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EPIDEMIOLOGICAL SURVEY OF CEREBRAL PALSY IN THE STATE OF ASSAM- A CROSS SECTIONAL OBSERVATIONAL STUDY OF 1986 CHILDREN WITH CEREBRAL PALSY.

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ABSTRACT:

BACKGROUND: Cerebral palsy (CP) is the most common etiology for motor dysfunction among children worldwide. There are only few articles available on epidemiological information in developing countries and low resource settings. We aim to study epidemiological profile of CP in the Assam state.

METHODOLOGY

This is a cross sectional observational study of all children attending the camp organized for children with disability at a tertiary care center.

RESULT: 1986 children of cerebral palsy attended the camp with largest number from lakhimpur, nagaon and karimganj districts of Assam. 60.8% were male. Highest number of children were of age group 5 to 10 years (44.9 %). Spastic CP (68%) was most common . Spastic quadriplegia (59.01%) constituted the predominant group. Home delivery was present in 30% and history of delayed cry in 47.1%. 51.8% were first born children and normal vaginal delivery was the most common (89.3%) mode of delivery. Delay in motor milestones (92.1%) was most common presenting problem. History of seizure was present in 31.9% of cases.

CONCLUSION : cerebral palsy is still a big burden on our health system. Spastic quadriplegia is the most common form of CP. Home delivery is still common in this part of population. There is need to strengthen our health system and increase awareness in public to combat the burden of CP.

INTRODUCTION:

Cerebral palsy is the most common cause of motor impairment in childhood in the world (1-3). Cerebral palsy is significantly associated with childhood morbidity and mortality (4,5). Morbidities associated with cerebral palsy like epilepsy, and visual and cognitive impairment cause a huge burden on society (6).

49 systemic review articles regarding the epidemiology of cerebral palsy were published between 1996 and 2013 among which only a single study was from developing countries

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(7,8) which shows the necessity to carry out further studies in developing countries like India. The incidence of CP is approximately 2 to 2.5 cases per 1000 live births (9) worldwide whereas it is estimated to be around 3 cases per 1000 live births in India.

There has been a significant change in the epidemiology of cerebral palsy (CP) in recent years in developed countries (10-12). Improvement in perinatal care leading to increasing survival of preterms (13,14) has been the main contributing factor to change in the distribution of clinical types of CP in developed countries. Studies are scarce regarding the incidence, prevalence, or clinical spectrum of CP in developing countries. The purpose of this study was to evaluate the clinical profile of CP and to determine the associated risk factors among North-Eastern Indian children.

MATERIALS AND METHODS:

This was a cross-sectional observational study of a total of 1986 children with cerebral palsy attending the special medical camp held on 12th and 28th January 2021 at GMCH, Guwahati. This camp was held to provide health and financial benefits to children with disability. Patients were referred by different health professionals, community health centers and many parents reached with their children guided by the camp information distributed by the government of Assam.

The term 'Cerebral palsy' was defined as a group of permanent disorders of the development of movement and posture that cause activity limitation, and are attributed to non-progressive insults to the developing fetal or infant brain.

After obtaining written informed consent from the parents/guardians, a detailed history including the history of pregnancy, natal history, and postnatal history was obtained. A comprehensive physical and systemic examination was done. As per a neurological examination, the cases were classified into the types of cerebral palsy. Associated morbidities of cerebral palsy were analyzed.

Ethical approval for this study was obtained from the institutional ethical committee, Gauhati Medical College and Hospital, Guwahati. Children less than one year and more than 18 years of age and Parents/guardians not willing to participate in the study were excluded from the study.

Statistical analyses were performed using SPSS version 20. A descriptive analysis was done. The results are reported in frequency.

RESULTS:

A total of 1986 children were enrolled in our study. The highest number of CP children were from the districts of Lakhimpur (9.8%), Nagaon(9.6%), Karimganj (9.1%), Kamrup Rural (8.6%) and Barpeta (8.4%) in the state of Assam.

