

Pattern of Neurological Disorders among Children Presenting at the Neurology Unit of Tertiary Hospital in Awka

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Abstract

Background: Many children in Nigeria suffer from detrimental, debilitating and lifelong neurologic disorders, many of which are highly preventable using simple, cost-effective interventions. **Objective:** To examine the pattern of neurological disorders among children presenting at the neurology unit of Chukwuemeka Odumegwu Ojukwu University Teaching Hospital Amaku, Awka, Nigeria. **Methods:** A retrospective review of the hospital records of children who presented at the Paediatric Neurology Unit between 1st March 2020 and 31st March 2022 was carried out. Data were abstracted using a proforma and analyzed using SPSS Version 21. **Results:** A total of 138 children aged 0 to 15 years were seen in the unit during the period under review. 115 (83.35%) of these children were diagnosed with chronic neurological disorders. Those with chronic neurological disorders had a male:female ratio of 1.9:1, and the majority (65%) of them were below 5 years of age. The most common presenting complaints were delayed milestones (43.4%), seizures (23.8%), and speech disorders (17.2%). The most typical diagnosis was cerebral palsy (CP) (34.7%), seizure disorder (29.8%) and attention deficit hyperactivity disorder (8.9%). Perinatal asphyxia (47.7%), neonatal jaundice (17.0%) and central nervous system infections (CNS) infections (12.5%) were identified as the major risk factors responsible for these neurologic disorders. **Conclusion:** Cerebral palsy and seizure disorders constitute the major neurological disorders among children seen in our institution. Efforts should be intensified at reducing the incidence and impact of perinatal asphyxia, neo-

natal jaundice and CNS infections, identified as the major culprits, to curb the menace of these debilitating lifelong neurologic sequelae.

Keywords

Pattern, Neurological Disorders, Children

1. Introduction

A more significant number of children enjoy early childhood without much need for special care. However, some children have difficulties in early childhood and may require long-term medical care. Even though caregiving is a normal role and desire of every parent, challenges and misgivings occur when a child experiences functional limitation and long-term dependence because disability in a child affects not just the child but the entire family [1] [2]. The brain controls all the functions in the human; neurological disorders or deficits hinder the performance of the affected child's everyday tasks and are significant causes of functional disability in children [3].

Neurologic disorders are seen commonly in children, especially in developing countries [4] [5] [6] [7] [8]. They significantly contribute to morbidity and disability in children [9] [10]. They account for more than 20% of the world disease burden, with Africa contributing a more significant percentage [11] [12]. Children are commonly affected as the developing brain of children is faced with numerous injuries during the prenatal, perinatal and postnatal periods. This could be because most pregnant women in developing countries do not register for antenatal care and still deliver at home [13] [14]. High prevalence of neurologic disorders could be due to the following: prematurity, jaundice, CNS infections, late presentation to the hospital, low level of education, poverty, cultural and inimical traditional practices, absence of basic healthcare facilities, a dearth of skilled health attendants within short distances, inadequate transportation and high cost of Medicare.

Neurological disorders contribute significantly to chronic illness and its burden on children. They can result from genetic or environmental factors or a combination of both factors [15]. Many relatively rare conditions which have high mortality in the past, like cancers, spinal bifida, and sickle cell anemia, now survive and contribute to the burden of chronic childhood diseases [16].

The burden of neurological disorders in Sub-Saharan Africa is worsened by malnutrition, malaria, HIV, encephalitis, meningitis, a demographic transition like increased vehicular traffic and persistent regional civil diseases [17]. Some common neurological disorders in the Sub-Saharan region include cerebral palsy, mental retardation, epilepsy, peripheral neuropathy, stroke, HIV CNS Complications, trauma, alcohol abuse and developmental disorders [17]. Many of these disorders are chronic, frustrating to caregivers and parents, and require understanding. The clinical manifestation of neurological disorders may progress

and get worse over time. People with the disorder suffer, and their caregivers experience significant pain [18]. The treatment period may take months to years, making room for a high default rate from follow-up. In developed countries, advances in diagnostic techniques have aided the characterization and definition of diseases [19]. Also, applying recent therapeutic measures has resulted in significantly improved outcomes [19]. In Nigeria, Frank Briggs *et al.* [4] reported that neurological diseases accounted for 6.7% of all Paediatric cases in the University of Port Harcourt teaching hospital. Another study by Birbeck [20] in Zambia reported a Prevalence rate of 10%. This study was the first of its kind in COOUTH and was therefore carried out to determine the pattern and predisposing factors of neurologic disorders presenting at the Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Amaku, Awka.

