

## Pattern of Presentation and Physiotherapy Approach to Management of Children with Cerebral Palsy at Public Hospitals in Ibadan, Nigeria

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### Abstract

#### Introduction

Children with Cerebral Palsy (CP) require physiotherapy as part of their habilitation programme. Given scarcity of physiotherapy clinical guidelines for managing CP in Nigeria, it is probable that physiotherapists would adopt management approaches based on individual preferences. The commonly used management approaches by physiotherapists at two purposively selected public-funded hospitals in Ibadan, Nigeria were documented in this retrospective study.

#### Methods

Information was methodically extracted from the clinic records of children with CP managed over a 5-year period. They include: information concerning the clinical diagnosis; physiotherapy management approach such as techniques, assessment and discharge practice. Data were analysed using descriptive statistics.

#### Results

Six hundred and ten (610) case files were retrieved. The spastic type of CP was the most prevalent (n = 214; 35.1%); conventional physiotherapy treatment (n = 344; 56.4%); neurodevelopmental technique (n=185; 30.3%); and the proprioceptive neuromuscular facilitation (n=81; 13.3%) were the treatment approaches. Home programmes were prescribed for the majority (n =520; 85.2%); 555 (90.0%) were not formally discharged; many (n=409; 67.0%) were not reassessed in the course of receiving physiotherapy and those reassessed were done without the use of a standardized outcome measure.

#### Conclusion

Importance of physiotherapy practice guideline in CP is underscored by this report.

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**Keywords:** Pattern, Presentation, Physiotherapy Management, Cerebral Palsy

## Introduction

Cerebral Palsy (CP) is a common paediatric condition that present with disturbance in motor performance as well as impairment of sensory and behavioural pattern of the affected child.[1] The condition results from a damage to an immature brain pre-, peri-, or ante-natal leading to pathological features including muscle incoordination and abnormal body movement, in the face of static pathophysiology.[2] Cerebral palsy is regarded as one of the major causes of childhood disabilities both in developed and developing countries.[3] It is the most common paediatric neurological disorder accounting for 50.3% of cases presented in the clinics in south-western Nigeria and also in Taiwan where a peak prevalence of 2.8 per 1000 children was recorded.[4.5] It was observed to be commonest paediatric neurological condition after seizure disorder in Ibadan [6] and Port Harcourt, Nigeria.[7] Findings also reported that cerebral palsy accounted for almost half (46.3%) of all new cases of paediatric conditions referred for physiotherapy in the University College Hospital, Ibadan, between 2002 and 2004. [8]

Management of CP requires a multidisciplinary approach,[9] where physiotherapy has been described as the mainstay of the treatment.[10] The role of physiotherapy covers helping the affected children with maximizing their motor function ability and thereby enhancing activity participation and health related quality of life. The physical approaches used in physiotherapy helps to promote, maintain and restore physical functioning, independence and participation.[11] Despite the crucial role of physiotherapy in the management of children with CP in Nigeria, standardized protocols or updated guidelines seem to be lacking.[5] It is probable therefore that the physiotherapists managing children with CP would adopt management approaches based on their individual preferences,

especially when working at health centers without established practice guidelines. Such guideline is scarce in physiotherapy clinics of public funded hospitals in Nigeria. The objective of this pilot study was to document the management approach commonly used by the physiotherapists managing children at the physiotherapy units of purposively selected public-funded hospitals in Ibadan, Nigeria.

## Methods

This was a retrospective survey. The instrument used for data gathering was a Microsoft Words format form specifically designed for the purpose of this study. Information was methodically extracted from the clinic records of children with CP managed at the paediatric physiotherapy units of two public funded health facilities namely the University College Hospital - a tertiary hospital and Oni and Sons Memorial Children Hospital - a specialist hospital. These health facilities were the referral centres for paediatric conditions in Ibadan, one of the largest cities in West Africa. Approval of the UI/UCH Ethics Committee (NHREC/05/01/2008a) was obtained in addition to administrative permission from the relevant authorities in charge of the hospitals to access the required information.

There was no interview or direct interfacing with the physiotherapists working in these hospitals. All cases of cerebral palsy managed by physiotherapy over a five-year period (January 2016 and December 2020) were identified from the health records office of the respective physiotherapy unit. The retrieved records (case files) were reviewed to extract the relevant information which were then entered into a purposely designed spread sheet. The information obtained include the following: (a). Information concerning the children with CP (age, sex, type of cerebral palsy, mode of delivery, immunization history, associated clinical problems with the cerebral palsy, parent marital status, relationship of the informal caregivers to the child);

(b) Referral pattern and attendance at the physiotherapy clinics (date of referral to; and date of first presentation at physiotherapy clinic, date of commencement of physiotherapy treatment); (c) Physiotherapy management approach (Plans and goals of treatment indicated; treatment approach; clinic appointment pattern; home programme prescription; how often cases were reviewed and discharge method).