Males were more in number (60.8%) compared to females (39.2%). The highest number of cases were in 5-10 years of age group (44.9%) compared to 32.3% in 10-15 years, 18.0% in 1-5 years and 4.8% in 15-18 years. The most common presenting symptom was a delay in motor milestones (92.1%) followed by delayed speech, seizures, and behavioral abnormality as shown in Table 1. The most common seizure semiology was

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generalized seizure (41%) followed by myoclonic (28%), focal (24%), and atonic (3%) whereas 4% remained unclassified (Fig.1.). 89.3% were normal vaginal deliveries, 9.1% were cesareans and 1.6% were breech delivery. Home delivery was present in 30%. History of delayed crying was present in 47.1% of cases. 51.8% of cases were first born whereas second and third born were 31.2% and 17% respectively. The neonatal predisposing factors were birth asphyxia in 43.9%, neonatal convulsion in 23.6%, neonatal jaundice in 23.4%, low birth weight in 19.8%, neonatal septicemia in 16.8%, prematurity in 11.3% and twin delivery in 2.3% (Fig. 2.).

Spastic type of cerebral palsy (68.0%) was the most common type found in our study. Other types of CP found were dyskinetic (9.0%), hypotonic (6.0%), and mixed (17.0%) (Fig.3.). Among spastic types of CP, Quadriplegic type was the most common (63%) followed by diplegic (25%) and hemiplegic (12%) (Fig.4.). Associated problems in the CP cases are shown in Fig.5.

Table.1. Presenting Symptoms

PRESENTING SYMPTOMS		
DELAY IN MOTOR MILESTONES	1829	92.1%
DELAYED SPEECH	858	43.2%
SEIZURE	634	31.9%
BEHAVIORAL PROBLEMS	224	11.3%

Fig.1. Seizure semiology in CP cases

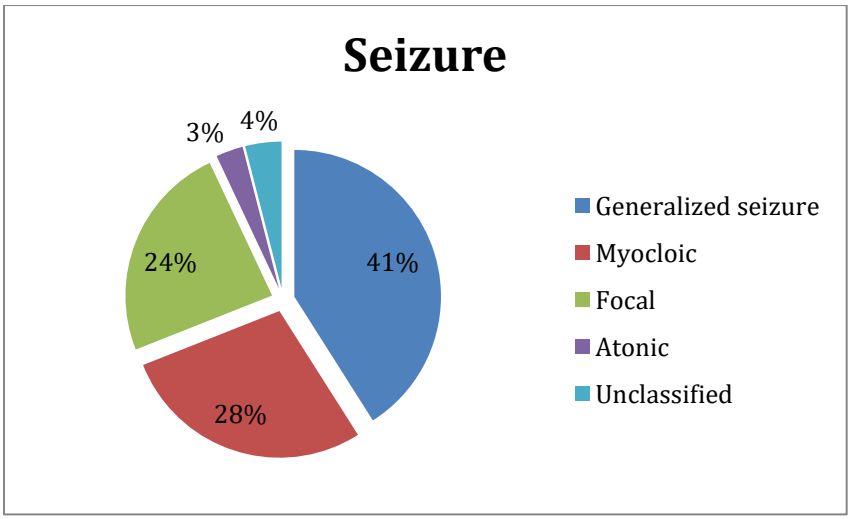

Fig.2. Predisposing factors in CP cases.

