DOI: https://doi.org/10.53350/pjmhs22165916

ORIGINAL ARTICLE

Epilepsy in Children with Cerebral Palsy at Liaquat National Hospital, Karachi

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ABSTRACT

Objective: To document the frequency of Epilepsy among children with Cerebral Palsy at Liaquat National Hospital, Karachi.
Duration: From 7th April 2018To6th October 2018
Methodology: Total 94patients who had developed mental delay and clinical examination showed the sign of upper motor neuron lesion like decrease/increase tone, loss of muscle mass, brisk reflexes, up going planter were included. Those who had history of two or more fits 24 hour apart without other cause were labeled as epilepsy.
Results: There were 62.8 percent male and 37.2 percent female patients. Mean age was 4.99±2.77 years. Most common type was quadriplegia (54.3%). Mostly mother's education was middle (31.9%) while mostly father's education was primary (31.9%). Total 55.3% study subjects were found with epilepsy. Significant association of epilepsy was observed withresidence and family income.
Conclusion: The study results showed high frequency (55.3%) of Epilepsy in cases with Cerebral Palsy.
Keywords: Frequency, Epilepsy, Children, Cerebral Palsy

INTRODUCTION

William Little firstly characterised Cerebral Palsy (CP) in the 1840s. CP is one of the most common causes of neurological dysfunction in children.[1]It is a diagnostic term for a group of persistent mobility and postural issues that restrict activities and are associated with nonprogressive abnormalities in the developing foetus and newborn brain.[2]

According to the Centers for Disease Control and Prevention (CDC), it affects 3.6 out of every 1000 children. The developing world data is predicted to be 1-6 per 1000 children.[3] Cerebral palsy is diagnosed clinically[4], but neuroimaging is useful in detecting underlying structural problems. [5]

CP is commonly linked to a wide range of developmental abnormalities, including reduced intelligence, seizures, vision and hearing impairments, and behavioural issues. In a local research done in Lahore,[6] the total prevalence of epilepsy in children with CP was estimated to be 58.6% whereas 39.8% in a regional study conducted in Iran, and 62 percent in children with CP in Parana Brazil. In spastic CP, seizures is more common, and it increases with increased Gross Motor Function Level.[7-10]

The purpose of this study was to document the rate of epilepsy in pediatric population with cerebral palsy in a tertiary care hospital. A survey of the literature revealed that there is insufficient local data and that frequency varies. Because, we are a weak socioeconomic country with inadequate research resources,the findings of this study will give current and accurate information on the scope of the problem in our population. This might assist to protect the cases from further brain damage caused by poorly treated epilepsy.

METHODOLOGY

We enrolled 94 patients from Liaquat National Hospital and Medical College Karachi's Paediatric Ward and Paediatric Neurology Clinic. (LNH is a tertiary care hospital with a specialised neurology serving clinic), of any gender, 2-12 years presenting with cerebral palsy. The exclusion criteria was younger than 2 years and older than 12 years, Disorders other than CP (based on previous history), and Traumatic Head Injuries (based on history).

A detailed history was recorded, and the patient was diagnosed with Cerebral Palsy after clinical examination revealed signs of upper motor neuron lesion such as decreased/increased tone, loss of muscle mass, quick reflexes, and upgoing planter. Those having a history of two or more fits 24 hours apart without additional causes were diagnosed with epilepsy. In proforma, data on age, gender, residence, family income, parent education were recoded. Proforma contains all information on Cerebral Palsy and the various kinds of CP.

Data Analysis Procedure: The collected data was computed and analyzed in a computer programe SPSS-22. For the quantitative variable like age, mean+standard deviation was calculated. For qualitative factors such as family income, gender, parent's education, type of CP, residence, and Epilepsy, frequency and percentage were computed. Stratification was performed based on gender, age, family income, parent's education, residency, and type of CP to determine the influence of these modifiers on outcome (Epilepsy).

RESULTS

To examine the prevalence of Epilepsy among children with Cerebral Palsy, 94 children of either gender with ages ranging from 2 to 12 years were evaluated.

The cumulative mean age of the 94 patients was 4.99+2.77 yrs, with 62.8 percent being male and 37.2 percent female. Out of the total participants, 77.7 percent were from metropolitan regions, while the remaining 22.3 percent were from rural areas. In terms of CP type, quadriplegia was the most prevalent (54.3 percent). A detailed frequency distribution of the CP type was shown. The observations shows that 18.1 percent of patients belonged to the lower SES class with a monthly income of less than 10,000 PKR, 54.3 percent to the middle SES class with a monthly income of 10,000 to 25,000 PKR, and 27.7% to the upper socioeconomic class with a monthly income of more than 25,000 PKR.

