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Research Article

### PREVALENCE OF CEREBRAL PALSY AND ITS DIFFERENT PRESENTATIONS AMONG CHILDREN OF GUJRANWALA, PAKISTAN

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**Abstract:**

*The objective of this study is to investigate the prevalence of cerebral palsy and its different presentations among children of Gujranwala, Pakistan. This study was executed among children of 4-6 years of age at DHQ hospital Gujranwala, Pakistan. The data was collected by a cross sectional survey and used close ended questionnaire based on APGAR, GMFCS and surveillance of cerebral palsy in Europe (SCPE) study. Parents of the children were interviewed and completed the questionnaires. SPSS software was used for Data analysis. Total of 138 cp children, were reported in DHQ hospital Gujranwala during 2-3 months. Out of which 61.6% were male and 38.4% were female. Findings of the research showed that incidence of spastic cp 89.9% was more common than the atonic 10.1%, athetoid and mixed cp. In subtypes of cp the quadriplegic cp 57.2% was more common than the diplegic 31.9% and hemiplegic cp 10.9% in children of Gujranwala Pakistan. Most common etiological factors of cp were birth asphyxia 81.9%, prematurity 10.9% and kernicterus 7.2%. Most of children were resided to the rural areas 75.4% and 24.6% were from urban area. The mode of delivery of most children were normal 57.2% and 34.1% were reported C-section other 8.7% were forceps deliveries.*

*Spastic quadriplegia were the frequent presentation in Gujranwala, Pakistan. The numerous etiological factors in CP development were birth asphyxia, prematurity and kernicterus. Rural area has the more prevalence of Cp in children than the urban areas. Majority of the affected children were male than the females.*

**Keywords:** Cerebral palsy, Spastic, Quadriplegic, Atonic, Diplegia, Premature birth, Birth asphyxia, Clinical presentation.

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**INTRODUCTION:**

Cerebral palsy (CP) is a neurogenic disorder of movement control and posture caused by damage to the developing brain that may occur during pregnancy, around delivery or within the first three years of life. It is a non-progressive disorder that affects movements, posture and sensations.

Cerebral palsy (CP) was first described in 1862 by an orthopedic surgeon named William James Little(1). World-wide prevalence of CP is approximately 2-2.5 per 1000 live births(2). The prevalence of CP has been extensively studied worldwide; it is higher in developing countries and shows a variable prevalence rate ranging from 1.5 to 3 per 1000 live births(3). Major etiological factors linked to the development of CP vary in terms of their relationship to the time of delivery (i.e. prenatal, perinatal and postnatal periods). These factors include birth asphyxia, prematurity, birth trauma, maternal infections and drug abuse, intracranial infections and kernicterus(2). The tremendous risk factor for the development of CP is Prematurity (born earlier than 37 weeks of gestation period). A comprehensive history from the mother or caregivers (in case mother was not available) was taken about pregnancy, place and gestational age record, mode of delivery, family history, developmental milestones, birth weight, and health status. Apgar scores, if feasible, were used for labeling birth asphyxia. Where Apgar scores were not available, birth asphyxia was draft based on positive information in the history i.e. positive history of delayed cry for >5 minutes after birth, baby turning blue and demanding oxygen supplementation or history of lethargy and/or seizures with-in 72 hours of delivery. Defects in the immature brain and affects movements, posture, or motor function of the body are considered the keystones associated with the cerebral palsy.

The motor disorders of cerebral palsy are often followed by disturbances of sensation, perception, communication, cognition, and behavior by epilepsy, and by secondary musculoskeletal problems.. Numerous clinical reports, in small series of patients, have indicated that brain damage may result in gastrointestinal (GI) dysfunction. Dysphagia, dysfunctional feeding patterns, vomiting and chronic constipation have all been reported in neurologically impaired children. Children with CP suffer from multiple problems and potential disabilities that require the provision of family-centered services that make a difference in the lives of these children and their families.(4) There are three major principles for diagnosis of cp neurological control deficits (that

