Original Research Article

CLINICAL PROFILE OF CHILDREN WITH CEREBRAL PALSY IN A DEVELOPMENTAL CLINIC IN LAGOS STATE, NIGERIA

ABSTRACT

Aim: This study described the clinical characteristics of children diagnosed with cerebral palsy (CP) who attended a developmental clinic in Lagos, Nigeria.
Study design: Cross-sectional design.
Place and Duration of Study: Child and Adolescent Mental Health Service (CAMHS) Centre in Lagos.
Methodology: 75 children with Cerebral palsy (CP) attending outpatient services at the clinc were enrolled. Participants aged 6 to 18 years were selected via total sampling over a six-month period. Assessment tools included the DSM-5, the Gross Motor Function Classification System (GMFCS), and the Children's Global Assessment Scale (CGAS).
Results: The mean age of the participants was 10.03 ± 3.37 years, with a male majority (56%). The predominant type of CP observed was spastic (88%), followed by dyskinetic (9.3%) and ataxic (2.7%) forms. Most children fell within GMFCS levels IV and V (46.7%). **Conclusion:** Trends in aetiology and clinical presentation of CP have remained relatively stable. However, there is an urgent need for improved maternal and child healthcare services in developing countries to reduce its morbidity. Additionally, effective interventions should be made accessible to enhance functionality in affected children.

Keywords: Cerebral palsy; Clinical profile; Comorbidities; Nigeria; Children; Perinatal asphyxia; Motor disorders.

1. INTRODUCTION

Cerebral palsy (CP) describes children who experience motor impairments or require specialized assistance with mobility (Panteliadis & Vassilyadi, 2018). CP is defined as a category of enduring movement and posture disorders that lead to activity limitations of an individual, originating from non-progressive disturbances of the brain during prenatal development or early infancy (Baxter et al., 2005). Additionally, individuals with CP frequently experience challenges related to sensation, cognition, communication, and may present with comorbid conditions such as epilepsy and musculoskeletal impairment (Baxter et al., 2005; Gulati & Sondhi, 2018).

Cerebral palsy presents in varying forms depending on the affected body region, movement type, and symptom severity (Michael-Asalu et al., 2019). Generally, CP is categorized as spastic, dyskinetic and ataxic types (Eunice Kennedy Shriver, 2021). The spastic subtype is the most prevalent and is marked by stiff muscles and involuntary, jerky movements. Dyskinetic CP is distinguished by slow, uncontrolled, and repetitive movements of the limbs and face. Compared to spastic CP, the dyskinetic type has no associated contracture (Gulati & Sondhi, 2018). Ataxic CP is the type that affects depth perception and balance manifesting in gait abnormalities. Such individuals find it difficult to carry out precise activities such as writing and buttoning a shirt (Eunice Kennedy Shriver, 2021). Some individuals exhibit a mixed type that encompasses features of multiple forms (Patel et al., 2020).

CP remains the most common cause of motor disability in childhood (Pasquale J. Accardo, 2008; Sellier et al., 2016). The reported prevalence varies with time and geographical locations because the identified risk factors depend on the availability of prenatal, natal and postnatal care. The global prevalence is estimated at 2 per 1,000 live births (Gulati & Sondhi, 2018; Van Naarden Braun et al., 2016). In Africa, documented prevalence studies of paediatric cerebral palsy by Donald et al comprising of studies from Nigeria, South Africa, Ethiopia, Ghana, Tanzania, Egypt, and Kenya studies suggest a range of 2-10 per 1,000 children.

Describing the current trends in paediatric pattern of cerebral palsy will aid in prevention, early intervention, enhanced management and improved quality of life of the children. The aim of the study was to explore current pattern of clinical presentation of children with cerebral palsy at the CAMHSC, Yaba, Lagos, Nigeria.

2. METHODOLOGY

2.1 Study location

The research was carried out at the Child and Adolescent Mental Health Service (CAMHS) Centre of the Federal Neuro-Psychiatric hospital (FNPH), Yaba. It is a monospecialist psychiatric facility that caters to people in the South West region of Nigeria. Children below the age of 18 years are seen in this facility.

