Original Article

PROFILE OF CHILDREN WITH CEREBRAL PALSY ATTENDING ABUBAKAR TAFAWA BALEWA UNIVERSITY TEACHING HOSPITAL PHYSIOTHERAPY OUT-PATIENT CLINIC

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Abstract

Background: Cerebral Palsy (CP) is a non-progressive developmental movement and posture disorder that occurs during foetal or infant development. CP has been said to be due to a broad group of developmental, genetic, metabolic, ischaemic, infectious and other acquired aetiologies that produce a common group of neurological manifestation.

Objective: To describe the clinical profile of children with CP attending Physiotherapy out-patient clinics in Abubakar Tafawa Balewa University Teaching Hospital, Bauchi, Nigeria.

Materials and Methods: This descriptive study was conducted over a period of 6 months from November 2019 to April, 2020 and involved the use of data collection form to obtain participant demographic and clinical variables and caregiver's socio-demography. A consecutive sampling technique was used to recruit the participant. The data obtained from the study was analysed using Microsoft Excel 2013 and SPSS v20 using descriptive statistics of frequency and percentage and inferential statistics of Chi-square or Fisher exact.

Results: A total of 45 participants were recruited over the study period. Majority of the participant aged below 2 years and that Male (68.9%) predominated in the study. Spastic and quadriplegic type of cerebral palsy are the commonest cerebral palsy seen based on motor and topographical classification respectively. Jaundice and asphyxia were the commonest underlying causes of CP cerebral palsy cases found. Half of the participants have one or more associated comorbidity. There was a significant association between motor classification and causes of cerebral palsy (P<0.05).

Conclusion: The most common cause of Cerebral palsy in Bauchi include Jaundice and asphyxia. Spastic cerebral palsy was the predominant motor type of CP while quadriplegia was the most common topographic type noted. Place of delivery, mode of delivery and the social status of the mother are not associated with the type of cerebral palsy in the children.

Keywords: Cerebral Palsy, Clinical Variables, Demographic Variables, Physiotherapy.

INTRODUCTION

Cerebral Palsy (CP) is a non-progressive developmental movement and posture disorder that occurs during foetal or infant development.[1] CP has been said to be due to a broad group of developmental, genetic, metabolic, ischaemic, infectious and other acquired aetiologies that produce a common group of neurological manifestation.[2]

Cerebral palsy is the leading cause of childhood neurodisability in Nigeria[3] and in the United State of America.[4]

The exact cause of CP is not known yet, however, a group of risk factors has been identified.[5,6] Premature birth, especially before 28 weeks of gestation, is the leading risk

factor for the development of CP.[7] The birth prevalence of CP is far higher in preterm than in term infants, increases with decreasing gestational age at delivery,[8-10] and can reach up to 15% among preterm neonates who were born between 24 and 27 weeks of gestation.[10]

Birth asphyxia, jaundice and infection have been reported to be the leading causes of CP,[11,12] and maternal infection has been identified as a major risk factor for CP.[13] Furthermore, seizure and mental retardation have been found to be predominant co-morbidities for CP as reported by different authors. Ogunlesi et al explained that the factors responsible for the differences observed in the distribution of different specific co-morbidities in different places is difficult to explain.[11] However, to our knowledge, there has never been a study on children with CP Bauchi state, Nigeria. Therefore, this study aims to describe the profile of children with cerebral palsy attending Physiotherapy out-patient clinics in Abubakar Tafawa Balewa University Teaching Hospital, Bauchi, Nigeria.

MATERIALS AND METHODS
The participants in this study were children with cerebral palsy attending Physiotherapy out-patient clinics in Abubakar Tafawa Balewa University Teaching Hospital, Bauchi, Nigeria.

Inclusion Criteria
 a) Children whose parents gave consent were included in this study.
 b) Children aged twelve years and below with cerebral palsy.

Exclusion Criterion
Eligible children whose mother was not available during the period of data collection and those whose parents did not give consent.