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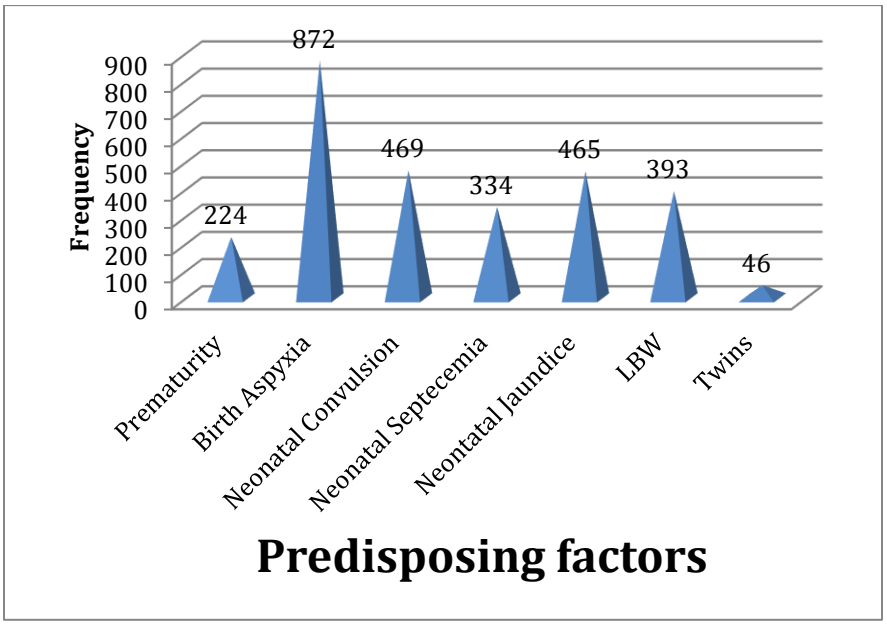