alters movements or posture and either before birth or in the first year of life. Children with CP generally present with developmental delay and motor deficits. The difference between a non-progressive and progressive clinical course is very important. Classically, loss of previously acquired milestones (regression) marks the onset of most metabolic and neurodegenerative disorders (NDD)(5). Motor deficits of CP include negative phenomena such as weakness, fatigue, incoordination and positive phenomena such as spasticity, clonus, rigidity, and spasms. Spasticity is a velocity dependent increased muscle tone with hyperreflexia resulting from hyper excitability of the stretch reflex. It can start to muscle stiffness, functional impairment, and atrophy. The etiologies can be distributed according to the timing of the investive as prenatal (commonest), natal, or postnatal. Another etiologic classification system depends on the certain causes such as congenital (developmental, malformations, syndromic) or acquired (traumatic, infectious, hypoxic, ischemic, TORCH infections, and others). Perinatal asphyxia is a cause in only 8% to 15% of all cases. CP can be classified according to the SCPE (surveillance cerebral palsy europe) monoplegia, diplegia, hemiplegia, and quadriplegia. And subtypes of cp are Spastic, Ataxic, dystonic, dyskinetics and choreo athetoid. Diplegia is present when the lower extremities are primarily affected, although the upper extremities are not completely spared. Spastic diplegia is the most common type of CP and is associated with prematurity. According to the recent research in Sawabi Khyber Pakhtunkhwa Pakistan the prevalence of CP in children was 1.22/1000 live births in district Swabi, Khyber Pakhtunkhwa - Pakistan. Majority of affected children were in the age group of 9-10 (39.6%) years. About half of the affected children had spastic quadriplegia and severe deformities were recorded in 39.2% cases. Spastic quadriplegia or spastic diplegia are the commonest presentations in Pakistani children diagnosed with CP(6). Another research in Islamabad, Rawalpindi Pakistan, 102 children, 46 (45.1%) were male and 56 (54.9%) were female with a mean age of  $5.6 \pm 2.25$  years. Spastic cerebral palsy was the commonest presentation (90.2%) mainly presenting as diplegia (33.3%) and quadriplegia (32.4%) followed by atonic, ataxic/mixed and athetoid CP accounting for 3.9%, 3.9%, and 2.0% (2).

Birth asphyxia was the most encountered etiologic factor (32.4%) followed by prematurity (26.5%), kernicterus (12.7%) and meningoencephalitis (10.8%). Spastic quadriplegic and diplegic CP were primarily related to birth asphyxia, hemiplegic, ataxic

and mixed CP to prematurity and atonic and athetoid CP to kernicterus(2). Pakistan being a under developed country and having an under-developed health care system still seeming a high prevalence of CP children. The report about prevalence, statistics and management needs to be better in Pakistan to improve health-care of such children. The aim of our study is to find out the prevalence of cerebral palsy and its different presentations among children of Gujranwala. Because very few studies on Cerebral Palsy was lead in Gujranwala Pakistan.

#### Literature review:

Ays, e Serdaroglu, Ali Cans, Seçil Özkan and Sabahat Tezcan et al (2006) conducted survey on prevalence of cerebral palsy in Turkish children between age 2 to 16 year. In their study, 41861 children were selected. Data was collected by parental interview and physical examination. 186 children were identified with CP. The prevalence of CP was recognized as 4.4 per 1000 live births and included postnatally acquired CP. Origin of CP was classified as prenatal in 49 (26.6%), perinatal/neonatal in 34 (18.5%), postnatal in 11 (5.9%), and unclassifiable in 90 participants (48.9%; data was unobtainable for two individuals). Type of CP was diplegia in 39.8% of children, hemiplegia in 28%, tetraplegia in 19.9%, ataxia in 5.9%, and dyskinetic in 6.4%.(3) Ahmad A, Akhtar N, Ali H Pakistan. Khyber Med Univ et al (2017).they conducted a reaserch of Prevalence of cerebral palsy in children of District Swabi, Khyber Pakhtunkhwa – As total of 278 children were found sufferers of CP, in them 191 (68.7%) were male children and 87 (45.5%) were female. Mean age was  $7.6 \pm 1.97$  years. Prevalence rate was recorded as 1.22/1000 live births. Most of the children were found in the age group between 9-10 (39.6%) years. Out of 278 children, 109 (39.2%) were severely affected, 112 (40.3%) moderately and 57 (20.5%) were mildly affected. Almost half of the children (49.6%) were suffering from spastic quadriplegia. The frequency of affected children was higher from urban areas (91.7%) as compared to rural areas (8.3%).(6) The pooled overall prevalence of CP was 2.11 per 1000 live births (95% confidence interval [CI] 1.98–2.25). The prevalence of CP stratified by gestational age group showed the highest pooled prevalence to be in children weighing 1000 to 1499g at birth (59.18 per 1000 live births; 95% CI 53.06–66.01), although there was no significant difference on pairwise meta-regression with children weighing less than 1000g. The prevalence of CP expressed by gestational age was highest in children born before 28 weeks' gestation (111.80 per 1000 live births).(5)

Atif Ahmed Khan, Khalil Ahmad, Saeed Bin Ayaz, Aisha Ayyub and Uzma Akhlaq et al (2014) conducted a hospital based survey on cerebral palsy in Pakistani children. Among 102 children, 46 (45.1%) were male and 56 (54.9%) were female with a mean age of  $5.6 \pm 2.25$  years. Spastic cerebral palsy was the commonest presentation (90.2%) mainly presenting as diplegia (33.3%) and quadriplegia (32.4%) followed by atonic, ataxic/mixed and athetoid CP accounting for 3.9%, 3.9%, and 2.0% respectively. Birth asphyxia was the most encountered etiologic factor (32.4%) followed by prematurity (26.5%), kernicterus (12.7%) and meningoencephalitis (10.8%). Spastic quadriplegic and diplegic CP were primarily related to birth asphyxia, hemiplegic, ataxic and mixed CP to prematurity and atonic and athetoid CP to kernicterus.(2)

