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Demographic profile and Pattern of cerebral palsy

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We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for acceptance this dissertation entitled, **"Demographic profile and Pattern of cerebral palsy",** Submitted by **Md. Shujayt Gani** for the partial fulfillment of the requirements for the degree of Master of Science in Physiotherapy .

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DECLARATION

This work has not previously been accepted in substance for any degree and isn't concurrently submitted in candidature for any degree.

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This dissertation is the result of my own independent work/investigation, except where otherwise stated. Other sources are acknowledged by giving explicit references. A Bibliography is appended.

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CONTENTS

Acronyms

BHPI	Bangladesh Health Professions Institute
BMRC	Bangladesh Medical Research Council
CP	Cerebral Palsy
CRP	Centre for the Rehabilitation of the Paralysed
IRB	Institution Review Board
LMIC	Low and Middle income countries
RR	Relative Risk
SPSS	Statistical Package for the Social Sciences
VR	Virtual Reality

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Abstract

Background: Cerebral palsy is one of the main disabilities in term born infants. The importance of studying cerebral palsy comes from the fact that this disorder imposes huge burden families, psychologically, emotionally, financially and socially. The demographic profile and pattern of cerebral palsy have not been explored before in our country. **Objective:** To explore Demography and pattern of cerebral palsy children. **Methods:** A cross sectional study was performed in children with cerebral palsy those who were attended at CRP. The researcher used A Technique of Hospital based random sampling procedure. The age range was 0-12 years. A structured questionnaire was introduced to all individuals' mother with cerebral palsy to identify the possible demographic Profile and pattern of cerebral palsy. **Result:** In study found cerebral palsy more affected in male 61.2%(n=90), age between 48-96 months male 27.9%(n=41) are affected ,more than 57.8%(n=85) live in nuclear family ,average 42.9%(n=63) birth history full term normal, cause of cerebral palsy before birth prolong labor 45%(n=30.6) and after birth seizure 44%(n=29.9), Bilateral cerebral palsy are more common 76.9%(n=115),GMFCS LEVEL III are more common 41%(27.9),not only vision but also hearing are normal 111(75.5%), 125(85.0%). Most of cerebral palsy children communicate by crying 48(32.7%). 55(37%). children gross motor function like supine to prone, 52(37.4%) prone to supine, 27(18.4%) Moving supine to box sitting,4 point kneeling 38(25.9%) are complete independence, rather than high kneeling 29(19.7%), Half kneeling 52(35.4%),walk on knees 60(40.8%), standing 27(18.88%),walking 5 meter 76(51.7%),Running 99(67.3%), ascending 91(61.9%) and descending 92(62.6%) are need total assistance .**Conclusion:** This study came to conclusion that male gender, age, prolong labor, seizure, Bilateral CP, GMFCS Level, vision, Hearing ,communication ,gross motor function were still the demographic profile and pattern of CP in Bangladesh.

Keyword: Cerebral Palsy, demographic Profile, Pattern of CP**.**

CHAPTER I   INTRODUCTION

1.1 Background

The term "cerebral palsy" (CP) refers to a broad range of symptoms that have several etiologies and evolve with age rather than a specific, distinct illness categorization. More than 170 years ago, the English orthopedic surgeon William little coined the phrase "cerebral paralysis" when he linked limb stiffness and ensuing musculoskeletal malformations to a difficult labor and neonatal hypoxia. The definition of cerebral palsy has undergone numerous changes over time. (Sadowska, Sarecka-Hujar, &Kopyta, 2020).

The clinical classification of cerebral palsy (CP), which includes spastic hemiplegia, spastic diplopia, spastic quadriplegia, and extrapyramidal or dyskinetic symptoms, is based on the main motor condition. However, numerous other factors, such as maternal illnesses and repeated gestations, have also been linked to an increased risk for CP. Prematurity and low birth weight are key risk factors for CP. The predominant pathologic features in preterm children who develop CP are intracerebral hemorrhage and periventricular leukomalacia. The initial lesion to the brain occurs in the majority of cases of CP during early fetal brain development (Patel, Neelakantan, Pandher, & Merrick, 2020).

