

# A clinical study of children with cerebral palsy in a tertiary care in Assam

Devi D<sup>1</sup>, Gedam DS<sup>2</sup>

<sup>1</sup>Dr. Dipti Devi, Ex. Associate Professor of Pediatrics, Tezpur Medical College, Assam, India, <sup>2</sup>Dr. D Sharad Gedam, Associate Professor, Department of Pediatrics, Government Autonomous Medical College, Vidisha, MP, India.

**Corresponding Author:** Dr. D Sharad Gedam, Associate Professor, Department of Pediatrics, Government Autonomous Medical College, Vidisha, MP, India, Email: sharad.gedam@gmail.com

## Abstract

**Introduction:** Cerebral Palsy is not a disease but a condition affecting health and well being of a child. Reports claim a rising incidence of cerebral palsy. Fifty children with cerebral palsy were studied to find out the etiological factors and the clinical findings. **Method:** A retrospective, cohort, observational study was done in 50 children with cerebral palsy attending the department of Pediatric, Tezpur Medical College, Assam from Feb 2016 to Nov 2017. **Results:** Male to female ratio was 7:3. Prenatal, natal and postnatal factors were found in 16%, 30% and 38% of cases respectively. In 8% of cases, cause was unknown. Birth Asphyxia was the commonest cause and spasticity was the commonest clinical type. Epilepsy and speech defect were the commonest problems associated with cerebral palsy. In 86% of cases the cause of 1<sup>st</sup> consultation was after 3 years with complain of not able to walk. Of all the cases 6% were diagnosed at High Risk Clinic at around 6 months of age. **Conclusions:** This study suggests improvement of maternal and child health care and follow up of high risk children from birth onwards.

**Key words:** Cerebral palsy, Etiology, High risk clinic

## Introduction

Cerebral Palsy is not a disease but a condition affecting health and wellbeing of the child and the members of his family. It is reported as 2 per 1000 live birth [1]. Reports from developed countries claimed rising incidences because of better intensive care [2,3]. CP is a non-progressive impairment in movement or posture caused by injury or anomaly of the developing brain [4]. Various reports have been published till now regarding etiology. But the exact etiology is not clear till today. In our day to day practice, we often get such children. In this study an attempt was made to find the etiological factors and clinical presentation of children with cerebral palsy.

Perinatal factors include low birth weight, hypoxic ischemic injury, hyperbilirubinemia, metabolic abnormalities hypoglycaemia [5]. The families of the CP children are affected psychologically, financially and socially [4]. It also imposes a huge burden on the national health system. In India, neonatal care services

are facing a challenging situation especially in the rural and remote areas in the south of the country [4]. These factors have all contributed to the increased percentage of children born with many health disorders in India.

However, shortages in studies exploring the actual numbers and prevalence of these health problems have not helped those under privileged population get the proper attention they need [5,6].

Recent improvements in neonatal care have not resulted in a decline in the overall prevalence of CP and, in fact, greater numbers of very preterm, very low birth weight infants are surviving with CP and other developmental problems.

Therefore, the emphasis would mainly be on the availability of a functional and efficient antenatal care and on the availability of a well-equipped neonatal care units and services to avoid the problem of having babies with CP. This study aims at highlighting the need for more emphasis on antenatal and neonatal care services in prevention of CP.

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## Materials and Methods

A retrospective, observational, cohort study was done in 50 children with cerebral palsy attending the department of Pediatrics, Tezpur Medical College Hospital, Assam from Feb 2016 to Nov 2017. Cerebral palsy was diagnosed as per definition of American Academy for cerebral palsy [7] and by Amiel Tison method in high risk infants [8]. A thorough history was taken. Term, birth weight more than 2.5 kg included in study. Children suspected of degenerative diseases were excluded from the study. Etiological Factors were classified as prenatal, natal, postnatal, mixed and unknown. Prenatal factors were present during antenatal

period, natal factors during delivery and post natal factors after birth to 5 yrs of age. More than one factor was regarded as mixed. In the absence of any factor, it was labeled as unknown. A thorough clinical examination was done. Diagnosis was clinical. Classification was done according to Mitchell [7]. Vision and hearing were examined by Stycar & Sheridan's and Sheridan's method respectively [9,10]. Mental retardation is very difficult to diagnose in a case with cerebral palsy. So cases were divided as mentally normal or subnormal [11]. Electro-encephalography (EEG) was done in symptomatic epilepsy.

