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Exploring Predisposing Factors for Cerebral Palsy in Patients Attending Tertiary Care Hospitals

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Abstract

Background: Cerebral palsy (CP) is a motor disability that originates in the early childhood; it is a group of permanent disorders that affect movement and posture, that typically result from brain insult in early childhood. Knowledge of the antecedents responsible for the development of CP is requisite for the champions of primary prevention as well as for management of children with such affliction especially in the developing nations. This cross-sectional study was carried out at a tertiary care hospital in Karachi, Pakistan where, healthcare services such as prenatal, perinatal, and postnatal care might affect CP outcomes.

Aim: The intended outcome of this research was to define predisposing factors related to cerebral palsy among paediatric patients in a tertiary care institution.

Method: About the study, a descriptive cross-sectional research design was adopted with the study site situated at the Department of Neurology, Dow University of Health Sciences, Karachi. A quantitative cross-sectional study which involved 91 children, with a confirmed diagnosis of CP, ranging from 2 to 8 years. The participants were chosen through the method of non-probability convenience sampling. Parents were interviewed using closed-ended questions, and the child's physical condition was assessed using a neurological examination with emphasis on predisposing factors such as P-I-H, perinatal factors such as birth asphyxia, and postnatal factors such as CNS infections. Data analysis was done Statistical Package for the Social Sciences (SPSS) version 24, Descriptive Statistical techniques was used for data presentation.

Results: PIH was reported as the leading prenatal condition with prevalence of 31 percent among the immediate post-partum clients. 9 % of the children and that was closely linked to mixed-type CP. Poor birth asphyxia assumed the largest perinatal factor and accounted for CP in 35 percent. However, it affects only 2% of the cases, and specific type is spastic diplegia. As expected, most of postnatal factors in this study were infection related and CNS infections were the most common, Affecting 39. 6% of the children and were significantly related to the types of spasticity including spastic diplegia, hemiplegia, and quadriplegia. Another parameter which was identified to have a connection with the increased cases of CP was spontaneous vaginal delivery and low parental education.

Conclusion: This work appreciates the impact of antepartum, intrapartum and neonatal factors in the causation of CP as explained by PIH, birth asphyxia and CNS infections. Thus, there is a need to also increase awareness of prenatal healthcare, attendants during childbirth, and preventable infections in order to reduce cases of CP. There is a need to conduct future studies to understand the development of the specified factors to result in CP and to establish the efficacy of early-intervention initiatives in the long-term.

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Keywords: Cerebral palsy, predisposing factors, pregnancy-induced hypertension, birth asphyxia, CNS infections, paediatric neurology, Karachi.

Introduction

Cerebral palsy (CP) therefore refers to a group of permanent nonprogressive neurological conditions that impact a person's movement and posture with many others indicating that coexisting disturbances may exist in sensation, cognition, communication, and behaviour. CP is caused by brain injury that is non-progressive, which affects the developing brain, and is often acquired before, during or within the initial days after birth [1]. The brain injury that results to CP is frequently linked with numerous prenatal, perinatal, and postnatal risk factors that differ from one study population and geographic location to another. Knowledge of these predisposing conditions is essential, not only to early diagnose children who are at risk but also to be able to design strategies for averting such issues, or to address any predisposing factor towards the effective improvement of the patient's conditions in future. Thus, it remains of paramount importance to understand the predisposing factors for CP. Globally, CP is the largest single cause of physical disability in children and it is life-long both for the child /patient and the family [2]. The condition significantly affects costs related to the consumption of health care resources, especially in developing countries where the availability of specialized services and support in rehabilitation may be limited. The to identification of pointer to risk factors of CP allows for early interventions that may lower the intensity of the disorder or even eliminate the risk factors that cause the disorder. However, knowing these factors can help to assist the healthcare practitioners to develop proper care models that aim at attending to the needs of children with CP with the possibility of enhancing their quality of life and functional results [3].