A data collection form was used to gather socio-demographic information of the children, such as age, gender, type of CP, topography of CP, co-morbidities associated with CP, causes of CP, birth position of children with CP, and socio-demographic information of their informal caregivers such as age, gender, occupation, age of mother at gestation, place of delivery and type of delivery process.

This was a descriptive cross-sectional survey which was conducted over a period of 6 months from 1st November 2019 to 30th April, 2020.

Consecutive sampling technique, in which participants who met the inclusion criteria are selected as they become available for the study was used.

Ethical approval was sought and obtained from the Research and Ethics Committee of the Abubakar Tafawa Balewa University Teaching Hospital Bauchi state. The study was conducted prospectively and participants were recruited from the above-mentioned clinic. The nature, purpose and procedure of the study was explained to the parents of the involved children in details and they were assured of confidentiality of the information gathered from them before the commencement of the study. The recruitment was restricted to the children with CP accompanied by their mothers who were attending the physiotherapy clinic at the period of study. Clinical characteristics of the children such as diagnosis, age, co-morbidities, types of CP and topography of CP and demographic information of the mother such as age at pregnancy and mode of delivery were also captured.

DATA ANALYSIS
Data will be analysed using Microsoft Excel 2013 and SPSS 20.0 version software and summarized using a descriptive statistic of frequency, percentage and charts. Inferential statistics of chi-square will be used to determine association among motor classification of cerebral palsy, maternal characteristics and type of cerebral palsy. Probability level was set at 0.05

RESULTS
Demographic characteristics of the participants
The study recruited 45 participants within the study period and all of them were considered. Their age ranged from 2 months to 168 months (14 years) with a mean± standard deviation (months) age of 30.76±39.87. Majority; 30 (66.7%) of them were <2 years of age, 6 (13.3%) were within the age range of 2-4 years, 5 (11.1%) were within the age range of 4-6 years while 4 (8.9%) aged above 6. There were 31 (68.9%) males and 14 (31.1%) female with a male: female ratio of 2: 1. With respect to position in birth order, first born children were predominant in the population of children with CP as shown in table 1.

Table 1: demographic characteristics of the participants

Variables	Frequency	Percentage
Age range (months) 2-168		
Mean age± standard deviation (month) 30.76±39.87		
Age category		
<2 years	30	66.7
2-4 years	6	13.3
4-6years	5	11.1
>6 years	4	8.9
Gender		
Male	31	68.9
Female	14	31.1
Birth order		
1	21	46.7
2	7	15.6
3	2	4.4
4	1	2.2
5	4	8.9
6	4	8.9
7	3	6.7
8	1	2.2
9	2	4.4

Demographic Characteristics of the Participant's Caregiver

The caregivers of children with cerebral palsy enrolled in this study comprised 3 (6.7%) males and 42 (93.3%) females (Table 2). Of the age range of the informal caregivers, 19 (42.2%) which are the majority are within the age range of 20-25; 15 of them (33.3%) are above the age of 30; 9 caregivers (20%) were within the age range of 25-30 and only 2 (4.4%) were below the age of 20. Most of these children with CP 28 (62.2%) were born in hospital; 9(20%) were born at home and in 8 (17.8%) of them, the delivery was assisted by traditional birth assistant. For the mode of delivery, the highest number of the participant 41 (91.1%) were born through spontaneous vaginal delivery, 3 (6.7%) were delivered through assisted form of delivery and only 1 (2.2%) was delivered through emergency Caesarean section. Analysis revealed that only 6 (13.3%) of the participant were born in a high-income family, 20 (44.4%) were from medium income and the remaining 19 (42.2%low income family respectively.