## Results

In the total 50 cases, case distribution according to gender, birth order and socio- economic status is shown in table 1

**Table-1: Showing demographic distribution.**

Total	No of children	%
Male	35	70%
Female	15	30%
1 <sup>st</sup> born	22	44%
2 <sup>nd</sup> born	12	24%
3 <sup>rd</sup> born	11	22%
4 <sup>th</sup> born	3	6%
5 <sup>th</sup> born	2	4%
High socio-economic status	6	12%
Middle socio-economic status	17	34%
Low socio-economic status	27	54%

Out of total 50 children, 35 (70%) were male and 15 (30%) were female, 22 (44%) were 1<sup>st</sup> born and 27 (54%) were from low socio economic status.

The etiological factors may result in injury to the developing brain from the date of conception to 5 years of chronological age. Family history of cerebral palsy was present in 4 cases. They were 2 siblings with congenital Toxoplasmosis, one paternal uncle and one nephew. There can be varied number of insults during antenatal, natal or postnatal periods.

**Antenatal** - Congenital infection, IUGR, Vaginal bleeding, Hypertension, Chronic disease

**Natal** - Birth asphyxia, Fetal distress, birth trauma

**Postnatal** - Sepsis, meningitis, marked jaundice, pneumonia, convulsion, respiratory distress

**Table-2: Aetiological factors**

Factor	No of cases	%
Antenatal	8	16%
Natal	15	30%
Postnatal	19	38%
Mixed	4	8%
Unknown	4	8%

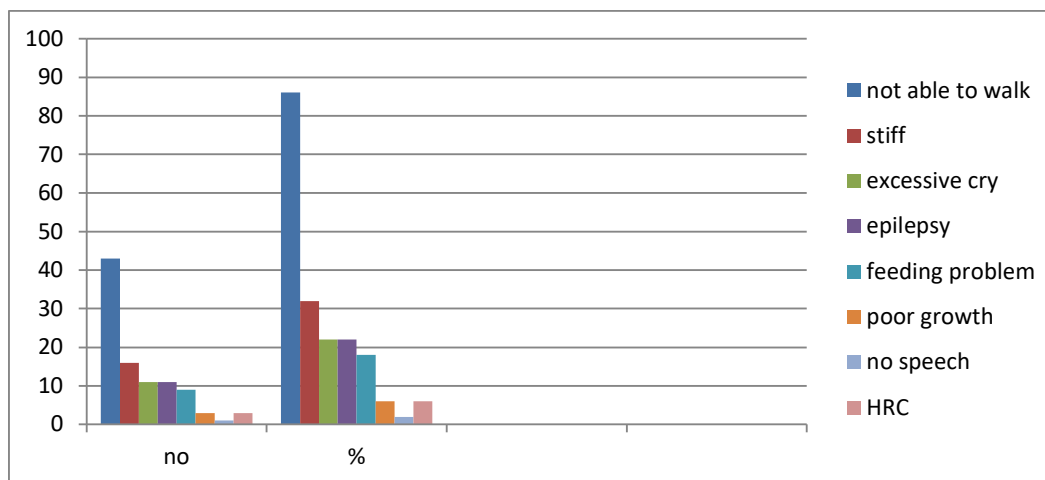
Highest numbers of factors were seen in natal (15=30%) and postnatal periods (19=38%).

The clinical types and associated problems are shown in table 3.