It is estimated, however, that in many developing countries such as Pakistan, the magnitude of CP is higher than that found in developed countries because of the challenges in socioeconomic status, lack of facilities and limited access to appropriate quality antenatal, intrapartum and post-natal care. Consequently, Karachi, the largest city in Pakistan, is an ideal study context for investigating the factors that contribute to CP because of its population heterogeneity and inequalities in the availability of health care services [4]. In this regard, many children are born into risky contextual factors that include poor maternal nutrition, no prenatal care, high home deliveries, and poor neonatal resuscitation. All these factors help to determine the higher rates of CP and at the same time stress the necessity of more specific studies to reveal all potential factors that raise the risk in this population group. Maternal infection, PIH and IUGR are some of prenatal factors that have been identified as having close association with CP. Some of the common causes of CP, such as PIH, can cause uteroplacental insufficiency; consequently, there is chronic fetal hypoxia, and eventual brain damage. Congenital infections including those in the TORCH group of pathogens, are also known to have an offending effect on the fetal brain hence contributing to CP. These prenatal factors are expected to have even more amplified effects in a setting such as Karachi, where women might not have access to adequate antenatal care; therefore, it is crucial to establish the proportion and relationship of these variables to CP in the area [5].

Many other secondary factors that occur during or soon after birth also play vital roles in the development of CP; these include birth asphyxia, preterm birth, and neonatal jaundice. Specifically, birth asphyxia is obviously the major reason for developing CP in many developing countries. This arises when the developing fetus, or the baby while still in the womb, during birth, or shortly after birth is deprived of oxygen that can cause brain damage resulting in CP. There is high risk of birth asphyxia where there are no qualified personnel to attend to women during childbirth, inaccessible emergency obstetric care and minimal facilities for neonatal resuscitation. The remaining significant MRC risk factor is preterm birth which causes underdevelopment of the brain and other organs of the body: preterm children are generally more sensitive to the various forms of injury that cause CP. If jaundice in neonates is not controlled, it leads to kernicterus which also leads to the development of

CP. Both facilities from home births to those births that happen in small ill-equipped health facilities common in Karachi, constitute the population where the incidence of these perinatal risk factors is almost certainly elevated, and therefore requires local studies in order to assess its role carefully. Similarly, other possible postnatal causes of CP include CNS infections, head trauma, and untreated severe jaundice. This paper covers CNS infections including meningitis and encephalitis that are very risky in places where patients have no easy access to better medical treatment [6]. These infections are grave and when they implant themselves in the brain they result to CP. Since IP has a significant impact on overall childhood morbidity and mortality and hence infectious diseases continue to be a major public health problem in Karachi, knowledge of the part played by postnatal infections in the pathogenesis of CP is worthwhile. In the same regard, postnatal risk factors include head injuries from accidents or abuse and or untreated jaundice that causes the baby to suffer from permanent neurological disorder.

In particular, the role of the predisposing factors for CP in a tertiary care hospital in Karachi is underlined by the possible intervention on different levels of the care continuum. Finding out the risk factors that are frequently seen and have the greatest impact in this population will help the clinicians fashion ways of preventing the occurrence of CP. For instance, increasing the chance of pregnant women to receive care during pregnancy, which would entail ensuring that pregnant women receive specialized care especially if they are classified as high risk pregnancies, and providing sufficient resources to ensure safe child birth may help in reducing some of the prenatal and perinatal risks that are likely to lead to CP. Likewise, increasing the care of the baby immediately after birth some of which is infection and jaundice could decrease the possibility of developing this condition after birth [7].

In other words, this study is set in a background where cerebral palsy's impact may be posed by both socio-economic factors and constrained health care. In light of this argument, this study seeks to establish the predisposing factors that could lead to development of CP among the focal group of a tertiary care hospital in Karachi. Knowledge of these factors is crucial to the formulation of the preventive measures and enhancement of the care of children with CP hence enhancing the quality of life of the affected children and their families.

In light of the aforementioned background, the purpose of this examine is as follows: The main aim of this study is to establish and determine factors that predispose paediatric patients to cerebral palsy within a tertiary hospital facility in Karachi, Pakistan. Thus, the main objectives of this study are to identify prenatal, perinatal and postnatal risk factors for the development of CP and to contribute to the improvement of knowledge and clinical practices with the use of interventions that might prevent or lessen the severity of such an outcome in this particular population. Altogether, the findings of this study based on the data collected with the patients and their families will make a significant addition into the current state of knowledge about CP and will be of great use for further promising attempts in the enhancement of the care and prognosis of the children affected by this severe and multifaceted disease [8].