Table 2: Demographic characteristics of the participant's caregiver

Variables	Frequency	Percentage
Caregivers Gender		
Male	3	6.7
Female	42	93.3
Caregivers Age		
<20	2	4.4
20-25	19	42.2
25-30	9	20.0
>30	15	33.3
Place of Delivery		
Hospital	28	62.2
Traditional birth assistant	8	17.8
Home	9	20.0
Mode of Delivery		
Spontaneous vaginal delivery	41	91.1
Emergency Caesarean section	1	2.2
Assisted delivery	3	6.7
Social income		
Low income	19	42.2
Medium income	20	44.4
High income	6	13.3

Types of Cerebral Palsy

Most of the children; 32 (71.1%) has spastic cerebral palsy and just 3 (26.7%) had hypotonic cerebral palsy. Based on topographical classification, quadriplegic cerebral palsy 33 (73.3%) is the most common type of cerebral palsy seen in this study, followed by diplegic 6 (13.3%) while the number of hemiplegic cases equal that of monoplegic cases 3 (6.7%) as can be deduced from table 3.

Table 3: Types of cerebral palsy

Variables	Frequency	Percentage
Motor classification		
Spastic	32	71.1
Hypotonic	3	6.7
Ataxic	5	11.1
Mixed	5	11.1
Topography		
Diplegic	6	13.3
Hemiplegic	3	6.7
Monoplegic	3	6.7
Quadriplegic	33	73.3

Causes of Cerebral Palsy

Figure 1 showed that jaundice and asphyxia accounted for the highest number (46.7% and 37.8% respectively) of cases and traumatic incident and preterm delivery (2.2% each) were the least.
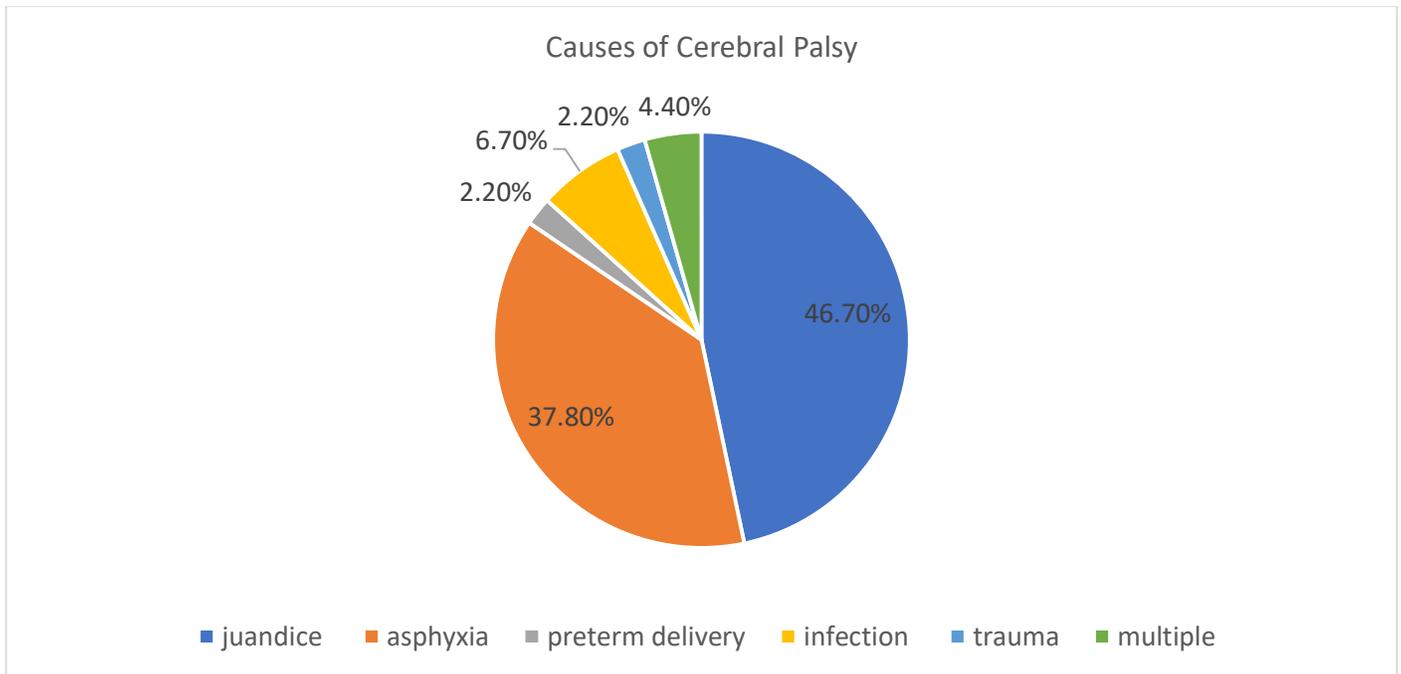
Causes of Cerebral Palsy

