

# Socio-clinical issues in cerebral palsy in Sagamu, Nigeria

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**Background.** Cerebral palsy (CP) is a common neurological disorder of childhood with significant implications.

**Objective.** To determine the socio-clinical characteristics of children with CP at a paediatric neurology clinic in Sagamu, Nigeria.

**Methods.** Hospital records of 92 children attending the clinic between 2000 and 2006 were reviewed. Demographic data were extracted and a validated socio-economic classification of parents was used.

**Results.** The majority of babies had been delivered by primary health workers and traditional birth attendants. The prevalence of CP at the paediatric neurology clinic was 50.3%. Most subjects were aged 1 - 3 years (77.2%), were malnourished (80.4%) and belonged to the lower socio-economic groups (70.6%). The clinical types of CP were spastic (80.4%), hypotonic (12.0%), extrapyramidal (4.3%) and mixed (3.3%). Quadriplegia was the commonest type of spastic CP (66.2%). Asphyxia (57.6%), kernicterus (36.9%) and CNS infections (21.7%) were the leading identified causes. Co-morbidities such as seizures, microcephaly and speech and auditory deficits were present in 90.2% of the subjects. Seizures and microcephaly were commoner among CP cases associated with asphyxia than those associated with kernicterus ( $p=0.026$  and  $p=0.005$ , respectively).

**Limitations.** The rarity of prenatal causes of CP in this study may reflect our inability to investigate high-risk pregnancies adequately, particularly for intra-uterine infections. This also emphasises the inability of retrospective studies to adequately identify risk factors.

**Conclusion.** Most patients with CP in this study were of low socio-economic status and had had perinatal problems. Improved perinatal care may reduce the burden of CP. Continuing training of health workers and traditional birth attendants is essential. It is hoped that this study will stimulate well-designed prospective studies.

Cerebral palsy (CP) is a chronic disabling condition resulting from permanent damage to the immature brain. It is commonly encountered worldwide.<sup>1-5</sup> The consequences of CP include retardation of growth and development as well as social and financial sequelae. The ideal management of CP is comprehensive and effective physical rehabilitation,<sup>6</sup> which is unfortunately expensive for the average Nigerian family. However, even with the best rehabilitation, functional and physical recovery in CP is rarely complete. Prevention therefore is of central importance, and this study was an attempt to identify medical and social issues surrounding CP in our setting.

The Olabisi Onabanjo University Teaching Hospital in Sagamu, Nigeria, provides specialist paediatric neurological care to at least three states of the federation and receives referral from other health facilities (public and privately owned) in these catchment areas. The paediatric neurology clinic is managed by a consultant, resident doctors and nurses. Supportive care is provided by physiotherapists, ophthalmologists and surgeons. Facilities for radiographic studies including transfontanelle ultrasound scanning and computed tomographic scanning are also available.

This study was conducted to determine the socio-clinical characteristics of children with CP in this Nigerian tertiary

hospital. These characteristics may help us identify factors that need further study in order to reduce the burden of CP in our country.

## Materials and methods

The hospital records of children with CP who attended the Paediatric Neurology Clinic between 2000 and 2006 were retrospectively studied. The data extracted from the records included age and weight at the first clinic attendance, sex, parental social indices, clinical diagnoses and the frequencies of clinic attendance. Parental socio-economic classification into the upper (I, II and III) and lower (IV and V) groups was done using the method recommended by Oyediji.<sup>7</sup> In this method of classification, specific scores were allotted to specific parental occupations and educational qualifications and the means of these scores were used to classify the children to socio-economic groups I, II, III, IV and V.

The nutritional status of each child was assessed by plotting his or her weight on the National Centre for Health Statistics (NCHS) Growth Chart (2000), which has been validated for Nigerian children.<sup>8</sup> Children who weighed below the 50th centile of the mean for age were regarded as undernourished and those who weighed less than the 5th centile as severely undernourished.

For the purpose of this study, default from the clinic was defined as non-attendance of the clinic for more than 6 months.

Data analysis was done with SPSS version 11.0 computer software using simple descriptive statistics such as proportion, mean and standard deviation. Student's *t*-test and the chi-square test were used to compare means and proportions, respectively.

## Results

### General characteristics

The prevalence of CP at the Paediatric Neurology Clinic for the study period was 50.3% (92 of 183 children), and the average number of CP children seen in the clinic was 13.1 per year. Their ages ranged from 0.42 to 12 years (mean (SD) 2.5 (2.2) years), and the age distribution at presentation is shown in Table I. Of the patients 60.9% were males and 39.1% females.

Most children (74, 80.4%) were undernourished, only 18 (18.6%) being well nourished; of the former group 52% were severely undernourished. Socio-economic stratification of the patients showed concentration in groups III (23.9%) and IV (46.7%) (Table II).

