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**Original Research Article**

# Clinical profile of cerebral palsy: a study from multidisciplinary clinic at tertiary care centre

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## ABSTRACT

**Background:** Cerebral Palsy (CP) is combined disorder of movement, posture, and motor function and may be associated sensory, neurological and musculoskeletal complications. It is a permanent condition attributed to nonprogressive disturbances that occurred in the developing brain. The aim of this study is to Cerebral Palsy (CP) is combined disorder of movement, posture, and motor function and may be associated sensory, neurological and musculoskeletal complications. It is a permanent condition attributed to nonprogressive disturbances that occurred in the developing brain.
**Methods:** Retro prospective cross-sectional study done in super speciality tertiary care centre of East India. Total 70 Children enrolled in multidisciplinary CP clinic in Physical medicine and Rehabilitation (PMR) OPD between September 2017- March 2018.
**Results:** 78.57%male and 21.42% female, all had hospital delivery with 78.5% had normal and 21.5% caesarean section. 70% had history of birth asphyxia and 61.5% required NICU admission. 61.4% had birth wt. less than 2 kg and 10% had birth wt. less than 1kg. One fourth cases had microcephaly and one third had history of seizures. Visual abnormalities, Hearing impairment and history of jaundice were found in about one sixth children. Spastic CP was the most common (76% cases) followed by Dyskinetic 10%, Hyponic and Ataxic (1%). In spastic CP Diplegia was most common (55%), followed by Quadriplegia 24%, Hemiplegia 19% and Monoplegia 2%. GMFCS score 5 was seen in 29% (mostly quadriplegic), followed by GMFCS level 1, 21.27% (mostly hemiplegic), others mostly diplegic in level 3(19%), level 2 and 4 (14%).
**Conclusions:** Male CP are more reaching tertiary care centre in Bihar. Perinatal factors (asphyxia) were main etiological risk factor, and Spastic Diplegia is the most common type of CP. Disability need to be detected at the earliest to facilitate a timely and appropriate intervention like early rehabilitation, special education and psycho-social support.

**Keywords:** Cerebral palsy, Rehabilitation, Risk factor of CP, Spasticity

## INTRODUCTION

Cerebral palsy (CP) is the most common type of motor disability in childhood.[1] Its incidence in India around 3 cases per 1000 live births; however, being a developing country, the actual figure may be much higher. There are increasing evidences suggesting rise in prevalence of CP.[2] Profile of CP in developing country is also different from developed countries.[3] Modern improved obstetric and advanced prenatal care had resulted in increased

survival of low birth weight babies and is associated with an increased proportion of cerebral palsy in these babies.[4]

It covers a group of conditions involving a combined disorder of movement, posture, and motor function and may be associated sensory, neurological and musculoskeletal complications. It is a permanent condition, attributed to nonprogressive disturbances that occurred in the developing foetal or infant brain.[5]

Since CP is a continuing problem, it is important to study and explore the causes and the newer aspects of the condition for proper understanding and management.

It causes considerable psychological and financial burden to the caregivers. As there is no cure of CP, hence a need for primary prevention of disease. But unfortunately, the aetiology of cerebral palsy is poorly understood thereby eluding a definitive prevention strategy.

The study was conducted to report the initial data from multidisciplinary CP clinic about the etiological factors, clinical spectrum and associated comorbidities associated with CP children presented to present hospital. So that rehabilitation needs can be defined and primary prevention is carried out effectively in present part of population.

## METHODS

This was a retro prospective cross-sectional study done in super speciality tertiary care centre of Eastern India.

Study period: 7 months from September 2017 to March 2018.

### *Inclusion criteria*

All patients attending the CP clinic in Physical Medicine and Rehabilitation (PMR) OPD either referred from the same institute or other centre was included.

Study population and Number: Total 70 Children between 5 months of age to 16 years of age enrolled for this study.

A multidisciplinary Clinic was started in present institute, after approval from the competent authority and Director. It is weekly clinic where CP child is examined by Physiatrist (PMR specialist), Paediatrician and Orthopaedician together. A preformed CP proforma is filled for every patients. Through history, anthropometric measurement, complete paediatric assessment, Neuromusculoskeletal examination were carried out in all cases. All necessary investigation like complete blood count, thyroid profile, magnetic resonance imaging of the brain, electroencephalogram, Audiometry and Brainstem Evoked Response Audiometry (BERA) was done as required. Neurology opinion, ENT referral for hearing, Ophthalmology opinion for vision assessment, was taken in the required cases. Microcephaly is considered as head circumference with Z score <-3 SD. This comprehensive CP proforma was fed in the Excel sheet for data analysis and simple statistics.

## RESULTS

Total 70 patients between 5 months to 16 years of age were enrolled for this study. 78.57 % male and 21.42% were female. Distribution of children in different age groups are described in Table 1.