2. Methods

2.1. Study Area

The study was conducted in the Paediatric neurology clinic of Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH), Amaku, Awka, Anambra state, Nigeria. The clinic runs once a week by a consultant Paediatrician assisted by Paediatric registrars. The patients consisted of referrals from the outpatient department CHOP, discharged patients from the admission of the same hospital, and referrals from the hospital outside the COOUTH set-up.

2.2. Study Design

This was a two-year retrospective observational study. The study period was from 31st March 2020 to 31st March 2022.

2.3. Study Population

The study was conducted among children from 0 to 15 years. The patients studied were both out-patients and in-patients. The data extracted from the folders include age on the first visit, sex, presenting complaints, past medical history, predisposing factors, history of pregnancy and delivery, a general clinical evaluation, and diagnosis. Their case notes were coded to ensure that duplication did not occur.

2.4. Ethical Considerations

Ethical approval for the study was obtained from the ethics committee of COOUTH.

Statistical Analysis

Data were analyzed using the SPSS version 17 and presented in frequency distribution tables and percentages.

3. Results

138 children aged 0 to 15 years were seen in the unit during the period under re-

view, out of which 115 (83.35) were diagnosed with chronic neurological disorders. Those with chronic neurological disorders had a male: female ratio of 1.9:1 and the majority (65.2%) were less than 5 years of age. (Table 1)

The primary presenting complaints were delayed developmental milestones 53 (43.4%), convulsion 29 (23.8%) and speech disorders 21 (17.2%), While the least presenting complaint was head trauma (0.8%) and headache 1 (0.8%). (Table 2)

Perinatal asphyxia (47.7%), neonatal jaundice (17.0%) and CNS infections (12.5%) were identified as the major risk factors responsible for the neurologic disorders, while prolonged neonatal hypoglycemia was the least (1.1%). (Table 3)

The most common neurologic disorder was cerebral palsy 43 (34.7%), followed by seizure disorder 37 (29.8%). While the least observed were microcephaly 2 (1.6%) and post-meningitis syndrome 2 (1.6%). Of the 43 (34.7%) that had CP, spastic hemiplegia was found in 20 (16.1%), spastic quadriplegia 9 (7.2%), choreoarthetoid CP 5 (4.0%), unilateral diplegia 2 (1.6%) and mixed type consist of 7 (5.6%). (Table 4)

Table 1. Age and sex distribution of 115 children seen at the Pediatric Neurology Clinic of COOUTH.

Age in years on first visit	Sex		Total (%)
	Male	Female	
0 - 12 months	19	7	26 (22.6%)
>1 - 5 years	28	21	49 (42.6%)
>5 - 10 years	13	6	19 (16.5%)
10 - 15 years	15	6	21 (18.5%)
	75	40	115 (100%)

Table 2. Major complaints of the children on the first visit to the clinic.

Major Complaint	Total	%
Delayed Developmental Milestones	53	43.4
Convulsions	29	23.8
Speech Disorders/Delayed Speech	21	17.2
Hyperactivity	9	7.4
Fainting Attacks	5	4.1
Large Head	2	1.6
Poor Coordination While Walking	1	0.8
Head Trauma	1	0.8
Headache	1	0.8
Total	122	100

Table 3. Identifiable risk factors for neurological disorders in the children.

Risk Factors	Number	%
Birth Asphyxia	42	47.7
Neonatal Jaundice	15	17
Infections	11	12.5
Prematurity	6	6.8
Down Syndrome	4	4.5
Road Traffic Accidents	3	3.4
Complex Febrile Seizure	3	3.4
Craniosynotosis		2
Prolonged Neonatal Hypoglycemia	1	1.1
Attempted Abortion at First Trimester	1	1.1
Total	88	100

Table 4. Distribution of pediatric neurological disorder seen at COOUTH Clinic.

Clinical Diagnosis	Number	(%)
Cerebral Palsy	43	-34.7
Seizure Disorder	37	-29.8
Attention Deficit Hyperactivity Disorder	11	-8.9
Dysphasia	10	-8.1
Intellectual Disability	7	-5.6
Delayed Speech	4	-3.2
Chromosomal Disorders	4	-3.2
Microcephaly	2	-1.6
Post Meningitis Syndrome	2	-1.6
Others	4	-3.2
Total	124	100

Seizure disorder comprises 37 (29.8%) of the diagnosis in the second position. Generalized tonic-clonic is the most familiar seizure type, with 19 (15.3%) cases. The generalized atonic seizure follows with 5 (4%) cases, absence seizures with 4 (3.2%) cases, infantile spasms consist of 3 (2.4%) cases, while the poorly classified seizures comprised 6 (4.8%) of the seizures.