2.2 Study participants

Participants included children diagnosed with CP who attended outpatient clinics at CAMHS Oshodi, FNPH Annex, Yaba, within the age range of 6-18 years. Eligible children had documented motor impairments attributed to early brain disturbances and delayed motor milestones, excluding those with comorbid cardiorespiratory issues. Primary caregivers provided antenatal and perinatal histories and consented to participation.

2.3 Study procedure

A cross-sectional study design was used, with 75 participants determined using Kish's sample size formula. Recruitment of participants followed a total sampling technique. On each outpatient clinic day, the case notes of children who received a diagnosis of cerebral palsy were selected. The inclusion and the exclusion criteria were used to select the participants consecutively on these clinic days till the sample size was complete over the data collection period. The interviews were carried out on the clinic days in a consulting room on a one-on-one basis at the CAMHS Centre. The aim of the study was explained to the caregivers and informed consent was obtained from them. The caregiver filled the questionnaire for the child. Records of each interviewed participant was kept with the use of serial numbering as well as the hospital number so that no participant was selected more than once.

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2.4 Study instruments

The socio-demographic questionnaire was designed to show the socio-demographic characteristics of the participants. The child variables included the age, the gender, the educational level (class / school year), and ethnicity of the child. Developmental history included place and of delivery and gestational age at delivery.

The Gross Motor Function Classification System is a classification system designed in 1997 by Robert Palisano et al. (Physiopedia, 2021) used in children with CP to describe and classify their motor functions. It has 5 levels namely levels I-V. A higher level signifies a poorer functional ability. The themes of each level are Level I: Walks without Limitations, Level II: Walks with Limitations, Level III: Walks Using a Hand-Held Mobility Device, Level IV: Self-Mobility with Limitations; May Use Powered Mobility, and Level V: Transported in a Manual Wheelchair.

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), is the 2013 update of the Diagnostic and Statistical Manual of Mental Disorders. It is a clinical diagnostic tool published by the American Psychiatric Association (APA). The DSM-5 is a widely used diagnostic tool for psychiatric disorders. In this study, it was used to make a diagnosis of intellectual disability in children with CP. It makes the diagnosis of intellectual disability using three criteria of: significant limitations in intellectual abilities such as reasoning, problem-solving, abstract thinking, judgment, and academic learning; impairments in adaptive behavior that hinder the individual's capacity to meet age-appropriate social and cultural expectations for independence; and the presence of these deficits during the developmental period of childhood. It divides intellectual disability into four severity levels using the basis of their daily skills(Bowles, 2013).

The Children's Global Assessment Scale (CGAS) is a clinician-administered numerical tool designed to evaluate the general functioning of individuals under the age of 18 (Shaffer et al., 2013). In this study, CGAS was utilized to measure and compare the functional capacity of children with cerebral palsy against that of typically developing peers.

2.5 Ethical consideration

Ethical clearance was gotten from the Health Research and Ethics Committee of FNPH Yaba Lagos. Written Informed consent was taken from the caregivers after the details of the research was explained to them. An assent was gotten from the children below age of 18 who can understand the research process depending on the severity of their disabilities. Anonymity and confidentiality were assured. They were informed of their free will to participate or not to. The participants were also informed that there will be no monetary benefits for participating in the study and also that the study will add no additional financial burden on them.

2.6 Data analysis

Data obtained from the study was analysed using Statistical Package for the Social Sciences (SPSS) version 27. Descriptive statistics was used for variable analysis of the participants.

3. RESULTS AND DISCUSSION

A total 75 children were selected for this study. The demographic details of children who participated in the study are presented in table 1.The ages of the children ranged from 6-18 years with a mean age of 10.03 ± 3.37 years old. Most of the participants (64%) were school-aged children while 36% were adolescents and more than half (56%) of them were males. The children either had no formal education (76%) or were in primary school (24%).