Early initiation of the rehabilitation is very important; its basic element is a therapeutic physical education. Therapy is not intended to cure or achieve a normal state. The real goal is to improve the functionality and skills and maintain health in terms of locomotors, cognitive development, social integration, and independence. Increased emphasis is now being placed on an active approach in the therapy, including intensive, repetitive, and task-specific training to enhance neuroplasticity (Das & Ganesh, 2019).

Although the pathophysiology of the brain in CP patients is static but the clinical manifestation of this disease is not, CP related to motor ability impairments may change over time. Several secondary conditions, which are not part of the initial state of a

disabling condition but occur as a result of the condition may adversely affect function and quality of life (Doralp&Bartlett., 2010).

Seizures were present in 30.4% of children with a spastic hemiplegia CP subtype, 28.7% with spastic quadriplegia, 26.3% with spastic diplegia, 24% with mixed type CP, and 6.3% with athetoid(K et al., 2022).

Common signs of severe CP that may be noticed shortly after birth include: problems sucking and swallowing, weak or shrill cry, seizures and unusual positions. Often the body is either very relaxed or floppy or very stiff. In some severe cases many signs and symptoms are not readily visible at birth except and may appear within the first three to five years of life as the brain and child developed (My child, 2017). Severe motor and coordination impairment also occur (Mandal, 2017).

The symptoms of cerebral palsy include: excessive drooling, difficulty swallowing, sucking or speaking, tremors, and trouble with fine motor skills such as fastening buttons or holding a pencil, stiff or tight muscles, low muscle tone, exaggerated reflexes, uncontrolled body movement, toe walking, limping or dragging a foot while walking, walking with a scissor gait, turning in their legs as they walk. Children with cerebral palsy can also have feeding problems, mental retardation, seizures, learning disabilities and problems with their vision and hearing. The symptoms don't worsen with age but symptoms can range from mild to severe (Appleton & Gupta, 2018).

A traditional physiotherapy program consisting of stretching, strengthening, posture, splinting, casting, and movement facilitation will often be used to manage a kid with cerebral palsy. Clinicians are now able to investigate the use of virtual reality (VR) as an alternative therapy modality for children with cerebral palsy because to recent advancements in computer technology. Due to brain plasticity and brain rearrangement caused by active engagement, receiving feedback, and repetition of motions, VR is said to improve desired motor performance. VR improves the efficiency of traditional physiotherapy while increasing workout compliance levels for gaining selective motor control. After 8 weeks of VR intervention, children with CP showed improvements in their balance, gait speed, running, jumping, and manual dexterity(Rathinam et al., 2019).

In developing country like Pakistan Compared to swallowing issues, language deficits were shown to be more common in CP kids. counseling for parents and to comprehend how language and swallowing issues coexist in CP youngsters, supportive programs must be implemented(KalsoomAltaf et al., 2022)and The main risk factors for prenatal complications were anemia, HTN, UTIs, and vaginal hemorrhage. The most frequent postnatal risk factors for CP were high temperature, jaundice, and hypoxia at birth. The majority of CP children were delivered vaginally. Consanguinity was common among CP children's mothers (Keramat, K.U. *et al.* ,2022).

In Ethiopia the most common types of CP are the severe ones; most children cannot communicate well and are dependent on their parents for basic daily tasks. Focused functional habilitation services and multidisciplinary care strategies are required. Although it is impossible to infer causal correlations from these data, the findings support the need for better maternal and child health care (Tsige, Moges, Mekasha, Abebe, &Forssberg, 2021).

Prior to recently, investigations on hospital clinical samples only indicated prevalence in Egypt, Uganda, South Africa, and South Egypt of 2 to 10 cases per 1000 children(Kakooza-Mwesige, A. *et al.*,2015) .

A few thorough population-based studies from Uganda have just lately been published(Kakooza-Mwesige,A.etal.,2015),AndBangladesh(Khandaker,G.etal.,2018).According to research, the prevalence of CP was greater in HIC, at 2.9 and 3.4 per 1000 children, respectively, as opposed to 2.1 per 1000.

1.2 Rationale

Bangladesh is one of the most under-resourced countries in the world. Bangladesh was listed by WHO as having a critical lack of healthcare professionals. Between urban and rural Bangladesh, there is inequality in the distribution and skill mix of health personnel. The importance of aligning care delivery with the local context is highlighted by one of the value-based framework for global health delivery's four axes.

It was once believed that cerebral palsy (CP), which mostly but not entirely affects the m otor system, results from a static brain lesion that causes a dynamic brain injury motor disability that changed and frequently got worse as growth and development progr essed.