### Data Analysis

Data were entered using IBM-SPSS (Statistical Package for Social Science) version 22.0 software. Mean, standard deviation, frequency percentages were calculated and used to present the socio-demographic data and clinical information of the patients. Data on plans of treatment and goals of treatment indicated was analysed according to outlined themes.

### Results

A total of 610 case files of children with cerebral palsy were retrieved comprising 262 (43.0%) from the University College Hospital, and 348 (57.0%) from the Oni and Sons Memorial Children Hospital. The mean age of the children was  $25.9 \pm 28.6$  months and their biological mothers accounted for 539 (88.4%) of the informal caregivers (Table 1).

**Table 1. Socio-Demographic Characteristics of Children with Cerebral Palsy (N = 610)**

Variable	Frequency (n)	Percentage (%)
<b>Age (months)</b>		
≤9	165	27.1
10-19	215	35.2
20-29	80	13.1
30-39	43	7.1
40-49	27	4.4
50-59	8	1.3
≥60	72	11.8
<b>Sex</b>		
Male	355	58.2
Female	255	41.8
<b>Position of Child in the Family</b>		
First	271	44.4
Second	155	25.4
Third	92	15.1
Fourth	55	9
Fifth	17	2.8
Sixth	5	0.8
N/I	15	2.5
<b>Source of History</b>		
Mothers	519	85.1
Fathers	28	4.6
Parents	31	5.1
Grandmothers	29	4.7
Aunts	3	0.5
<b>Parents' Marital Status</b>		
Married	590	96.7
Widowed	5	0.8
Divorced	8	1.3
N/I	7	1.2

N/I: Not Indicated

The clinical information on the children is presented in Table 2. The commonest identified type of CP based on classification according to motor function disorder is the spastic type (35.1%; n = 214), while the commonest type (n = 122; 20.0%) of CP based on topography is the quadriparetic type. Majority (n=140; 23.0%) had seizure disorder as the associated problem and nearly three-quarters (n = 444; 72.8%) had completed their immunization against childhood killer diseases.

**Table 2. Clinical Profile of Children with Cerebral Palsy (N = 610)**

Variable	(n)	(%)
<b>Mode of Delivery</b>		
SVD	458	75.1
CS	123	20.2
N/I	29	4.8
<b>Immunization History</b>		
Not Completed	444	72.8
Completed	119	19.5
N/I	47	7.7
<b>Classification according to motor function disorder</b>		
Spastic	214	35.1
Athetoid	14	2.3
Mixed	9	1.5
Dyskinetic	15	2.4
Unspecified	358	58.7
<b>Classification according to topography affectation</b>		
Quadripareisis	122	20
Quadriplegic	36	5.9
Diplegic	33	5.4
Hemiplegic	26	4.3
Unspecified	393	64.4
<b>Risk Factors</b>		
Birth Asphyxia	334	54.8
NJ	182	29.8
Birth Asphyxia & NJ	12	1.9
Meningitis	7	1.2
Others	75	12.3
<b>Associated Problems</b>		
<b>Seizure</b>		
Measles	140	23
Intellectual Problem	19	3.1
Cerebral Malaria	9	1.5
Fever	17	2.8
Speech Difficulty	39	6.4
N/I	21	3.4
N/I	365	59.8

SVD: Spontaneous Vaginal Delivery, CS: Caesarean Section, NJ: Neonatal Jaundice, N/I: Not Indicated

**Table 3. Management Pattern of Children with CP seen between 2016 and 2020 (N = 610)**

Variable	(n)	%
<b>Time difference between Referral and Presentation at Physiotherapy</b>		
Same Day	8	8.8
1-3 Days	1	1.1
4-7 Days	14	15.4
8-13 Days	16	17.6
14-27 Days	20	21.9
1-2 Months	19	20.9
2-4 Months	4	4.4
>4 Months	9	9.9
<b>Time difference between Presentation &amp; Commencement of Treatment</b>		
Same Day	329	53.9
1-3 Days	20	3.3
4-7 Days	89	14.6
8-13 Days	79	13
14-27 Days	73	11.9
1-2 Months	14	2.3
2-4 Months	4	0.7
>4 Months	2	0.3
<b>Treatment Approach</b>		
CT	344	56.4
NDT	185	30.3
PNF	81	13.3
<b>Home Programme Prescription</b>		
Yes	520	85.2
No	90	14.8
<b>Discharge Pattern</b>		
Self-discharged	555	90
PT-discharged	1	0.2
Attending	54	8.9
<b>WBCPT</b>		
Mothers	539	88.4
Fathers	33	5.4
Grandmothers	28	4.6
Aunts	10	1.6
<b>Review Pattern</b>		
Not Reviewed	409	67
Yearly	148	24.3
Bi-Annual	44	7.2
Quarterly	9	1.5
<b>SOM use for Review</b>		
Yes	0	0
No	610	100

