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Demographical and Obstetrics Characteristics of Study Subjects Coming in a Tertiary Care Hospital in Eastern U.P.

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ABSTRACT

Background: Cerebral Palsy is a common childhood neurodevelopmental disorder. Published studies estimate the prevalence of cerebral palsy in India to be 2.1 to 3 per 1000 live births. The present study was aimed to study the demographical and obstetrics characteristics of study subjects coming in a tertiary care hospital.
Methodology: It was an hospital-based case control study design. 125 cases of 2 to 18 years aged CP children attending pediatrics neurology unit and 125 controls from OPD, department of pediatrics were selected. Information regarding age, gender, caste, religion, place of birth, types of deliveries was collected using an interview schedule form for the study.
Result: Most children in both groups were aged 2-4 years (61.6%) and male (65.6%). A significant proportion of CP cases (69.6%) resided in rural areas, compared to 43.2% of controls ($p<0.001$). Caste wise, OBC representation was higher among cases (64.0%) than controls (34.4%) ($p<0.001$). While no significant differences were found in place of birth, delivery mode, or gestational age, a notable difference emerged in crying at birth- 84.8% of CP cases did not cry at birth versus 50.4% of controls ($p<0.001$).
Conclusion: The findings of this study the role of socio-demographic disparities and perinatal factors, especially preterm birth and birth asphyxia, ethology of CP. Improved the prenatal monitoring, and early interventions are important in reducing the burden of cerebral palsy among vulnerable population.

Keywords: Cerebral Palsy, Prevalence, India

INTRODUCTION

The term Cerebral palsy (CP) is group of permanent disorder and posture abnormalities associated with activity limitation resulting from non-progressive interruptions in the developing infant or fetus brain are all termed CP. Sensory, perceptual, cognitive, behavioral, and communication abnormalities, epilepsy, or secondary musculoskeletal issues are often associated with CP motor impairments [1]. According to published research worldwide, the prevalence of CP ranges from 1.5 to 4 per 1000 live births; however, in India which is a developing country the actual prevalence would be much larger than the probable figure, the estimated value ranges from 2.08 to 3.88 per 1000 live births. [2].

According to the topographical classification there are five types of CP are hemiplegia, diplegia, quadriplegia, monoplegia and triplegia. The hybrid type both combines features of two types. Hemiplegic CP (milder disorder affecting one side of the body), diplegic CP (more impairments of the legs than arms), quadriplegic CP (all four limbs affected equally), monoplegic CP (one affected limb), and triplegic CP (three affected limbs) are additional categories of CP based on impairments of the arms relative to the spastic legs [3]. There are different means by which CP can be categorized or described according to whether or not gross motor movement is included. According to the physiological classification there are mainly four types of CP which are spastic, dyskinetic, ataxic and mixed. The most common type, Spastic CP, affects about 77-93% of individuals who have the disorder. Around 2-15% of people with CP have dyskinetic CP, which is further divided into two categories: dystonia (ongoing or sustained contractions of muscles that lead to twisting) and athetosis (unpredictable, slow, turbulent, and writhing movements). The rarest form of CP (2-8%) is ataxic which is defined as unstable movements that affect balance and coordination [4].

MATERIALS & METHODS

The present study was conducted at Pediatrics Neurology unit of the Department of Pediatrics, Sir Sundarlal Hospital, Institute of Medical Sciences, Banaras Hindu University, Varanasi Uttar Pradesh.

Study Design and Period of data collection: This present study was hospital-based case control study and it was conducted during January 2024 to November 2024.

Study Subjects: The study subject was categorized into two groups, cases (CP children and their mothers) and controls (Normal children and their mothers).

Study Variables: Socio-demographic, economic variables like age, sex, place of residence, religion, caste, and Obstetrics variables like place of birth, Mode of delivery, Gestational age, Crying at birth.

Definition of Cases: Clinically diagnosed children of CP and their mothers attending the OPD of the Neurology Unit, Department of Pediatrics, IMS, BHU, Varanasi.

Inclusion criteria:

(i) Age group 2-18 years irrespective of genders.

(ii) The CP children whose mother are alive to provide the data

(iii) Written consent was taken from mother of each CP children.

Exclusion criteria:

(i) CP children with other chronic comorbidities/illness [e.g. Sequelae of inflammatory brain disorders, Chronic renal disease, Chronic liver and lung disease, inborn errors of metabolism].

(ii) CP children; whose mother is suffering with chronic diseases.

Definition of Controls: Apparently healthy children and their mothers coming to the hospital.

Inclusion Criteria:

1. Age group 2-18 years matched with cases in the intervals of 2 years and Gender is matched in 1:1 ratio
2. Written consent was taken from legal guardian of each apparently children.

