

## A Study of Clinical Spectrum And Risk Factors of Cerebral Palsy in Children

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### Abstract

**Aim And Objective:** Cerebral palsy (CP) is a common neurodevelopmental disorder of childhood.

The aim of our study is to define the clinical spectrum and risk factors associated with CP in children.

**Materials And Methods:** This was a hospital based observational study, 100 consecutive children diagnosed to have cerebral palsy attending the Department of Pediatrics, SVS Medical college and Hospital, Mahabubnagar. Thorough history was taken and detailed examination was done in order to classify the type of cerebral palsy, to find out the associated abnormalities and to identify the risk factors. Necessary investigations were done, wherever indicated to find out the etiology and to find out the associated problems.

**Results:** A total of 100 cases were studied, among them male predominance was observed (66%), majority were first born (60%), 65% patients had microcephaly, Natal risk factors were commonest, among them perinatal asphyxia (40%) and preterm/LBW (33%) contributing majority. Spastic CP (88%) was most common physiological type, and quadriplegia (54%) was the most common topographical type observed in this study. Mental retardation (42%) followed by seizures (36%) was the most common comorbidity. **Conclusion-** Intranatal risk factors are the predominant risk factors in this study due to significant number of deliveries occurring at home and lack of widespread availability of adequate neonatal resuscitation facilities and advanced neonatal care. High risk pregnancies should be identified and managed appropriately. Incidence can effectively be lowered by increasing standard of delivery rooms, delivery teams, neonatal transport and neonatal intensive care units.

**Keywords:** Asphyxia, Cerebral palsy, Microcephaly, Spastic diplegia.

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### I. Introduction

Cerebral palsy (CP) is the most common motor disability in childhood.<sup>(1)</sup> Cerebral palsy is a dynamic disorder of posture and mobility being the "motor manifestation of non progressive brain damage (static encephalopathy) sustained during the period of brain growth in fetal life, infancy or childhood".<sup>(2)</sup> The motor disorders are often accompanied by disturbances of sensation, perception, cognition, communication, and behavior as well as by epilepsy and secondary musculoskeletal problems. CP has historically been considered a static encephalopathy, but some of the neurologic features of CP, such as movement disorders and orthopedic complications, including scoliosis and hip dislocation, can change or progress over time.<sup>(3)</sup> Cerebral palsy is a common problem, the worldwide incidence being 1.5 to 2.5 per 1000 live births. Clinically cerebral palsy can be spastic, atonic, dyskinetic or ataxic type. The spastic type can be quadriplegic, diplegic, triplegic, monoplegic, hemiplegic or double hemiplegic depending on the type of involvement.<sup>(2)</sup> CP is also commonly associated with a spectrum of developmental disabilities, including intellectual impairment, epilepsy, and visual, hearing, speech, cognitive, and behavioral abnormalities. The motor handicap may be the least of the child's problems.<sup>(3)</sup> Cerebral palsy occurs due to various etiologies. These can be congenital, genetic, inflammatory, infectious, anoxic, traumatic and metabolic. The injury to developing brain can occur during prenatal, natal or postnatal period. Predominant insult occurs during prenatal period. Low birth weight and prematurity are the most important risk factors for cerebral palsy. Gestational age and risk of cerebral palsy are inversely proportional.<sup>(2)</sup> Increase in the incidence of cerebral palsy and the change in clinical spectrum distribution of cerebral palsy is likely to be due to advances in perinatology and increasing survival of preterm and sick term babies.<sup>(4)</sup>

Aim of the our study is to define the clinical spectrum of CP observed in our institute and to define the risk factors associated with CP as observed in our study.

