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The Study on Etiology, Assisted impairments and Conditions in Cerebral Palsy Population Among Children and Young Adults

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Abstract:

Cerebral palsy is a widely discussed physical and mental dysfunction that leads to disturbances in growth, sensory integration, gross motor function and mobility .It is now a very common childhood physical disability that affects millions across the globe. There are other differential diagnosis of cerebral palsy that includes various aspects like genetic disorders and metabolic disorders. The main objective of the study is to understand etiology, assisted impairments and conditions for the individuals with cerebral palsy to establish baseline functioning and monitoring of the developmental prognosis contributed to an increase of the evidenced-based recommendation for patients with cerebral palsy. The prevalence's of congenital cerebral palsy (CP) is observed using data available and also cerebral palsy existed as an individual disability or was combined by other disabilities. There are many complications which are evident in patients with cerebral palsy some are contractures and spasticity, drooling, feeding difficulties, communication difficulties, pain, osteopenia, fractures, osteoporosis and gastrointestinal functional abnormalities contributing to reduced bowel movements ,vomiting ,constipation and obstruction. The aim of treatment is to improve the independent capabilities and functionality of the individual. The Multispecialty treatment teams with various first line medical aids and therapeutic must be developed in order to provide continuous medical updated treatments for each patients. Historical treatment methods for conditions like cerebral palsy are challenged and new treatment modalities are still questioned for their essential benefits for the patients. The mortality and morbidity in the patients with cerebral palsy is from cerebrovascular disease, heart disease, trauma and cancer.

Keywords **—Cerebral palsy , diagnosis ,etiology , assisted impairments .**

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I. INTRODUCTION

Cerebral palsy (CP) is the most common motor disability found in children. The various definitions which are referring to the conditions acknowledged a broad syndrome that caused brain damage, with prominent motor dysfunction such as psychological, behavioural and epileptic symptoms. Cerebral palsy can be described a permanent neurological disorder which consists of other related impairments and conditions that can cause developmental delay and dysfunction such as spasticity with very limited activity .Also in some cases it is a disorder caused during the developmental stage of fetal brain and show severe limited prognosis with respect to motor functioning of the individual. The motor disorders in patients with Cerebral palsy (CP) are often accompanied by other disturbances such as lack of sensation, cognition, perception, behaviour, epilepsy, communication and musculoskeletal problem.[15]The Cerebral palsy (CP) is defined as, a congenital neurological disorder ,[15] with 4 core

signs and symptoms : (1) an abnormality of the brain functioning ;(2) a disorder of movement and posture with musculoskeletal abnormalities; (3) a condition acquired in early infant stage of life; and (4) is a static conditions with many neurological disorders at the time of recognition .However, due to lack of specificity of the CP conditions there are various challenges when using for epidemiology purposes. Most of the criteria that are mentioned do not fully address severity of the motor disability must be included; however the brain abnormality is static with onset age of the brain lesion or the youngest onset age of identification of the condition. [16] In addition, there are also other conditions that do meet the criteria for CP that are not included. Stanley and Blair proposed to make the term cerebral palsy more specific to the condition, especially for epidemiology of the disease studies, CP researchers should: (1) By defining the severity with appropriate measure, for example the Gross Motor Function Classification System (GMFCS); (2) Specifying an onset age for cases acquired during post neonatal; (3) formulate inclusion and exclusion criteria to contemplate the gene, molecular level and metabolic conditions; (4) Defining the standard age for the diagnosis beyond which there would not be any other possibilities or changes in the diagnosis; The same criteria for studies many not be agreed by all by the above mentioned criteria covers the major relevant states of the conditions and allows of comparison and analysis study to conclude with the relevant diagnosis and treatments.

II. ETIOLOGIC CLASSIFICATION

Etiologic classification is aimed at developing prevention strategies to help identify and treat the condition to an extent for the patients with cerebral palsy. However, classifications are not fully developed and till date is not proven to be successful in formulating or addressing prevention for the condition. [20, 21]Many Collaborative Project has helped in identifying a large number of problems that can potentially place a child at risk of cerebral palsy. However, relatively very few of the conditions were found to relate to specific outcome or diagnosis. [23] Most of the predictors were combination of various factors which was present prior to onset of labour, implying CP is caused by a many disturbance which can interact to the related conditions. Some research has also focused on recognizing the mechanism and the causes of the brain damage. [24] Considering the brain has a specific number of ways to respond to damage, CP might have been a result of a common pathophysiological cycle .One of the research hypothesis that bridges white matter damage and inflammatory factors that can cause asphyxia, relating to maternal infections such a chorioamnionitis and urinary tract infection may be a common mechanism in CP. The neuropathology classification idea was proposed to highlight and understand the brain structures and functioning with respect to structural and functional abnormalities. Although it's still arguable that neuroimaging is significantly classifying the neuropathology of a CP patient. Other modalities such as volumetric studies, magnetic resonance imaging, Ultrasound and computed tomography do not present a consistent functional or structure relationships. [21] As science has captured more about the development brain, a theory of vulnerability has come in play. Two important associations that are described: (1) Basal ganglia injury with asphyxia before or during birth, and (2) Periventricular leukomalacia with prematurity births.