Sample Size Calculation: The minimum sample size was determined using the formula for two independent proportion:

$$n = \frac{[\, Z_{1-\alpha/2}\sqrt{2PQ} + Z_{1-\beta}\sqrt{(p_1q_1+p_2q_2)}\,]^2}{[\, p_1-p_2]^2}$$

Where,

$P=(p_1+p_2)/2$ and $Q=1-P$, $q_{1=1-}\ p_1$, $q_2=1-p_2$

p_1= Proportion in group 1

p_2= Proportion in group 2

α=Level of significance

$1-\beta$=power of study

- In this study, case and control is one to one ratio we take 5% level of significance at 2 tailed test and 90%

power of study. Thus $Z_{(1-\alpha/2)}$ =1.96 and $Z_{(1-\beta)}$ =1.28

- p_1= proportion of sleep disorder in CP children=45%
- p_2= proportion of sleep disorder in apparently healthy children=25%
- (A Singh et.al 2022)
- Using the above formula, sample size was calculated to be 118 in each group.
- Adding the non-response rate of 5%, the required sample size was 125 in each group and total sample size for this study is 250.

Collection of Data: Interview Schedule was used as the main tool of data collection and it was be drafted based on the variables to fulfill the objectives of the study.

STATISTICAL ANALYSIS

Data were entered and analysed using SPSS software version 28.0. Descriptive statistics were used to summarize frequencies and percentages. Chi-square test was used to show the association between demographic and obstetrics profiling variables.

RESULT

Table No: 1- Distribution of demographic characteristics of study subjects-:

Demographical & clinical characteristics	Cases (n=125) Number (%)	Controls (n=125) Number (%)	Total (%)	χ^2, p value
Age group (in years)				
2-4	77(61.6)	77(61.6)	154(61.6)	
5-7	31(24.8)	31(24.8)	62(24.8)	
8 & above	17(13.6)	17(13.6)	34(13.6)	
Gender				
Male	82(65.6)	82(65.6)	164(65.6)	
Female	43(34.4)	43(34.4)	86(34.4)	
Residence				
Rural	87(69.6)	54(43.2)	141(56.4)	χ^2=17.71, p=0.000
Urban	38(30.4)	71(56.8)	109(43.6)	
Religion				
Hindu	109(87.2)	103(82.4)	212(84.8)	χ^2 =1.11, p=0.291
Muslim	16(12.8)	22(17.6)	38(15.2)	
Caste				
General	24(19.2)	53(42.4)	77(30.8)	χ^2 =23.40, p=0.000
OBC	80(64.0)	43(34.4)	123(49.2)	
SC	18(14.4)	24(19.2)	42(16.8)	
ST	3(2.4)	5(4.0)	8(3.2)	
Total	125(100.0)	125(100.0)		

Table no 1 presents the various demographic characteristics of 125 cases and 125 controls. For age group the distribution across the cases and controls is identical 2-4 years (61.6%), 5-7 years (24.8%) and ages 8 & above years (13.6%). Males (65.6%) and females (34.4%) in both groups are equally distributed. Regarding the place of residence, the majority of cases (69.6%) were from rural areas, while controls were predominantly urban (56.8%) there is a significant difference between case and controls as regards to residence. Regarding the religion 87.2% cases and 82.4% controls were Hindu and other 12.8% cases and 17.6% controls were Muslim and the difference between groups was not statistically significant. Regarding the caste OBC was the largest group among cases (64.0%), whereas controls had a higher proportion of General caste individuals (42.4%) and there is significant difference between case and controls as regards to caste.

Table 2: Details of Obstetrics history of children under study:

Obstetrics variables	Cases (n=125) Number (%)	Controls (n=125) Number (%)	Total (%)	χ^2, p value
Place of birth				
Private Hospital	68(54.4)	82(65.6)	150(60.0)	χ^2 =4.60, p=0.100
Government Hospital	50(40.0)	34(27.2)	84(33.6)	
Home	7(5.6)	9(7.2)	16(6.4)	
Mode of delivery				
SVD	92(73.6)	84(67.2)	176(70.4)	χ^2 =0.94, p=0.332
Cesarean(elective)/emergency	33(26.4)	41(32.8)	74(29.6)	
Gestational Age (weeks)				
Term (>37)	56(44.8)	46(36.8)	102(40.8)	χ^2 =1.65, p=0.198
Preterm (≤ 37)	69(55.2)	79(63.2)	148(59.2)	
Crying at birth				
Yes	19(15.2)	62(49.6)	81(32.4)	χ^2 =33.76, p=0.000
No	106(84.8)	63(50.4)	169(67.6)	
Total	125(100.0)	125(100.0)		