Table 1: Socio-demographic characteristics of the children

Variable	n (%)
Age	
6 – 11	48 (64.0)
12 – 18	27 (36.0)
Gender	
Male	42 (56.0)
Female	33 (44.0)
Education	
No formal education	57 (76.0)
Playgroup	14 (18.7)
Primary	4 (5.3)
Secondary	0 (0.0)

Table 2 presents the clinical characteristics of the children in both groups. Preterm (10.7%) or postdate gestational age (2.6%) was seen amongst the children. Amongst the participants 62.7% were on antiepileptics, 9.3% were on antipsychotics, and 76% were on cognitive enhancers. Seizure disorder was a comorbidity in 49.3% and other psychiatric comorbidities were present in 6.7% of the participants in the study. The children in the study who had a psychiatric comorbidity all had the diagnosis of Attention Deficit Hyperactivity Disorder (ADHD). None of the participants had hearing nor visual impairment.

Table 2: Clinical characteristics of the children

Variable	Study n(%)
Gestational age	

Term	65(86.7)
Preterm	8(10.7)
Postdate	2(2.6)
Mode of delivery	
Spontaneous vertex delivery	64(85.4)
Caesarean section	10(13.3)
Assisted vaginal delivery	1(1.3)
Place of delivery	
Hospital	69(92.0)
Church	2(2.7)
Home	0(0)
Others	4(5.3)
Seizure disorder	
Yes	37(49.3)
No	38(50.7)
Antiepileptics	
Yes	47(62.7)
No	28(37.3)
Cognitive enhancers	
Yes	57(76.0)
No	18(24.0)
Antipsychotics	
Yes	7(9.3)
No	68(90.7)
Hearing/visual impairment	
Yes	0(0)
No	75(100.0)

Table 3 presents the classification of CP using severity of mobility and motor function (GMFCS). Spastic cerebral palsy was the most common type in 88% of the children. GMFCS level III and IV were the most common level of motor function seen in the children (22% respectively).

Table 3: Classification of cerebral palsy

Variable	N=75	%
Severity of mobility		
Spastic	66	88.0
Dyskinetic	7	9.3
Ataxic	2	2.7
Gross motor function classification system		
Level I	9	12.0
Level II	9	12.0
Level III	22	29.3
Level IV	22	29.3
Level V	13	17.4

The Children's global assessment scale was used to group the level of functioning of the children into ten (10) classes as shown in table 4. Lower levels of functioning was more frequent in children in the participants particularly 40-31 (22.7%) and 30-21 (21.3%). Only 2.7% of the children in the study group had good level of functioning. Table 5 shows the levels of intellectual disability in the children. Majority (97.3%) of the participants had intellectual disability.

Table 4: level of functioning of the children

Variable	N(%)

Children's global assessment of functioning	
100 – 91	2(2.7)
90 – 81	0 (0.0)
80 – 71	1 (1.3)
70 – 61	3 (4.0)
60 – 51	7 (9.3)
50 – 41	7 (9.3)
40 – 31	17(22.7)
30 – 21	16(21.3))
20 – 11	11(14.7)
10 – 1	11(14.7)

Table 5: intellectual disability in the children

Variable	N(%)
Intellectual disability	
no intellectual disability	2 (2.7)
mild intellectual disability	7 (9.3)
moderate intellectual disability	14(18.7)
severe intellectual disability	26(34.7)
profound intellectual disability	26(34.7)

The average age of the participants was 10.03 ± 3.37 years. The majority (64%) were school-aged (6-11 years), while 36% were adolescents. The finding of more school-aged children in this study is consistent with that of a large population study of 3,545 children in Sweden of children with CP aged 4 to 18 years with more of the participants aged 6 to 11 years (Kristoffersson et al., 2020). It is also similar to studies done in Nigeria among children with cerebral palsy aged 4 to 12 years which identified more children being in the school-age group (Ayanniyi & Abdulsalam, 2015; Y. K. S. Jibril et al., 2021). A reduction in clinic visits as children get older could explain the lower proportion of adolescents with CP in relation to pre-school-aged children in the study (Munyumu et al., 2018). Similarly, increased mortality in older adolescents with severe cerebral palsy may be a contributory factor.