In the past, the disease was thought to be a "fait accompli," which caused specialists to co ncentrateon treating its problems.At that time, we were aware that brain damage was irre versible and that the brain was unique among the body's organs due to its impermanence and lack of regenerative capacity.Many people were unable to comprehend the idea that t he sickness itself could be treated rather than just the symptom.

There is a dearth of data on the incidence of childhood CP and its risk factors in Bangladesh, and the broader Rajshahi area in particular. A community-based rehabilitation model focusing on SDPs and CP clinical characteristics of the disabled children should be a top public health priority, according to this cross-sectional study, which documents for the first time the sociodemographic risk factors, birth practices, and frequency of CP children in the urban slum dwellers of Rajshahi Metropolis. The increased occurrence of CP in the population, which requires proper medical attention, may have been considerably influenced by SDPs and the predominate birth habits among slum inhabitants (Rahman, 2021).

It is recognized that greater research on the type, prevalence, and length of extended cp experienced by affected patients, as well as any associated risk factors, is urgently needed in order to improve overall therapeutic therapy. This is especially true in low-to middle-income countries like Bangladesh, where the majority of the population lives in rural areas.

This study is important because we do not have any national data so, this study will help the represent our data inBangladesh and help in making reference. In different countries I wish participate in the conference the current situation. This will be first research that shows Hospital based demographic profile in Bangladesh.

1.3 Operational definition

Cerebral palsy: A series of conditions known as cerebral palsy (CP) have an impact on a person's mobility, balance, and posture. The most typical motor impairment in children is cerebral palsy. Cerebral refers to something involving the brain. Palsy refers to muscle weakness or functional issues.

Patterns in cerebral palsy : The five main kinds of cerebral palsy are mixed, athetoid, ataxic, spastic, and athetoid. Depending on how severely a brain injury has damaged a person's muscle tone, the type of movement problems they have can vary.

Demographic profile:
In order to provide more pertinent services, a demographic profile is a type of demographic analysis in which data is gathered about a group in order to better understand its makeup or tendencies. Typically, a demographic profile is applied in business to improve marketing effectiveness.

1.4 Aim of the study

To explore Demography and pattern of cerebral palsy children.

1.5 Objectives of the study

General objectives:

To find out the demographic profile and pattern of cerebral palsy

Specific objectives:

I. To find out Socio-demographic profile of cerebral palsy children
II. To explorethe Pattern of cerebral palsy children..
III. To find out gross motor and transitional function by using FIM scale.
IV. To explore the co-morbidities by the structured developed questionnaire

One prospective study in Ethiopia discovered that 174 children who met the clinical criteria were included. With a mean age of 5.6 (SD 3.6) years and a gender ratio of 55.2, half (50.6%) were children under the age of five. Bilateral spastic CP (60.4%) predominated, followed by unilateral spastic CP (21.8%), dyskinetic CP (10.4%), and ataxic CP (3.4%), whereas 4% of the population could not be classified. 95.4% of the kids had speech difficulties, 87.4% had learning challenges, 60.9% had epilepsy, 24.7% had vision problems, and 8.6% had hearing problems. 75.3% of the kids had functional impairments at levels IV and V based on the gross motor function classification system (GMFCS) and manual ability classification system (MACS). More than 80% of the mothers experienced difficulties giving birth. The majority of newborns—50%—did not cry right away, and 44% were (Tsige, S. et al., 2021)andIn Pakistan, researchers discovered that 45 (81%) of the population was unable to complete morphological tasks, 41 (74%) was unable to complete sentence structure tasks, 40 (72%) was unable to complete literacy and narrative skills tasks, 41 (74%) was unable to complete pragmatic tasks, and 49 (89%) had speech that was incomprehensible. According to the patient checklist, 40 (73%) of the children who completed the oral motor test and 39 (71%) of the children who underwent normal swallow trials all had normal medical histories, normal behavioral variables, and normal gross motor abilities (KalsoomAltaf*et al.*,2022).

The objective of another study was to assess the demographics of CP risk variables. Prenatal risk factors like anemia, HTN, and hypotension were shown to be more common in CP child moms at the time of their pregnancies. According to earlier reports, up to 75% of pregnant women in Faisalabad have anaemia(Batool et al., 2015) in the general population.   The negative effects of anemia in the third trimester (Mahmood,   T.   *et al.,*2019) .