Eleven children had attention deficit hyperactivity disorder. No identifiable risk factor was seen in 4 children; four had birth asphyxia, two had neonatal infections, and one was born prematurely.

Only ten children had dysphasia. No risk factor was found in 6 children; two had neonatal jaundice, two had birth asphyxia, and one had severe neonatal hypoglycemia.

Four children had delayed speech and improved on follow-up over time.

Intellectual disability was diagnosed in 7 (5.6%) of the subjects. No predisposing factors were seen in 3 subjects; 3 subjects had birth asphyxia, while one issue had both birth asphyxia and severe neonatal jaundice.

Chromosomal abnormalities were documented for 3 obvious cases of Down syndrome and one case of achondroplasia. Subjects defaulted follow-up and did not follow through with chromosomal analysis attempts.

Microcephaly was noted in two cases of craniosynostosis, who were sent to a neurosurgical unit of the hospital and were lost to follow-up.

Post-meningitis syndrome was seen in two cases. One is an 11 years old girl who developed ataxic gait and poor coordination of the hands, while the second case is a 3-year-old male who developed unilateral hemiplegic cerebral palsy later.

Two cases of road traffic accident result in prolonged headache and dizziness, respectively.

Of the 43 that had CP, spastic hemiplegia was found in 20 (46.51%), spastic quadriplegia 9 (20.93%), choreoathetoid CP 5 (11.62%), unilateral diplegia 2 (4.65%) and mixed type consist of 7 (16.28%) (**Figure 1**).

Seizure disorder comprised 37 (29.8%) of the diagnosis in this study. Generalized tonic-clonic (GTC) was the most common seizure type, with 19 (51.4%) cases. Atonic seizures were about 5 (13.51%) cases, absence seizures with 4 (10.81%) cases, infantile spasms consist of 3 (8.11%) cases, while the poorly classified seizures comprised 6 (16.22%) of the seizures (**Figure 2**).

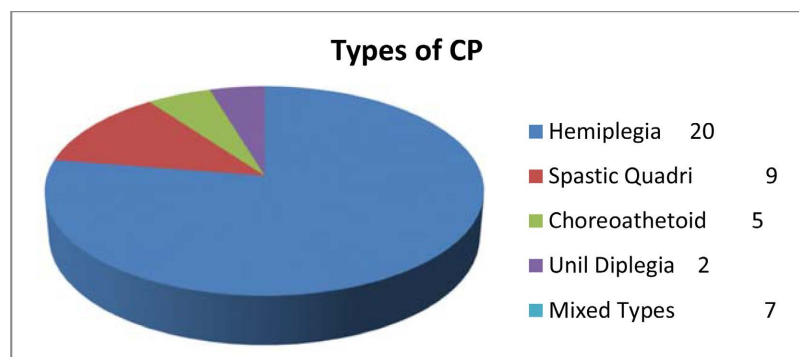


Figure 1. Types of cerebral palsy (CP).

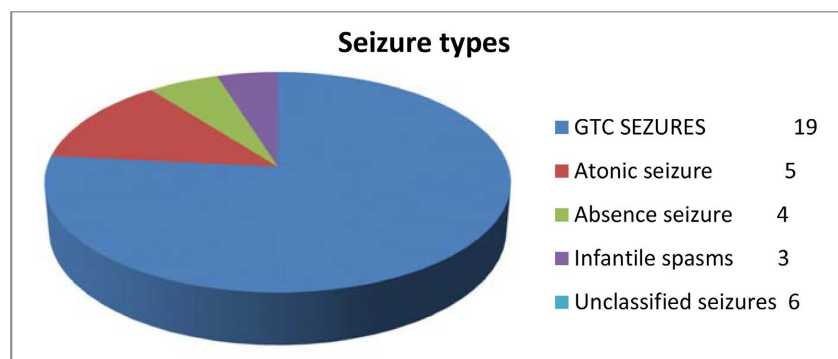


Figure 2. Types of seizures.