There were more males than females in this study. Several studies in Nigeria also reported similar findings of more males than females with cerebral palsy (R. Duke et al., 2020; Y. K. S. Jibril et al., 2021; Margaret Bukola et al., 2022). Cerebral palsy and other neurodevelopmental disorders occur more commonly in males than females. Male gender had been consistently reported as a predisposing factor for neurodevelopmental disorders including cerebral palsy. The higher biological vulnerability related to the cerebral structure and genetic polymorphisms in males and the hormone protective role in females may explain role in the gender variation in cerebral palsy (Romeo et al., 2016).

More than two third (76%) of the children in this study had no formal education. A study done among 388 Nigerian children with CP aged 4 to 15 years reported about two third of the children with no formal education (R. E. Duke et al., 2021). The dearth of special education and self-contained classroom services for these children in Nigeria are possible reasons for the lack of formal education. Special education services with specific resources and teaching materials are vital for children with CP for the needed help and attention.

Almost all the participants in the current study were found to be below the expected academic grade for the respective age. A lower mental age in comparison to chronological age is a determinant of intellectual disability. The common co-occurrence of learning disorders and intellectual disability in cerebral palsy could explain the lower than expected academic performance in the children.

In this study, a lower proportion of the children were product of preterm gestation (10.7%), emergency caesarean section (13.3%), and born in places other than hospitals (8.0%). These findings are similar to that of a study done to determine the clinical profile of children with CP in Benin Republic, a low-income country in West African that reported a lower proportion of deliveries of the children were born preterm, in places other than hospitals and via emergency caesarean section (Sogbossi et al., 2019). Although preterm delivery and emergency caesarean section have been identified as

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contributing factors for cerebral palsy, a higher proportion of children with cerebral palsy have been documented to be products of term spontaneous vertex delivery (Abd Elmagid & Magdy, 2021; Y. Jibril et al., 2021).
The comorbidities identified in this study were seizure disorder and intellectual disability. There are studies that support the evidence that seizure disorder and intellectual disability are common comorbidities seen in children with CP (R. E. Duke et al., 2021; Gabriel-Job et al., 2022).
Medications used by the study participants include anti-epileptics, antipsychotics, and cognitive enhancers. Anti-epileptics have been identified as the drug of choice for the management of seizure disorders which commonly co-occur in those children. There has also been growing evidence that cognitive enhancers have potential benefits of cognitive stimulation in children with neurodevelopmental disorders (Phillips & Robinson, 2017). In keeping with the use of antipsychotics by the children with CP in this study, a systematic review by Loy et al. (Loy et al., 2018) evaluated the effects and safety of antipsychotics in treating behavioural problems in children; it was reported that atypical antipsychotics can reduce aggression and behavioural challenges in children with CP (Loy et al., 2018).
Spastic cerebral palsy was identified as the most common subtype among participants in the study constituting 88%. This reflects reports by most studies however in different frequencies (R. E. Duke et al., 2021; Y. Jibril et al., 2021; Olagunju et al., 2018). With respect to the severity of cerebral palsy, this study reported more (46.7%) children with severe GMFCS levels (IV and V). Studies done in school settings usually report children with less severe GMFCS levels than those in rehabilitation homes or specialist clinics (Iloeje & Ogoke, 2017; Sogbossi et al., 2019).
The study showed that most children with CP had low Global Assessment of Functioning scores as they had major impairments in several areas of function. Functioning is relative to the intellectual ability of an individual hence, with the reported level of functioning, majority of the respondents had severe and profound intellectual disability.
One notable limitation of this study is use of a self-reported questionnaire and hence could be prone to recall bias by the caregivers. The study however presents the current trends in the clinical profile of paediatric cerebral palsy.

CONCLUSION

The study reinforces that CP remains more prevalent among males, with spastic CP as the dominant subtype. Comorbid disorders such as epilepsy and intellectual disability are widespread, contributing to reduced functional independence. Strengthening maternal and child healthcare, early intervention activities, and special education services is essential to improve outcomes for children diagnosed with CP in developing countries

CONSENT

All authors declare that informed consent was obtained from the participants for this study.

ETHICAL APPROVAL

All authors declare that the approval for this work was gotten from the health research and ethics committee of the institution.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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