Fig.3. Types of CP

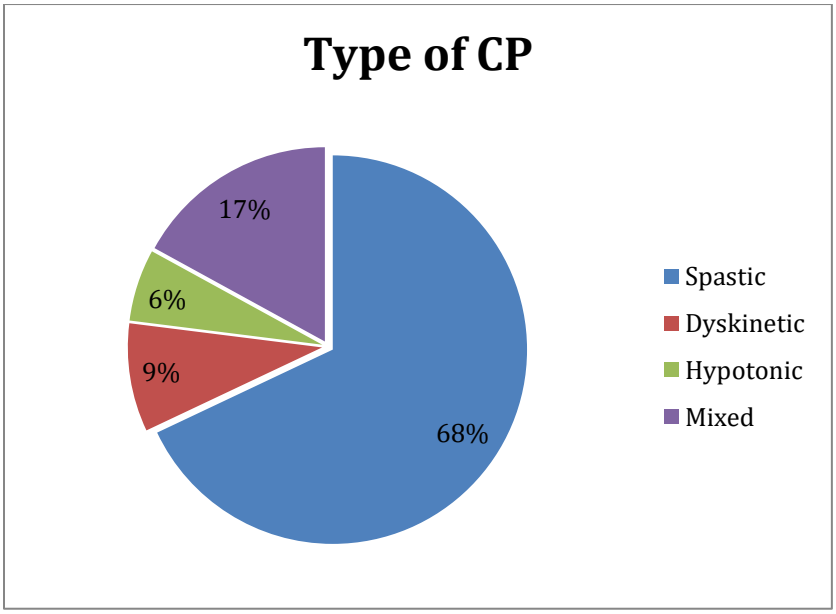

Fig.4. Types of spastic CP

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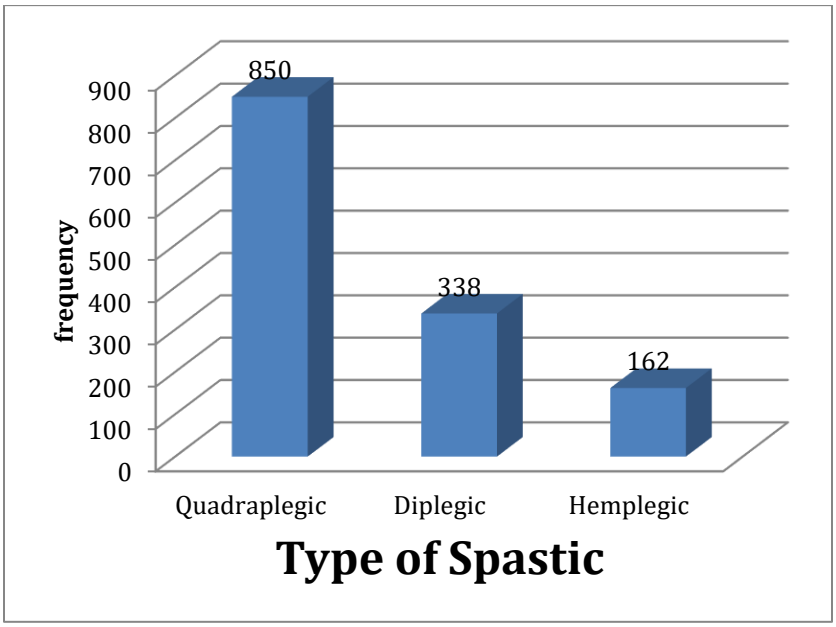
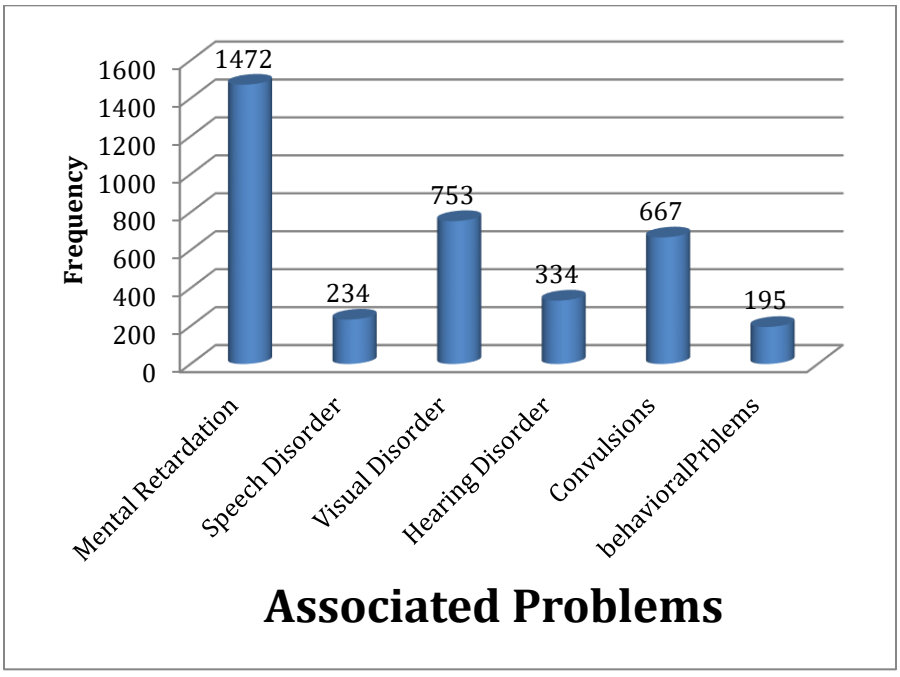


Fig.5. Associated morbidity in CP cases



DISCUSSION:

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This study aimed to determine the etiology, clinical outcomes, and co-morbidities in cerebral palsy patients in North-Eastern India.

Spastic cerebral palsy was the predominant type (68%) in our study, similar to that reported by others (15). However, Clinical subtypes of spastic CP were different from developed countries. Spastic diplegia is generally the commonest form reported from developed countries (10) whereas, spastic quadriplegia was most commonly seen in our study. In a study from a tertiary care hospital in North India, out of 1000 cases of cerebral palsy, spastic quadriplegia was the most common
type followed by diplegia (16).

Increasing survival rates of extremely premature infants with advancement in perinatal care are attributed to an increase in spastic diplegic CP and a decreasing trend of spastic quadriplegic CP in developed countries (13,14). This advancement in perinatal care is lacking in resource-limited countries like India.

Hemiplegic CP was the least common type of spastic CP in our study (12%) in contrast to developed countries where it is a common form of spastic CP (15). A significant proportion of CP cases was dyskinetic (9%) in our study in contrast to its declining trend in other parts of the world, which is most likely attributed to the high prevalence of neonatal jaundice in India (23.4% in our study).

Birth asphyxia was the major contributor to cerebral palsy in this current study. Recent studies from developed countries revealed that intrapartum hypoxic events contribute only to 8 to 10% of all cerebral palsy cases (17,18). In contrast, 35% to 58% of CP cases are attributed to birth asphyxia in poor income countries (19-22). The high occurrence of birth asphyxia in developing countries is attributed to poor obstetric care facilities.