**Table-3: Clinicaltypes and associated problems.**

Type	No of cases	%
Spastic diplegia	24	48%
Spastic hemiplegia(lt)	5	10%
Spastic hemiplegia(rt)	4	9%
Spastic trioplegia	2	4%
Athetosis	14	28%
Hypotonic	1	2%
Spastic double hemiplegia	0	0%
Associated problems		
Epilepsy	25	50%
Mentally subnormal	25	50%
Vision defect	5	10%
Hearing defect	6	12%
Speech defect	25	50%
Malnutrition	8	16%
Dental caries	10	20%
Squint	5	10%

Spastic diplegia was found in highest number (24=48%). Epilepsy and speech defect were the commonest associated problems.



**Figure-1: Shows the presenting problems for consultation**

Out of 50 children, more than 80% presented after 3 yrs of age for not able to walk. On the otherhand, 6 % of children were picked up for early intervention at the age of 6 months; all of them were attending HRC regularly.

**Table- 4: Age at diagnosis.**

Beyond infancy	No of cases	%
Not attending high risk clinic(HRC)	47	94%
Attending HRC	3	6%

Out of all cases, 94% were diagnosed beyond infancy. All of them were not on follow up at high risk clinic.

**Table-5: Studies reporting etiological factors.**

Studies	Antenatal	Natal	Postnatal	Mixed	Unknown
Peristein, USA	30%	60%	10%	-	-
Hagberg, Sweden	21%	48%	10%	-	21%
Elliot, Missouri	39%	46%	15%	-	-
Maureem, Nigeria	-	55%	45%	-	-
Makewabe, Tanzania	-	24%	72%	-	4%
Laisram, Delhi	7%	44%	26%	15%	8%
Present study	16%	30%	38%	8%	8%

Our study shows highest natal and postnatal factors like in Nigeria, Tanzania and Delhi.

## Discussion

According to World Health Organization (WHO) estimation, 10% of the global population has some form of disability due to different causes; in India, it is 3.8% of the population. Nearly 15-20% of the total physically handicapped children suffer from Cerebral Palsy (CP) [12].

It is found that 10% of the global population has some form of disability from different causes; in India, it is 3.8% of the population. Nearly 15-20% of physically disabled children are affected by Cerebral Palsy. In India, the estimated incidence is around 3/1000 live births [13,14].

There are about 25 lakh CP children in India as per the last statistical information [15]. It is a symptom complex or syndrome condition rather than a single disease. It is an umbrella term encompassing a group of non-progressive, non-contagious condition that causes motor impairment syndrome characterized by abnormalities in movement, posture, and tone.[16]

Cerebral palsy (CP), the most common motor disability in childhood resulting from a lesion caused by early insults to the developing brain, is a syndrome that has a serious impact on the life qualities of the affected children and their families. The prevalence of CP is approximately 1.8–3.5 per 1000 live births in developed countries [16,17].

There are several antenatal factors, including preterm delivery, low birth weight, infection/inflammation, multiple gestations, and other pregnancy complications, that have been associated with CP in both the preterm and term infant, with birth asphyxia playing a minor role. Due to the increasing survival of the very preterm and very low birth weight infant secondary to improvements in neonatal and obstetric care, the incidence of CP may be increasing [16].

In our study, Out of total 50 children, 35(70%) were male and 15(30%) were female similar to study done by leisram et al they found [18] Five hundred and forty four cases of cerebral palsy were studied to find the etiology. Male to female ratio was 1.9:1. Prenatal, natal and postnatal factors were found in 42 (7.72%), 238 (43.75%) and 142 (26.1%) cases respectively. Our study shows a male preponderance as according to other workers [18, 19,20]. It may reflect the Indian culture of interest and care of male siblings.

The birth order was seen to be decreasing from 1<sup>st</sup> to 5<sup>th</sup> born. A small family is better planned and taken care now. Cases were increasing from high to low socio-economic status indicating level of care. Postnatal factors were the commonest followed by natal factors in our study. Studies from developing country like Nigeria [21] and Tanzania [22] reported same way. Developed countries like USA [23,24] and Sweden [25] reported low postnatal factors. It may be because of better medical care in developed countries. Current knowledge highlights on last trimester, perinatal and postnatal adverse events as etiology of cerebral palsy [6]. Late fetal, early neonatal and postnatal hypoperfusion and dysmetabolic cellular derangement play major role. Metabolic abnormalities during reperfusion injury contribute substantially to the nature and extent of neuronal destruction of the developing brain.

