

## Cerebral Palsy in Kano, Nigeria - A Review

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### Abstract

**Background:** Cerebral palsy is the most common form of chronic motor disability that starts in childhood. The aim of this study is to determine the magnitude of cerebral palsy in Kano and environs as well as to highlight the types, aetiologic factors and associated co-morbidities.

**Method:** The medical records of 356 patients who attended the paediatric neurology clinic between January 1998 and December 2005 were examined and all those with diagnosis of cerebral palsy were studied. The relevant data extracted and analysed included age at first presentation, sex, physiologic form of cerebral palsy and co-morbidities.

**Results:** Of all the paediatric neurology cases, there were 151 (42.4%) cases of cerebral palsy. There were 95 males (62.9%) and 56 females (37.1%) giving a male female ratio of 1.7:1. The age range was 6 months 12years. The difference between the two sexes was not statistically significant ( $P > 0.05$ ) Birth asphyxia was the leading cause of cerebral palsy (45.7%), followed by neonatal jaundice (12.6%), seizure disorder (11.9%), meningitis (7.3%), prematurity (3.3%), encephalitis (2.6%), genetic disorder (1.3%), trauma (1.3%) and craniosynostosis (0.62%). In 20 (13.2%) cases, the aetiology was unknown.

The physiologic forms of cerebral palsy observed included spastic (41.7%), mixed (29.8%), hypotonic (21.9%) and dyskinetic (6.6%). The most prevalent co-morbid conditions included :speech impairment (15.2%), mental retardation (13.2%), auditory impairment (11.9%), strabismus (11.3%) seizure disorder (11%) and microcephaly (7.3%).

**Conclusion:** It is suggested that general improvement in perinatal health services will reduce the burden of the disease in Kano and environs.

**Key words:** cerebral palsy, magnitude, co-morbidities

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### Introduction

Cerebral palsy is a diagnostic term used to describe disorders of movement, posture and tone due to insult to a developing brain<sup>1</sup>. It is the most common form of chronic motor disability that starts in childhood with reported prevalence of 2/1000<sup>2</sup>. It has been observed that there has been little change in this rate over time despite advances in obstetric and perinatal care<sup>1</sup>. It is caused by a group of developmental, genetic, metabolic, ischaemic, infectious and other acquired conditions. It is the involvement of the brain's motor systems that defines the disorder but there may be epilepsy and abnormalities of vision, hearing, behaviour and cognition<sup>2</sup>.

Physiologically, there are 5 types of cerebral palsy: spastic, dyskinetic, ataxic, hypotonic and mixed<sup>3</sup>. Topographically, there are 6 types: hemiplegia, monoplegia, diplegia, quadriplegia, triplegia and double hemiplegia<sup>3</sup>. Studies from various parts of the world have shown that cerebral palsy is one of the leading causes of children's disabilities<sup>3-9</sup>. There has been no previous published work on cerebral palsy in Kano and its catchment areas which include Jigawa and Katsina states. This retrospective study was therefore undertaken to determine the magnitude of cerebral palsy in the region as well as highlight the types, the aetiologic factors, associated morbidities and to proffer suggestions for reducing the incidence in the nearest future.

### Materials and Methods

The medical records of 356 patients who attended paediatric neurology clinic of Aminu Kano Teaching Hospital from January 1998 - December 2005 were examined and all those with diagnosis of cerebral palsy were sorted out for detailed study. Data extracted from the case records included age at first presentation, sex, physiologic forms of cerebral palsy and associated co-morbidities. The extracted data were entered in designated forms, checked and corrected for errors; they were coded and entered into personal computer and analysed using the SPSS statistical package. The

Chi-square test was used to compare differences and the level of significance was set at  $P < 0.05$ . Percentages and ratios were used to determine some other relationships.

## Results

During the 8-year period, there were 356 patients with neurologic disorders out of which 151(42.4%) patients had cerebral palsy. There were 95 males (62.9%) and 56 females (37.1%) giving a male:female ratio of 1.7:1. The age range at first visit was 6 months 12 years with a mean of 30.4 months and standard deviation of 29.2 months. When comparing involvement of the two sexes,  $\chi^2 = 0.03279$  and  $P > 0.05$ . Hence the difference is not statistically significant.