Preterm birth for spastic diplegic CP and term birth asphyxia for spastic quadriplegic CP is a known risk factor (23). In this study, 11.3% of the cases were the result of prematurity in contrast, 78% of the cases are attributed to prematurity in developed countries (17). Neonatal sepsis contributed to 16.8% of the cases of CP in our study, which is high compared to most developed countries. In an Australian study, only 2.4% of the CP cohort had sepsis during the neonatal period (24).

Most of the babies in our study were born by normal vaginal delivery (89.3%). Instrument-assisted delivery has been considered a risk factor for cerebral palsy in some studies (25,26), whereas other studies have differed on this (15,27). Multiple pregnancy has been attributed to an important prenatal risk factor for CP (15). However, in our study, only 2.3% of twins were identified.

Disabilities due to CNS injury are commonly found in the majority of children with CP (28). Mental retardation has been found in approximately over 60 % of children with cerebral palsy (29) similar to our study.

Epilepsy is common in children with cerebral palsy (30). Symptomatic epilepsies contributing to brain insult have been found in most patients with cerebral palsy. Generalized and focal seizures are the most common semiology in CP (30). Generalized

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seizure was the most common semiology in our study. Hearing loss, behavioral abnormality, and visual problems seen in our children were similar to other studies (31).

CONCLUSION

In conclusion, the spectrum of CP in North East India differs from that seen in the West. The shift in the West attributed to preterm survival is still not apparent in our country. Severe birth asphyxia is an important predisposing factor for CP.

Targeting the preventable causes of CP may help reduce, to some extent, the huge problem of childhood disability in the country.

Conflict of interest: none
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REFERENCES:

1. Bax M, Goldstein M, Rosenbaum P, Leviton A, Paneth N, Dan B, et al. Executive Committee for the Definition of Cerebral Palsy. Proposed definition and classification of cerebral palsy. Dev Med Child Neurol. 2005;47(8):571-6.

2. Odding E, Roebroeck ME, Stam HJ. The epidemiology of cerebral palsy: incidence, impairments and risk factors. Disabil Rehabil. 2006;28(4):183-91.

3. Pakula AT, Van Naarden Braun K, Yeargin-Allsopp M. Cerebral palsy: classification and epidemiology. Phys Med Rehabil Clin N Am. 2009;20(3):425-52.

4. Chen KL, Tseng MH, Shieh JY, Lu L, Huang CY. Determinants of quality of life in children with cerebral palsy: a comprehensive biopsychosocial approach. Res Dev Disabil. 2014;35(2):520-8.

5. Raina P , O'Donnell M, Rosenbaum P , Brehaut J, Walter SD, Russell D, et al. The health and well-being of caregivers of children with cerebral palsy. Pediatr. 2005;115(6):e626-36.

6. Colver A, Fairhurst C, Pharoah PO. Cerebral palsy. Lancet. 2014;383(9924):1240-9.

7. Oskoui M, Coutinho F, Dykeman J, Jetté N, Pringsheim T. An update on the prevalence of cerebral palsy: a systematic review and meta-analysis. Dev Med Child Neurol. 2013;55(6):509- 19.

8. Were FN, Bwibo NO. Two-year neurological outcomes of Very Low Birth Weight infants. East African Medical Journal. 2006;83(5):243.

9.Vyas AG, Kori VK, Rajagopala S, Patel KS. Etiopathological study on cerebral palsy and its management by Shashtika Shali Pinda Sweda and Samvardhana Ghrita. Ayu. 2013;34(1):56-62.

10. Riikonen R, Raumavrita S, Sinivuori E, Seppala T. Changing pattern of cerebral palsy in the southwest region of Finland. Acta Paediatr Scand 1989; 78: 581–87.

