

Different Causes and its Association in Children with Cerebral Palsy

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ABSTRACT

Aim: To assess the different causes and their association of cerebral palsy in children.

Methods: We conducted this cross-sectional survey using consecutive sampling technique at the orthopedic surgery department Mayo hospital, Lahore from October 2011 to November. The sample size was 200 children of all age groups, on history and clinical examination who were diagnosed with cerebral palsy were included in the study and children or their parents refused to participate in the study were excluded.

Results: Out of the total 200 children, 42(21%) had <1year of age, 80(40%) has 1-5 year age, 62(31%) has 5-15 year and 16(8%) had reached the skeletal maturity. Majority, 130(65%) were boy and 70(35%) were girls. None of the participant was married till study completion. When education status was asked, majority 127(63.5%) were illiterate and 28(14%) children were admitted in nursery, 27(13.5%) had primary education, 13(6.5%) completed the matriculation and only 5(2.5%) children were enrolled as undergraduate.

Conclusion: Low socioeconomic status and illiterate population were in majority. Most children had age up to five years with one third of the children had associated illness.

Keywords: Cerebral palsy, congenital disease, central nervous system, motor impairment syndrome, gait analysis.

INTRODUCTION

Cerebral palsy is a group of non-progressive disorders of the brain and central nervous system. In the United States, approximately 500,000 children are affected by cerebral palsy (CP). Every year, it has been estimated to affect approximately 6000 children with 2 to 3 per 1000 live births^{1,2}. It has various types, in which broadly it accounts for spastic type (70% to 80%) and athetoid (10% to 15%) of the cerebral palsy (CP)³.

Its association with low birth weight and premature birth has been proven³. The prevalence of CP vary with in-term versus pre-term infants as 60-65% and 30-40% respectively. Infants with birth weight lower than 1500 gram have 90.4 & risk of CP, with multiple births has a minute risk of 0.2% for the single. Male to female has a 1.34:1 ratio⁴. It has no association with any specific ethnic group however low income has been recognized as a core risk that impacts adequate prenatal care and good medical care⁵.

It results in a premature lesion of the brain motor cortex up to two years of birth⁶. Motor skills may improve but there is a delay in milestones as compared to the normal child⁷. Central nervous system pathology results from many causes but mainly due to hypoxia, haemorrhage, mechanical injury to the spinal cord or brain stem and some bacterial or viral infections at 26 to 34th weeks^{4,8}. Failure to meet the metabolic demand at 38-40 weeks to the basal ganglia causes dystonia. Motor neuron injury affects the reticulospinal and corticospinal tracts that affect the motor activity of the CP child. Simultaneously, the reticulospinal tract and other systems play their functional role in the excitability of alpha and gamma neuron that results in the sparsity^{6,9,10}.

The objective of the study was to describe the demographic detail with the different association in patients with cerebral palsy.

METHODOLOGY

We conducted this cross-sectional survey using consecutive sampling technique at the orthopedic surgery department Mayo hospital, Lahore from October 2011 to November 2012. Sample size was 200 children of all age groups, who were diagnosed with cerebral palsy were included in the study and children or their parents refused to participate in the study were excluded.

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Ethical approval was obtained from institutional review board of the university and informed written consent was taken from the parents of the children. The purpose of the study was briefed. Data was collected using a questionnaire. The questionnaire was developed after going through online material, journals and books. The questions were proofread by the supervisor keeping the objective of the study. The questionnaire was a pilot test before administration to the study population. We obtained demographic data, mode, place of delivery, vaccination history, weight and APGAR score at the time of birth.

Collected data was coded and tabulated on the excel spreadsheet. For the analyzation of data obtained (continuous variable age, height, weight), SPSS version 18 was used, and data was showed in the form of tables and histograms. Quantitative data like age, APGAR score, weight and height were presented as mean and standard deviation. Qualitative data like gender, literacy and socio-economic status were presented as frequencies and percentages.

RESULTS

Out of the total 200 children, 42(21%) had <1year of age, 80(40%) has 1-5 year age, 62(31%) has 5-15 year and 16(8%) had reached the skeletal maturity. Majority, 130(65%) were boy and 70(35%) were girls. None of the participant was married till study completion. Only 3(1.5%) children suffer asthma, 5(2.5%) had skin infection, 6(3%) had acid peptic disease, and 24(12%) reported epilepsy as an associated disease. When education status was asked, majority 127(63.5%) were illiterate and 28(14%) children were admitted in nursery, 27(13.5%) had primary education, 13(6.5%) completed the matriculation and only 5(2.5%) children were enrolled as undergraduate. The mean height of the child was 86.19±29.63 cm and mean weight of the child was 16.03±9.12 Kg. The mean duration of the pregnancy 38.13±2.030 weeks with minimum duration of 28 weeks and maximum duration of 41 weeks (Table 1).