**II. Materials & Methods**

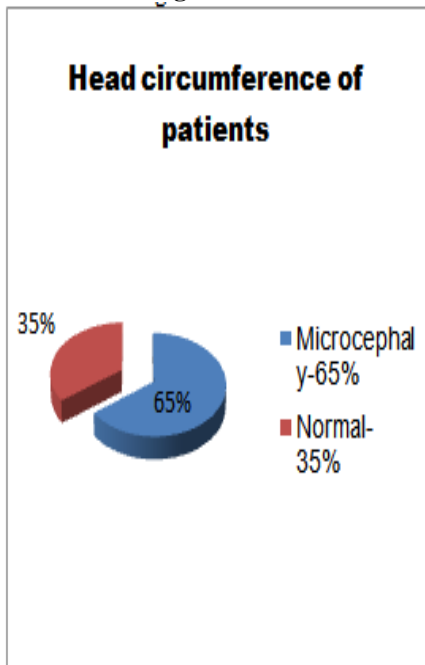
This was a hospital based observational study carried out at Department of Pediatrics, SVS Medical college and Hospital, Mahabubnagar, 100 consecutive children diagnosed to have cerebral palsy attending during the period of October 2015 to September 2017.

A predesigned and Pretested proforma was used to collect the information. Thorough history was taken and detailed examination was done in order to classify the type of cerebral palsy, to find out the associated abnormalities and to identify the risk factors present in the case. Necessary investigations were done wherever indicated to find out the etiology and to find out the associated problems.

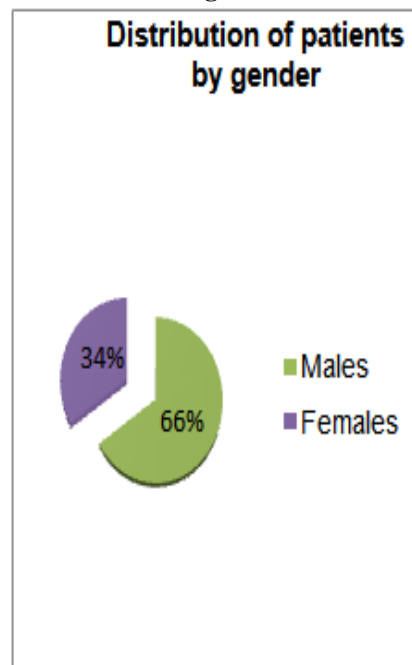
**III. Results**

In this study male patients were 66%, female were 34%(Figure-1), most of them patients were 1<sup>ST</sup> born(60%), followed by 2<sup>nd</sup> in birth order(29%), majority of them had microcephaly (65%)(Figure-2). Predominant of patients hailed from rural area. Delayed milestones (90% cases) and convulsions (15% cases) were the predominant presenting complaints in the cases studied, 82% of the patients were malnourished with 10% being severely malnourished, 65% of the cases showed microcephaly. Spastic cerebral palsy was the commonest clinical type of cerebral palsy accounting for 88% of the cases, remaining were Ataxic (7%) and Dyskinetic(5%)(Table-1). Spastic Quadriplegia and Spastic Diplegia were the most common topographical types of spastic cerebral palsy accounting for 48% and 28% of the cases respectively(Figure-3). Natal risk factors were responsible for 72% of cases, 38% of cases had more than one risk factor. Among natal risk factors majority of cases perinatal asphyxia(40%) and preterm/LBW (33%)(Figure-4). Neonatal convulsions(34%) was the commonest postnatal risk factor found in this study(Table-2). Delayed milestones(90%) was the predominant commonest presenting complaint. Mental retardation (42% cases) and convulsions (36% cases) were the commonest associated manifestations observed in our current the study .