Figure 1: Causes of Cerebral Palsy

Associated Comorbidities
The co-morbidities associated with CP are shown in figure 2. Only about half (49.9%) of the children did not have any other impairment co-existing with CP. Beside the 2 (8.7%) of the participants that are had more than one comorbidity, of which one of the two had 4 different comorbidities, all the rest had only one associated conditions each, with speech impairment (39.1%) being the highest reported associated condition and sensory deficit being the least (4.3%).
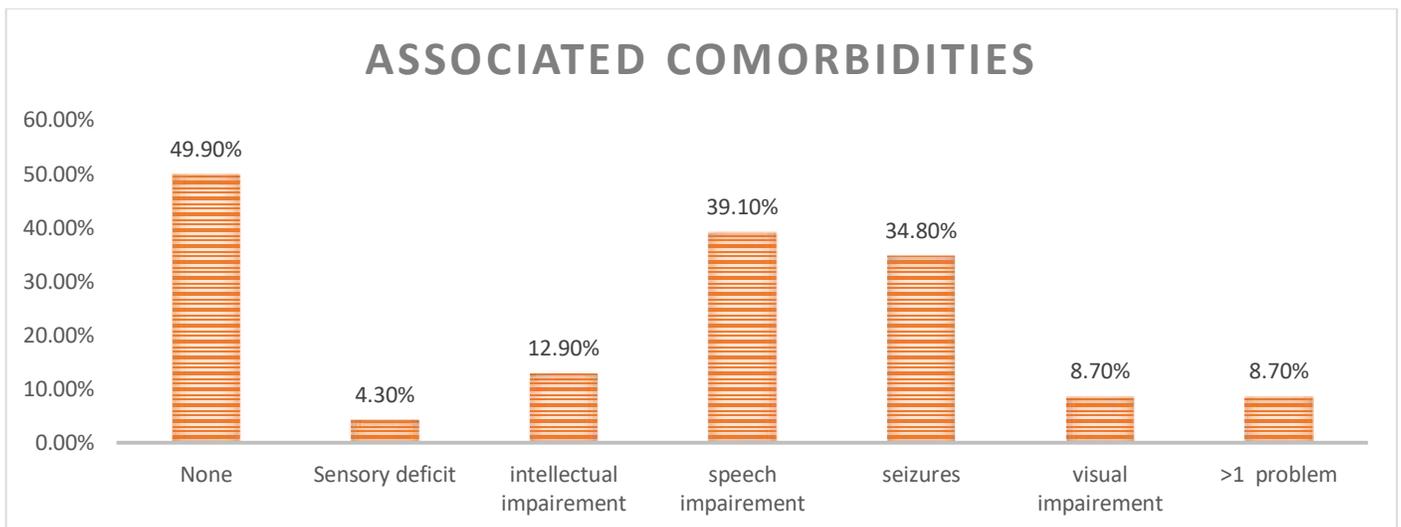

Figure 2: Associated comorbidities

Association between Type of CP and Causes of CP
Table 4 showed significant association between motor classification of CP and the causes of cerebral palsy (P<0.05) but no significant association was seen between topographical classification of CP and its causes (P>0.05). This implied that a cause of cerebral palsy determines which type of cerebral palsy a child is going to present with.