CT: Conventional Physiotherapy, Treatment:  
 NDT: Neuro Developmental Therapy,PNF:  
 ProprioceptiveNeuromuscular Facilitation,PT:  
 Physiotherapist; WBCPT: Who Brought the Child for  
 Physiotherapy Treatment,SOM for Review: Standardized  
 outcome measure use for review

Table 3 shows that the children with CP reported to physiotherapy clinics between two weeks (n = 20; 21.9%) to 8 weeks (n = 19; 20.9%) of their date of referral by the physicians. More than half (n = 329; 53.9%) commenced physiotherapy treatment session on the same day of first presentation at the physiotherapy unit. It was observed that the children were managed using conventional physiotherapy treatment (n = 344; 56.4%); neurodevelopmental technique (n=185; 30.3%);

and the principle of proprioceptive neuromuscular facilitation (n=81; 13.3%) as an additional treatment approach respectively. The attending physiotherapists prescribed home programs for the majority (n =520; 85.2%) and 555 (90.0%) of the children were not documented to be discharged by the physiotherapists. The records showed that the physiotherapists reviewed only 9 (1.5%) of the cases at a time interval (quarterly) while many (n=409; 67.0%) were not reviewed at all in the course of receiving physiotherapy care. None of the children was assessed or reviewed using a standardized outcome measure. The summary of the themes and sub-themes of plans of treatment is shown in Table 4.

Table 4. Themes and sub-themes generated from the plan of treatment

S/N	Themes	Sub-themes
1	To educate mother about child’s condition	Carry out home programme prescription and need for regular
2	To relieve pain	
3	To habilitate child on developmental milestones	Train head and neck control and trunk control
4	To strengthen weak muscles	Passive movement
5	To reduce spasticity	Positioning
6	To stretch tight structures	Reduce contracture
7	To preserve physiological properties of muscles	Prevent atrophy
8	To correct deformity	Prevent further musculoskeletal complications

## Discussion

This study was carried out to review the five year (2016-2020) management approach of cerebral palsy by physiotherapists at two purposively selected public funded hospitals in Ibadan, Nigeria. Majority of the children were males, the gender considered to be a risk factor associated with cerebral palsy.[12] This finding aligns with previous reports that indicated a preponderance of male children with CP in our locality. [13,14,15] The result in this study revealed that almost all the parents of the children were married which may have positive outcomes on management of the children.

However, caring for these children may be putting a strain on the family, especially the mothers who had reportedly lacked support from their family as well as their husbands, in whose hands they suffer domestic violence.[16] Majority of the children with CP were normally brought for physiotherapy treatment by their biological mothers who were also their informal caregivers. It has been opined that the trend of biological mothers constituting the majority of the caregivers for children with cerebral palsy might be a reflection of the traditional roles assigned women in the care of children in this African community.[8]

It is pertinent to note that irrespective of the health status of such children, mothers are generally role-assigned to take charge of day to day caring for their children while fathers are regarded as the bread winners in many family settings. It may also be a reflection of low involvement of the fathers in providing caregiving for these children with cerebral palsy.[4,17,18,19]

It was observed that majority of the children had completed all their courses of immunization against early childhood killer diseases. Although this was a physiotherapy clinic-based study, the fact that all the children had completed their immunization may be an indication of what would be obtainable in the larger society. The increased awareness on immunization in the eradication of childhood diseases in Nigeria,[20] could have accounted for this observation. However, the finding of the present study contrasts with the earlier report in Australia which reported high risks of delayed or non-immunization among children with CP.[21] Based on motor function disorder description, the most common type of CP was the spastic type while distribution based on paralysis showed majority to be quadriplegic, although the reviewed clinical records in this study did not indicate the type for a significant proportion. This is in consonance with previous reports that the spastic and the quadriplegic type was the most observed types based on motor function disorder and topography of affectation respectively.[4,13,14,23] This means spastic quadriplegia was the dominant clinical presentation in paediatric physiotherapy clinics in this study. Perinatal events such as birth asphyxia and neonatal jaundice were the leading risk factors of CP among the cases reviewed in this study. Birth asphyxia has been noted as the common risk factor associated with cerebral palsy.[22] Coincidentally, this is also the most common risk factor reported for neurological damage among children in Nigeria.[24] This could explain the high incidence of the spastic quadriplegic type of CP.