**Figure 1**



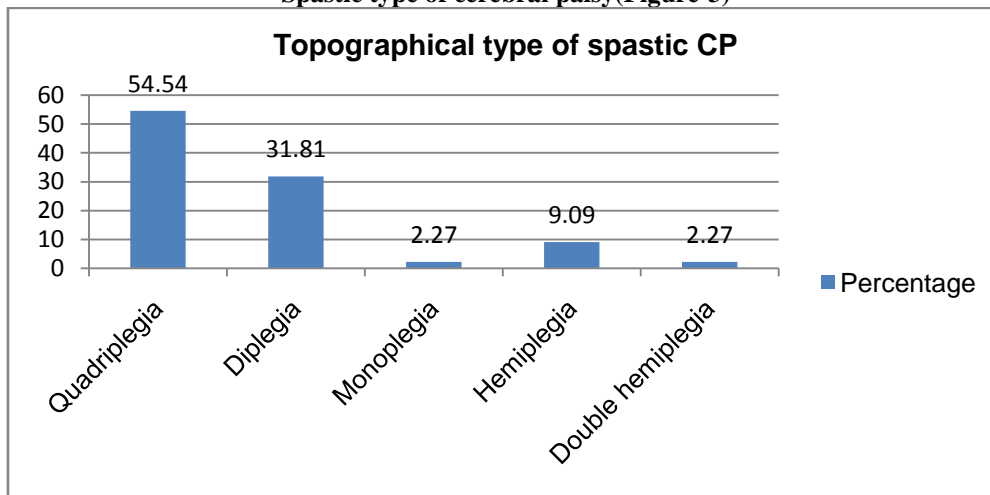
**Figure 2**



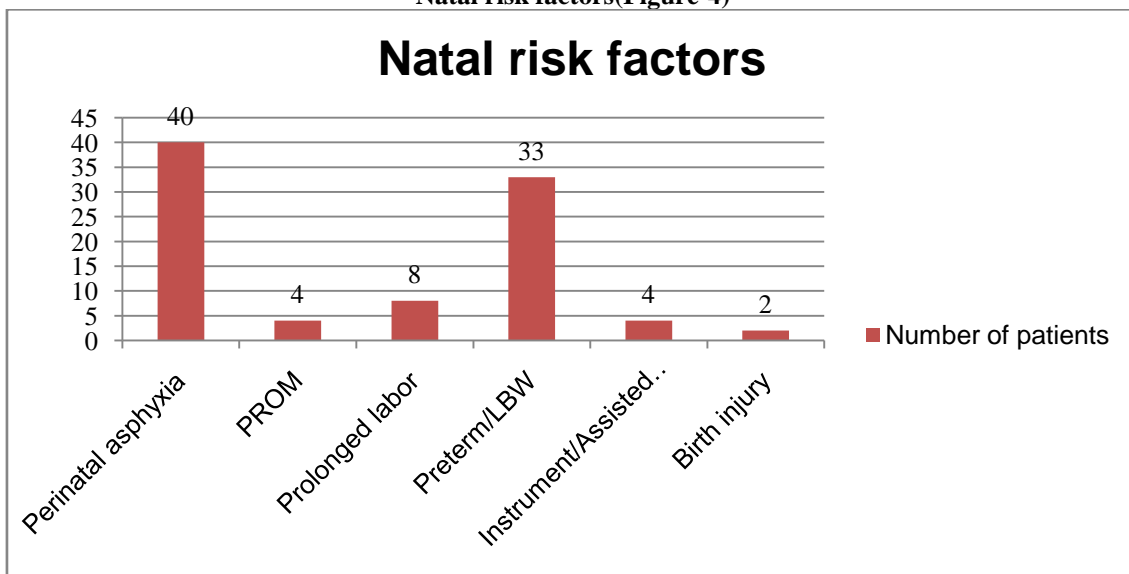
**Clinical type of cerebral palsy (Table-1)**

Clinical type	Number of patients	Percentage
Spastic	88	88%
Atonic	5	5%
Ataxic	2	2%
Mixed/Dystonic	5	5%

Spastic type of cerebral palsy(Figure-3)



Natal risk factors(Figure-4)



Postnatal risk factor (Table-2)

Risk factor	Number of patients	Percentage(among the postnatal risk factors) n=40	Percentage(among total cases) n=100
Neonatal seizures	34	85.00	34.00
Neonatal jaundice	6	15.00	6.00
Neonatal sepsis/meningitis	5	12.5	5.00

