

Pattern of Neurological Conditions Seen at the Outpatient Paediatric Physiotherapy Unit of a Nigerian Tertiary Hospital: A-five year review

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Abstract

Neurological conditions in children constitute a major source of referral and workload for physiotherapy. This study assessed the pattern of neurological conditions in children seen at the physiotherapy department of a Nigerian tertiary hospital. A five-year retrospective review (January 2008 to December 2012) of children with neurological conditions seen in the Physiotherapy Department of the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria was carried out. Data were gleaned on patients' demographic (gender, age and residential address) and clinical (diagnosis and source of referral) variables. A total of 410 paediatric cases were reviewed out of which 294 (71.7%) constituted neurological conditions with a male to female ratio of 1.5:1.0. The mean age of the study's participants was 32.9 ± 32.5 months. Cerebral Palsy (CP) was the most common neurological condition seen (50.3%) with spastic quadriplegic type as the most common (41.9%). Other types of neurological conditions seen were traumatic sciatic nerve palsy (22.4%), obstetric brachial plexus injury (13.3%), central nervous system infection (7.1%) and facial nerve palsy (1.4%). Physicians' referrals from the paediatric out patient department (27.2%) and children emergency ward (20.7%) followed by self-referral (18%) constituted the most of referrals. 44.2% of the cases were referrals from other satellite towns outside the location of the clinic. In Conclusion Paediatric neurological conditions constitute a huge burden for physiotherapy in Nigeria. CP and traumatic sciatic nerve palsy were the most common neurological conditions. Demographic distribution of neurological conditions seen in this study was similar to findings from previous studies in literature.

Key words: Paediatrics, Physiotherapy, Neurological condition, Workload

Introduction

Neurological disorders in children are common occurrences in clinical practice (*Lagunju and Okafor, 2009*). These disorders could arise from prenatal, perinatal and postnatal pathological changes or lesions of the peripheral or central nervous system (*Edwards, 2002*). Genetic factors, chromosomal abnormalities, metabolic disorders and trauma are known to play a significant role with respect to the aetiology of paediatric neurological disorders (*Williams, 2003*). Specifically, neurological disorders include conditions like cerebral palsy, traumatic

nerve palsy, obstetric brachial plexus injury, poliomyelitis, cerebral malaria and head injury (*Adelugba et al, 2011*). These disorders are usually associated with motor impairments which include low muscle force production, poor motor planning and postural control, irregular muscle tone, limited joint range of motion and poor balance and coordination (*Peters et al, 2008*). Children with neurological disorders in the developing world are faced with the added burden of poverty, inadequate health facilities, inadequate community services, parental ignorance and illiteracy as well as lack of facilities for rehabilitative care (*Bribeck, 2000*).

Effective care for children with neurological conditions is often predicated on a multidisciplinary team approach with a cordial understanding between paediatricians and physiotherapists (Michaud, 2004). Physiotherapy over the years has played important roles in the overall management of children with neurological conditions (Michaud, 2004). The physiotherapist intervention for children with neurological conditions is based on training, skill and experience in clinical practice, scientific evidence from research and patients' preference (Campbell et al, 2006). The pattern of neurological conditions seen by physiotherapist may vary from one geographic location to another. The variation in prevalence and pattern of neurological conditions reported in previous studies have been predicated on methodological differences between studies, variation in case definitions and sampling techniques and lack of age adjustment of rates with standard national and international population (Gourie-Devi et al, 1987; Razdan et al, 1984; Bharucha et al, 1987). For example autism, is a common condition among children in the North America (Baio, 2012; Hirtez et al, 2007), while most studies reported attention deficit hyperactivity disorder (ADHD) as the most common behavioural among children in the United Kingdom (Boston, 2011). Available studies from Africa indicate the Cerebral Palsy (CP) is the most prevalent neurological condition among children with varying rates (Peters et al, 2008; Franks-Briggs and Alikor, 2011; Ogunlesi et al, 2008; Couper, 2002). Local and regional studies on the pattern of neurological disorders in children are valuable in understanding

trends and characteristic of these conditions and also for preventive health purposes. Studies on pattern of neurological conditions among children attending physiotherapy from rural communities are scant. The objective of this study was to assess the pattern of neurological conditions seen in children attending physiotherapy department in a Nigerian Teaching Hospital.