Among the entire research participants, the majority of mothers' education was observed until middle school (31.9%), whereas the majority of fathers' education was observed until primary school (31.9 percent). The frequency distribution of mother and father education is shown in detail. Epilepsy was discovered in 55.3 percent of our research participants.(Table 1)

Gender, age, residence, CP type, family income, mother education, and father education were all used to stratify the effects of these modifiers on epilepsy. Significant was defined as a P-value of less than 0.05. The findings revealed a significant link between epilepsy and residency (p=0.000) and family income (p=0.035), but no link between gender (p=0.784), age (p=0.104),

CP type (p=0.837), family income (p=0.035), maternal education (p=0.881), or paternal education (p=0.510). (See Table 2)

Table 1: Demographic Data of the Children (n=94)

Variables	No. of patients	%
Age (Years): 4.99±2.7		
Gender		
Male	59	62.77
Female	35	37.23
Residential status		
Rural	21	22.3
Urban	73	77.7
CP TYPE (TOPOGRAPHICALLY)		
Heimiplegia	13	(13.8)
Diplegia	5	(5.3)
Paraplegia	25	(26.6)
Quadriplegia	51	(54.3)
FAMILY INCOME(per month)		
<10,000 PKR	17	18.1
10,000-25,000 PKR	51	54.3
>25,000 PKR	26	27.7
MOTHER EDUCATION		
Illiterate	8	8.8
Primary	29	30.9
Middle	30	31.9
Inter	18	19.1
Graduate/Master	9	9.6
FATHER EDUCATION		
Illiterate	13	13.8
Primary	30	31.9
Middle	25	26.6
Inter	20	21.3
Graduate/Master	6	6.4
FREQUENCY DISTRIBUTION OF EPILEPSY		
Yes	52	55.3
No	42	44.7

Table 2: Data Stratification

Variable	EPILEPSY		Total	P value
	Yes	No		
Male	32(54.2%)	27(45.8%)	59	0.784
Female	20(57.1%)	15(42.8%)	35	
≤5 years	30(49.2%)	31(50.8%)	61	0.104
>5 years	22(66.7%)	11(33.3%)	33	
Urban	27(41.5%)	38(58.5%)	65	0.000
Rural	25(86.2%)	4(13.8%)	29	
Heimiplegia	7(53.8%)	6(46.2%)	13	0.837
Diplegia	3(60%)	2(40%)	5	
Paraplegia	12(48%)	13(52%)	25	
Quadriplegia	30(58.8%)	21(41.2%)	51	
<10,000 PKR	12 (70.6%)	5 (29.4%)	17	0.035
10,000-25,000 PKR	31 (60.8%)	20 (39.2%)	51	
>25,000 PKR	9 (34.6%)	17 (65.4%)	26	
Mother's education				
Illiterate	4 (50%)	4 (50%)	8	0.881
Primary	14 (48.3%)	15 (51.7%)	29	
Middle	18 (60%)	12 (40%)	30	
Inter	11 (61.1%)	7 (38.9%)	18	
Graduate/Master	5 (55.6%)	4 (44.4%)	9	
Father's education				
Illiterate	6 (46.2%)	7 (53.8%)	13	0.510
Primary	16 (53.3%)	14 (46.7%)	30	
Middle	17 (68%)	8 (32%)	25	
Inter	9 (45%)	11 (55%)	20	
Graduate/Master	4 (66.7%)	2 (33.3%)	6	

DISCUSSION

Cerebral palsy (CP) is a mobility and posture disease that affects people of all ages. It is characterised by non-progressive injury to the juvenile neural system caused by a variety of factors11 that happened during the prenatal, perinatal, or postnatal eras.[12]It can present itself in a variety of forms, the most prevalent of which are spastic, athetoid, and axicpalsies. It is also one of the most common causes of motor handicap in children, and it is commonly connected with other issues such as mental retardation, sensory abnormalities, and epilepsy.[13]

According to research, epilepsy is prevalent from 12 to 90% in pediatric population.[14-15] Some writers suggest that specific kinds of CP are associated with a greater risk of epilepsy6, and that roughly one-third of CP patients have seizures, which is proportionate to the degree of motor and cognitive impairment.[16-17] Epilepsy has been recorded in children with cerebral palsy at rates ranging from 15% to 41.8 percent.[18-20] The incidence and spectrum of cerebral palsy in developing nations, such as India, varies from those in the West. [21-22]