The table no 2 shows that details the birth history of children, comparing obstetrics variable between 125 cases and 125 controls. For the place of birth, private hospitals were the most, accounting for 60.0 of all births (54.4% of cases, 65.6% of controls), followed by government hospitals at 33.6% (40.0% of cases, 27.2% of controls) and home births at 6.4% (5.6% of cases, 7.2% of controls), there is no significant difference in the place of birth between two groups. Regarding the mode of delivery, Spontaneous Vaginal Delivery (SVD) was more frequent at 70.4% overall (73.6% of cases, 67.2% of controls), while Cesarean Sections(elective/emergency) made up 29.6% (26.4% of cases, 32.8% of controls), there is no significant difference in the mode of delivery. In the terms of gestational age, 40.8% of births were at term (>37 weeks), and 59.2% were preterm (≤ 37 weeks), there is no significant difference in gestational age between groups. For the crying at birth, (84.8%) of cases did not cry at birth, only (49.6%) of controls cried at birth. There is a significant difference in the crying at birth between groups.

DISCUSSION

This study explored the demographic and obstetrics characteristics of children attending a tertiary care hospital. The findings provide important insights into the pattern related to age, gender, caste, place of residence, birth history, and types of CP. The majority (61.6%) of children were in the 2-4 years age group, suggesting that early childhood is most common period of clinical recognition and diagnosis. Blair et al. [1] have reported that clinical signs of CP usually manifest during the first two years of life. Consistent with the other studies with an increased frequency of CP males, males were more affected than females (65.6% vs 34.4%) [4]. Male predominance as found in this study is in accordance with other Indian and global studies, although gender-specific age distribution disparity was not statistically significant [8]. Most children with CP (69.6%) were from rural areas. This could be an indication of disparity in prenatal care, perinatal management, and availability of healthcare, which are often more observed in rural settings. In addition, OBC children accounted for the majority (64%), followed by SC (14.4%), General (19.2%), and ST (2.4%). Aside from demographically reflecting regional demography, this caste distribution indicates possible socio-economic susceptibility because disadvantaged groups are more susceptible to such factors due to poor prenatal care and nutritional factors [7]. The single notable finding here is that 84.8% infants did not cry at birth and 55.2% of infants were born preterm, both of which are significant

indicators of perinatal asphyxia or difficulties at birth, which are significant risk factors for CP [5,6]. Premature birth and hypoxic-ischemic encephalopathy are also highlighted in studies by Spittle et.al. and Minocha et.al. as significant risk factors for CP [5,8]. The fact that 73.6% of deliveries were SVDs makes it a possibly that delivery-related complications were not anticipated or properly intervened upon, particularly within the remote or resource-limited settings. Eighty-four children who met the clinical inclusion criteria were studied. The median age was 5-years [IQR: 3.8] with an even mix of men and women. Over more than half (52.4%) of neonates did not cry at all in five minutes and/or required resuscitation for breathing, 55.3% had to be admitted to the NICU with median hospital stay of 5 days. SVD contributed 77.4% of the deliveries [9]. We found, in our study, a significant correlation between CP development and operative vaginal deliveries, which are vaginal deliveries involving the use of instruments, like suction or forceps. All these patients were delivered using vacuum-assisted delivery. A systematic review of risk factors for cerebral palsy in term-born children in industrialized countries identified that instrumental deliveries were associated with an increased risk of cerebral palsy (CP) than with spontaneous vaginal or elective caesarean sections. But another study did not show that surgical delivery was a common etiology among African countries [10]. In the present study conducted by Negeso et.al. sixty-five (91.5%) and six (8.5%) of the cases were delivered by caesarean section and spontaneous vaginal delivery, respectively. Eight (5.6%), twenty (14.1%), and 114 (80.3%) controls had assisted delivery, spontaneous vaginal delivery, and caesarean section, respectively [11]. The outcomes highlight the importance of early intervention and high-risk obstetric surveillance.

CONCLUSION

This study was aimed at studying "Demographic and Obstetrics characteristics" compares various demographic and obstetrics subject between 125 cases and 125 controls children in tertiary care hospital. The research highlights the prevalence of spastic quadriplegic CP among rural male children with a preterm birth and perinatal history of complications like failure to cry at birth. Excessive rates of poor neonatal outcomes, particularly in rural and less-equipped regions, points towards the necessity of improved obstetric and neonatal care even as hospital deliveries rise. These factors underscore the importance of improving antenatal care coverage, strengthening maternal health services, and building awareness of high-risk pregnancy. In tertiary care facilities, specific interventions are essential to mitigating avoidable prenatal risks and improving child health outcomes. These findings highlight the urgent requirement for enhanced perinatal monitoring, early intervention programs, and community-based rehabilitation methods.

Declaration by Authors

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