**Table I Aetiology of Cerebral Palsy**

Aetiology	Number	% of Total
Birth asphyxia	69	45.7
Neonatal jaundice	19	12.6
Seizures	18	11.9
Meningitis	11	7.3
Prematurity/low birth weight	5	3.3
Encephalitis	4	2.6
Genetic disorder	2	1.3
Trauma	2	1.3
Craniosynostosis	1	0.6
Unknown	20	13.2
<b>TOTAL</b>	<b>151</b>	<b>99.8</b>

Table I shows clearly that birth asphyxia is the leading cause of cerebral palsy (45.7%). It is followed by neonatal Jaundice (12.6%), seizure disorder (11.9%), meningitis (7.3%), prematurity (3.3%), encephalitis (2.6%) and trauma (1.3%). In 20(13.2%) cases, the aetiology is unknown except that in one of them kwashiorkor was a risk factor. The role of genetic disorders (1.3%) is noted. Measles infection was responsible in 3 out of the 4 cases of encephalitis. In the case of seizure disorders, 7 were due to neonatal seizures, 8 were due to epilepsy and 3 were due to recurrent febrile seizures.

**Table II Different Physiologic Forms of Cerebral Palsy**

Physiologic Form	Number	% Total
Spastic	63	41.7%
Hypotonic	33	21.9%
Dyskinetic	10	6.6%
Mixed	45	29.8%
Ataxic	0	0
Total	151	100

Table II shows that spastic form (41.7%) is the most predominant, followed by mixed form (29.8%), hypotonic form (21.9%) and dyskinetic form (6.6%). The dyskinetic form were mostly due to neonatal Jaundice and bilirubin encephalopathy (90%). The spastic forms were mostly seen in those with birth asphyxia. The mixed forms

comprised mostly those presenting with hypertonia in upper limbs and hypotonia in lower limbs as well as some who presented with involuntary movements and spasticity of the limbs. The hypotonic forms were seen mostly in those with prematurity and unknown aetiology as well as a few with birth asphyxia.

**Table III: Pattern of Associated Co-morbidities in Patients with Cerebral Palsy**

Co-Morbidities	Frequency	% of Total
Speech impairment	23	15.2
Mental retardation	20	13.2
Auditory impairment	18	11.9
Seizure disorder	16	11
Microcephaly	11	7.3
Visual impairment	9	6
Behavioral disorders	6	4
Strabismus	17	11.3
Nystagmus	2	1.3

\*Some patients had multiple deficits while few had none.

Table III shows the various co-morbid conditions seen in the cerebral palsy patients. It clearly reveals that speech impairment (15.2%), mental retardation (13.2%), auditory impairment (11.9%), seizure disorders(11%), microcephaly(7.3%), visual impairment (6%) and behavioral disorders (4%) were the most frequent neurologic co-morbidities seen in the patients. Strabismus was the most frequently seen ocular abnormality in 11.3% of patients followed by nystagmus (1.3%).

## Discussion

The preponderance of cerebral palsy in our study is similar to the findings of both hospital and community based studies here in Nigeria<sup>4,7</sup> and elsewhere<sup>3,5,8</sup>. The figure of 42.4% of all neurologic cases is much higher than the 16% reported by Izuora and Iloge in Enugu<sup>4</sup>. It is also much higher than the 16.2% reported by Nottige and Okogbo in Ibadan<sup>7</sup>. Both Enugu and Ibadan are in the southern part of Nigeria; and considering the advantages the two places have over Kano in Northern Nigeria in terms of better educated populace (which implies better utilisation of health facilities), greater number of more skilled health care personnel, more readily available and easily accessible health facilities(both private and government - owned) and less frequent occurrence of epidemics of infectious diseases(particularly meningoencephalitis), it becomes quite understandable why there are more cases of cerebral palsy in the present study. A male preponderance (62.9%) in the present study had been noted in earlier study<sup>8</sup> where 67.5% of the children were males. This contrasts with the nearly 50% ratio

(78males and 79 females) which was found in South African study<sup>3</sup>. It is noteworthy that while the present study and the Indian series<sup>8</sup> involved homogenous populations (blacks in Nigeria and native Indians), the South African study involved heterogenous population (black, white and mixed races) and that probably accounted for the differences in the sex ratio.