**Table 1: Age at presentation.**

| Age | n (Percentage) |
|---|---|
| <2 years | 23 (32.85%) |
| 2-5 years | 28 (40%) |
| 5-10 years | 12 (17.15%) |
| >10 years | 7 (10%) |
| Mean age | 4.07 years |
| Mean age >2 years | 5.55 |
| Total | 70 (100%) |

Maximum number of Children (40%) are from 2 to 5 years of age followed by 33% in less than 2 years of age. Overall mean age was 4.07 years. Spastic CP was the most common type (76%) followed by Dyskinetic 10%, 1% each in hypotonic and Ataxic CP. 12% cases were of evolving CP infants with Global developmental delay (GDD) (Figure 1). Amongst the Spastic CP, Diplegia was present in maximum cases (55%) followed by Quadriplegia 24%, Hemilplegia 19% and Monoplegia 2% (Figure 2).

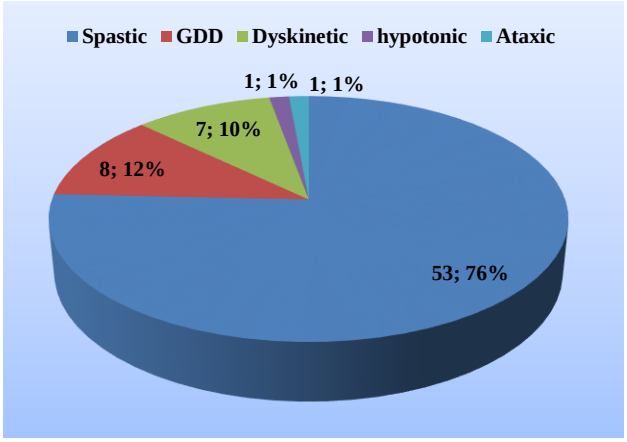


**Figure 1: Types of cerebral palsy and their distribution.**

All had hospital delivery with 78.5% normal vaginal and 21.5% caesarean section. Four (5.5%) patients were twins. History of birth asphyxia was noted in 70 % (49/70) children. NICU admission was seen in 61.50% (43) children. Low birth weight (less than 2 kg) was present in 61.4% (43/70) and very low birth weight (less than 1 kg) in 10% (7/70) patients.

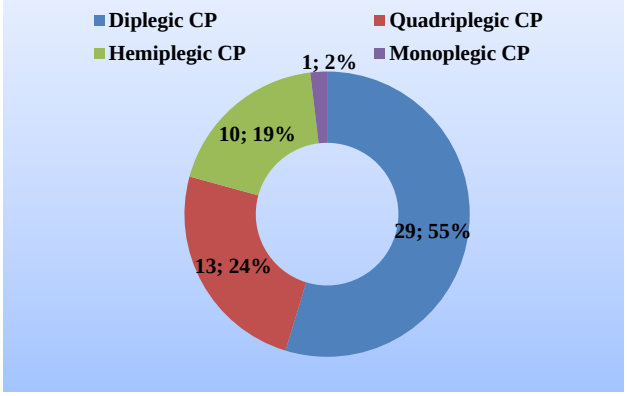


**Figure 2: Types of spastic CP and its topographical representation.**

History of seizure was present in 35.71% (25) cases. 25.71% children (18) had microcephaly. 12 patients (17.15%) had history of jaundice and 5 children had history of septicaemia also.

Behavioural problem like hyper activeness, restlessness, temper tantrum were present in 6 (8.5%) cases. Visual abnormalities like squint and poor visual acuity were found in 12 (17.15%) cases. Hearing impairment (BERA confirmed) was found in 10 (15%) children.

Authors evaluated all patients of aged more than 2years for Gross Motor Function Classification System (GMFCS) (Table 2).

Out of 47 children 23 Diplegic almost equally found in level 2 to 4. 90% (9) hemiplegic in level 1 and all 13 Quadriplegic in level 5.

**Table 2: Gross Motor Function Classification System (GMFCS): HCP-hemiplegic CP, DCP- diplegic CP, QCP-Quadriplegic CP, MCP-Monoplegic CP.**

| GMFCS Score | No of patients (47) | Type of Spastic CP | Mean Age (range) years | Percentage |
|---|---|---|---|---|
| Level 1 | 10 | 9HCP+1MCP | 7.5 (5-16) | 21.27 |
| Level 2 | 7 | 6DCP+1HCP | 7.14 (4-12) | 14.89 |
| Level 3 | 9 | DCP | 5.11 (3-9) | 19.14 |
| Level 4 | 7 | DCP | 5.71 (2-10) | 14.89 |
| Level 5 | 14 | 13QCP+1DCP | 3.57 (2-8) | 29.78 |

## DISCUSSION

Authors have 78.57% children male, almost 3.6times (higher than female) in present study, which is higher than most of other Indian or abroad studies.