Kim Van Naarden Braun, Laura Schieve, Deborah Christensen, Alyson Goodman, Marshalyn Yeargin-Allsopp et al (2015) conducted a population based study on birth prevalence of cerebral palsy in United States. The overall birth prevalence of congenital CP increased modestly from 1.9 per 1000 1-year survivors in 1985 to 2.2 in 2002, representing an average annual increase of 1.2% (95% confidence interval [CI] 0.1 to 2.3). However, when restricted to children with spastic CP there were no significant trends in birth prevalence (average annual change in birth prevalence of 0.3% [95% CI –1.1 to 1.8]). No changes in prevalence were observed by spastic laterality. A significant increase was observed for children with hypotonic CP, driven primarily by higher prevalence in 2008 and 2010, which contributed to the small overall increase.(7)

Peter O D Pharoah, Mary Jane Platt, Theresa Cooke et al (1996) conducted research on changing epidemiology of cerebral palsy. Over 1500 cases formed the database for the study.

There were 1612 cases of idiopathic cerebral palsy on the register born during 1966-89; 916 were male and 696 female, giving a male:female ratio of 1.3: 1. The clinical type of cerebral palsy was recorded in 1599 cases. These comprised 525 (32.6%) cases of hemiplegia, 360 (22.3%) of diplegia, 581 (36.0%) of quadriplegia and 133(8.3%) "other." There was no record of type of cerebral palsy in 13 (0.8%). There were 51 (3.2%) cases of birthweight <1000g, 189 (11.7%) were 1001-1500 g, 408 (25.3%) were 1501-2500 g and 962 (59.8%) were >2500 g. In two (0.1%) cases the birthweight was not recorded.(8)

#### METHODOLOGY:

A Cross sectional survey was conducted in DHQ Gujranwala. A written consent was taken from DHQ authority and verbal consent was taken from the parents of children. (Appendix2,1)

Study design: hospital based survey

Sample size: 138 CP patients

Sampling technique: Convenient sampling technique

Setting: DHQ Gujranwala Inclusion criteria:

≥4 years children

Who Fulfill the definition of CP according to SCPE.

Exclusion criteria:

Not fulfill the definition of CP

Myopathies

Other neurological disorders

Measurements:

Data collection procedure: Cross sectional survey

Data collection tool: Close ended questionnaire based on APGAR score scale, GMFCS , SCPE.

4 to 6 years, in which the incidence of 4 years old children were 46.4%, and 5 years old children were 37.7% and 6 years old were 15.9%. Out of which(61.6%) were male and (38.4%)were females. Findings of the research showed that the incidence of spastic cp(89.9%) were more common than the atonic(10.1%), athetoid and mixed cp. In subtypes of cp the quadriplegic cp(57.2%) were more common than the diplegic(31.9%) and hemiplegic cp(10.9%) in children of Gujranwala Pakistan. Following Data indicated that the etiology of cp were birth asphyxia(81.9%), prematurity(10.9%)and kernicterus(7.2%) . Most of children were belonged to the rural area(75.4%) and (24.6%) were from urban area. The mode of delivery of most children were normal (57.2%) and (34.1%) were reported C-section other (8.7%) were forceps deliveries.

