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Exploring the frequency of various risk Factors and its association with types of cerebal palsy in patients visiting NIRM Islamabad

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ABSTRACT

Background: Cerebral palsy (CP) is a set of permanent movement disorders which are caused by non-progressive lesions of the developing brain. Other disorders concerning (CP) are disturbances of sensation, cognition, and/or seizure disorder. The current study intended to compare the frequency of factors associated with risk in cerebral palsy and their link with the type of cerebral palsy. **Methods:** Case-control study was conducted to collect the data through a structured questionnaire. Data was collected from the mother of the CP child and from the mother of healthy individuals at the National Institute of Rehabilitation and Medicine Islamabad. Sample of 400 individuals selected through purposive sampling technique and divided in two groups. 100 were in the case group and 300 were in the control group. For statistical significance, SPSS 20 was used. **Results:** An aggregate of 400 patients selected in this study among which 100 were assigned as a case group and 300 as a control group. male and female children were equally distributed with N=150 in the control group, similarly equal gender distribution (N=50 for male and female each) was adopted for the case group. Among the risk factors leading to CP development, the most prevalent was maternal infection (56%) followed by poor socioeconomic status (45%), delayed crying(48%) after birth, and high-grade fever with fits leading to spastic CP(44%) and was significantly higher in case group as compared to control($p<0.05$). A higher frequency of CP children with a p-value of 0.00 was found in mothers having pregnancy in the age group 35-40 years. **Conclusions:** Our study concludes that among the risk factors associated with CP, the most frequent is maternal infection followed by delayed crying, low socioeconomic status and high-grade fever with fits and mother age of pregnancy above 35 years.

Keywords: Urinary tract infection, Spastic cerebral palsy, Prenatal care, Post-natal problems, Preterm birth

INTRODUCTION

Cerebral palsy is considered a neurological disorder caused by non-progressive brain injury or malformation that occurs while child's brain is under development. CP affects most commonly body movement and muscle coordination. [1]. The etiology of cerebral palsy is often not well understood. CP factors that may contribute to brain injury include prematurity, maternal infection, inflammation and coagulopathy. One of the leading cause for development of CP is prematurity. Maternal risk factors for CP include placental infarction, diabetes, mother age and thyroid disease, drug disorders, exposure of mother to various toxins. [4, 5].

Causes of developmental disability in postnatal stage are "Bacterial meningitis and Child battering". Postnatal causes for brain lesion can bacterial meningitis, delayed cry leading to hypoxia, hydrocephalus, and microcephaly brain injuries that occur during the first 2 years of life, severe jaundice and hypoglycemia [6, 7]. Premature baby i.e. before 37 weeks of gestation are much more likely to develop motor or balance disorders because of the immature brain development. Knotted umbilical cord around neck, multiple deliveries, breech presentation, partial or absent of cervix dilation during delivery and lack of oxygen at birth all are natal factor which play powerful role in the development of cerebral palsy. [8, 9]. CP has traditionally been classified by type of anatomic distribution and movement disorders. Movement pattern include ataxic, spastic, dyskinesia, hypotonic and mixed forms. [10, 11]. Among all types spastic CP is more prevalent among child. Hypotonic and ataxic type of CP are rare and therefore any child suspected these forms of CP require thorough diagnostic evaluation. The three categories of hemiparesis, diparesis and quadriplegia are the anatomic distribution of motor problems of cerebral palsy. [12]. Associated features of CP includes paralysis of gaze, perceptual deficits, partial or complete hearing loss, dysarthria, aphasia, sensory problems, seizures, emotional and behavioral problems.[13]. More than 80% of patients have abnormal findings on neuroimaging which can give valuable information about the pathogenesis of disease [14]. As CP is a broad term that does not depend upon single etiology, pathology or prognosis so careful history and early diagnosis of the injury to the developing brain are tools to rule out the cause and type of cerebral palsy. [15]. Proper management of a child with CP requires a detailed assessment to find out the functional capacity of the child and nature and extend of the motor as well as associated deficits. This can be best accompanied by a multidisciplinary team which includes pediatrician, physiotherapist, ENT specialist, occupational therapist and teacher. Early concealing of parents and caregivers also play vital role in the prognosis of disease.