Previous studies[21,23] and those by others from India have found comparable distributions of various kinds of cerebral palsy. [22] The prevalence of epilepsy in people with cerebral palsy has been estimated to range from 33 to 41.2 percent.[21,24] Approximately one-third of children with cerebral palsy had epilepsy, according to one research. Others have had similar experiences.[25-26]

Epilepsy incidence and types vary depending on the kind of cerebral palsy. Epilepsy is most prevalent in hemiplegia (65.9%) and quadriplegia (42.6%), according to one study, which may be connected to the cortical involvement and degree of brain injury in these instances. Diplegia (15.8%) had the lowest rate of epilepsy, presumably because the brain injury in these individuals is primarily periventricular. [27]

Hadjipanayis et al found seizures in nearly half of their quadriplegic and hemiplegic patients.[28]Others have reported quadriplegia rates of 54 percent, hemiplegia rates of 34 to 60 percent, diplegia rates of 27 percent, and dystonic cerebral palsy rates of 23 to 26 percent. 52 Seizures were detected in 87.5 percent of children with hypotonic cerebral palsy.[29]

Hadjipanayis et al. reported 36.8 percent generalized and 33 percent partial seizures, 15.6 percent West's syndrome, and 10.6 percent myoclonic jerks. 28 In our analysis, no case of absence seizures were discovered. Other studies have found that 3.3 to 6.7 percent of people had absence seizures. However, only one of the six individuals with absence of seizures observed by Hadjipanayis et al had conventional absence seizures; the others all had atypical absence seizures.[28]Seizure types appear to be unrelated to neurologic findings. [30] According to certain studies, 36.7 percent

and 69.7 percent 29 of patients with seizure start in the first year of life. The onset of epilepsy is most likely related to the timing and severity of brain injury.

The severity and age of cerebral palsy. Children with quadriplegia and diplegia developed seizures at a much earlier age than children with hemiplegia, according to Hadjipanayiset al28. Whereas more than 60% of kids with quadriplegia and diplegia had their first seizure during the first year, 60% of children with hemiplegia had their first seizure after their first birthday. Monotherapy proved effective in controlling seizures in the vast majority of patients.

Polytherapy was necessary in half, a third, and a fourth of diplegia, quadriplegia, and hemiplegia patients, respectively, however the difference was not significant. Children with cerebral palsy and epilepsy often have abnormal EEGs (66 percent). The incidence of abnormal EEGs was more than 70% in all subgroups with spastic cerebral palsy. Patients with quadriplegia and diplegia had mostly bilateral epileptic activity, whereas roughly half of those with hemiplegia had focal findings. [27]

CT abnormalities are prevalent in patients with spastic cerebral palsy. In quadriplegia, cerebral atrophy was the most common result, but in hemiplegia, infarction, porencephalic cyst, and cerebral atrophy all occurred similarly (26.7 percent). Periventricular leukomalacia was significant (P 0.05) more prevalent in diplegia, as expected. Pedersen et colleagues found CT abnormalities in 77 percent of hemiplegia cases, 75 percent of quadriplegia cases, and 25 percent of diplegia cases (55 percent).[31]

In one study, the majority of children were diagnosed with mental disability. 5 percent and 15 percent, respectively, had normal and borderline social quotients. The incidence of mental retardation was higher among children with quadriplegia, followed by those with hemiplegia. In contrast, almost half of children with diplegia and 60% of children with dystonic cerebral palsy had a normal or borderline IQ, which again corresponds substantially with the kind and location of brain damage. [27]

One study revealed an interested link between mental impairment and an earlier age of start, greater frequency, and difficult-to-control seizures. Others have noticed the same findings.[32]It is likely that this is due to an underlying severity of brain damage that is causing both the severity of cognitive deficiency and the severity of epilepsy.

According to a study, the occurrence of mental impairment in a kid with cerebral palsy is connected with an increased risk of experiencing seizures.[24] Children with both epilepsy and cerebral palsy had poorer intellect as compared to those who do not have documented seizures.[30] Additional epilepsy has been shown to have a negative impact on IQ, memory, and learning in people with hemiplegic cerebral palsy. [33]

Limitation of the Study: The study's small sample size limits its application. The present study's major disadvantages include its single-center experience and nonrandomized study methodology. Because it was done in an urban setting, the findings may not be applicable to a larger populations.

CONCLUSION

The study results showed high frequency (55.3%) of Epilepsy among patients of Cerebral Palsy. Further, epilepsy was significantly associated with residence and family income. Epilepsy was also commonly observed in patients with female gender, having age more than 5 years, live in rural areas, with diplegia type CP, and undergraduate education of parents.

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