### Maternal parity and places of birth

The parity of the mothers at the index pregnancy ranged from 1 to 8 with a mean of 2.49 (1.6). Most of the children had been delivered in privately owned clinics (44.6%) or at home (21.7%). Only 1 child (1.1%) had been delivered in a teaching hospital. The remainder had been delivered in traditional birth homes (13.0%), general hospitals (12.0%), churches (4.3%) and primary health centres (3.3%).

**TABLE I. AGE DISTRIBUTION OF 92 CHILDREN WITH CEREBRAL PALSY AT PRESENTATION**

Age	No.	%
<1 year	26	28.3
1 - 3 years	45	48.9
4 - 6 years	15	16.3
7 - 9 years	5	5.4
≥10 years	1	1.1
Total	92	100.0

**TABLE II. SOCIO-ECONOMIC CLASSIFICATION OF 92 CHILDREN WITH CEREBRAL PALSY**

Socio-economic group	No.	%
I (upper)	3	3.2
II (upper)	8	8.7
III (upper)	22	24.0
IV (lower)	43	46.7
V (lower)	16	17.4
Total	92	100.0

### Clinical classification

Most of the children (80.4%) had spastic CP. Eleven (12.0%) had hypotonic and 4 (4.3%) extrapyramidal types, and the mixed type (3.3%) was the least common. Of the 74 children with spastic CP, 49 (66.2%), 15 (20.3%) and 10 (13.5%) were quadriplegic, hemiplegic and diplegic, respectively.

### Possible aetiologies

Table III shows various possible aetiologies; in half of the children only one cause was identified, 46.6% had multiple causes, and 3.3% had no identifiable cause. There was no case with a prenatal cause. The perinatal causes included asphyxia, kernicterus and prematurity, while central nervous system (CNS) infections and head injuries were the major post-natal causes. The commonest individual aetiologies were perinatal asphyxia (57.6%), kernicterus (36.9%) and CNS infections (21.7%).

### Neurological co-morbidities

The majority of children (83, 90.2%) had CP with various co-morbidities. The mean age of children without co-morbidities at the first clinic attendance was 2.8 (0.8) years compared with 2.3 (0.6) years for those with co-morbidities ( $t=2.30$ ;  $p=0.024$ ).

Seizures, microcephaly and speech impairment were the commonest co-morbidities, affecting 43 (46.7%), 40 (43.5%) and 40 (43.5%) children, respectively (Table IV).

All 16 children (17.4%) whose CP had been caused by both kernicterus and asphyxia had microcephaly and seizures. Of the 18 subjects with only kernicterus as a cause, 27.8% had microcephaly compared with 67.6% of the 37 children with only asphyxia as a cause ( $\chi^2=7.732$ ;  $p=0.005$ ). Similarly, seizures occurred more frequently among children with CP from asphyxia (54.0%) than from kernicterus (22.2%) ( $\chi^2=4.989$ ;  $p=0.026$ ). However, the proportions of the children with CP from asphyxia only versus that from kernicterus only who also had speech impairment were similar (64.9% v. 50%;  $p=0.291$ ).

### Default rate

Only 18 children (19.6%) were still attending the clinic regularly at the time of study. Of the 74 defaulters the majority (59) defaulted within five follow-up visits.

## Discussion

The prevalence of CP in this study was higher than the 16%<sup>4</sup> and 16.2%<sup>6</sup> previously reported from other centres in Nigeria. This disparity may be attributed to differences in the spectrum of cases referred to the neurology clinics in different locations. It is also possible that the prevalence of CP in Nigeria is rising owing to an increasing number of neonates at risk of significant cerebral damage following unsupervised deliveries.<sup>9,10</sup> Rising prevalences of cerebral palsy have been reported in Europe and other countries, where improved survival of very low-birth-weight babies associated with the availability of intensive care facilities may be responsible for the trend.<sup>11-13</sup>

The concentration of subjects in the lower socio-economic groups is consistent with previous association of CP with poor education and poverty<sup>12</sup> resulting in limited antenatal

TABLE III. CAUSES AND CLINICAL TYPES OF CEREBRAL PALSY AMONG 92 CHILDREN

Causes	Types of cerebral palsy				Total
	Spastic	Extrapyramidal	Hypotonic	Mixed	
Asphyxia	17 (23.0)	-	-	-	17 (18.5)
Kernicterus	11 (14.9)	2 (50.0)	-	-	13 (14.1)
Febrile seizures	2 (2.7)	-	-	-	2 (2.2)
CNS infections*	7 (9.5)	-	2 (18.2)	-	9 (9.8)
Prematurity-associated complications	-	-	1 (9.1)	-	1 (1.1)
Neonatal seizures†	2 (2.7)	-	-	-	2 (2.2)
Head injury	2 (2.7)	-	-	-	2 (2.2)
Multiple‡	30 (40.5)	2 (50.0)	8 (72.7)	3 (100.0)	43 (46.6)
Unknown	3 (4.0)	-	-	-	3 (3.3)
Total	74 (100.0)	4 (100.0)	11 (100.0)	3 (100.0)	92 (100.0)

Figures in parentheses are percentages of the total in each column.  
 \*CNS infections = central nervous system infections (meningitis and encephalitis).  
 †Uninvestigated neonatal seizures.  
 ‡Combination of several causes.