Materials & Methods:

A five-year retrospective case review (January 2008 to December 2012) of children with neurological conditions was carried out. The setting for the study was the Out-patient Physiotherapy Department of the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife, Nigeria. The OAUTHC is strategically located to cater for health needs of people within Osun, Ekiti, and Ondo state, even to some parts of Oyo, Kwara, Edo and Kogi States respectively (Bello et al, 2004; OAUTHC, 2010). Ethical approval for the study was obtained from the Ethics and Research Committee of the OAUTHC. Data were gleaned on patients' demographic (gender, age and residential address) and clinical (diagnosis and source of referrer) variables. Data was analyzed using descriptive statistics of frequency and percentages on SPSS version 17.0.

Results

A total of 410 paediatric cases were reviewed out of which 294 (71.7%) constituted neurological conditions. The mean age of the children was 32.9 ± 32.5 months with a male to female ratio 1.5:1.0. The highest number of cases recorded was in 2012.

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Table 1: Socio-demographic and Clinical Characteristics of the Children with Neurological Conditions Seen at the Physiotherapy Department (N=294)

| Variable | Frequency | Percentage % |
|---------------------------------------|-----------|--------------|
| Age at first contact | | |
| 0-12 Months | 127 | 43.2 |
| ≤ 5 years | 122 | 41.5 |
| ≤ 10 years | 28 | 9.5 |
| ≤ 13 years | 17 | 5.8 |
| Gender | | |
| Male | 176 | 59.9 |
| Female | 118 | 40.1 |
| Patients' Residential Location | | |
| Within town | 214 | 72.8 |
| Outside town | 80 | 27.2 |
| Neurological Condition | | |
| a. Cerebral Palsy | 148 | 50.3 |
| b. Traumatic sciatic nerve injury | 66 | 22.4 |
| c. Obstetric brachial plexus injury | 39 | 13.3 |
| d. Central nervous system infection | 21 | 7.1 |
| e. Head injury | 4 | 1.4 |
| f. Facial nerve palsy | 4 | 1.4 |
| g. Down's syndrome | 4 | 1.4 |
| h. Radial nerve palsy | 3 | 1 |
| i. Spinal bifida | 2 | 0.7 |
| j. Paralysis of Unspecified diagnosis | 2 | 0.7 |
| k. Paralysis due to cancer | 1 | 0.3 |

Table 1 shows the ages of children at first contact, gender distribution, domicile of patients and the various types of neurological conditions seen. The age group of 0-12 months constituted the age bracket with the highest proportion of neurological disorders (43.2%) while children who were 11 years and above accounted for 5.8% of the study population. In Table 2 the highest rates of referrals were from the Paediatric Out-

Patient Department (27.2%) and Children Emergency Ward (20.7%) respectively. Self referral constituted 18% of the referrals. 55.8% of the referees were resident with the clinic location town.

Table 2: Pattern of Referral of Paediatric Neurological Conditions seen at Physiotherapy Clinic

| Variable | Frequency | Percentage % |
|--------------------------------|-----------|--------------|
| Source of referral | | |
| Physician | 241 | 82 |
| Physiotherapists and Self | 53 | 18 |
| Place of referral | | |
| Children Emergency Ward | 61 | 20.7 |
| UCHC, Eleyele | 17 | 5.8 |
| Children Outpatient Department | 80 | 27.2 |
| Neurosurgery Clinic | 6 | 2 |
| Orthopaedic Clinic | 28 | 9.5 |
| Neonatal Clinic | 3 | 1 |
| Paediatric Neurology Clinic | 14 | 4.8 |
| Hospital Ward | 26 | 8.8 |
| Others | 53 | 18 |
| Outside the Hospital | 5 | 1.7 |