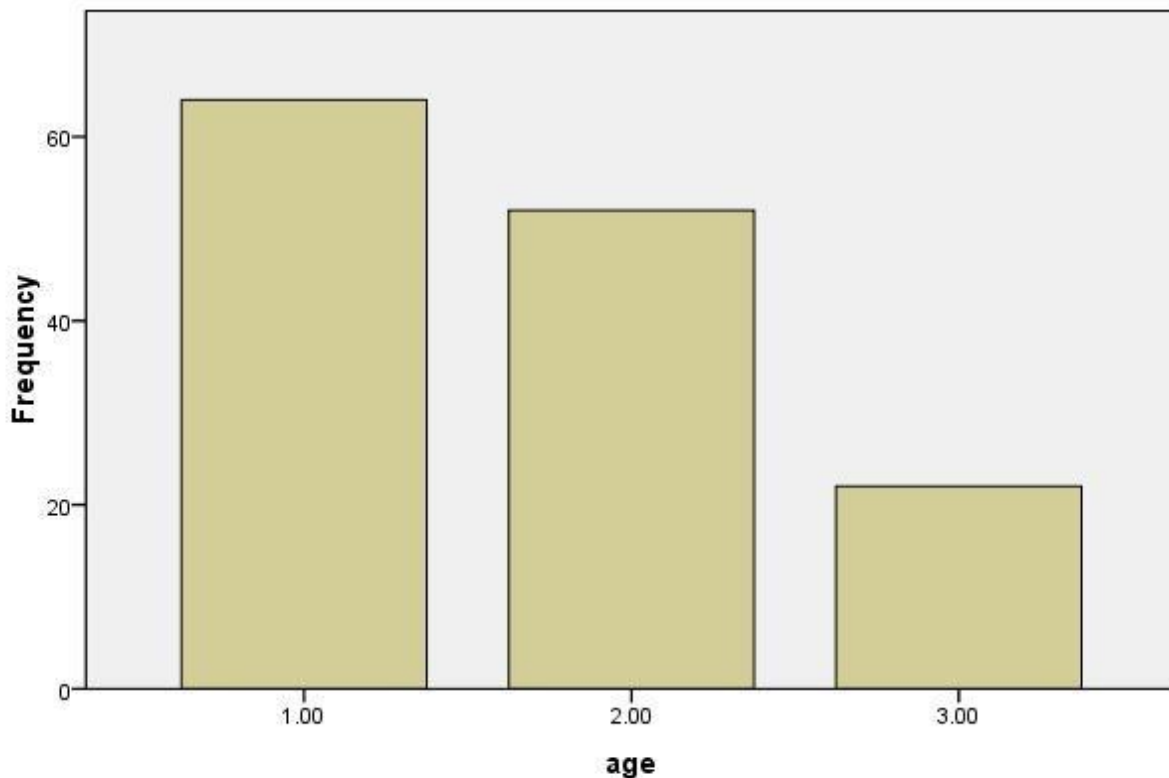
1:00 = 4 years

2:00 =5 years

3:00 = 6 years

### RESULTS:

Total of 138 cp children, were reported in DHQ hospital, gujranwala during 2-3 months. Mean age was

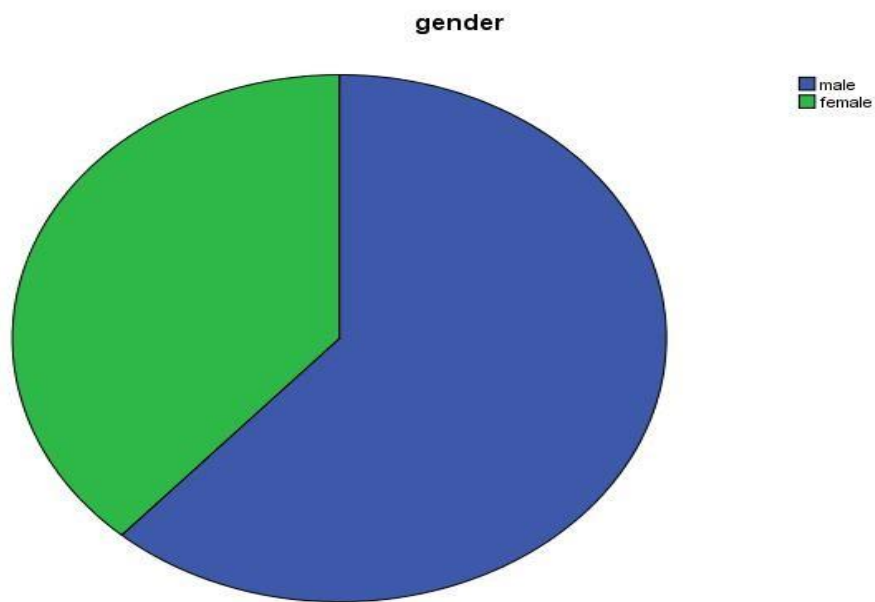
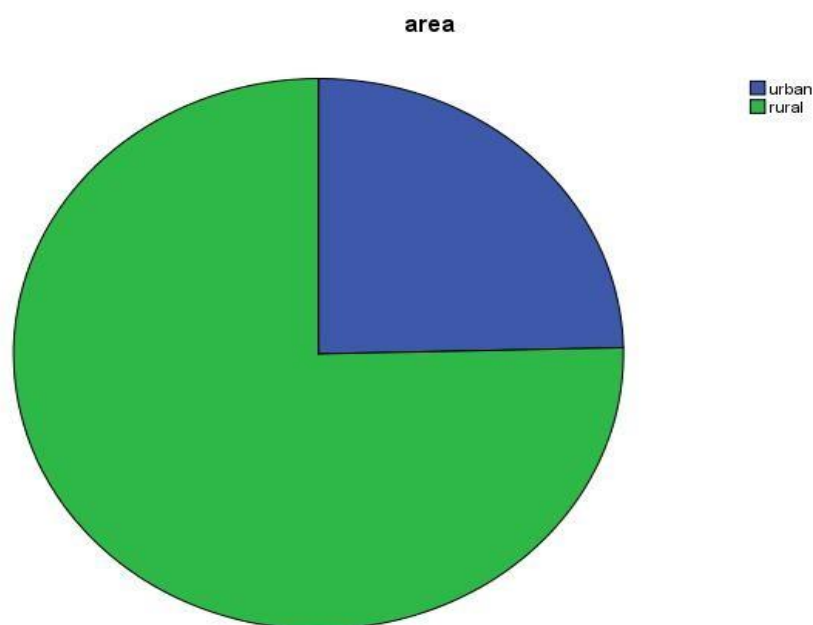


**Figure 1: Participant's Age**

Incidence of 4 years old children were 46.4%, and 5 years old children were 37.7% and 6 years old were 15.9%.