MATERIALS AND METHODS

The case control study was conducted at NIRM, Islamabad, Pakistan and completed in 6 months (March to August 2015). Purposive sampling technique was used to collect data for 100 cerebral palsy and 300 controls

Data collection procedure:

Pre structured questionnaire was utilized to collect desired information from the care giver of case and control group. 13 questions related to prenatal, natal and postnatal factors were included in the questionnaire. Case group data was collected from National institute of rehabilitation medicine. Data for control group was collected from the mother of children who did not have cerebral palsy.

Statistical analysis:

Data was analyzed through SPSS version 19. Between case and control group data was analyzed with odd ratio.

RESULTS

The sample size was 400 patients where 100 patients were of case group and control group consisted of 300 patients. According to gender distribution male population was (51%) in case group and 48.6% in control group on the other hand 49% in cases group and (51.3%) in control group were females. Our result showed that gender did not come out to be the risk factor for CP ($p>0.05$).

Among clinical problems during pregnancy, urinary tract infection was reported in 56 % of mothers in case group during pregnancy while it was 24% of mothers in control group (Fig.1). In case group, Diabetes was found in 6% of mothers while in

control group, 1.3% of mothers. In case group, Drug disorders were reported in 5% of mothers and only 0.33% in other group. Significant association between clinical problem of mothers during pregnancy and CP was found ($p < 0.05$).

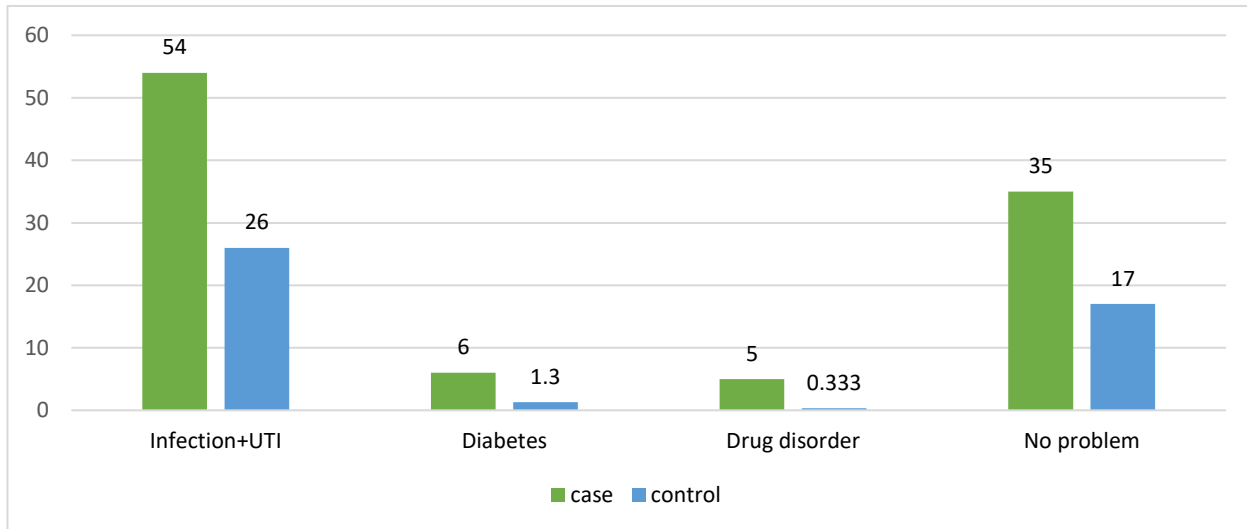


Figure 1: Percentage distribution of various problems in pregnancy

Our results showed that that a significant number of patients in cases group were preterm as compared to control group (26% vs. 6.7%), showing a significant association between term of pregnancy and CP ($p < 0.05$).