III. METHODOLOGY

The objective of the study is to understand an etiology assisted impairments and conditions for the individuals with CP to establish baseline functioning and monitoring of the developmental prognosis contributed to an increase of the evidenced-based recommendation for patients with cerebral palsy. The sample size of the retrospective data between July 2018 and November 2019, sample size (N= 200) was collected from The Spastic society of Tamilnadu with patients clinical diagnosed of cerebral palsy without any exclusion

for other possible neurological conditions. The data collected was the activity and gross motor function measures of the patients which was already mentioned and assessed in their medical records. As majority of the patients had other neurological complications such as epilepsy, gross motor dysfunction, spasm, intellectual disability. The researchers have classified various methods to measure the prevalence's of CP (1) onset of the disease in pre natal, delivery or post natal stages (2) maternal congenital (3) idiopathic congenital and CP being a bilateral disorder originating from the brain.

A. RISK FACTORS IN CEREBRAL PALSY

There is vase area of research which was conducted to find the possible causes and risks factors related to CP, which implies there needs to be an individual causal pathways with many possible etiological multi factors. The examination of risk factors of the condition is categorized by the timing of their first or early occurrence during prenatal, perinatal, and postnatal. There are a list of Prenatal and perinatal complications that include neonatal encephalopathy, preterm birth, multiple pregnancy, infection and inflammation, assisted reproductive, ELBW and VLBW, and genetic factors. Although prevention of postnatal causes holds well in most cases for reduction in prevalence of CP.

B. ASSOCIATED CONDITIONS AND IMPAIRMENTS IN CEREBRAL PALSY

In most cases of the motor impairments of CP are often prevalent with cognitive, behavioural, and sensory impairments, also with epilepsy. The data from the study has present the associated impairments and conditions which are found in majority of the cases 20% to 60% of intellectual disability, incidence of epilepsy with history of neonatal seizures, status epilepticus and spasm onset, these conditions are in need of poly therapy and secondary treatment of antiepileptic drugs AED .The generalized and partial epilepsy are more predominant in some observational cases ranging from severe to moderate frequency. The Sensory Impairment that are common among CP involves neuropathology of the central nervous system that alters the normal somatosensory development and the etiologies of diplegic and hemiplegic conditions in the system. [24, 26-33].

The Sensory impairments are most common among those with hemiplegia, in whom almost 90% have bilateral sensory deficits. The Stereo gnosis and proprioception are the highly affected in bilaterally deficit. The degree of motor impairments and sensory dysfunction do not correlate in all the cases. The bilateral tactile deficits are commonly found in bilateral spastic (diplegic) and unilateral spastic (hemiplegic) in cerebral palsy subtypes, that includes those with milder motor involvement. The people with cerebral palsy experience different types of chronic pain than the general population, such as back pain, foot, knee and ankle pain which is more prevalent in diplegia and tetra plegia and neck and shoulder pain with dyskinesia. The chronic pain that is caused is associated with deterioration of functional motor and cognitive skills. Visual impairment, visual defects and Hearing Loss are common in children with CP. More than 60% of children with cerebral palsy have been found to have low visual functioning. Although there is an increased presence of acuity problems such as central visual impairment strabismus, syntagms, amblyopia, refractive errors and optic atrophy. Apart from associative conditions there are significant risk factors including neonatal meningitis, hypoxia, intellectual disability, kernicterus which can be found in advance neuroimaging. It is also found feeding, growth and endocrine problems such as feeding the children, issues in sucking or swallowing and related oral motor dysfunction. The children with spastic quadriplegia require assistances on long term and sever motor dysfunction which is measured using Gross motor functional scale (GMFCS Level of IV or V). The growth curve is typically reduced in children with CP. It is significant that children with severe CP develop clinically significant osteopenia which causes loss

of bone minerals over the period of their lives. Unlike elderly adults, the rate of growth in bone mineral is diminished when compared non CP population. Also the skeletal growth and development and skeletal maturation is altered in children with moderate or severe CP diagnosis.

C. *Results*

The study resulted in understanding etiology, assisted impairments and conditions for cerebral palsy CP. It is effectively proven that early diagnosis of the condition or treatment from the earliest onset period combined with poly therapy to help in effective gross motor functioning. Through the study individual with CP to establish baseline functioning and monitoring of the patients prognosis.