Table 4: Association between type of CP and causes of CP

Variables	causes of CP					X^2/exact	P-value
	Jaundice	Asphyxia	Preterm	Infection	Trauma		
Motor						27.4	.006*
Spastic	14	15	0	3	0		
Hypotonic	0	1	1	0	1		
Ataxic	3	1	0	0	0		
Mixed	4	0	0	3	1		
Total	21	17	1	3	1		
Topography						18.0	.342
Monoplegic	1	2	0	0	0		
Diplegic	2	2	0	1	1		
Hemiplegic	2	0	0	1	0		
Quadriplegic	16	13	1	1	0		
Total	21	17	1	3	1		

Association between some maternal factors and type of CP

There was no significant association between any maternal factors and motor classification of CP (P>0.05) as shown in table 5. Likewise, no significant association was found between any of maternal factors and topographical classification of CP (P>0.05) as shown in table 6. This meant that maternal factors such as place of delivery, mode of delivery and socio-economic status of the mother does not influence the type of cerebral palsy a child is going to present.

Table 5: Association between some maternal factors and motor classification of CP

Variables	type of CP				X2/exact	p-value
	Spastic	Hypotonic	Ataxic	Mixed		
Place of delivery					10.0	.06
Hospital	23	2	2	1		
Traditional	6	0	1	1		
Home	3	1	2	3		
Total	32	3	5	5		
Mode of delivery					3.7	1.00
SVD	28	3	5	5		
Emergency CS	1	0	0	0		
Assisted	3	0	0	0		
Total	32	3	5	5		
Social income					6.0	.37
Low	13	0	3	3		
Middle	15	3	1	1		
High	4	0	1	1		
Total	32	3	5	5		

Table 6: Association between some maternal factors and topographic classification of CP

Variables	type of CP				X2/exact	p-value
	Diplegic	Hemiplegic	Monoplegic	Quadriplegic		
Place of delivery					3.1	.39
Hospital	4	2	1	21		
Traditional	1	0	1	6		
Home	1	1	1	6		
Total	6	3	3	33		
Mode of delivery					7.2	.40
SVD	5	3	3	30		
Emergency CS	1	0	0	0		
Assisted	0	0	0	3		
Total	6	3	3	33		
Social income					2.9	.94
Low	2	2	1	14		
Middle	3	1	1	15		
High	1	0	1	4		
Total	6	3	3	33		

DISCUSSION

Demographic Characteristics of the Participants

Male children with CP predominated the study. This was in tandem with previous findings.[12,14,19-21] However, Buljina et al, reported an insignificant gender difference in children with CP in their study.[23] Mothers constitute three-quarters of the caregivers in the sample thus suggesting that the role of caregiving for children with CP in the setting where the study was conducted was mainly carried out by women. This observation is in consonance with that of Hamzat and Mordi in a Nigerian study. These authors found that female caregivers for children with cerebral palsy were more common than the male caregivers.[24] However, Basaran et al reported more male caregivers than female in his study thus indicating that males also play a significant role in caring for children with cerebral palsy.[25]

Despite the fact that no socio-economic class was spared, most of the children with CP were in lower and middle class. This is similar to previous reports from developing countries.[11,19,26] These are children whose mother were likely to have missed antenatal care, delivered at home and would not have taken their children to a health facility if they had medical problem. The triad of poverty, ignorance and disease would have played an important role in this finding.

Birth Order of Children with Cerebral Palsy

The role of birth order in the aetiology of CP is not clear. Many of the children in this study were in first to third born position in the family. This range of birth order does not fall within the high parity range that has been implicated as a probable cause of CP.[27] According to Cummins et al,[27] high parity is a risk factor for CP and not low parity as witnessed in the present study. However, this finding is consistent with that of Ogunlesi et al, who implicated poor maternal health care during pregnancy and after delivery as a possible reason for high cases of CP in low parity children.[11]

Types of Cerebral Palsy

The participants in this study comprised 45 caregivers and their 45 children with cerebral palsy. Nearly three quarters of the children had the spastic type of CP based on motor classification approach of assessing muscle tone. This finding is in line with pattern that was reported in previous Nigerian studies[11,12,14,15] and elsewhere[16,17] that the most common sub-type of CP is the spastic type. Using topographic classification, children with quadriplegia

were more than those in other topography classification, which is consistent with findings in some earlier studies.[11,14,18,19] However, this finding is at variance with some researchers who reported a predominance of diplegic affectation among children with cerebral palsy,[20] as well as in Emeka et al where hemiplegic was reported to be commonest.[15]