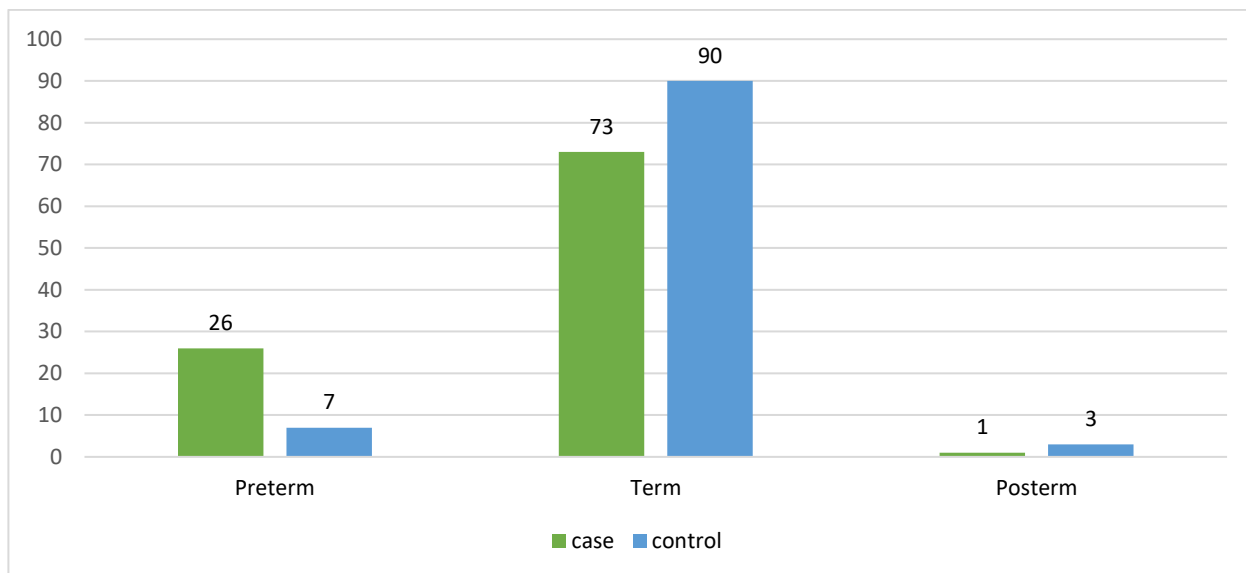


Figure 2: Comparison of case versus control group in Preterm factor.

Another interesting and important finding noted was that only 8% of children in control group had delayed cry at birth as compared to 48% of patients in case group, showing a significant association between delayed cry and CP ($p < 0.005$).

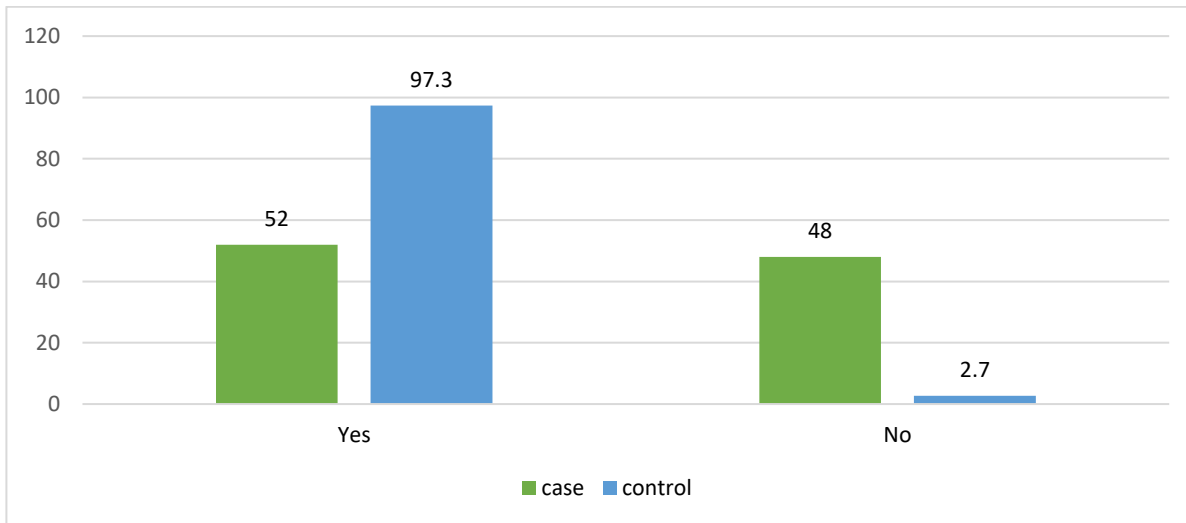


Figure 3: Comparison of cry at time of birth in case versus control group.