D. *Discussions*

There are hardly few population-based data on consequences of CP in individuals are very limited. In the late 20th century, the epidemiologic study that was conducted with a subset of children with CP was identified only through surveillance activities and patient record tracking which was either a critical diagnosis of neurological disorder combined with other conditions. This study findings resulted as follows with 75% of the young adults with CP was identified during childhood, because they had experienced limitations and improper daily activities functioning. Also, substantially 50% of young adults with CP, were without intellectual disability, hearing loss, vision loss, or epilepsy other compliances, on the other hand 25 % of young adults with CP and with one of these combined developmental disabilities [15, 16] .The data from one of the various studies examining the secondary educational outcomes using the data from children based their special education exceptionality. Although, utility of these data from the CP populations are limited because not many children with CP are availing the services under the same special education and therapy. The children with CP receive special services under several exceptionality, they often differing by the presence of co-occurring conditions. For example, the research data show 75% of children with co-occurring disorders such as intellectual disability receive specific services under an intellectual disability , when compared with children with CP who have severe motor impairment, of which 33% will be served through other health impairment facilities , 25% of them will be served through orthopaedic impairment and ranging upon their initial diagnosis the children get sorted in serves based upon their primary and secondary diagnosis which comes under services for CP population .There are a lot of organized systems that are brought about when the treatment services is done based on the diagnosis and it is of greater importance to evaluate the current challenges in helping to improve the lifestyle of the Cerebral palsy population .

IV. CONCLUSIONS

The children with CP when they become young adults, several supportive services such as rehabilitation therapy, special equipment's, special education, and specialized care are often required. Young adults with CP without these services can experiences all new problems with their day today activities which can worsen their existing conditions and also cause trouble in their family and hamper proper care and treatments. The new social norms for young adults are coupled with such vulnerabilities which as a result can decline their assistive systems, such issues are of major concern in framing a valid and reliable treatment methods in helping CP populations.

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REFERENCES

[1] Arneson C, Durkin M, Benedict R, et al. Brief report: prevalence of cerebral palsy - autism and developmental disabilities monitoring network, three sites. Disability and Health Journal 2009;2:45–8.

[2] Charcot JM, Richer PMLP. Les deformeset les maladesdansl'art. Paris: Lecrosnieret Babe; 1889.

[3] Christensen E, Melchior J. Cerebral palsy – a clinical and neuropathological study. ClinDev Med 1967;25:97–100.

[4] Little WJ. Lectures on the deformity of the human frame. Lancet 1843;1:318–20.

[5] Scherzer AL. In: Scherzer AL, editor. Early diagnosis and interventional therapy in cerebral palsy: an interdisciplinary age-focused approach. New York: Marcel Decker, Inc; 2001. p. 3–7, 9–10.

[6] Little WJ. On the influence of abnormal parturition, difficult labor, premature birth and asphyxia neonatorum on the mental and physical condition of the child, especially in relation to deformities. Transactions of the Obstetrical Society of London 1862;3:293.

[7] Osler W. The cerebral palsies of childhood. London: HK Lewis; 1889.

[8] Freud S. Les diplegiescerebralesinfantiles. Rev Neurol 1893;1:178–83.

[9] Minear WL. A classification of cerebral palsy. Pediatrics 1956;18:841–52.

[10] MacKeith RC, Polani PE. The Little Club: memorandum on terminology and classification of cerebral palsy. Cereb Palsy Bull 1959;5:27–35.

[11] Bax MC. Terminology and classification of cerebral palsy. Dev Med Child Neurol 1964;11:295–7.

[12] Evans P, Alberman E, Johnson A, et al. Standardization of recording and reporting cerebral palsy. Dev Med Child Neurol 1987;29:272.

[13] Mutch L, Alberman E, Hagberg B, et al. Cerebral palsy epidemiology: where are we now and where are we going? [see comment]. Dev Med Child Neurol 1992; 34:547–51.

[14] Surveillance of Cerebral Palsy in Europe. a collaboration of cerebral palsy surveys and registers. Surveillance of Cerebral Palsy in Europe (SCPE) [see comment]. Dev Med Child Neurol 2000;42:816–24.

[15] Rosenbaum P, Paneth N, Leviton A, et al. The definition and classification of cerebral palsy. Dev Med Child Neurol 2007;49(Suppl 109):8–14.

[16] Blair E, Stanley F. The epidemiology of the cerebral palsies. In: Levene M, Chervenak F, editors. Fetal and neonatal neurology. 4th edition. Edinburgh: Churchill Livingstone Elsevier; 2009. p. 867–8.