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11. Pharoah POD, Platt MJ, Cooke T. The changing epidemiology of cerebral palsy. Arch Dis Child 1996; 75: F169–73.
12. Stanley F, Blair E, Alberman E. How common are cerebral palsies? In Bax MCO, Hart HM (eds), Cerebral Palsies: Epidemiology and Causal Pathways. MacKeith Press, Suffolk,
2000: pp. 22–39.
13. Hagberg B, Hagberg G, Zetterstrom R. Decreasing perinatal mortality—increasing in cerebral palsy morbidity. Acta Paediatr Scand 1989; 78: 664–70.
14. Hagberg B, Hagberg G. The changing panorama of infantile hydrocephalus and cerebral palsy over forty years. A Swedish survey. Brain Dev (Tokyo) 1989; 11: 368–73.)
15. O'Reilly DE, Walentynawicz JE. Etiological factors in cerebral palsy. A historical review. Dev Med Child Neurol 1981; 23: 633–42.
16. Singhi PD, Ray M, Suri G. Clinical spectrum of cerebral palsy in North India analysis of 1000 cases. J Trop Pediatr. 2002;48:162–6.)
633–42.)
17. Strijbis EM, Oudman I, van Essen P, MacLennan AH. Cerebral palsy and the application of the international criteria for acute intrapartum hypoxia. Obstet Gynecol. 2006;107(6):1357-65.

18. McIntyre S, Taitz D, Keogh J, Goldsmith S, Badawi N, Blair E. A systematic review of risk factors for cerebral palsy in children born at term in developed countries. Dev Med Child Neurol. 2013;55(6):499-508.
19. El Tallawy HN, Farghaly WM, Rageh TA, Shehata GA, Metwaly NA, Abo Elftoh N, et al. Epidemiology of major neurological disorders project in Al Kharga district, New Valley, Egypt. Neuroepidemiol. 2010;35(4):291-7.
20. Ogunlesi T, Ogundeyi M, Ogunfowora O, Olowu A. Socio-clinical issues in cerebral palsy in Sagamu, Nigeria. South African Journal of Child Health. 2008;2(3).
21. Gladstone M. A review of the incidence and prevalence, types and etiology of childhood cerebral palsy in resource-poor settings. Ann Trop Paediatr. 2010;30(3):181-96.
22. Belonwu RO, Gwarzo GD, Adeleke SI. Cerebral palsy in Kano, Nigeria-a review. Niger J Med. 2009;18(2):186-9.)
23. Banerjee TK, Hazra A, Biswas A, et al. Neurological disorders in children and adolescents. Indian J Pediatr. 2009;76:139–46.)
24. Reid SM, Lanigan A, Reddihough DS. Post-neonatally acquired cerebral palsy in Victoria, Australia, 1970-1999. J Paediatr Child Health. 2006;42(10):606-11.
25. Torfs C, Van den Berg BJ, Oeschli FW, Cummins S. Prenatal and perinatal factors in the etiology of cerebral palsy. J Paediatr 1990; 116: 615–19.

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26. Powell TG, Pharoah POD, Cooke RW, Rosenbloom L. Cerebral palsy in low birth weight infants, I spastic hemiplegia: association with intrapartum stress. Dev Med Child Neurol 1988; 30: 11–18.
27. Powell TG, Pharoah POD, Cooke RW, Rosenbloom L. Cerebral palsy in low birth weight infants, II spastic diplegia: association with fetal immaturity. Dev Med Child Neurol 1988; 30: 19–25.
28. Jones M. Differential diagnosis and natural history of cerebral palsied child. In: Samilson R (ed.), Orthopedic Aspects of Cerebral Palsy. JB Lippincott, Philadelphia, 1975.
29. Eicher PS, Batshaw M. Cerebral palsy. Pediatr Clin North Am 1993; 40: 537–51.
30. Aicardi J. Epilepsy and cerebral palsy. In: Aicardi J (ed.), Epilepsy in Children, 2nd ed. Raven Press, New York, 1994; 350–51.
31. Cohen BA, Schenk VA, Sweeny DB. Meningitis-related hearing loss evaluated with hearing loss evaluated with evoked potentials. Paediatr Neurol 1988; 4: 18