Weight of the patient at birth was noted and a significant number of patients in cases were low birth weight than control group (34% vs. 4%, $p < 0.05$).

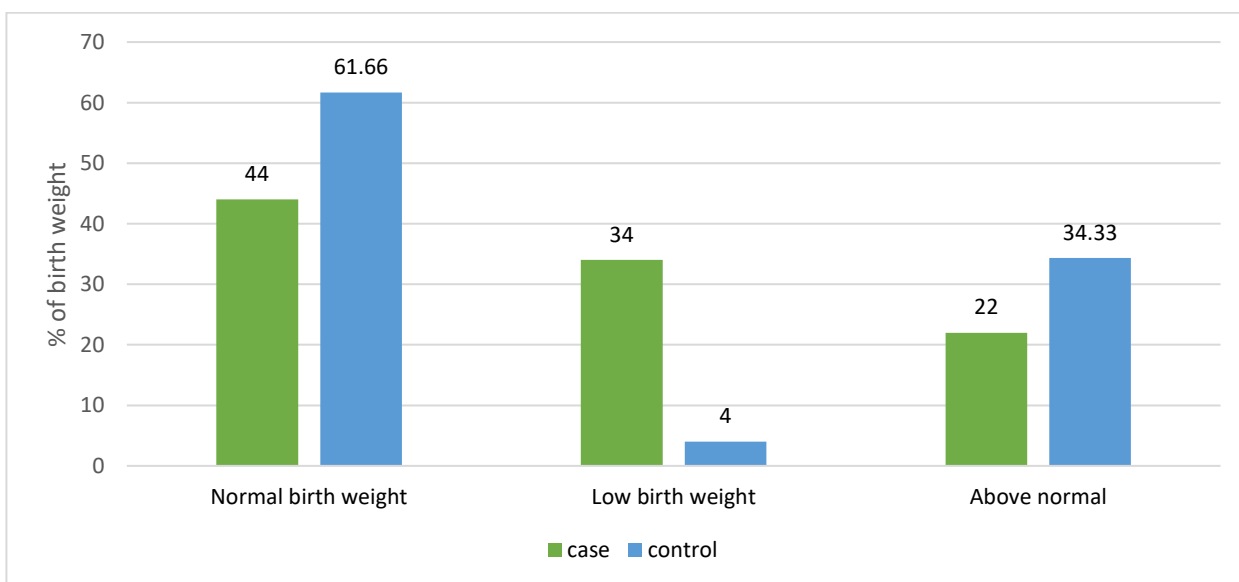


Figure 4: Frequency of birth weight in case versus control group.

Socioeconomic status of the patient was significantly related ($p < 0.05$) and in cases 45% of patients belonged to low socioeconomic status as compared to 15% of patients in control group.