Material and Methods

It was planned as a descriptive cross sectional and was conducted at the Department of Neurology, Dow University of Health Sciences, Karachi. The focus of this study was basically on analysing and determining the antecedent factors related to CP in the paediatric patients treated in a tertiary health care facility. The cross-sectional design was adopted because it enables the determination of the popularity of several factors and their inventory in relationship to CP at one point in time. Due to the challenges that are bound to be faced when conducting long-term research in health facilities this method proves ideal. Thus, by implementing this design, it was possible to capture a cross-sectional view of the factors that contribute to CP among this population and identify research-informed interventions for its prevention.

The eligible participants consisted of children between the ages of 2 and 8 years who clinically diagnosed with CP. The inclusion criteria were clearly elaborated to confine the study with the children of this age group since it is an appropriate age for the identification of CP and commencement of treatment. Children less than 2 years old were not included to further press out cases in which CP may not be easily identifiable and children more than 8 years were not included to minimize on variations in duration of the condition and complications arising out of it. The study involved 91 patients from which the researcher used non-probability convenience sampling techniques. This sampling technique was adopted given the ease of accessing the patients traveling for treatment in the neurology department's outpatient clinics and in-patient units. However, due to its nature, non-probability sampling may have a potential issue in selection bias Non-probability sampling was considered suitable for this study because the aim was to identify specific predisposing factors in a given population within a certain period [9].

The collection of data was done systematically to enable reliable information to be collected since the study is empirical. The means of the data collection was interviewing, which is a primary research method; in particular, the interview had a clearly defined set of questions; the subjects of the interview were the parents or the primary caregivers of the children. These interviews aimed at establishing detailed information on the children's antecedents which might have contributed to CP including the prenatal, perinatal, and postnatal period. This was conducted by research assistants who were trained to interview the patients under the watchful eye of neurologists with experience in such processes in order to record all necessary details. Clinical assessments in terms of gross motor and tone were carried out on all the children by the attending neurologists as a way of confirming the diagnosis of CP and categorizing it by type.

The predisposing factors assessed in the study were categorized into three main groups: Prenatal, perinatal, and postnatal factors came under the consideration in this context. These were defined as conditions or events that occurred before birth such as pregnancy induced hypertension (PIH), maternal infections, and intra/perinatal factors that resulted in IUGR. PIH was chosen for examination, because the data of its connection with complications of pregnancy and childbirth, including CP, are rather unambiguous. Questionnaires were completed by the mother and the medical records of the mother-as well, the presence of PIH was also confirmed by the verbal response of the mother. Prenatal features like maternal infections during pregnancy were clarified, especially those that affect neurodevelopment including the TORCH pathogens; toxoplasmosis, others, rubella, cytomegaloviral and herpes simplex virus.

According to the type of intervention, perinatal factors were described as occurring during birth or within the first 72 hours of life. Among such IMRs were birth asphyxia, prematurity, low birth weight, and neonatal jaundice. One of the main perinatal variables examined in the study was the birth asphyxia, which is defined as oxygen deprivation during birth. Data on birth asphyxia was collected from birth documents when available and the parents' recall during the interviews. Other variables of focus included prematurity and low birth weight because both of them had a close relationship with the development of CP. According to the results, prematurity was operationally defined as delivery before 37 completed weeks of pregnancy, whereas low birth weight was identified as fewer than 2,500 grams at birth. Neonatal jaundice, the other perinatal variable, intended whether the child got treated for jaundice soon after birth with focus being placed on the cases that needed phototherapy or exchange transfusion [10].

It comprised factors that happen in the period after birth and are associated with CP development. The postnatal factors predominantly investigated were post meningitis and postencephalitic, which are CNS infections including meningitis and encephalitis. These infections were diagnosed from the records of the children and reports from the parents. The study also looked at other factors that may occur after the birth, that is head injury and the failure to treat severe jaundice, which causes kernicterus a type of CP. The data collection procedures were used so that no stone would be left

unturned to make sure that all factors that may have predisposed the child to the acquired CP were well captured for each child.

Statistical analysis was done with the help of SPSS version 24. This statistical software was chosen for its reliability and to fit to most research studies in medicine for analysis of complicated data. The collected data were punched into this SPSS database and further cleaned to reduce errors or missing values. In terms of analysing the participants' data, frequencies and percentages were calculated for the collected demographic characteristics, clinical types of CP, and predisposing factors. Descriptive statistics enabled a distinction of predisposing factors and their distribution that was of great help in expressing the results of the research in terms of frequency and proportionality to the types of CP.