TABLE IV. CO-MORBIDITIES AMONG 92 CHILDREN WITH CEREBRAL PALSY

Co-morbidities	No.	%
Seizures	43	46.7
Speech impairment	40	43.5
Microcephaly	40	43.5
Mental subnormality	22	24.0
Visual deficits*	23	25.0
Behavioural disorder	6	6.5
Hydrocephalus	3	3.3

\*Strabismus and cortical blindness.

and delivery care.<sup>14</sup> Most of the children studied were severely undernourished.<sup>12</sup> The growth of children with CP has been shown not to be comparable with that of the general population;<sup>15</sup> however, the growth chart designed for children with CP<sup>15</sup> was not used in this study as (unlike the NCHS Growth Chart<sup>8</sup>) it has not been validated in our country. Poor nutrition has been reported among children with cerebral palsy and oral motor dysfunction.<sup>16</sup> Special feeding devices may therefore be required for affected children, but in places where these are not available, fluid and semi-solid diets may be preferred.

The relatively low parity of most of the mothers may be related to their poor experience of health care during pregnancy and during and after delivery. Improved access to quality prenatal, obstetric and neonatal care services should be provided free of charge, particularly for the poor.

The dominance of the spastic type of CP in this study and the general pattern of clinical classification is consistent with published data.<sup>2,6,12,17</sup> However, our finding of the dominance of seizures as a neurological co-morbidity differs from reports by others that mental retardation<sup>12,17</sup> and visual deficits are the most common neurological co-morbidities among similar groups of children.<sup>5</sup> This pre-eminence of different specific morbidities in different places is difficult to explain. The occurrence of seizures, mostly in quadriplegic CP, may be directly related to the extent of cerebral damage.<sup>18</sup>

Perinatal events are the commonest causes of CP in resource-poor settings like Nigeria.<sup>2,6,18</sup> This contrasts with the report of a predominance of brain infections from India<sup>16</sup> and problems of low birth weight from the Netherlands<sup>12,13</sup> and Saudi Arabia.<sup>19</sup> The predominance of asphyxia in our study may be related to the high rate of poorly supervised deliveries, as has been demonstrated previously.<sup>20,21</sup> Kernicterus had been shown to be a leading cause of CP in Nigeria,<sup>6</sup> but this study also shows that brain damage is more severe when both kernicterus and asphyxia are present. Stringent efforts should be made to prevent these conditions. Traditional birth attendants should be taught simple ways of identifying fetal distress and the need for prompt referral. Mothers and health workers should also be taught simple ways of recognising jaundice in babies.<sup>22</sup> Since many of the children with prematurity-associated complications were not delivered in our hospital, it was difficult to determine the relative contribution of problems such as sepsis and intracranial bleeding in this group of babies.

The rarity of prenatal causes of CP in this study may reflect inability to investigate high-risk pregnant women and their infants adequately, particularly for intra-uterine infections. Such inability is not surprising, as a significant number of deliveries were performed by attendants who may not have had adequate training.

*Improved perinatal care  
may reduce the burden  
of CP, so continuing  
training of health workers  
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attendants is essential.*



High rates of co-morbidity are likely to increase the burden of management of CP, as anticonvulsants, speech therapy, hearing aids and special education become necessary. Furthermore, looking after disabled children has been shown to cause psycho-morbidities in the caregivers.<sup>23</sup>

The default rate in our study was found to be high, as earlier reported in Enugu, Nigeria.<sup>24</sup> Although we did not explore reasons for the high default rate, limited finances are likely to be an important factor, and some children might have died at home. Counselling from health visitors could improve compliance and the chances of rehabilitation.

## Conclusion

CP in Sagamu, Nigeria, is mainly associated with perinatal events and low socio-economic status. Continuing education of health workers and traditional birth attendants about the prevention of asphyxia and training in the identification of jaundice and neonatal infections need to be emphasised, as they deliver the majority of babies. Retrospective studies are unable to identify risk factors adequately, and it is hoped that this study will stimulate well-designed prospective studies.

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