#### IV. Discussion

In this study we describe clinical spectrum and risk factors associated with cerebral palsy. Cerebral palsy is often seen as a measure of outcome of obstetric and neonatal care. With improved neonatal care and reduction in neonatal mortality there has not been a corresponding reduction in the incidence of cerebral palsy.<sup>(5)</sup> Male patients were the predominant group (66%) in our study which was comparable with Singhi Pratibha D et al study(67.5%) and Srivatsava V K et al study(65.1%).<sup>(4,6)</sup> Majority of the patients (65%) had microcephaly which was comparable to study by Singhi Pratibha D et al(88.6%)<sup>(4)</sup>. Spastic cerebral palsy most common clinical type(88%) followed by mixed type consistent with results of Sahu Suvanand et al(88%).<sup>(7)</sup> In developed countries children of spastic diplegia CP are increasing as survival of preterm babies is improved, but in this study, spastic quadriplegia was the most common topographical type and contributed for 54.54% cases. Spastic diplegia 31.81% was the second most common type. These results were consistent with results of

study by Singhi et al, Srivatsava VK et al and Taha SA et al.<sup>(4,6,8)</sup>The probability of survival, gestational age and neurological impairment are interrelated.<sup>(9)</sup> Prematurity is the predominant etiology in developed countries due to increased survival of preterms with resultant predominance of spastic diplegia. Term babies are more likely to survive than preterms in developing countries due to lack of widespread availability of advanced tertiary care. Home deliveries are still common in developing countries and lack of trained personnel and appropriate facilities for neonatal resuscitation makes birth asphyxia still a predominant etiology for cerebral palsy. Among antenatal factors,maternal anemia contributed for 6% cases,followed by antepartum hemorrhage(6%), hypertension(6%),and infections(5%).Gedal et al.described probable etiological factors of CP in central india and found that antepartum hemorrhage and hypertension contributed 10% and 6% respectively.<sup>(10)</sup>Pattar and Yelamali described similar results with equal frequency of maternal anemia,PIH/toxemia and APH (in 6% of each) as risk factor of CP.<sup>(11)</sup>Consistent with literature,our study also showed perinatal asphyxia (40%) as the most common risk factor of CP Anwar et al.observed that majority (53.6%) of the CP cases were reported to had perinatal asphyxia.<sup>(12)</sup>They also observed that mothers of 43.6% CP children had history of prolonged labor while in our study only 8% CP children's mothers had prolonged labor history.Our study result was supported by similar finding in study performed by Gedam et al. They found 2% mothers of CP children had history of prolonged labor.<sup>(10)</sup>In this study, 17.7% children were born preterm. O'Callaghan et al. estimated epidemiological risk factors of CP children and found that 43.9% and 29.3%CP children were SGA and preterm at birth, respectively.<sup>(13)</sup>Seizure (34%) was the most common risk factor in postnatal life for the development of CP, and majority of these cases were consequences of hypoxic ischemic encephalopathy.Pathological jaundice and infection contributed for 6% and 5% cases, respectively, which was comparable to other studies by Singhi Pratibha D et al.<sup>(4)</sup>

## V. Conclusion

Spastic quadriplegia is still the commonest type of cerebral palsy and intranatal risk factors are the predominant risk factors for cerebral palsy in developing countries due to significant proportion of deliveries occurring at home and lack of widespread availability of adequate neonatal resuscitation facilities and advanced neonatal care. Cerebral palsy represents a non-progressive central motor disorder with a wide range and severity of manifestations. With proper understanding and experience it is possible to make an early diagnosis and start early intervention. With a team approach and active parental involvement, a lot can be done for children with cerebral palsy.

**Conflicts of interest :** None stated.

**Funding:** None.

**Ethical approval:** Approved by institutional ethics committee of the institute.

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