**Figure 2: Participant's Area**

Most of children were belonged to the rural area(75.4%) and (24.6%) were from urban area.

**Figure 3: Participant's Gender** ( 61.6%) were male and (38.4%)were females.



**Figure 4: Participants mode of delivery**

The mode of delivery of most children were normal (57.2%) and (34.1%) were reported C- section and other (8.7%) were forceps deliveries.

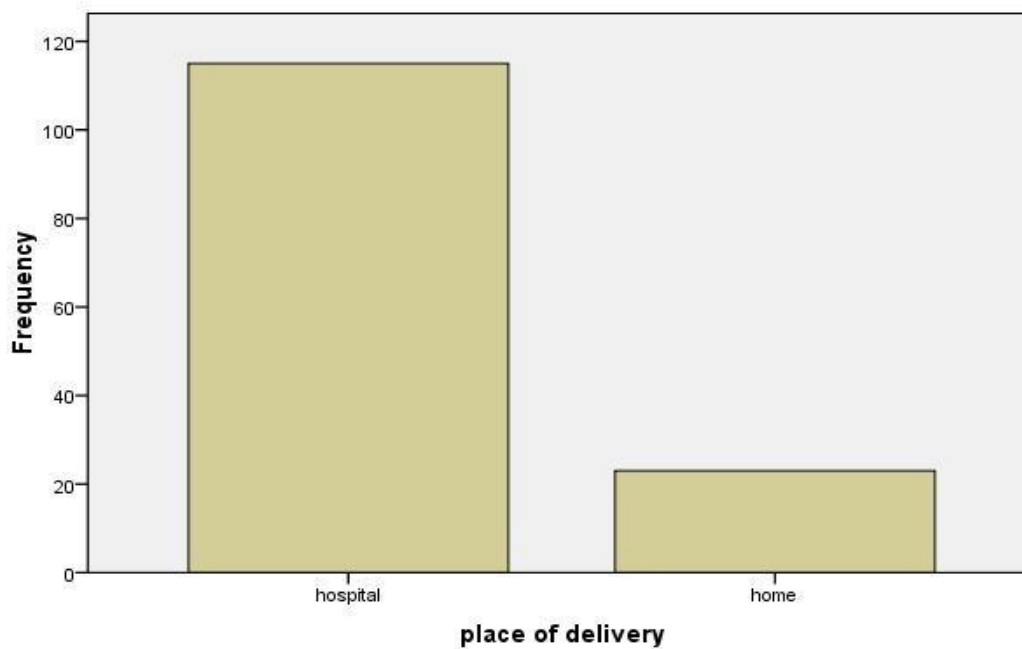


Figure 5: participant's Place of delivery

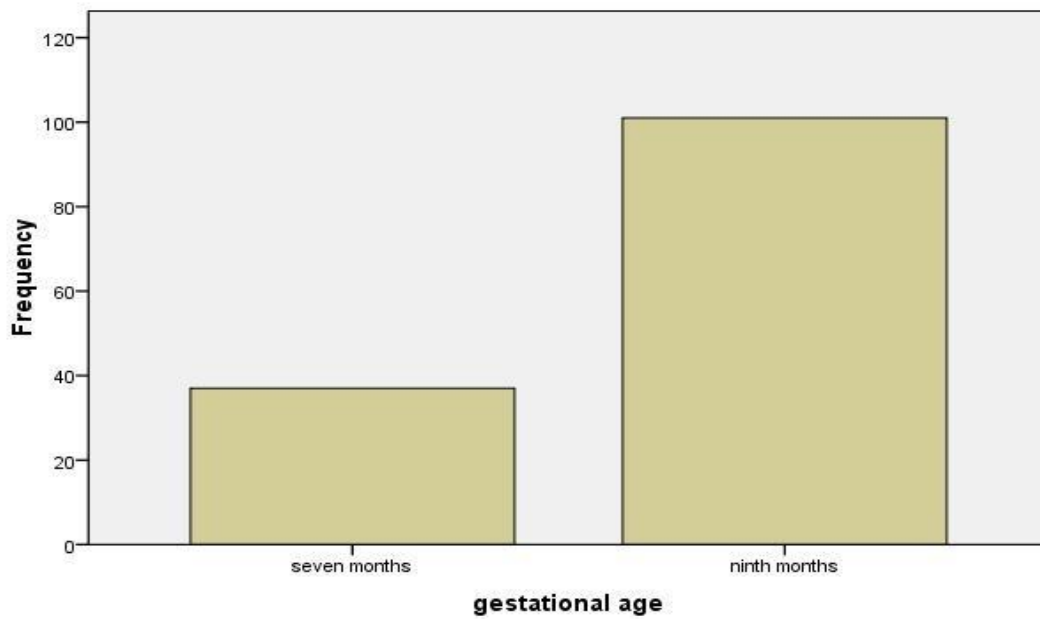


Figure 6: Participant's gestational age

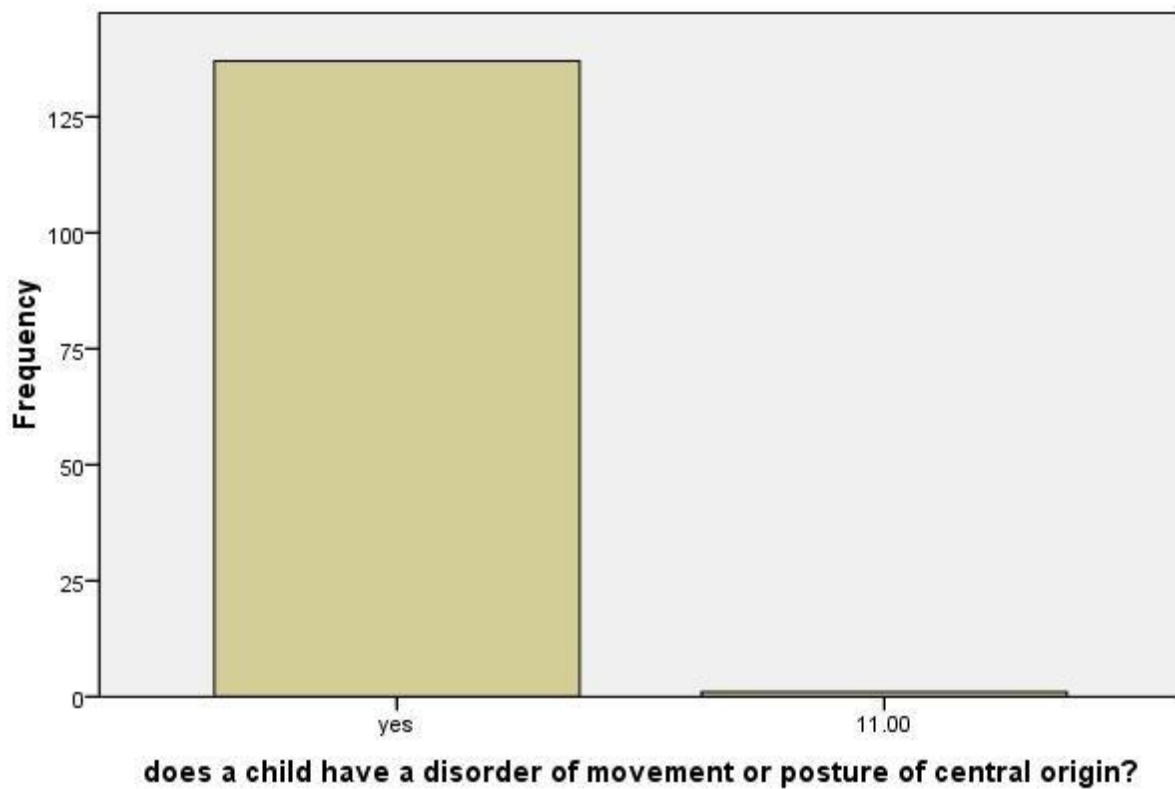