*PT's: Physiotherapists, UCHC: Urban comprehensive health centre, CEW: Children Emergency Ward, CPD: Children Outpatient Department
PNC: Paediatric Neurology Clinic*

Cerebral palsy constituted the most common neurological conditions (50.3%) in the study. Specifically, spastic quadriplegic type was the most common type of CP. Birth asphyxia (40.5%) was the major aetiology for CP. Table 3 shows frequency distribution of the types of cerebral palsies seen. Traumatic Sciatic Nerve Palsy accounted for 22.4% of neurological conditions. Injection neuritis (92.4%) was the main cause of TSNP. Obstetric Brachial Plexus Injury accounted for 13.3% of neurological conditions and increase in birth weights greater than or equal to 3.9Kg was the leading aetiology (43.6%). Cerebrospinal meningitis accounted 42.9% of neurological conditions caused by central nervous system infection.

| Neurological Conditions | Frequency | Percentage |
|---|-----------|------------|
| 1. Type | | |
| a. Cerebral Palsy | | |
| Spastic Quadriplegia | 62 | 41.9 |
| Spastic Diplegia | 26 | 17.6 |
| Spastic Hemiplegia | 22 | 14.9 |
| Spastic Monoplegia | 4 | 2.7 |
| Hypotonic | 6 | 4 |
| Ataxia | 5 | 3.4 |
| Mixed | 6 | 4 |
| Normal | 13 | 8.8 |
| Unknown | 4 | 2.7 |
| b. Central Nervous System Infections | | |
| Cerebrospinal meningitis | 9 | 42.9 |
| Poliomyelitis | 4 | 19 |
| Tetanus | 3 | 14.3 |
| Encephalitis | 3 | 14.3 |
| Measles | 2 | 9.5 |
| 2. Causes | | |
| A. Cerebral Palsy | | |
| Birth Asphyxia | 48 | 32.4 |
| Kernicterus | 26 | 17.6 |
| Febrile Seizures | 20 | 13.5 |
| Prematurity | 10 | 6.8 |
| Neonatal Seizures | 3 | 2 |
| Head Injury | 8 | 5.4 |
| Unknown | 14 | 9.5 |
| Multiple (Combination of several causes) | 19 | 12.8 |
| B. Traumatic sciatic nerve palsy | | |
| Injection neuritis (Dorsogluteal Trama) | 61 | 92.4 |
| Trauma | 2 | 3 |
| Breech Presentation | 1 | 1.5 |
| Unknown | 2 | 3 |
| C. Obstetric brachial plexus injury | | |
| Birth weights ($\geq 3.9\text{kg}$) | 17 | 43.6 |
| Shoulder dystocia | 10 | 25.6 |
| Immunisation | 1 | 2.6 |
| Breech Delivery | 3 | 7.7 |
| Trauma (Fall) | 2 | 5.1 |
| Umbilical Cord Compression | 1 | 2.6 |
| Unknown | 5 | 12.8 |

Discussion

This study assessed the pattern of neurological conditions in children seen at the physiotherapy department of a Nigerian tertiary hospital. The result of the study showed that neurological conditions (71.7%) were the most prevalent

paediatric conditions referred for physiotherapy within the study period. This result is comparable with the findings of *Adelugba et al (2011)* which showed that paediatric neurological conditions accounted for 72.9% of the total number of paediatric cases for physiotherapy at a federal hospital in a rural community in Nigeria. In concert, some previous studies have shown high rates of neurological disorders among children with consequent co-morbidity and disability (*Hamzat and Omotade, 2006; Adelugba et al, 2011; Frank-Briggs and Alikor, 2011; Onwuekwe and Ezeala-Adikaibe, 2011*).