Such major abnormalities are loss of cellular ATP, oxygen free radical formation, cellular acid base disturbances, imbalance between excitatory and inhibitory neurotransmitter activity and deranged calcium homeostasis. For term infant, such damage occurs during last trimester, at delivery or at postnatal period. In preterm infants the most vulnerable and decisive period for brain development is 26-36 gestational weeks i.e. the most problematic period of extra-uterine existence [19].

In the present study, most common type of CP was spastic (24-48%) where as it was 80% in a study done by Das et al [26], and 77% in a study done by Mustafa et al done in Libya [27].

Severe asphyxia is the leading perinatal cause of CP in this study which was observed in 33% of the cases, whereas it was much higher 57% in study by Das et al [26].

Because of neuronal plasticity during early years of life, early intervention claims optimization of developmental potential of the child [28]. The parents are involved early resulting in better care and adjustment with a special child. But, in a developing country like India, the real scenario is far from optimal. Often such children reach the appropriate caring facility quite late. Parmelee and Humes defined a high risk infant as “any newborn or young infant who has a high probability of manifesting in childhood a sensory or otordeficit /or mental handicap” [28]. Ideally every graduate of NICU is a high risk baby. He needs intense follow up to diagnose and intervene early. National Neonatology Forum ( NNF) recommended long back that there should be a high risk clinic at all hospitals offering level 2 care for newborn and one neurodevelopment clinic for a population of 5 lakhs [29].

Soumya V et al [30] studied Socioeconomic status of the subjects according to updated BG Prasad Classification. It shows that most of the study subjects belong to lower middle class 34 (38%) followed by upper middle 26 (29%), upper lower 24 (26.5%) and upper class 6 (6.5%). None of the study subjects belong to lower class, similar to our study in which 54% of cases belongs to lower socioeconomic status.

Severe asphyxia is the leading perinatal cause of CP in the study done by soumya et al [30] which was observed in 33% of the cases, whereas it was much higher 57% in study by Das et al[26]. 4 Birth asphyxia (hypoxic ischemic encephalopathy) was observed in 43% of cases in Gowda et al study [31]. Our study findings correlate with that of the findings of study done by sharma et al [32] which shows that birth asphyxia as an important risk factors for CP among children.

Improved as the perinatal and neonatal intensive cares are, the prevalence of CP remains relatively stable over the last several decades in developed countries [33] It is suggested that perinatal disorders may not be the main cause of CP. Increasing evidence has demonstrated CP as a heterogeneous disease resulting from genetic factors, intrauterine triggers, and perinatal and neonatal

diseases or their interaction effects [34], such as maternal infection [35,36], gestational age [37], small for gestational age [38]

It is a term to describe a neuro developmental disorder because of injury to the developing brain. Though it is a static encephalopathy, it affects the health and well-being of the whole family. Numerous therapeutic interventions are being used by professionals to improve the functional capabilities of these children [39]. Early intervention provides a range of stimulation and remedial training activities to the child at the earliest possible time [28].

## Conclusion

In this study, spasticity was the commonest type followed by athetosis. Among the associated problems epilepsy and speech defect were high. Developmental delay was the commonest presenting complaint. Most of the cases were diagnosed late because of unawareness of parent. However, the cases attending HRC were diagnosed and intervened early. Our study suggests better maternal and child care at every possible contact and follow up of high risk babies at least till 1 year of age for early diagnosis and early intervention.

Follow up of high risk babies is very important for early diagnosis and early intervention of children with cerebral palsy. More research is needed to understand the risk factors of CP and specifically how they relate to causal pathways of cerebral palsy.

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