4. Discussions

The findings from this review showed that 115 children had neurological disorders out of 138 children seen in the Pediatric neurology clinic of our hospital in the first two years of service provision at the clinic. The male to female ratio is 1.9:1. This is in keeping with the findings of earlier studies [18] [21] [22]. This agrees with the general observation of higher incidences of neurological disorders and Epilepsy in males [23]. It may reflect the cultural practice of bringing the males to the hospital as they are taught to be more valuable than females [24]. However, a retrospective study done in Cameroun reported female preponderance. The reason could not be ascertained. It is also noted that 65.2% of all cases occurred in children under 5 years of age. This is similar to what was observed in Port Harcourt, Jos and Zambia [4] [19] [25]. This could be attributable to the predominance of the risk factors during the perinatal and postnatal periods and the first 24 months of life. This is not surprising as the developing brain is prone to injuries during the perinatal period.

Delayed developmental milestones were the most common presenting complaint. This agrees with a study done in Zaria [4] but differs from other reports that convulsion is the most common presenting complaint [4] [6] [7] [26] [27]. Birth asphyxia is the commonest predisposing risk factor for neurological disorders. The combination of birth asphyxia (47.7%), neonatal jaundice (17%), infections (12.5%) and prematurity (6.8%) gave 84% of the risk factors. These are predominantly perinatal and postnatal issues with consequences beyond these periods [4] [5] [7]. In Nigeria and other less developed parts of the world, these risk factors are worsened by improperly home deliveries and delivery by quacks at maternity homes with lethal consequences to the babies [28].

Cerebral palsy is the commonest neurological disorder seen in this study, followed by seizure disorder accounting for 34.7% and 29.8%, respectively. This is consistent with the results of other Nigerian studies at Zaria [5] Calabar [21], Benin [29], and elsewhere [30]. Contrary to the above reports, earlier studies in Nigeria identified seizure disorder as the commonest cause of the neurological disorder, as was documented in Port Harcourt [4], Oshogbo [22], Jos [25] and North African countries of Cairo, Egypt [26] and Khartoum Sudan [27]. These varying reports could be due to variations in geographic locations, socio-economic and cultural differences and time variation. Studies done in Zaria [5] and Calabar [21] showed that the high prevalence of cerebral palsy in their study was due to practice of child/teenage marriages as well as home deliveries. It is noted that a higher proportion (66.7%) of the children that had birth asphyxia developed cerebral palsy of various types.

The most common presenting factors to neurologic disorder were birth asphyxia, neonatal jaundice and neonatal infections accounting for 47.7%, 17%, and 12.5 %, respectively. Work done in Port Harcourt [4] and Shagamu [31] reported similar predisposing factors. Port Harcourt and Shagamu's studies observed that most babies were delivered by traditional birth attendants/unqualified

attendants. This was not part of this study.

Further analysis in the present study showed that patients with perinatal asphyxia as risk factors were more predisposed to cerebral palsy (66%), while 19% developed seizure disorders of various types. This is not surprising as asphyxia lead to brain damage and consequent neurological complications like cerebral palsy and decreased brain growth. Post meningitis syndrome was found in two cases with cerebral palsy; meningitis leads to a severe reduction in blood flow, leading to neurological damage.

A reasonable number of the patients had dysphasia with Neonatal Jaundice and birth Asphyxia as risk factors. It is not surprising because bilirubin is extremely toxic to the developing brain. They are deposited in the deep nuclei of the developing brain, mainly in the basal ganglia, which controls balance, coordination, hearing and eye movement.

Congenital CNS abnormalities and other syndromes contribute to a small proportion of childhood neurological disorders in this study. This may be due to the unavailability of hi-tech diagnostic equipment, which could help make early and definitive diagnoses in our setting.

5. Conclusion

Cerebral palsy and seizure disorders constitute the major neurological disorders among children seen in our institution. Efforts should be intensified at reducing the incidence and impact of perinatal asphyxia, neonatal jaundice and CNS infections identified as the major culprits, to curb the menace of these debilitating lifelong neurologic sequelae. Effective implementation of proven interventions such as the Integrated Maternal Newborn and Child Health Strategy (IMNCH) and Integrated Management of Childhood Illnesses (IMCI) is recommended.

6. Limitations of the Study

Difficulty in making diagnoses in some neurological cases was a challenge. Very few patients with neurological disorders had no definitive diagnosis due to financial constraints; patients have to pay out of pocket for all investigations. Some patients were lost to patients due to caregiver's burnout on account of prolonged treatment of neurological disorders.

Most of the folders reviewed had incomplete data and many of the patients were excluded.

Author Contribution

Authors are responsible for patient care medical records, data entry, data analysis, literature review, and writing and editing.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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