Cerebral palsy accounted for the highest rate (50.3%) of referral for physiotherapy among children in this study. This finding is consistent with other studies from Nigeria that have reported that CP was the most prevalent paediatric neurological condition seen by physiotherapists (*Adelugba et al, 2011; Peters et al, 2008*). Furthermore, spastic quadriplegia was found to be the most common type of cerebral palsy. This finding is also consistent with the submission of *Peters et al (2008)* that spastic quadriplegia is the most predominant type of CP managed at the physiotherapy department of a Nigerian Teaching Hospital. Cerebral palsy is a common neurological disorder of childhood with significant neurological complications and associated comorbidities (*Franks-Briggs and Alikor, 2011*). In Nigeria, birth asphyxia, severe neonatal jaundice and prematurity appears to be the most important factors associated with cerebral palsy (*Azubuike and Nkanginieme, 2007*). It is alluded that the high rate of CP observed in this study is possibly as a result of high rates of

unsupervised deliveries (*Mcgil-Ugwu et al, 2012*) and mother's poor knowledge about risk factors and consequence of birth asphyxia as opined by other studies (*Ogunlesi et al, 2013*). According to World Health Organisation, an estimated one million children who survive birth asphyxia live with chronic neurodevelopmental morbidities including cerebral palsy, mental retardation, seizure disorders and learning disabilities (*WHO, 2005*). But *Nelson, (2008)* concluded that even though the aetiology of cerebral palsy is impressive in its preservative preoccupation with birth asphyxia, this only marks a minor part of the entire causes. In addition, *Hare et al (1998)* noted that infantile cerebral paralysis was caused by prenatal abnormalities, birth asphyxia being a marker for, rather than a cause of brain dysfunction.

The second most common reason for patient's referral for physiotherapy intervention in this study was traumatic sciatic nerve palsy with injection neuritis as the major cause. This result corresponds with the findings of *Hamzat and Omotade (2006)*. Sciatic nerve injury most commonly occurs as a result of a misplaced injection in the buttocks in early childhood (*Howlett, 2012*). All the cases observed in this study resulted after administration of gluteal intramuscular injection despite the world's Health Organisation recommendation against the use of dorsogluteal as injection sites but support either the use of ventrogluteal or anteriolateral thigh as injection sites for vaccination (*WHO, 2004*). *Plotkin et al, (2008)* advocated the use of ventrogluteal site for all ages as a safer way of administering intramuscular injections.

Also *Malkin (2008)* concluded that dorsogluteal site should be removed from the injection practice as an unnecessary and unacceptable risk for patients including children. The recovery rate of children with traumatic sciatic nerve palsy is inadequate (*Bagis et al, 2012*) and this is because the sacral plexopathies reinnervate so poorly: the excessive regeneration distance prevents effective proximodistal regeneration (*Wilbourn, 2006; Wilbourn, 2005*).

From this study, obstetric Brachial Plexus Injury was found to be a common paediatric neurological condition with greater birth weights of 3.8kg as the major cause. This finding is in agreement with *Pondaag et al, (2011)* but other studies implicate birth trauma at delivery as the major cause (*Evans-Jones et al, 2003*). Brachial plexus injuries are almost always recognized in the labour suite (*Piatt, 2004; Royal, 2013*) and is a complication of childbirth (*Bialocerkowski and Galea, 2006; Wilbourn, 2005*). Brachial plexus is often damaged when it is under tension (*Royal, 2013*). *Ugboma et al, (2010)* stated that Erb's palsy is on the rise and recommended measures to control excessive weight gain in pregnancy and prevent overweight. This is in contrast to a study done by *Chauhan et al, (2005)* which stated that the rate of macrosomia seen in Erb's palsy is on the decline. Cerebrospinal meningitis still remains the most common form of central nervous system infection (42.9%). This result is also consistent with the findings of *Frank-Briggs and Alikor, (2011)* that central nervous system infection was mostly due to bacterial meningitis.

Conclusion:

Paediatric neurological conditions constitute a huge burden for physiotherapy in Nigeria. CP and traumatic sciatic nerve palsy were the most common neurological conditions. Demographic distribution of neurological conditions seen in this study was similar to findings from previous studies in literature.

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