Mothers over 40 who also had prenatal hemorrhage, maternal infections, and anemia (59.75%). The neonatal brain is harmed by the prenatal risk factors. Further examination of the prenatal risk variables revealed a higher percentage of delayed crying, kernicterus, feeding difficulties, and vaginal hemorrhage, which ranked fourth among the antenatal

risks in the current study (14.3%). The likelihood of preterm births with LBW was shown to be greater in mothers in the second and third trimesters if they were anemic (Mahmood, T. *et al.,* 2019).

In the first 24 hours of life, high-grade fever is a significant indicator of CP and associated problems. In the current study, more home births (22.2%) than hospital births (17.9%) were reported by mothers as having high-grade fever in their children within 24 hours of delivery. Preterm births were 7.3%, stress was 6%, diabetes mellitus was 4%, hepatitis was 1%, fits were 0.7%, and thyroid problems were 0.3%. The majority of deliveries (67%) occurred in hospitals, and 61.2% of the moms said their kid cried after birth but not immediately. The potential causes include meconium aspiration, prenatal risk factors, breech presentation, shoulder dystocia, and preeclampsia. (Keramat et al., 2022).

In wealthier nations, antenatal factors are a major factor in CP, but secondary factors like infection, hypoxia, and jaundice are more prevalent in developing nations (Asztalos, E.V,. 2013) . Spastic quadriplegic, spastic hemiplegic, spastic diplegia, hypotonic, ataxic, mixed, and unclassified CP were the most prevalent kinds. CP was more frequently found in people from lower social classes. Spastic quadriplegic CP is the most prevalent kind in children (43.5%), and there is a substantial correlation between it and social classes (p 0.05). Regarding gender, however, there was no discernible difference (p > 0.05). Spastic quadriplegic, spastic hemiplegic, spastic diplegic, hypotonic, ataxic, mixed, and unclassified CP were all more common than other types of CP, with relative rates of 47 (43.5%), 28 (25.9%), 15 (13.9%), 9 (8.3%), 4 (3.7%), 3 (2.8%), and 2 (1.9%). The most frequent causes were perinatal (41.7%), including neonatal jaundice (14.8%) and birth asphyxia (26.9%). In 45 cases, CP was brought on by perinatal, prenatal, acquired, or unidentified causes(Pattern of Cerebral Palsy among Sudanese Children Less Than 15 Years of Age KarimeldinSalih) (Donald et al., 2014).

A wheelchair was required for movement in a different trial where nearly half of the subjects had severe CP with GMFCS levels IV-V. Children that exhibit this form of CP expression have poor motor functioning due to disorders in head and body control,

posture, and movement control. Thus, even with walking mobility equipment, their capacity for independent movement is severely constrained. The occurrence of more connected deficits was coupled with higher levels of GMFCS (V and IV), which also affect a child's motor development. 50% of children had intellectual disabilities, with 22.7% of those having severe disabilities. 9.09% of the kids in our study had serious vision impairment. Children who had mild hearing loss made up 40.9% of the population (Martinec, S, 2021).

In India the majority of patients at presentation were between the ages of 2 and 5 (40%) and under 2 (32.85%), which is substantially identical to another study by Makwana et al. on 46 patients. In 10 cases, 78.5% of babies were delivered normally, 70% had delayed cries after birth, and 61.5% needed NICU admission. Similar to global data, the majority of the current patients (76%) had CP with spasticity. The distribution of the clinical subtypes of spastic CP in this study, however, is comparable to those of European studies, which reported 18% -20.8% occurrences of spastic 29, 55% 13, 24% 10, 19% 1, and 2%. CP diplegic Cp. quadriplegic CP hemiplegic Cp. monoplegic (Kumar, R. *et al*, .2018).

Quadriplegia and cases of spastic diplegia ranging from 40.9% to 54.9%. 18,19 In the current study, 24% of cases had spastic quadriplegia and 55% of cases had spastic diplegia. Gowda et al., in contrast, reported 16% cases of spastic diplegia and 71.6% cases of spastic quadriplegia, which is comparable to the majority of Indian studies. This finding's likely causes include all cases of 100% hospital delivery and better preterm infant survival rates. In recent years, scholars have written extensively about how CP severity is declining, diplegia is increasing compared to quadriplegia, and prevalence is declining. 1,9,20 Only 18 (25.71%) of the children in the current study had microcephaly, but the incidence ranges from 50% to 75% in other studies(Kumar et al., 2018), (Donald, K.A. et al., 2014).