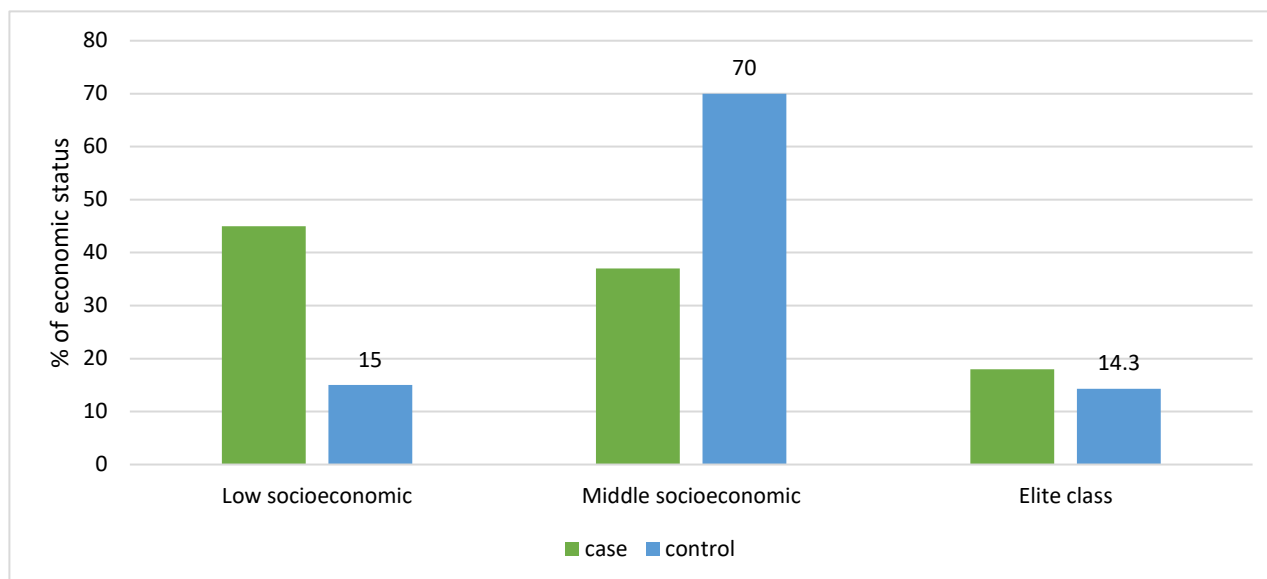


Figure 5: Comparison of socioeconomic status case versus control group.

History of jaundice after birth was found significant as 23% of patients in cases had history while in controls only 7% had positive history with calculated $p < 0.05$.

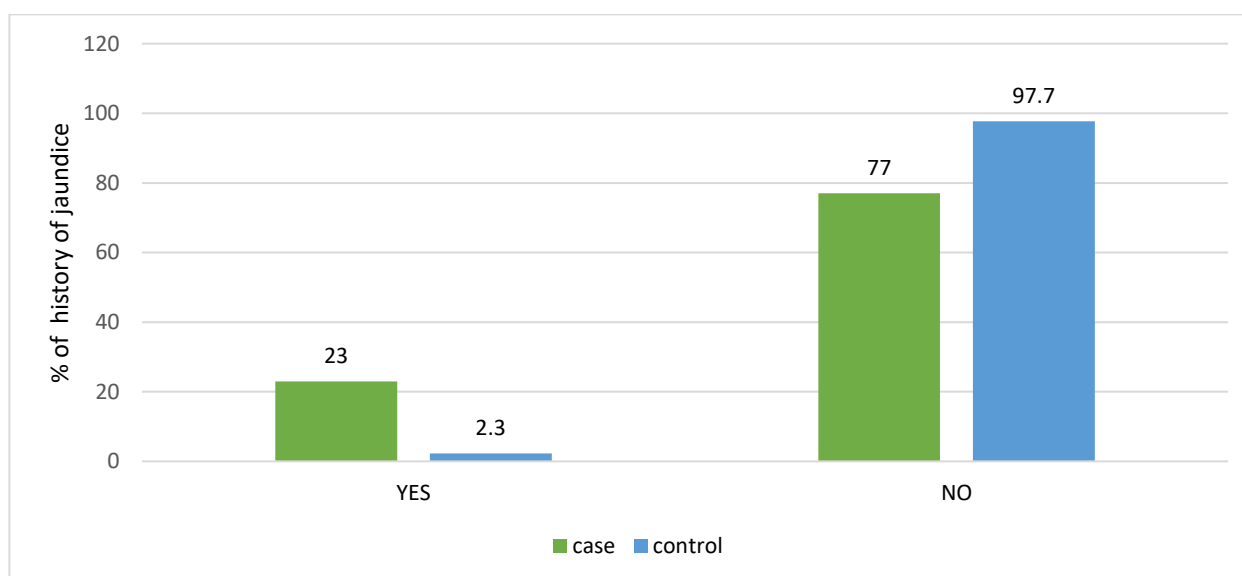


Figure 6: Percentage of history of jaundice present in case group.