However, cross tabulation was also done in order to determine potential interrelation between the mentioned predisposing factors and clinical types of CP. This allowed to define which of the indicators was most closely connected with certain types of CP, for example, spastic diplegia, spastic quadriplegia, or mixed type of the disease. The findings of the analysis were further discussed in relation to the relevant prior research to compare the results with the other investigations and focus on the specifics of CP in the studied population [11].

In sum, the materials and procedures used in the study were well planned and selected to make sure that the study that was carried out aimed at identifying predisposing factors of cerebral palsy in tertiary care in Karachi is very effective and reliable. The structured approach of data collection alongside the use of SPSS for the data analysis and interpretation offered a strong background when examining the contextual relationships between prenatal, perinatal and postnatal factors that may lead to the development of CP. The knowledge generated from this study should inform the direction of future investigations in the specialty of paediatric neurology, especially regarding CP prevention, wherein there remains a critical gap in literature considering that more than 75% of the global burden of CP is estimated to be in LMICs.

Results

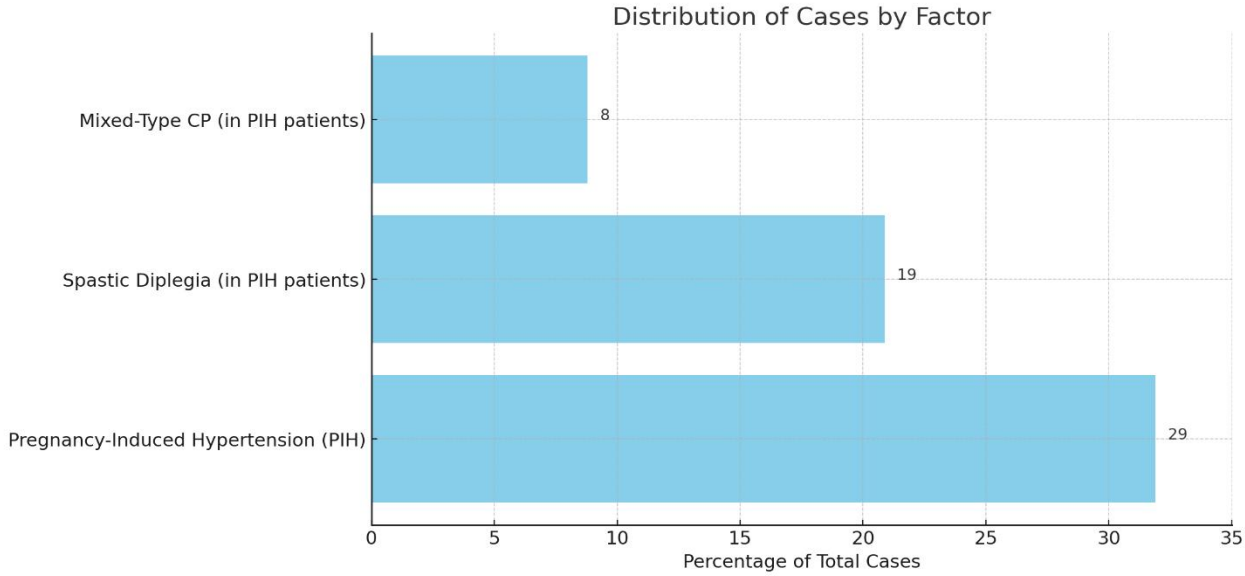
Consequently, this study aimed descriptive cross-sectional study to identify the predisposing factors of the 91 paediatric patients suffering from CP in a tertiary health care facility of Karachi. Noticeably, the analysis was aimed at evaluating antenatal, intranasal, and early postnatal influences related to distinct kinds of CP. The following is a summary of the findings with regards to main factors and envisaged wants to depict the prevalence of the CP types within the study population.