According to the report, 67.57% of kids were boys and 32.22% of them were between the ages of 48 and 96 months. When diagnosed, 77.34% of the population had a spastic form of cerebral palsy, with diplegic cerebral palsy being the most prevalent (42.83%) of them.

When functional levels were evaluated, the majority of the kids (76.30%) fell into levels 3 and 4 of the gross motor function classification system(Ramanandi& Shukla, 2022).

According to the findings, 74.1% of the kids have spasticity. Speech (60.3%) and visual (40.5%) disabilities were the most prevalent related impairments. Physical therapy was the most often used service (90.4%). Future program design benefits from knowledge of the requirements of children with CP and current service consumption. Individualized services must be provided in accordance with the child's age and functional restrictions(Saleh &Almasri, 2015).

Between 2013 and 2015, 176 kids (with a mean age of 3.6 3.0 years) were registered. 42 percent of babies were born prematurely, and 48 percent had birthweights below average. 54% of the participants indicated perinatal causes. Based on tone disturbance, the spastic type of CP was the most prevalent, and quadriplegia and diplegia were the most prevalent topographical distributions of motor dysfunction. 56 percent of the individuals had serious difficulties walking, 48 percent had limited physical skills, and 47 percent had trouble communicating even with close friends and family members (Almasri et al., 2017).

50 children—31 of them were boys—were recruited; of these, 18 (36%) had severe malnutrition, with 12 (24%) of the children having WFH 3SD (severe wasting) and 12 (24%) having HFA 3SD (severe stunting) according to WHO classification. There was a 425 (41.6) Kcal mean (SD) calorie deficit. Children with concurrent epilepsy [OR-3.35 (0.59-19.02); p = 0.17], GMFCS grades IV and V [OR-2.72 (0.36-20.66); p = 0.33], and dyskinetic type of CP [OR-3.24 (0.53-19.76); p = 0.22] had greater risks of malnutrition despite the absence of statistical significance. None of the variables, including the patient's age, gender, GMFCS grade, type of cerebral palsy, presence of concomitant epilepsy, and calorie deficit, were found to be reliable independent predictors of severe malnutrition, though(Goyal, Rana, Bhatia, &Kaushik, 2019).

There were 54 females with CP, with a mean age of 29.5 (range 7-68, SD 14.6) years and 54 males, with a mean age of 27.5 (range 8-70, SD 13.9) years. The recommendation of a wheelchair was affected by 16 comorbidities, 9 CP characteristics, and 5 disability characteristics. Sixty-four users received specialized seating (SS), while 47 received seats

with tilt-in-space (TIS). 16 users with 12 tray-mounted were given complex controls.(Frank & De Souza, 2016).

A between-group comparison revealed a correlation between aberrant heart rate variability and lower Apgar scores at 1 and 5 minutes (2 and 6, respectively; P = 0.001) and 5.5 and 8, respectively; as well as more episodes of fetal movement loss (41% and 10%, respectively; P = 0.027). A hypoxic event that occurred less than a week before birth was more likely to be linked to aberrant heart rate variability (89%) and a poor Apgar score (82%), whereas events that occurred more than a week before delivery were linked to the development of polyhydramnios (44%)(Fukushima et al., 2016).

The sample included 408 persons with CP, aged 18 to 73 (mean age = 27, SD = 10), including 189 women and 219 males. About half of the participants reported no issues with self-care, routine tasks, anxiety or sadness, and some issues with mobility and pain or discomfort. When compared to the hypothetical-based values (0.54), using the value-set based on experienced health states produced significantly higher HRQoL scores (0.77) (when the health state is reported to someone who is not personally experiencing it). Gross motor functioning was the dominant component in the relationship between level of functioning and HRQoL. The multivariate analysis did not reveal any associations between sex and CP-subtype and HRQoL.(Jarl, Alriksson-Schmidt&Rodby-Bousquet, 2019)