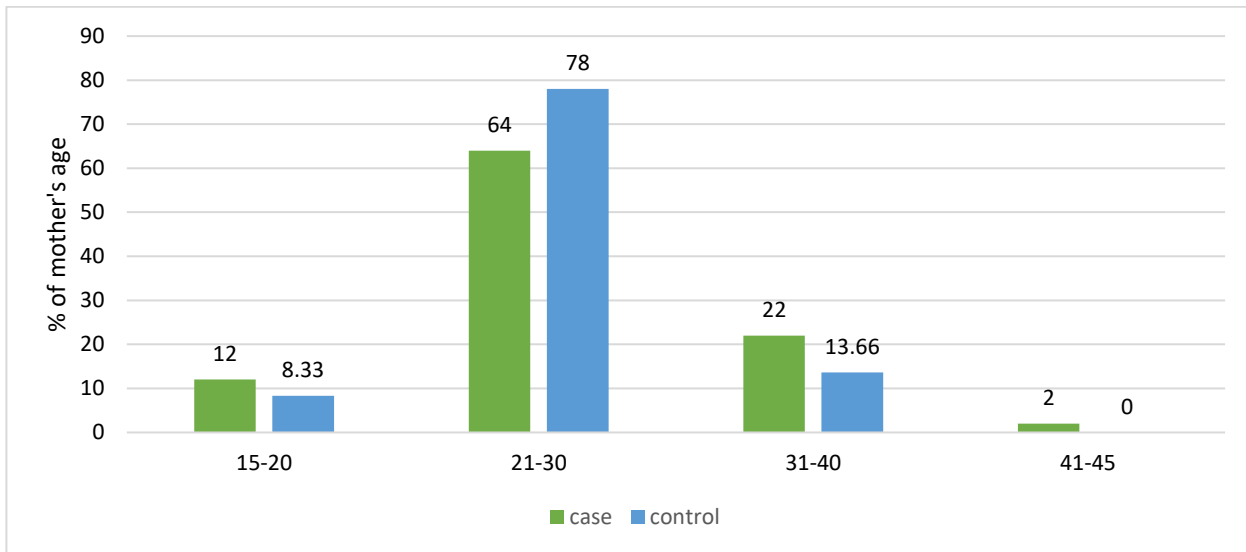


Figure 7: Percentage of Mother age during pregnancy.

Mother age ranges between 31-40 shows greater percentage in case as compare to control and can contribute to CP.