Thus, PIH was recognized as the most common prenatal condition, with a frequency of 31%. Taking it into consideration, a total of 29 participants out of 91 corresponds to 9% of the study populace. Therefore, this high prevalence points to the huge contribution that PIH makes in the causation of CP, mostly in the developing world where there may be restricted access to adequate antenatal care. The study showed that Patient's income level was highly correlated with mixed type of CP, that is, 53%. In children diagnosed with mixed-type CP, only 3% of them, that is 8 out of 15, had mothers who suffered from PIH. This may explain the fact that multiple interacting motor dysfunctions discussed above and forming the basis for the mixed-type CP might be related to the chronic fetal hypoxia and placental insufficiency in PIH. Furthermore, 19 patients had spastic diplegia identified as the most common form of CP. Children who had PIH had a 4% prevalence of CP, thus proving that PIH also leads to this certain type of CP [12].

Table 1: Prenatal Factors and CP Association

Factor	Number of Cases	Percentage
Pregnancy-Induced Hypertension (PIH)	29	**31.9%**
Spastic Diplegia (in PIH patients)	19	

		20.9%
Mixed-Type CP (in PIH patients)	8	**8.8%**

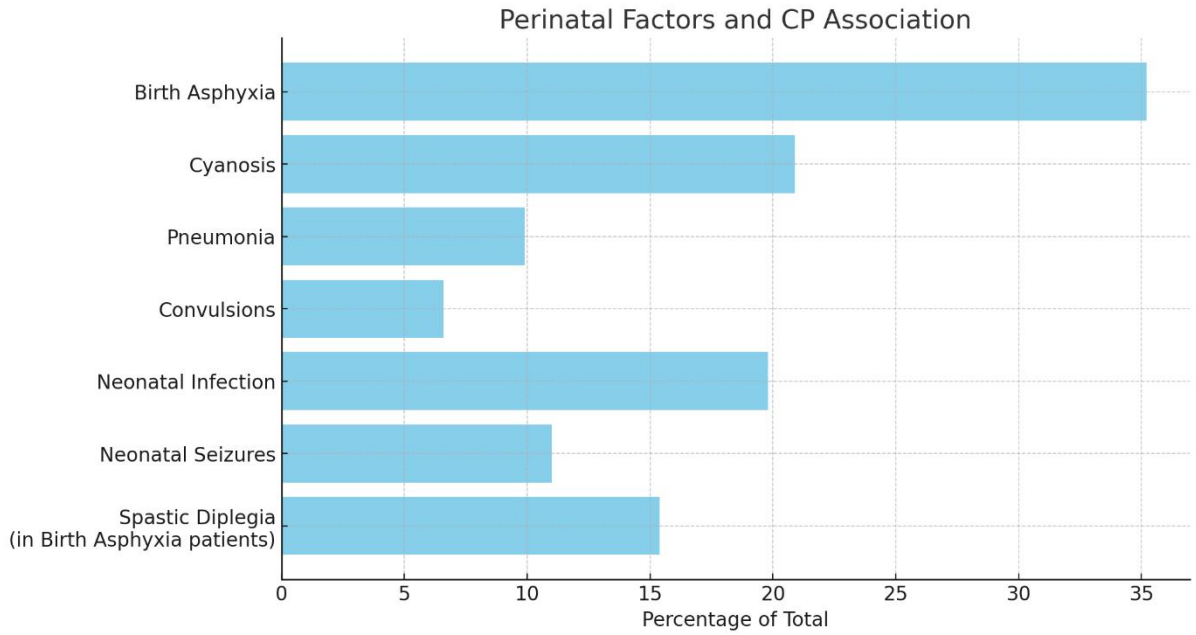


According to the perinatal factors explored, birth asphyxia was found to be the most impactful factor for the development of CP, which affected 35. Thus, this study indicates that 32 of the 91 children, or 2%, are ill. The present investigation revealed that on comparing the index of risk of various types of handicapped children, there was a very high degree of correlation between birth asphyxia and spastic diplegia and 38. 9% (14 out of 36) of the children diagnosed to have spastic diplegia accompanied by history of birth asphyxia. This issue brings about the significance of ensuring skilled birth, and proper resuscitation of newborns who are also at a high risk of developing CP as a result of perinatal hypoxia. Other perinatal factors were also considered; these are as follows Cyanosis 19, Pneumonia 9, Convulsions 6, area of sunken chest 10, received blood transfusion 14. Neonatal infection was seen in 8% (18 out of 91) of the children and neonatal seizures encountered in 11% (10 out of 91) of the cases. These factors also demonstrated a strong relationship with spastic forms of CP, thus supporting the notion on the involvement of perinatal complications in the development of the condition [13].