In addition perinatal asphyxia was significantly associated with spastic quadriplegia as a common risk factor.[22, 25]

A considerable time lag between the time of referral and first presentation of the children at the physiotherapy units was observed in this study. This interval may be due to factors such as time availability constraint, financial limitation, and the caregivers taking time out to consider other treatment options including alternative medicine, traditional healers and spiritual centres. Poverty, stigmatization and non-inclusive public policy were identified as factors creating a burden for the CP caregivers in India, such burden may cause delay in taking their children to receive appropriate medical attention including physiotherapy. [26] Instructively, a significant proportion of the children commenced physiotherapy treatment on the first day of reporting at the physiotherapy unit. This finding is consistent with recommended best practices in cerebral palsy rehabilitation whereby prompt commencement of physiotherapy services is indicated for the children to optimize rehabilitation. Some studies had observed that early intervention services aimed at reducing physical impairments engenders the highest possible functioning in the community among children with cerebral palsy.[27,28]

The specific treatment approach used by the physiotherapists appeared to be dependent on clinical attribute like the age of the child, the developmental milestone already attained, the presenting complaints and functional limitation of the child. The most observed treatment approach under study was conventional physiotherapy treatments which include passive mobilization followed by neurodevelopmental therapy. It had been reported that the frequent physical treatment approach used in physiotherapy paediatric units entailed passive mobilization, range of motion exercises, strengthening exercises and neurodevelopmental technique (NDT) to stimulate the central nervous system in order to improve coordination,

balance and to establish normal patterns of movement.[29] The frequently documented treatment plans by the Physiotherapists in this study include: *“to educate caregivers about the child’s condition and the need for regular physiotherapy treatment”*; *“to explain and emphasize the importance of carrying out home programmes”*; *“to reduce spasticity and stretch tight structures”*; *“to strengthen weak muscles, preserve physiological properties of muscle and to correct deformities”*. The most common documented goal was *“to ensure mobility independence”*.

Home programme was prescribed for the children by a significant majority of the physiotherapists. Home programme are usually a battery of individualised treatment activities designed for a child with conditions such as CP and taught to parents or informal caregivers to be administered on the child at home. The objective is to complement the clinician administered therapies that are aimed at improving gross motor skills, self-care abilities, behaviour and communication by the child.[30] It is a practice that is particularly useful because it improves the chances of achieving the desired outcomes in CP care.[31]

Children with CP typically receive physiotherapy care, as part of their habilitation intervention over several months or years, depending on severity. This long term engagement with the patients would necessitate the physiotherapy regularly re-evaluating effectiveness of their interventions. It was observed in this study that the physiotherapists were not regularly re-evaluating the clinical status of the children which could have enabled them to determine whether or not the children were making clinical improvements. More than two-thirds of the children were never re-evaluated in the course of physiotherapy intervention and only very few got their cases re-evaluated quarterly. This observed poor pattern of patients’ reassessment may however be a result of poor medical records keeping culture among the physiotherapists.

A similar pattern of poor record keeping in physiotherapy was observed in the report from a 5-year review of acute flaccid paralysis at the physiotherapy unit of the University College Hospital Ibadan,[32] which is one of the study centres of this present study. Utilization of standardized treatment outcome measures is widely recognized in clinical practice guideline including physiotherapy. Information obtained from this study showed that none of the patients were assessed or reviewed using a standardized outcome measure. This could have impacted negatively on objective assessment and re-evaluation of the effectiveness of physiotherapy intervention with the children. In contrast, a study to determine the physiotherapy management of CP in public hospitals of KwaZulu-Natal, South Africa,[33] reported that 25 (34.7%) of the physiotherapists used outcome measures to evaluate their cerebral palsy management. [33] In a survey to determine the levels of familiarity, knowledge and utilization of 16 selected standardized outcome measures among physiotherapists in Nigeria, it was reported that the physiotherapists had poor knowledge, seldom utilized, and were unfamiliar with the 16 instruments.[34] In a more recent study on the use of standardized outcome measures in managing cerebral palsy in Nigeria, it was noted that although many physiotherapists surveyed identified the standardized outcome measures for the disorder, fewer used them and that the usage did not follow any pattern along the educational status and work experience of the physiotherapists.[35]

## Conclusion

The study documented the pattern of cerebral palsy in the two public funded hospitals in Ibadan Nigeria and the physiotherapy approach to care. The pattern of the cerebral palsy was not significantly different from what had been earlier reported, the need for physiotherapy practice guideline and better clinical practice including clinical information documentation were underscored by this study.

### Authors' contribution

All authors were involved in the conceptualisation of this research work. OO coordinated the data collection. All authors were involved in the interpreting the results while MBF and TKH prepared the draft manuscript. All authors approved of the final draft manuscript for submission to the journal.

### Conflict of interest declaration

We declare that there is no conflict of interest in this study.

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