Reported Causes of Cerebral Palsy

Perinatal events (jaundice and asphyxia) are the leading causes of CP among the participants in the present study, which according to Ogunlesi et al is a problem in resource-poor settings like Nigeria.[11] This finding is consistent with previous findings from different parts of Nigeria: Zaria S North Central;[28] Ibadan and Sagamu South Western Region[11,14,21] and Port Harcourt South-South Region[19] where the problem of CP has been linked to poor maternal care from incompetent carers. However, this is at variance with the report of a predominance of brain infections from India[26,29] and problems of low birth weight from the Netherlands[30,31] and Saudi Arabia.[32] In the present study, jaundice was reported as the major causative factor of CP among the sampled population. This is consistent with the finding of Nottidge and Okogbo,[33] but at variance with others[11,19,21] who reported asphyxia as the predominant cause of CP followed by jaundice in their studies. With respect to CP caused by asphyxia as found in this study and others, Ogunlesi et al opined that this may be related to the high rate of poorly supervised deliveries,[11] as has been demonstrated previously.[34,35]

Co-morbidities Associated with Cerebral Palsy

The associated co-morbidities reported in this study are speech and seizure disorder which is supported by some studies such as Ogunlesi et al,[11] Frank-Briggs and Alikor,[19] and Emeka et al,[15] but is at variance with the findings of some other[12,26,36] where mental retardation is the single predominant co-morbidities reported.

Association between motor classification of CP and its causes

The result of this study revealed a significant association between the motor classification of CP and its causes. This implies that the motor abnormality seen or experienced by these children varies based on the cause of CP. This might be connected to the fact that a cause of cerebral like jaundice is linked to the pathophysiology of cerebral palsy in the brain parenchyma which determine the type of cerebral palsy a child may present base on the area affected.

Association between some maternal factors and the motor and topographical classification of CP

It was revealed that there was no statistically significant association between some maternal characteristics (place of delivery, the mode of delivery and the social income) and the motor classification of the CP. Also, there was no statistically significant association found between the place of delivery, mode of delivery and social income of caregivers of patient with CP as against the topographical classification of their CP. Thus, by implication, it can be concluded that irrespective of the place of delivery, the mode of delivery and social income of the caregivers, the motor and topographical classification of the CP does not necessarily change.

This might be due to the fact that these maternal factors may not be linked to the pathophysiologic case of the cerebral palsy which determine the type of cerebral palsy a child may present.

CONCLUSION

The case of cerebral palsy in Bauchi, Nigeria is mainly associated with Jaundice and asphyxia. While the most prevalent motor type of cerebral palsy was the spastic type, the quadriplegic account for the highest percentage in term of topographical classification.

The most observed co-mobidity among children with cerebral palsy was speech impairment. Most of the mothers of children with CP were between the ages of 20 to 25 years at the time of birth of the affected child.

RECCOMENDATION

There is a need for sustained health care education f women of child bearing age to make them aware of the importance of pre- and post-natal care in the control and prevention of factors that may predispose the developing foetus and new-born baby to CP.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethics approval was obtained from Abubakar Tafawa Balewa University Teaching Hospital Bauchi research

ethical committee with reference number ATBUTH/0039/2019. Consent to participation was sought and obtained from the participant's caregivers. The caregivers of the participant were their parents and written informed consent was signed by their parents for data publication.

AUTHORS' CONTRIBUTIONS
TG initiated and designed the study, analysed the data, wrote methodology, results section and coordinate the study. AO, GA, AA and EB contributed in performing literature review, data collection, discussion and manuscript review. DG help in data collection and analysed, wrote result section, prepared, formatted and submitted the manuscript for publication. All authors read and approved the final version of the manuscript.

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