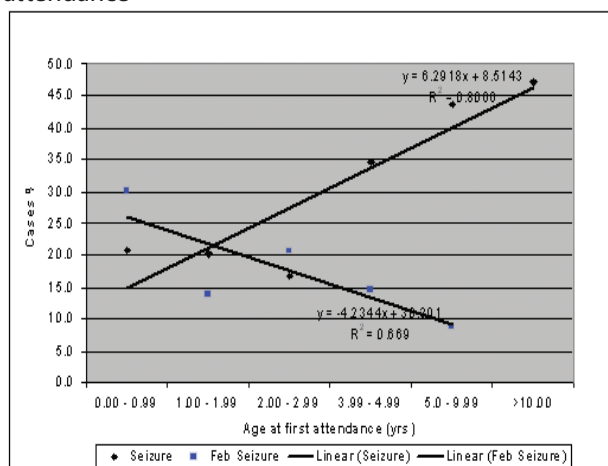
Causes	No	Percentage
Unknown	157	63.5%
Brain insult during Perinatal period	33	13.3%
Post head trauma	16	6.4%
Post febrile illness	22	8.9%
Post meningitis & encephalitis	12	4.8%
Sturge Weber syndrome	2	0.8%
Hereditary	2	0.8%
Post Vaccination	1	0.4%
Hydrocephalus	1	0.4%
Torch disease	1	0.4%
Total	247	100%

The most common neurological condition associated with cerebral palsy was motor deficit 71.2% exhibited by quadriplegia (44.3%), hemiplegia or hemiparesis (19.0%), spastic diplegia (6.8%), spastic monoplegia 0.7%, hypotonic C/P (1.5%) and delay in motor development (27.4%). Speech and language impairment (34.2%), mental retardation (17.9%) and epilepsy (17.3%) were also associated with C/P.

Motor deficit was the most common neurological condition in post febrile illness neurological impairment and included flaccid paralysis (33.8%), hemiplegia and/or hemiparesis (30.5%), quadriplegia (11.8%), spastic diplegia (11.8%), delay in motor development (11.8%). Other conditions associated with post febrile illness were speech and language impairment (20.1%), Epilepsy (18.4%) and mental retardation (11.7%).

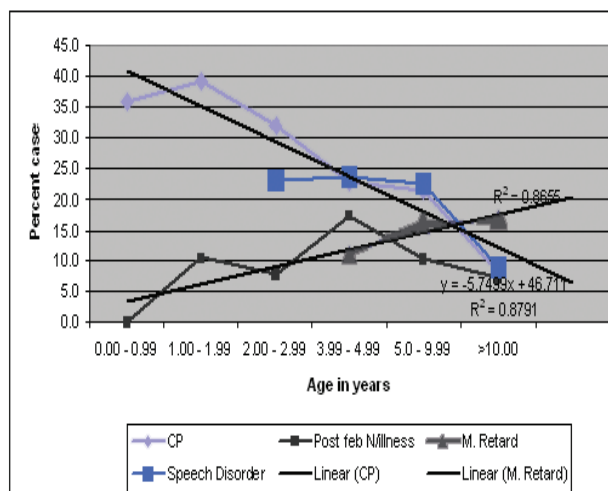
Further statistical analysis indicates that there was strong positive correlation between age and first attendance in the neuro-clinic for seizure disorder ($p < 0.001$) and strong negative correlation with febrile seizure (Figure 1).

Figure 1. Proportion of seizure cases by age of first attendance



The proportion of CP and post febrile illness cases declined with age at first clinic attendance compared to mental retardation that increased with age (Figure 2). The number of cases with speech and language impairment at first clinic attendance increased until age 5 years after which this markedly declined. The association of age at first attendance and CP and mental retardation was statistically significant ($p < 0.001$).

Figure 2. Proportion of neurological cases by age at first attendance.



Epilepsy is positively correlated with the following three conditions: cerebral palsy, presumptive mental retardation, and speech impairment ($p < 0.001$).

Mental retardation cases consisted of 10.5% (101 cases) of all neurological cases. Among 101 cases, Down's syndrome was found in 40.5%, cerebral palsy in 24.7%, post febrile illness in 13.8%, Epilepsy in 7.9%. In the remaining 13.1% no known cause could be identified.