[17] Butler C, Darrah J. Effects of neurodevelopmental treatment (NDT) for cerebral palsy: an AACPDM evidence report. Dev Med Child Neurol 2001;43:778-90.

[18] Darrah J, Watkins B, Chen L, Bonin C, for the AACPDM. Conductive education intervention for children with a diagnosis of cerebral palsy: an AACPDM evidence report. Dev Med Child Neurol 2004;46: 187-203. Accessed online September 8, 2005, at: http://www.aacpdm. org/resources/ConEdOut.pdf.

[19] Fowler EG, Ho TW, Nwigwe AI, Dorey FJ. The effect of quadriceps femoris muscle strengthening exercises on spasticity in children with cerebral palsy. PhysTher 2001;81:1215-23.

[20] Andersson C, Grooten W, Hellsten M, Kaping K, Mattsson E. Adults with cerebral palsy: walking ability after progressive strength training. Dev Med Child Neurol 2003;45:220-8.

[21] Dodd KJ, Taylor NF, Damiano DL. A systematic review of the effectiveness of strength-training programs for people with cerebral palsy. Arch Phys Med Rehabil 2002;83:1157-64.

[22] Trahan J, Malouin F. Intermittent intensive physiotherapy in children with cerebral palsy: a pilot study. Dev Med Child Neurol 2002;44:233-9.

[23] Ketelaar M, Vermeer A, Hart H, van Petegem-van Beek E, Helders PJ. Effects of a functional therapy program on motor abilities of children with cerebral palsy. PhysTher 2001;81:1534-45.

[24] Mayer NH, Esquenazi A, Childers MK. Common patterns of clinical motor dysfunction. Muscle Nerve Suppl 1997;20:S21-35.

[25] Baker R, Jasinski M, Maciag-Tymecka I, Michalowska-Mrozek J, Bonikowski M, Carr L, et al. Botulinum toxin treatment of spasticity in diplegic cerebral palsy: a randomized, double-blind, placebo-controlled, dose-ranging study. Dev Med Child Neurol 2002;44:666-75.

[26] Polak F, Morton R, Ward C, Wallace WA, Doderlein L, Siebel A. Doubleblind comparison study of two doses of botulinum toxin A injected into calf muscles in children with hemiplegic cerebral palsy. Dev Med Child Neurol 2002;44:551-5.

[27] Reddihough DS, King JA, Coleman GJ, Fosang A, McCoy AT, Thomason P, et al. Functional outcome of botulinum toxin A injections to the lower limbs in cerebral palsy. Dev Med Child Neurol 2002;44:820-7.

[28] Houltram J, Noble I, Boyd RN, Corry I, Flett P, Graham HK. Botulinum toxin type A in the management of equinus in children with cerebral palsy: an evidence-based economic evaluation. Euro J Neurol 2001;8(suppl 5):S194-202.

[29] Ade-Hall RA, Moore AP. Botulinum toxin type A in the treatment of lower limb spasticity in cerebral palsy. Cochrane Database Syst Rev 2000;(1):CD001408.

[30] Butler C, Campbell S, for the AACPDM Treatment Outcomes Committee Review Panel. Evidence of the effects of intrathecal baclofen for spastic and dystonic cerebral palsy. Dev Med Child Neurol 2000;42:634-45.

[31] Campbell WM, Ferrel A, McLaughlin JF, Grant GA, Loeser JD, Graubert C, et al. Long-term safety and efficacy of continuous intrathecal baclofen. Dev Med Child Neurol 2002;44:660-5.

[32] McLaughlin J, Bjornson K, Temkin N, Steinbok P, Wright V, Reiner A, et al. Selective dorsal rhizotomy: meta-analysis of three randomized controlled trials. Dev Med Child Neurol 2002;44:17-25.

[33] Hodgkinson I, Jindrich ML, Duhaut P, Vadot JP, Metton G, Berard C. Hip pain in 234 non-ambulatory adolescents and young adults with cerebral palsy: a cross-sectional multicentre study. Dev Med Child Neurol 2001;43:806-8.

[34] Settecerri JJ, Karol LA. Effectiveness of femoral varus osteotomy in patients with cerebral palsy. J PediatrOrthop 2000;20:776-80.

[35] Morris C. A review of the efficacy of lower-limb orthoses used for cerebral palsy. Dev Med Child Neurol 2002;44:205-11.

[36] Nicholson JH, Morton RE, Attfield S, Rennie D. Assessment of upperlimb function and movement in children with cerebral palsy wearing lycra garments. Dev Med Child Neurol 2001;43:384-91.

[37] Essex C. Hyperbaric oxygen and cerebral palsy: no proven benefit and potentially harmful. Dev Med Child Neurol 2003;45:213-5.