Figure 7: participant's Disorder of movement

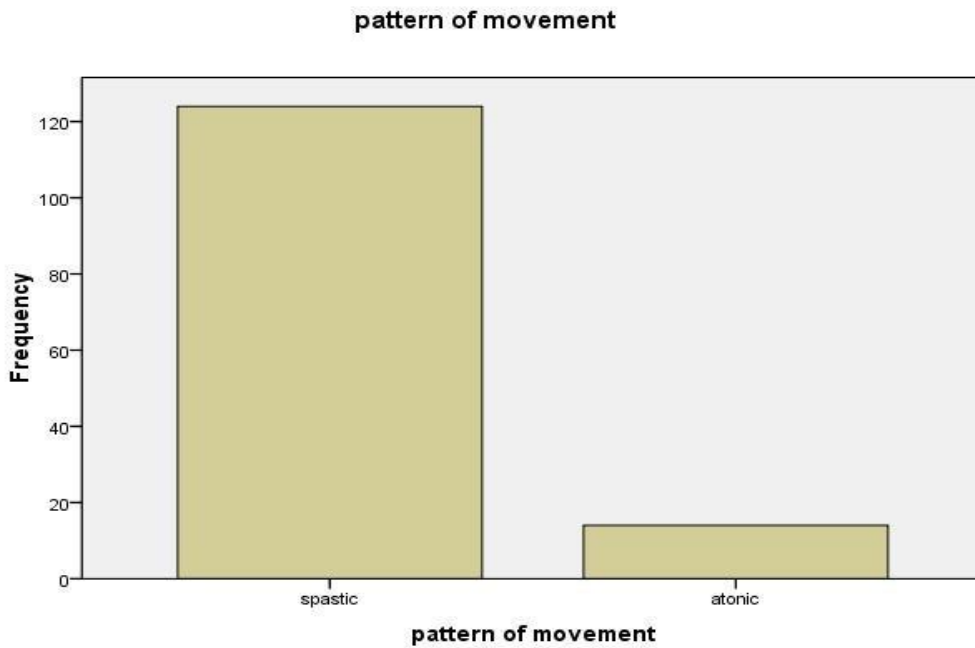


Figure 8: participant's pattern of movement

spastic cp(89.9%) were more common than the atonic(10.1%), athetoid and mixed cp.

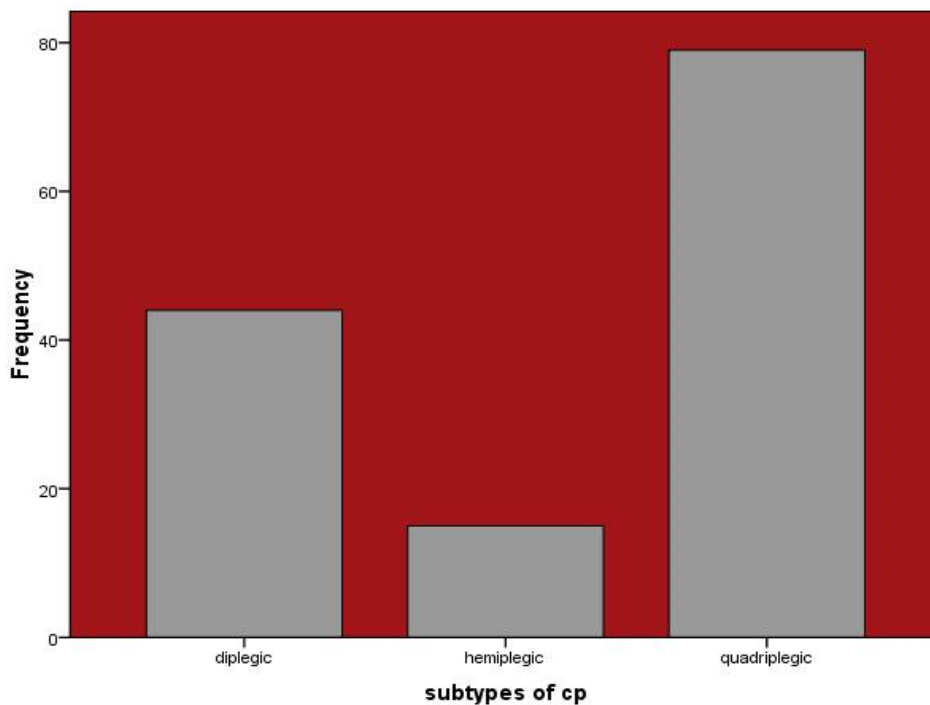
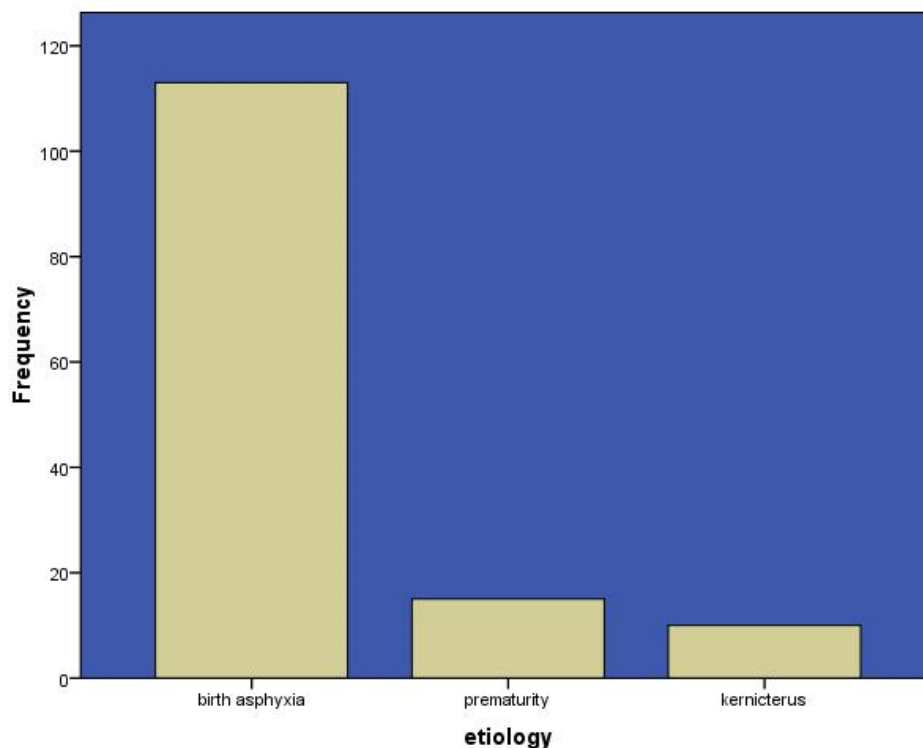