There was no significant sex difference between cases with seizure disorder, cerebral palsy, mental retardation, febrile seizure, speech problem and Down's syndrome.

Discussion

The study set out to describe the prevalence of neurological conditions among children aged 3 month- 15 years old attending the neurology clinic in Orotta paediatric hospital.

Epilepsy was the commonest neurological problem in our setting with a predominance of males which is consistent with the findings from the report by Obi and Sykes⁹ in Nigerian children. In addition, the proportions of the types of epilepsy with grand mal being the most common type of seizures were similar to the findings from the Nigerian study and also to the observations made in Ethiopia and Uganda^{2,3}. However the reporting of the predominance of grand mal epilepsy was not consistent in the studies on children as the findings by Kotsopoulos's⁶ and et al in USA who found partial seizures to be more frequent in children than grand mal epilepsy. It is not immediately clear why grand mal prevailed over partial seizures in our setting and in other African based reports^{2,3,9}. It may be suggested that the partial seizures remain unnoticed and the patients sought medical attention when it had secondarily evolved into generalized tonic-clonic seizure and this is especially true in the absence of EEG investigation.

A relatively high prevalence of drop attacks was found among epileptic cases in our study which was one point of departure from the findings in the other studies⁹. This is a unique finding in our study whose basis was investigated and needs further examination.

Recurrent febrile seizures were responsible for more than a quarter of all the cases with seizures in the study. This proportion was higher than that reported in other studies¹³. The reasons for high incidence of recurrent febrile seizures in our setting are not known but such children should be treated and followed up properly before the febrile seizures become epilepsy (afebrile seizures). This practice is very important because it is during the preventable seizures that the children develop neurological damage. Febrile illness contributed much to neurological conditions in our study. The reasons for neurological conditions in post febrile illness in Eritrea were not investigated but one can speculate that poor primary health care in the community may have played a role.

Some cases of epilepsy presented late in spite of having had history of seizures for long period of time. The reason for the delay in presentation was not investigated but one can speculate that social and cultural beliefs and stigma may have played a role. In addition at one stage antiepileptic drugs for children

were in short supply, a situation which led to some patients sent away without appropriate management. In contrast, children with febrile seizures presented very early because of associated febrile conditions, as a result neurological disorders were less frequent in this category of patients.

Cases with C/P presented relatively early compared to those with mental retardation and speech problem not associated with C/P. This is because C/P presented with easily recognizable symptoms and signs, whereas, mental retardation and speech problems became noticeable in our situation after the age of 2 years and 5 respectively. The incidence of cerebral palsy in our findings was higher compared to developed countries, as observations made in other studies^{14, 15} and developing countries alike¹. Patients with this condition require a multidisciplinary management approach that requires expensive resources and facilities that are not always available in developing countries. The causes of cerebral palsy were associated mainly with brain insult during perinatal stage in the study, findings which were consistent with those previously reported¹. Therefore, there is an urgent need for preventive measures, particularly improvement in antenatal and perinatal care and health education to be undertaken at the community level where the majority of children are delivered in developing countries with minimal skilled care attendance. There is also a need to establish a physiotherapeutic centre for disabled children, a considerable number of which is due to cerebral palsy, in order to improve their quality of life and life expectancy rates.

The clinical spectrum of cerebral palsy in our study was different from that of the Indian report¹⁶, where mental retardation prevalence 72.5% compared to less than 20% in our setting. On the contrary, motor deficit was present in more than two thirds of the cases with cerebral palsy in our study. Other associations with cerebral palsy in our study were speech and language impairment which was similar to other studies¹. However, epilepsy was 17.3% in our finding compared to 57% in the study by Obi and Sykes¹.

The basis of the differences in these patterns of disabilities among cases in different geographical environments was not investigated but it is essential to determine as that information would be useful in streamlining preventive and rehabilitative interventions.

This study has established that neurological problems are common in children and they constitute a heavy burden on resources. Some of the common disorder worsen with age which is strong justification for instituting aggressive management of these diseases especially epilepsy to prevent development of neurological disorders. Therefore, there is an urgent need of appropriate allocation and distribution of relevant resources especially antiepileptic drugs and instituting special placement for speech therapy for speech and language disorders and provision of education for mental retarded children in Eritrea.

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