Table 2: Perinatal Factors and CP Association

Factor	**Number of Cases**	**Percentage of Total**
Birth Asphyxia	32	**35.2%**
Cyanosis	19	**20.9%**
Pneumonia	9	**9.9%**
Convulsions	6	**6.6%**
Neonatal Infection	18	**19.8%**
Neonatal Seizures	10	**11%**
Spastic Diplegia (in Birth Asphyxia	14	

patients)		**15.4%**



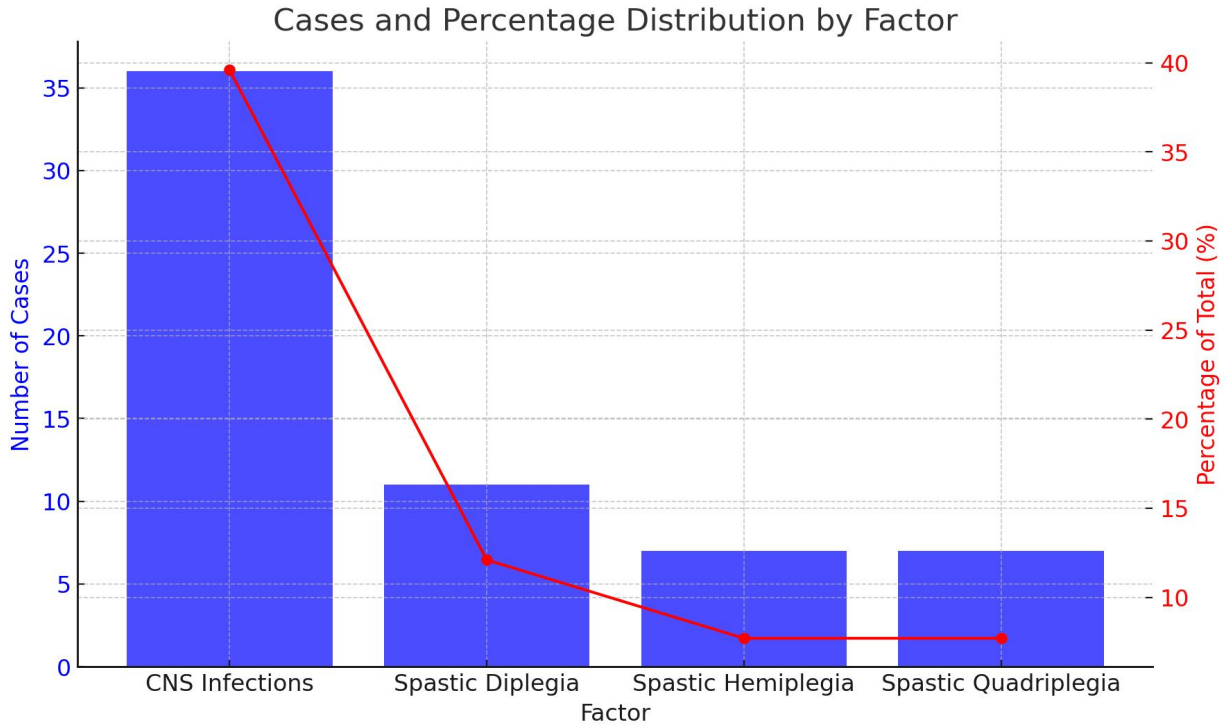
Infections of the central nervous system were further flagged as the most postnatal factor linked to CP with a prevalence estimate of 39. out of 91, 36 children accounted for 6%. Most of these, for instance, meningitis and encephalitis attack the brain and have been known to cause damages that culminate in different forms of CP. In this study, CNS infections revealed strongest relation with the SOP of spastic diplegia with 30 percent frequency among all the children included in the study. In another study, 6% (11 out of 36) of the affected children presenting with this kind of CP. Moreover, CNS infections were associated with the outcome of spastic hemiplegia and spastic quadriplegia both of which were noted in 19. Hence, only 4% (7 out of 36) of the children with a history of CNS infections had the complication. Of the postnatal factors that predispose an individual to CNS infections, high rates were noted in the present study; therefore, early diagnosis and intervention for these conditions are important to avoid detrimental neurological effects.