If we talked about the financial status of patients, majority 192(96%) were dependent, 5(2.5%) were self-earning and 3(1.5%) were unemployed. This reflects that most of the patient with cerebral palsy need constant care and constant burden to supporting family. Out of the total 200 sample, 59(29.50%) were students and 141(70.50%) dependents on the other. This shows that special attention should be given to CP child. According to the

financial status of parents of the examined patients, 148(74%) low socioeconomic status, 48(24%) middle socio-economic status and only 4(2%) belonged to upper socio-economic status. When mothers were inquired about the mode of the delivery, 144(72%) has spontaneous vaginal delivery, 50(35%) had delivery with cesarean, and 6(3%) had delivery with forceps. It was alarming to know that 66(33%) had delivery at home and 134(67%) had delivery at the hospital.

Patients were asked about their vaccination history. It was 195(97.5%) parents had polio vaccination, 191(95.5%) had BCG vaccination and 189(94.5%) had DPT, Tetanus and Measles vaccination. The mean birth weight was Mean weight at birth 2.21±0.44kg with minimum weight was 1.5kg and maximum weight was 3.0kg. The mean APGAR score was 6.41±2.45 with minimum score was 3 and maximum score was 10. The detail of the number of brothers and sisters were given in table 2.

Table 1: Demographic data of age, gender, educational status, weight, height and pregnancy duration

Variables	Frequency (n=200)	%age
Age of patients (years)		
<1 Year	42	21%
1-5 Years	80	40%
5-15 Years (Till skeletal maturity)	62	31%
More than skeletal Maturity	16	8.0%
Gender of the children		
Boy	130	65.0%
Girl	70	35.0%
Educational status		
Nil	127	63.5%
Nursery	28	14.0%
Primary	27	13.5%
Matriculation	13	6.5%
Undergraduate	05	2.5%
Weight in (Kg)	16.03±9.12	
Height in (Cm)	86.19±29.63	
Pregnancy Duration (Weeks)	38.13±2.030	

Table 2: Number of brother & sisters

Number of brothers & sisters	Frequency	Percent
0.00	7	3.5%
1.00	20	10.0%
2.00	38	19.0%
3.00	80	40.0%
4.00	37	18.5%
5.00	11	5.5%
6.00	5	2.5%
7.00	2	1.0%
Total	200	100%

DISCUSSION

From the previous decades, the epidemiology and aetiology of cerebral palsy have been changed regarding advanced healthcare systems in different societies. The survival of premature and growth-retarded babies and profoundly disabled young people with cerebral palsy was noticed to be increased but its occurrence rate seems to be the same as it was 40 years ago. In early childhood, the physical disability was most commonly caused by Cerebral Palsy (CP)¹¹.

The study which I have done on the financial status of parents showed that 148(74%) belonged to the lower class, 48(24%) were from the middle class and only 4(2%) of parents were from the upper class. The mothers who belonged to lower socio-economic groups, their children were at high risk of CP and the frequency of that risk was 50% higher in lower groups than in higher groups. Prematurity and low APGAR scores were some perinatal processes that were associated with increased risk of CP. All these results were in research done by Hjern A, *et al* in a large population in Sweden¹².

In our study, the details of APGAR and birth weight was taken. The mean weight of the child at birth was 2.21±0.44kg and

the mean APGAR score was 6.41±2.45. Similarly, the minimum and maximum weight at birth was 1.50 kg and 3 kg respectively. The minimum APGAR score was three and the maximum score was 10. Johnson *et al* ^[3] reported in data that premature birth and low birth weight is associated with 60-65% cause of CP.

Better data can be generated with multicentric studies. Data was inconsistent when reported from a single country or single centre regarding low birth weight and pre-term pregnancy¹³. Initially occurrence studies played a vital role in making a better understanding of CP. The low birth weight reported in these studies helped spread awareness amongst the mothers and families. Critically low birth weight has more association with CP^{2,3}. Another major risk factor for cerebral palsy is premature birth. By premature birth, it was understood that birth before 32 weeks of after the gestation^{14,15}. 16-28% of children would develop CP if they were born before 26 weeks. For children who were born between 32 and 36 weeks, the risk of CP was noticed to be higher than those who were born at 36 weeks of gestation^{16,17}. The results of this study showed that the mean pregnancy duration in patients suffering from CP was 38.13±2.030 weeks. The minimum and maximum period of pregnancy were 28 weeks and 41 weeks respectively.

Our study has limitation of the small sample size and single centre data. Further evidence can be developed by keeping a registry of the cerebral palsy patient and gather multi-centre data.

CONCLUSION

It was reported in the majority between the age of one to five years with boys were affected more than girls. CP child needs special attention due to which most did not attain the education. Low birth weight and premature pregnancy were reported amongst the children with cerebral palsy.

Conflict of interest: Nil

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