The Australian provides an overview of the outcomes for perinatal adversity, preterm birth status, disease severity, the presence of comorbidities, and MRI results. Children who no longer matched the criteria for CP at age 5 were more likely to be born healthy, have normal MRI results, and have had no perinatal adversity (odds ratio [OR]=4.1, 95% confidence interval [CI]=1.6-10.7). These elements showed statistical significance (p0.05). Children with verified CP and those without a CP diagnosis at age 5 were compared in terms of their initial CP motor type at age 2 years .Children who no longer had a CP diagnosis were more likely to have an ataxic-hypotonic CP original diagnosis at 2 years (24.4% vs 3.1%, respectively)((Chen et al., 2019) . Compared to the general population, people with CP have a significantly higher burden of medical, neurological, and mental/behavioral illnesses. However, somewhat surprisingly, nearly half (45%) of

the general population were also recorded in the specialized healthcare services with the same mild-to-severe and transient-to-chronic problems. The majority (95%) of people with CP had at least one additional disorder. In contrast, only 3% of people without CP had at least one illness in each of the three categories of medical, neurological, and mental/behavioral disorders, compared to 36% of people with CP. The neurological and mental/behavioral illness categories' most frequent comorbidities for CP patients were cocausal, meaning they were brought on by the same damage to the developing brain that led to CP. Medical issues include side effects from the primary (Hollung, S.J. *et al.,*2019).

Hong Kong explore the relationships between brain territorial involvement, clinical risk factors, and neurodevelopmental outcomes in neonates diagnosed with perinatal hemorrhagic stroke (PHS) who were born at term. Method: Between 2007 and 2017, we conducted a population-based study with 55 neonates who had PHS verified by magnetic resonance imaging and were born at term. The Brunet-Lézine test, the Stanford-Binet Intelligence Scales, Fifth Edition, and the Bayley Scales of Infant Development, Second Edition, were used to evaluate the long-term neurodevelopmental outcome. Results: At a median age of 60 months, follow-up was available for 50 (91%) of the infants (interquartile range 35–88). Developmental impairments were found less frequently in newborns with frontal lobe PHS, and 40% of the children developed in line with population norms (Vojcek et al., 2022).

Total and severe CP prevalence rates in Taiwan varied from 1.9 to 2.8 and 1.1 to 1.4 per 1000 children, respectively, from 2002 to 2008. Boys were 30% more likely than girls to have CP; the 95% confidence interval (CI) for the adjusted relative risk (RR) ranged from 1.3 (1.2–1.4) to 1.4 (1.2–1.5). A higher prevalence of CP was linked to lower family income [adjusted RR (95% CI) varied from 5.1 (4.26.2) to 6.4 (5.47.6)]. Compared to urban or suburban regions, rural areas have a higher frequency of CP. Within the 7-year study period, the death rate of severe CP ranged from 12.2 to 22.7 per 1000 children. (Szu-Hung Chen *et al.*, 2013).

Globally, it is estimated that 16.1 million (11.5-21.0) or 2.4% of children under the age of 5 have intellectual disability and 8.1 million (7.1-9.2) or 1.2% have cerebral palsy. More

than 98% of people lived in low- and middle-income nations (LMICs). 6.5% and 4.5%, respectively, of the total YLDs from all causes of negative health outcomes were caused by cerebral palsy and intellectual disability. South-East Asia Region had the highest prevalence of intellectual disability, while the African Region had the highest frequency of CP (1.6%). The top 10 nations were responsible for 62.0% of the world's prevalence of intellectual disability and 57.2% of the world's prevalence of CP, respectively.(Olusanya, B.O. *et al.,*2022).

Irish people describe how adults with cerebral palsy (CP) in Ireland use health services, to identify unmet needs in this area, and to pinpoint risk factors for service usage. Method: Information on adults with CP was gathered from the National Physical and Sensory Disability Database regarding their demographics, secondary diagnoses, current use of health services and assistive equipment, and unmet requirements for both. To find the factors connected to service consumption, logistic regression was employed. Results: This study included 1268 persons with CP in total. 78% of the population lived with parents, siblings, or other family members, and 56% of them were men. The most frequently used services were physiotherapy, occupational therapy, and orthotics/prosthetics services, which were utilized by 57%, 48%, and 35% of the population, respectively(Manikandan, M. *et al.,*2022) .