Birth asphyxia as a leading cause of cerebral palsy in the present study is similar to the findings of Duggan and Ogalla in Zaria<sup>6</sup>, Izuorah and Iloge in Enugu<sup>4</sup> and Pratibha et al in India<sup>9</sup>. Occurrence of severe birth asphyxia which is rarely seen in developed countries, continues to be a major problem in several developing countries especially in Africa where obstetric facilities are few in urban and semi urban areas but virtually non-existent for a vast majority of women in rural areas.

Acquired causes of cerebral palsy especially meningitis, seizure disorder and bilirubin encephalopathy constitute a significant proportion of cerebral palsy in the present study. Kano is in the meningitis belt and so sporadic and epidemic cases of meningitis do occur and when inadequately managed lead to neurologic deficits. Seizure disorders are common and most often result from acute febrile illnesses, neonatal seizure and epilepsies. The prominent role of neonatal Jaundice in causation of cerebral palsy in this study is similar to the findings in India<sup>9</sup> and Nigeria<sup>6,10</sup>. The predisposing factors of neonatal Jaundice in Nigeria include Neonatal septicaemia, G-6-P-D deficiency and ABO incompatibility.<sup>6,11,12</sup>

Previous studies have reported a significant association between premature/low birth weight and cerebral palsy<sup>13,15,16</sup>. Unlike western figures, most of the children in our study were term babies, hence only few cases of cerebral palsy in the study were due to prematurity. The few cases of prematurity in the present study still raises concern considering the ill equipped medical facilities in Nigeria and most developing countries.

The preponderance of spastic cerebral palsy cases in our study is similar to that reported by others<sup>3,9</sup>. The spastic forms varied from mild to severe with associated neurological deficits. These forms always require physiotherapy. Most of the patients in our study can not access the physiotherapy services regularly especially those living in rural areas due to high cost of the services and distances between patients' place of abode and the few health facilities in Kano that provide the services. The spastic form (41.7%) in our study is however lower than the 70% and 75% recorded in the Indian<sup>9</sup> and South Africa<sup>3</sup> studies respectively. The mixed form was second

in terms of frequency of occurrence in our study. This finding is in keeping with earlier studies<sup>3,9</sup>. In our study, the least form is the dyskinetic form(6.6%) which is in keeping with an earlier study<sup>3</sup> in which dyskinetic form constituted 1%. However the present study contrasts with an earlier study<sup>9</sup> where hypotonic /ataxic form (7.7%) is the least common. Our study includes high percentage of those with hypotonic cerebral palsy. Most of these did not have identifiable cause except few cases in which prematurity and severe birth asphyxia were associated. These hypotonic forms usually made little progress while undergoing physiotherapy and so usually required prolonged care and hence the concomittant financial burden on parents. Almost all children with cerebral palsy have at least one or more additional disability associated with damage to central nervous system. These co-morbidities are most often the reasons why the children are brought to the health facility. Mental retardation occurs in a significant number of children with cerebral palsy<sup>9</sup> and our finding of 13.2% is in agreement. The Indian study<sup>9</sup> however showed that as much as 75% of the children in their series had mental retardation. The difference may be explained on the basis that the Indian study was conducted in a setting of a rehabilitation center for disabled with probably severe forms of cerebral palsy. It presupposes that these children with mental retardation will require special educational care and possibly institutional care. These special educational centers are few and far between in Nigeria and other developing countries. Epilepsy occurs frequently in children with cerebral palsy.<sup>17</sup> Our finding supports this assertion. Those that had epilepsy had the best chance of receiving care because of more readily available antiepileptic drugs. It is however not same with those presenting with other co-morbid conditions. The specialists for the co-morbid conditions are very few and far between. As a result, most of these children remain underserved. The frustrations of the managing paediatricians and the parents could be better imagined than described.