The study also considered the association between the mode of delivery and development of CP. SVD was common among the study population [70%] compared to assisted vaginal delivery [Assisted VD] which was at 29% and elective C/S at 1%. The number of respondent organizations that experienced increase in VIP clients with the use of the portal was 64 which is 3% out of 91 cases. Interestingly, it has been found that, the SVD birth was statistically associated with the occurrence of spastic diplegia in childhood with prevalence of 29% in the studied population. Among the study population, 7% of the patients, specifically 27 of 91, was diagnosed with this type of CP. This result raises the possibility that events associated with vaginal birth, for example, difficulty in delivering the baby and fetal distress, could cause spastic diplegia [14].

Table 3: Postnatal Factors and CP Association

Factor	Number of Cases	Percentage of Total
CNS Infections	36	**39.6%**

Spastic Diplegia (in CNS Infection patients)	11	**12.1%**
Spastic Hemiplegia (in CNS Infection patients)	7	**7.7%**
Spastic Quadriplegia (in CNS Infection patients)	7	**7.7%**



Socioeconomic status was another parameter that was taken into consideration in the given investigation. Although a slightly higher percentage of respondents (47. 5% or 43 out of 91) were female, a vast majority of them (63. 7% or 58 out of 91) was from the low income families. These findings show the trends between low SES and the occurrence of the CP types, particularly, spastic diplegia with higher percentage of fifty percent (50%), (58% = 29 children) of the children from the lower income families had spastic diplegia form of Cerebral palsy. This association draws the attention to other social and economic factors that increase the likelihood of developing CP, for example, poor utilization of maternal health services, poor diet, and physical environment. These findings imply that the reduction of the socio-economic factors could have an important contribution in the decrease of the global burden of CP in the developing world.

Discussion

The development of this study is in conformity with and adds to the literature database on cerebral palsy (CP), mainly regarding the risk factors linked with the genesis of several forms of CP. Pregnancy-induced hypertension (PIH), birth asphyxia, and CNS infections were seen as such key denominated risk factors to CP in a tertiary care setting in Karachi, Pakistan among children and adolescents. These findings are in support of earlier published studies done in both developed and the developing world where these have been identified factors that play a major role in the causal

pathway of CP. Nevertheless, the findings presented in this study help in understanding several issues that are related to the burden of CP in Karachi and which cannot be fathomed out from the general results of any global analysis of risk factors for developing CP in newborns [15].

PIH is a prenatal risk factor for CP prevailing in all the studies reviewed and hence the study has revealed new information unawareness of PIH is a condition associated with increased risk of having a child with CP. Several investigations undertaking in different parts of the world still described maternal hypertensive disorders as contributing to unfavourable neurodevelopmental outcomes such as CP. For instance, investigations conducted among high-income countries established that PIH predisposes women to pre-eclampsia; this in turns precipitates placental insufficiency and chronic fetal hypoxaemia which led to development of brain injuries that precipitate CP [16]. These results support the aforementioned association in the present study, especially regarding mixed-type CP that was pointed to be tightly linked with a history of PIH. This could have a forbidder that the perused chequer – board of injuries resulting from chronic hypoxia – may precipitate the children for a blend of motor dysfunctions for injuries that are in concordance with other studies. In the case of Karachi, though, AN could also represent other systemic problems relating to pregnancy complications that stem from PIH, including poor prenatal care, malnutrition, and restricted access to hospital facilities [17].

Another cause of CP that was established in this study is birth asphyxia, which is, also a recognized perinatal condition that contributes to the condition in regions with poor healthcare infrastructure. Indeed, birth asphyxia correlates with spastic forms of CP, particularly spastic diplegia, which can be observed based on the results of the presented study. Several studies prove that intrapartum hypoxic and ischemic insult as a cause of HIE and lesioning of the brain's motor areas, which creates an outcome of spasticity or other kinds of motor abnormality [18]. This study revealed a high prevalence of birth asphyxia which points to a big problem that needs urgent solution to prevent development of CP through effective skilled birth attendance and functional neonatal resuscitation skills. In Karachi, where an immense number of women deliver at home or receive professional assistance in understaffed healthcare facilities, the lack of qualified staff and the insufficient emergency obstetric care are the main obstacles to preventing further instances of NES. This underlines the value of country-wide health interventions to raise the quality of maternal and neonatal care with an emphasis on the education of midwives and birth attendants concerning neonatal care practices [19].