Based on significant information gathered during admission to a neurological rehabilitation unit for children and adolescents, this study was conducted to assess the co-occurrence of hydrocephalus treated or untreated surgically, congenital nervous system disorders or neurological syndromes with symptoms visible since childhood, and with somatic development disorders. The study used a retrospective analysis of information gathered during the hospitalization of 327 children and adolescents, aged 4 to 18 years, who were all diagnosed with congenital disorders of the nervous system and/or neurological syndromes linked to at least one neurodysfunction that had been present since infancy. The proposed criteria took into account the z-score values for body height, body weight, head circumference, and body mass to enable the identification of people with somatic development abnormalities in the group of children and adolescents with hydrocephalus treated or untreated medically(Perenc, L. *et al,.* 2022).

The percentages of CP patients who struggle in each of the following five areas are 72.73%, 81.82%, 81.82%, 83.64%, and 92.73%, respectively: action, self-care, daily activity abilities, pain/discomfort, and anxiety/depression. In Changzhou, 55 children with CP have an average EQ5D score of 0.423. The proportions of problems in the five aspects are 3.4%, 1.4%, 2.2%, 13.0%, and 5.3%, respectively, according to the EQ-5D scale survey of 2994 urban residents in Beijing. Their average EQ-5D index score is 0.77 . The proportions from 2830 rural residents in Kaiyang County, Guizhou Province, are 5.95%, 3.39%, 8.19%, 25.03%, and 33.23%, and their average EQ-5D score is 0.67 . In Hebei Province, the proportions of the five CP-related factors are 87.81%, 94.34%, 94.34%, 58.43%, (Bian et al., 2022).

One National administrative claims data from a random 20% were utilized for this retrospective cohort analysis from January 1, 2012, to December 31, 2017. The cohorts included individuals under the age of 18 with CP and an incident fragility fracture (CP+Fx) as well as control cohorts with and without CP and an incident fragility fracture (w/oCP+Fx). By age group—18–40, 41–64, and 65 years—the incidence rate (IR) of pneumonia 30-days post fracture and IR ratios were computed. For CP+Fx, Cox regression looked at the relationship between mortality and the incidence of cardiovascular events 0-30 days after the fracture and 31-365 days later. Results: There were 363,995 w/oCP+Fx (65.9 [18.3]; 65.5% women), 29,429 CPw/oFx (50.3 [15.8]; 45.9% women), and 3,688 CP+Fx (mean [SD] age, 58.2 [14.9]; 56.4% women). The 30-day IR of pneumonia for CP+Fx was comparable across (Whitney, D.G., Xu, T. and Berri, M.,2022) .

Infants born very preterm (less than 32 weeks gestational age) have a higher chance of developing significant motor disorders including cerebral palsy (CP). A deeper knowledge of the brain network changes that precede the early development of CP in infants may provide novel ways for risk-stratification at term, which could result in earlier access to therapies. The organization and information transfer capabilities of the preterm brain may be quantified with more nuance by graph theoretical techniques applied to diffusion MRI-derived brain connectomes than by overt morphological or regional microstructural alterations. In order to assist find the most accurate early CP

biomarkers, our goal was to provide light on the pathophysiology of early CP development before the advent of early intervention therapies and other environmental confounders. These metrics of brain network efficiency at term may be sensitive biomarkers for early CP detection because they remained strongly related with CP despite adjustment for typical risk factors of motor development. For the first time, we show that in VPT infants, early CP diagnosis is proceeded by decreased brain network segregation in a number of nodes, including motor regions frequently associated with CP and novel regions that could help to partially explain the high rate of cognitive impairments associated with CP diagnosis. These cutting-edge MRI biomarkers could aid in identifying (Kline et al., 2021).

One study objective was to determine the prevalence and underlying risk factors of malnutrition among kids and teenagers with cerebral palsy in Arabic-speaking nations. Up until July 3rd, 2021, searches were made in the OVID Medline, OVID Embase, CINAHL through EBSCO, Cochrane Library, and SCOPUS databases. Following established inclusion/exclusion criteria, publications were examined to find pertinent works. For inclusion, the studies were evaluated independently by two reviewers. Two reviewers each separately extracted the data. It has been reported on descriptive and pooled analysis. Nine full-text papers were evaluated for eligibility from a total of 79 records reviewed; seven studies of those met the inclusion criteria. The studies' anthropometric measurements, dietary outcomes, and study characteristics differed. Data from a total of 400 participants, ages 1 to 18, were included in the investigations. The majority of children with cerebral palsy (mean: 71.46%, 95% confidence interval: 55.52-85.04) had some degree of malnutrition. The most often mentioned underlying risk factors for malnutrition among children with cerebral palsy included severe limitations in gross motor function, feeding challenges, cognitive impairment, and insufficient calorie intake. Children with cerebral palsy are more likely to be malnourished in Arabic-speaking nations. For a better understanding of this public health issue in these countries, more research is required (Mushta, S. et al., 2021).