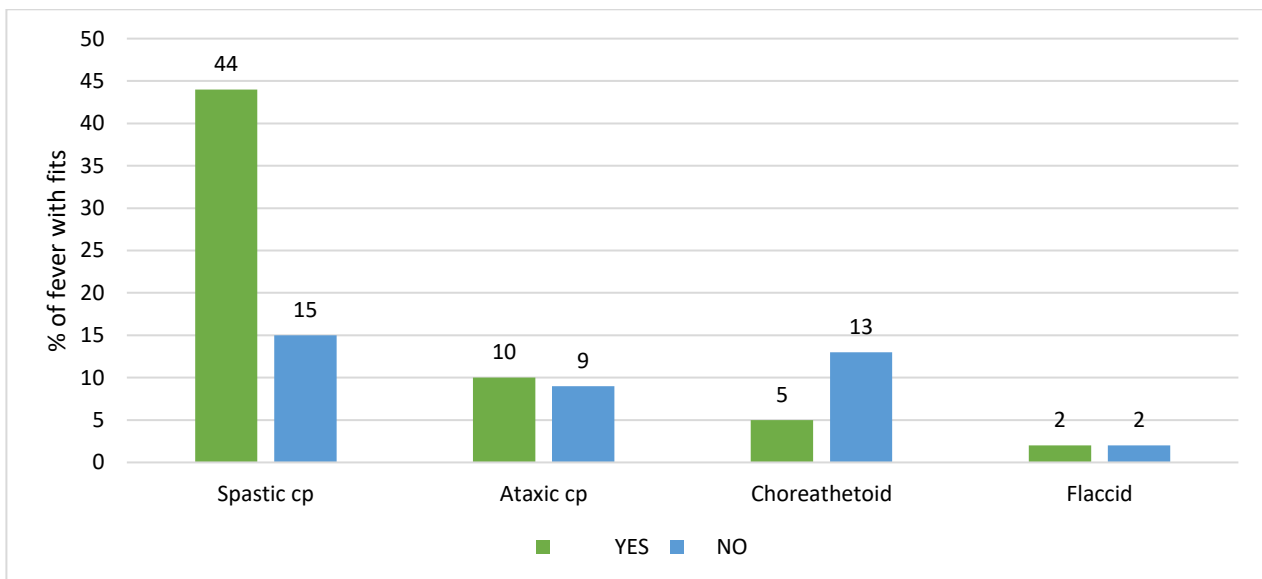


Figure: 8 Frequency of spastic CP with fever & fits.

DISCUSSION

CP is one of the leading cause of disability among children [16].early diagnosis and treatment or rehabilitation is essential to prevent long term and irreversible disabilities among CP children.so it is very essential to identify the risk factors that may lead to CP and its various types .here we compared the incidence of risk factors associated with CP among case and control groups, along with identifying the types of CP.

Our results show that preterm delivery and maternal urinary tract infection during pregnancy are the most frequent risk factors associated with CP. Similar results were found previously where pre term delivery of baby at 22 or 23 weeks of gestation and mother's infection including intrauterine growth restrictions and abruption of placenta were found highly associated with CP [17].

Among socioeconomically factors, poor socioeconomic status and home delivery showed greater association with CP. Home deliveries in developing countries are carried without essential medical care and birth asphyxia is common with such cases, which is among the leading causes in the pathophysiology of CP [18, 19].

Another important factor contributing as a risk for cerebral palsy is low birth weight. Low birth weights are especially significant among pre term babies [20]. Significant association was found among low birth weights and CP in our study. Similarly CP was more common among pre term births when cases and controls were matched. More over children having birth weight less than 2kg were more prone to cerebral palsy in this study. Our findings are supported by previous literature where preterm and low birth weights are reported among the highly prevalent risk factors for CP. One of the leading causes of low birth weight is hypomania and other ventilated issues [20]. Similarly preterm births especially of 23 to 27 weeks is considered as Absolute risk of CP.

Among natal factors contributing to CP, delayed cry is of prime importance. Some of the previous reports associate The history of delayed cry among CP children [21]. Similar results were obtained in our study where 48% of the cases had history of delayed cry as compared to controls where it was only 8% demonstrating a high association between CP and delayed cry. Among CP cases, meningitis accompanied by high-grade fever and fits was found to be frequent among spastic CP. These results are supported by some of the previous data where children who had seizures within 48 hours of birth were found to be high risk population for the development of cerebral palsy [22].

Major Limitation to our study was that it addressed only a single block of the whole community due to lack of the resources and time constraints moreover the links between the CP and experimental risk cannot be drawn out correctly because of the implementation of small sample size.

Conclusions

Our study concludes that major risk factors contributing to CP came out to be delayed cry, preterm births and low birth weights. Similarly, meningitis accompanied by fever and fits was the prime cause leading to spastic CP. Spastic CP is the most common type of CP concluded according to studies conducted. Various factors contribute to the development of CP. According to studies conducted, pre-natal, natal and post-natal problems mostly contribute to the development of this disease. Based upon the results of this study we hereby recommend further evaluation of the risk factors leading to CP at larger scale as well as the assessment of genetic factors leading to CP.

CONFLICT OF INTEREST

None to declare

AUTHOR CONTRIBUTION

HJ conceptualized the whole study and drafted the manuscript, AJ helped in study design and critically reviewed the manuscript, HA helped in data analysis and results interpretation, NK helped in editing the final version of the manuscript and improved the English grammar and removed the type errors, RR contributed to the design of study and revision of the final manuscript.

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