CNS infections as a postnatal cause identified in this study is also supported by evidence in the literature as the leading postnatal risk factors linked with the development of CP especially in developing countries with high prevalence of infections. The connection between CNS infections and severe forms of CP including spastic hemiplegia and spastic quadriplegia that has been revealed in the context of the present study coincides with findings of others. Cases such as meningitis and encephalitis are known to lead to severe damages to the brain and hence the formation of CP. In Karachi, the incidence of ID continues to be high and hence the results of this study add on finding the need for enhancing the measures taken in infection control especially in neonate and paediatric units. This consists of vaccination, early identification and management of CNS infections with an aim of preventing neurological sequelae [20].

The clinical application of these findings also together with the therapeutic processes involved is rather important. Interventions oriented at early diagnosis and control of risk factors associated with the development of CP are critical to minimizing the prevalence of this disabling disease. The findings of the study should therefore be used to promote adequate prenatal care with a view of preventing and managing PIH. This comprises the consistent assessment of BP, counselling expectant women about their diets and lifestyles, and screening for Pharmaceutical-Induced Hypertension, among others. Thirdly, increasing the quality of the perinatal care especially about the management of birth asphyxia is important. This can be made by conducting programs to train healthcare providers in newborn

resuscitation and by making sure that all deliveries, facility based and home, are helped by skilled personnel.

With regard to postnatal care, it is pointed that further infection control interventions are required so that controls of CNS infections and resulting CP could be achieved. This entails making certain that each child is administered on the recommended immunization mostly the ones that cause encephalitis or meningitis. Infections are also another significant cause of brain damage, which leads to CP; therefore, early diagnosis and treatment are vital. The results of this study imply that healthcare providers in Karachi and other similar context, ought to prevent CP through the use of an umbrella approach that targets the prenatal, perinatal, and post-natal phases [21].

However, the study also has some limitations and challenges that are worth to be mentioned. This limitation of available diagnostic equipment and specialty care makes accurate diagnosis of the disease, as well as its management, very difficult in resource-poor environments such as Karachi. The age at which the children was diagnosed for the condition might have been rather late, meaning that the early intervention which is important when it comes to children with CP might have been delayed. Furthermore, in assigning a score, the study used self-reported measures that originated from non-probability convenience sampling; therefore, the participants were from a tertiary care hospital meaning that children with CP who may not be accessing such facilities may be excluded. Due to the selection of a small sample of 91 patients, some generalizability of the results is affected. A larger sample will result in a more refined data and enable the researchers examine in detail predisposing factors and different forms of CP. In addition, it should be noted that the work has a cross-sectional nature, which makes it possible to bi-directionally determine the presence of associations, but not prerequisites, and therefore it cannot be stated that the identified risk factors are the causes of CP. Further, more long-term follow-up research could be needed to assess the results of the kids with CP in this particular setting and to confirm that the relationships suggested by this study would be causal.

In conclusion, the present research work has explored the antecedents that may be linked with risk of developing cerebral palsy in a tertiary care out-patient department of Karachi. Erabor opens up significant points which correlate with the literature reviews espoused in this paper: the contribution of PIH, birth asphyxia, and CNS infections as aetiology of CP. At the same time, it is necessary to note that the study also underlines the special ownership of healthcare risks in Karachi because of limited access and low quality of healthcare caused by socio-economic issues. The implications for clinical practice are clear: It is therefore important to make changes to the prenatal, perinatal and postnatal care so that there are reductions in the rates of CP. Therefore, this study adds important information to the body of literature and highlights the imperative role that future research will play in dealing with the burden of CP in areas with limited resources [22].

Conclusion

This paper is important in drawing attention to the important predisposing factors of CP in tertiary level health care centre in Karachi revealing that factors such as PIH, birth asphyxia and CNS infection are the most important contributors and that PIH with CP is more related to mixed type or CP and that birth asphyxia to spastic diplegia. These results only emphasize the necessity for additional study to establish the links between these variables and CP and review the efficacy of the early intervention approaches in the future prognosis of the disorder as well. For those reasons, the focus should be made both on policy shift as well as on the healthcare improvements particularly concerning antenatal, intrapartum, and postnatal care, DPPI being especially important for the population deprived of access to adequate resources, similar to women from Karachi.

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