Pratibha SD et al study in 1000 patients reported 67.5% male, Srivatsava VK et al study (65.1% male) Reddy B et al on 100 patients (66% male).[6-8] Nonica et al study on 954 patients during 1981 to 1990 and during 2008-12 had comparable male percentage as of these studies.[9] So, authors presume that in Bihar may be more male CP attending the apex centre for treatment as of in western Rajasthan in a study by Makwana M et al 2017.[10]

Maximum numbers of patients at presentation were in the age group of 2-5 years (40%) followed by in less than 2years (32.85%) which is nearly similar to other study by Makwana et al on 46 patients.[10]

78.5% cases born as normal delivery, 70 % children had delayed cry after birth and 61.50% children required Admission in NICU. This is nearly similar to the Indian studies by done by Sharma et al, Anwar S et al and Singhi et al.[11-13] This may be attributed to poor antenatal check-up, fewer 1 or 2 USG in antenatal check-up. Resuscitation details were not available in most of the cases. As authors see there is 100% hospital delivery in contrast to one recently published study shown about 60% home delivery from western Rajasthan but status of antenatal and perinatal care is not clear.[10] But studies particularly from developed countries like Nelson and Ellenberg, Nelson and Grether have found that perinatal asphyxia is a much less frequent cause of Cerebral Palsy.[14,15] This may be due to lesser patient load, increased availability of specialist, better perinatal care and in developed country than ours. In present observations better antenatal, prenatal care might require improvement in peripheral hospitals.

In present study 61.4% of CP patients had birth wt. less than 2 kg and 10% had birth wt. less than 1kg. O'Callaghan et al found that 43.9% and 29.3% CP children were SGA and preterm at birth, respectively.[16] Similar finding were seen in other studies as 10 – 18 % of babies were of 500–999 grams birth weight.[17] All patients of cerebral palsy had delayed developmental milestones in present study.

Most of present patients (76%) were spastic CP similar to worldwide data. However, the distribution of the clinical subtypes of spastic CP in present study is similar to what European studies reporting 18% -20.8% cases of spastic

quadriplegia and 40.9% - 54.9% cases of spastic diplegia.[18,19] In present study, 55% of present cases were spastic diplegia and 24% were spastic quadriplegia. In contrast Gowda et al had reported 16% cases of spastic diplegia and 71.6% cases of spastic quadriplegia is similar to other most of the Indian studies. The probable explanations of this finding are 100% hospital delivery in all the cases as well as the survival of preterm babies has improved. In recent times, authors have lots of discussions in India as well as western world that severity of CP is decreasing, Diplegia is increasing than quadriplegia as well as 'prevalence is decreasing.[1,9,20]

In present study only 18 (25.71%) children had microcephaly but in other studies the incidence is 50% - 75%.[21] Some of easily preventable causes of microcephaly are maternal infections, severe malnutrition, exposure to some drugs and alcohol.

Seizure was present in 35.71% of cases similar to recently published study and is consistent with most of the world-wide studies (30%-50%).[8]

12 (17.15%) patient had history of jaundice with 5 had history of septicaemia also. Behaviour problem like hyper activeness, restlessness, temper tantrum was present t in 6 (8.5%) cases comparable (7% in 100 cases) to a recently done study by Das N et al.[22]

Visual abnormalities like squint and poor visual acuity was found in 12 (17.15%). Sharma et al, reported ocular defects in 35.8% (squint 12%, cataract 6%, nystagmus 4.8%, optic atrophy 4.8%).[11]

Hearing impairment were found in 10 (15%) children after doing BERA mostly in Athetoid CP which is similar to study by Fidan et al and Nabanita et al.[23]

Higher the GMFCS score and a higher risk of hip dislocation observed some studies, Children with a GMFCS score of 4 or more have a risk of hip dislocation.[24,25] In present study 21 out of 47 (44.68%) most of the quadriplegic and severe diplegia were in GMFCS score 4 and 5. But only 2 had hip subluxation. This may be due to patients come in early age, prescription of exercises, positioning, splinting with abductor bar, antispastic medication. Most of hemiplegic had GMFCS score 1 and Mild to moderate diplegia in GMFCS score 2 or 3 as per most of the studies.

Further exploration about the causes of cerebral palsy is likely to add more information. Research for risk factors and causes of cerebral palsy will likely to promote development of preventive strategies for CP.

From present study felt needs to be implemented are preventive health strategies; 24-hour availability of a specialist to carry out neonatal resuscitation, availability of intensive neonatal care units, prevention of secondary brain damage and improving maternal nutrition and preventing infection.

Some Limitation of present studies are short duration, relatively less number of patients, for mental /cognitive assessment I.Q was not done. So, for a definitive conclusive remark more number of patients required for epidemiological research in present area which authors will be coming up in future. However, further studies with more specific aims are required to for specific aims and to improve the quality of life of these children.

## CONCLUSION

In present study, children between 2 to 5 years with male preponderance were mainly noted. Diplegic CP patients were most common and equally distributed between GMFCS 2 to 4. Perinatal factors (asphyxia) were main etiological risk factor. Multidisciplinary CP clinic also provide more satisfaction thus compliance for rehabilitation.

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