Figure 9: subtypes of cp

In subtypes of cp the quadriplegic cp(57.2%) were more common than the diplegic(31.9%) and hemiplegic cp(10.9%)





**Figure 10: Etiology of cp**

Birth asphyxia(81.9%), prematurity(10.9%)and kernicterus(7.2%)

### DISCUSSION:

The main purpose of the study was to find the prevalence of cerebral palsy and its different presentations among children of Gujranwala. This study assessed the prevalence of types, subtypes and etiology of cerebral palsy among children. The average prevalence rate of CP is 1.5 to 3 per 1000 live births in the developed countries. In Pakistan studies have been performed on CP children but in reference to the risk factors associated with it, causes and respecting the clinical findings. Very little work has been done regarding the etiology and prevalence of CP. The epidemiology and etiology of CP in Pakistan has been seek in few hospitals but this effort is so far not enough. The retrospective study on the prevalence of CP among Asian racial subsections children with a birth cohort, from California, of 11-year period (1991-2001) found 8397/6221001 cases as diagnosed with CP with prevalence rate of 1.40/ 1000 live births. In China the prevalence of CP was studied during 1993-1996 and was recorded as 1.6/1000 children. The highest prevalence has been reported from Turkey which was as high as 4.4/1000 live births. In Pakistan studies have been performed on CP children but in reference to the risk factors associated with it, causes and regarding the clinical findings. Very little work

has been done respecting the presentations and prevalence of CP.

Preceding study conducted in Rawalpindi Pakistan, they has been the data of 102 children, 46 (45.1%) were male and 56 (54.9%) were female with a mean age of  $5.6 \pm 2.25$  years. Spastic cerebral palsy was the commonest presentation (90.2%) mainly presenting as diplegia (33.3%) and quadriplegia (32.4%) followed by atonic, ataxic/mixed and athetoid CP accounting for 3.9%, 3.9%, and 2.0% respectively. Birth asphyxia was the most encountered etiologic factor (32.4%) followed by prematurity (26.5%), kernicterus (12.7%) and meningoencephalitis (10.8%). Spastic quadriplegic and diplegic CP were primarily related to birth asphyxia, hemiplegic, ataxic and mixed CP to prematurity and atonic and athetoid CP to kernicterus. another study conducted in district Swabi khyber pakhtunkhwa Pakistan, in which study, total of 278 children were found as sufferers from CP, out of which 191 (68.7%) were male children and 87 (45.5%) were female. Mean age was  $7.6 \pm 1.97$  years. Prevalence rate was recorded as 1.22/1000 live births. The most affected children were found in the age group between 9-10 (39.6%) years. Out of 278 children, 109 (39.2%) were severely affected, 112 (40.3%) were moderately

and 57 (20.5%) were mildly affected. Almost half of the children (49.6%) were suffering from spastic quadriplegia. The frequency of affected children was higher from urban areas (91.7%) as compared to rural areas (8.3%). The results of our study have been supported by others researches .Total of 138 cp children, were reported in DHQ gujranwala . Out of which( 61.6%) were male and (38.4%)were female. Findings of the research shows that incidence of spastic cp(89.9%) more common than the atonic(10.1%) ,athetoid and mixed cp . In subtypes of cp the quadriplegic cp(57.2%) more common than the diplegic(31.9%) and hemiplegic cp(10.9%) in children of Gujranwala Pakistan. Data indicates that the etiology of cp were birth asphyxia(81.9%), prematurity(10.9%)and kernicterus(7.2%) . Most of children were belonged to the rural area(75.4%) and (24.6%) were from urban area. The mode of delivery of most children were normal (57.2%) and (34.1%) were reported C-section other (8.7%) forceps deliveries .

#### CONCLUSION:

We concluded that the prevalence of spastic cp were more common than the atonic cp in Gujranwala. This study revealed that the quadriplegic cp were more than diplegic and hemiplegic cp. And Cp was more common in 4years old children than the 5 , 6 years old children. Rural area has been the more incidence of cp than the rural area . The prevalence of Cp were more in male than in females and the gestational age were 9months in more of the cp children. The frequent etiological factors in CP development are birth asphyxia, prematurity and kernicterus.

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