In conclusion, the profile of cerebral palsy in Kano differ from that seen in other places. While prematurity accounts for high percentage of cerebral palsy in the developed nations because of advanced obstetric care, our study reveals that severe birth asphyxia is an important predisposing factor for cerebral palsy. Acquired causes of cerebral palsy such as meningoencephalitis, seizure disorders, neonatal Jaundice constitute a significant proportion of cerebral palsy cases.

The efforts directed at improved obstetric and neonatal care, immunization against childhood preventable diseases, adequate treatment of common childhood illnesses and training/ retraining of health personnel will

help to reduce substantially the enormous burden posed by cerebral palsy as a serious childhood disability in Kano, Nigeria and other developing countries.

## References

1. Wollack J B, Nichter C A. Static encephalopathies. In: Rudolph A M, Hoffman J I, Rudolph C D, eds. Rudolph's Paediatrics. Connecticut: Appleton and Lange, 1996: 1892-1896
2. Johnson M V. Encephalopathies. In: Behrman ER, Kliegman M R, Jenson B H, eds. Nelson Textbook of Paediatrics. Philadelphia: WB Saunders, 2004: 2023-2029
3. Venter A, Schirm N, Joubert G, Fock J M. Profile of children diagnosed with cerebral palsy at Universitas Hospital, Bloemfontein, 1991-2001. SAfam pract 2006; 48:15
4. Izuora G I, Iloje S O. A review of neurological disorders seen at the paediatric neurologic clinic of the University of Nigeria Teaching Hospital, Enugu. Ann Trop Paediatr 1989; 9: 185-90
5. Jacqui C. Prevalence of childhood disability in rural Kwazulu-Natal. SAfr Med J 2002; 92: 549-552
6. Duggan M B, Ogala W. Cerebral Palsy in Nigeria - A report from Zaria. Ann Trop Paediatr 1982; 2: 7-11
7. Nottidge V A, Okogbo M E. Cerebral palsy in Ibadan. Dev. Med child neurol 1991; 33: 241-245
8. Waaler P E, Rederseen S J, Sommerfelt K. Child neurology in a regional hospital. Tidsskr Nor laegeforen 1991; 111: 1226-9
9. Pratibha D S, Munni R, Gunmala S. Clinical Spectrum of Cerebral Palsy in Northern India - An analysis of 1000 cases. J Trop Paediatr 2002; 48: 162-6
10. Animashaun A. Aetiology of cerebral palsy in African children. Afr J med Sci 1971; 2: 165-71
11. Azubike J C. Neonatal Jaundice in Eastern Nigeria. E Afr med J 1979; 59: 320-4
12. Owa J A, Dawodu A H, familusi J NB. Kernicterus in Nigerian infants. West Afr J med 1987; 6: 11-20
13. Nelson K B, Ellenberg J H. Antecedents of cerebral palsy. Univariate analysis of risks. Am J Dis Child 1985; 23: 633-42
14. Nelson KB, Ellenberg JH. Antecedents of cerebral palsy. Multivariate analysis of risks. New Engl J Med 1986; 315: 81-6
15. Dale A, Stanley F J. An epidemiological study of cerebral palsy in Western Australia 1956-1975. II: Spastic cerebral palsy and perinatal factors. Dev Med Child Neurol 1980; 22: 13-25
16. Powel T G, Pharoah P O D, Cooke R W, Rosenblom L. Cerebral palsy in low birth weight infants, II spastic diplegia: association with fetal immaturity. Dev Med Child Neurol 1988; 30: 19-25
17. Aicardi J. Epilepsy and Cerebral palsy. In: Aicardi J ed. Epilepsy in children, 2<sup>nd</sup> edn. Raven press, New York 1994; 350-51