In low- and middle-income countries, malnutrition in children with cerebral palsy (CP) is a problem that needs to be better understood, according to this study (LMICs). data from

children aged n with confirmed CP Despite the high prevalence of malnutrition among the overall population in LMICs, children with CP had an even greater prevalence of malnutrition than the general population in LMICs, which is alarming. The study's findings have significantly improved our knowledge of children with CP's nutritional status and allowed us to identify the sociodemographic and clinical risk factors for malnutrition. Any health-related interventions for children with CP in LMIC settings should take into account these considerations. The discoveries also have effects at other levels, including at the person (Jahan et al., 2021).

The purpose of the pilot study in Bangladesh was to evaluate the acceptance rate and payback rate of the microfinance program among the parents of children with cerebral palsy. 20 extremely poor households from the BCPR cohort—recruited between Jan 2015 and Nov 2018; n = 1,381—were found during the pilot phase and were found to have previously gotten microloans from several regional NGOs. Borrowed amounts for microloans ranged from 100 to 300 AUD, with 12-month loans due in 45 to 46 weekly installments. The majority of these households (n = 12) borrowed money to begin or expand income-generating ventures (e.g. agricultural work, purchasing livestock, vehicle for hire, etc.). The initial weekly installment was paid back by about 50% of borrowers, while the remaining respondents' repayment schedules were not due at the time of data collection. (Al Imam et al., 2021).

The investigation of spasticity-related pain (SRP) in children with cerebral palsy was made possible by a sizable prospective database from three Phase 3 studies (CP). METHODS: The Questionnaire on Pain Caused by Spasticity (QPS; six modules specific to spasticity level [lower limb (LL) or upper limb (UL)] and type of respondent [child/adolescent, interviewer, or parent/caregiver] was used to collect baseline (pretreatment) SRP data occurring during different activities in children/adolescents (aged 2-17 years, ambulant/nonambulant) with uni- or bilateral spastic .At baseline, 155 children and adolescents with UL-spasticity and 331 with LL-spasticity completed at least one key item of their modules, while 841 parents and caregivers completed at least some of the important items for the LL/UL QPS modules. Children and adolescents with

spasticity self-reported SRP with at least one activity at baseline in 81.9%/69.7% (LLs/ULs) of the sample. Parents/caregivers(Heinen et al., 2022).

Adults with post-stroke mobility impairment may benefit from robot-assisted activities by regaining use of their upper arms. According to preliminary research, this form of therapy may also help people with CP or other acquired brain injuries who have motor function issues in their upper and lower extremities. These findings imply that similar approaches can help children with cerebral palsy move more freely and function better than they do for adults with stroke. Physical therapies to boost motivation have included virtual reality, which may also make use of neuroplasticity. Transcranial magnetic stimulation and functional MRI, which examine the function of the motor cortex, may be able to shed light on typical neuromotor maturation and suggest potential treatment objectives. These and numerous additional developments at the meeting point between technology and rehabilitation(Gulati &Sondhi, 2017)

Moldova is one of the nations in Europe with the lowest income per capita and one of the highest rates of infant and maternal mortality. There is a dearth of knowledge about neurodisabilities in general, and cerebral palsy (CP) in particular. Therefore, the purpose of this study was to define subtypes, the degree of motor impairments, and associated issues in this country as well as to estimate the prevalence of CP. Methods: Medical data were used to identify children with CP who were born between 2009 and 2010 and were patients at the National Hospital Institute of Mother and Child, the reference facility for approximately 75% of Moldovan children with neurological disorders. Results: Among 207 CP patients (estimated prevalence 3.4 per 1000 live births). There were 84 (45%) children with severe speech problems, 93 (51%) with epilepsy, 109 (59%) with intellectual disability, 42 (23%) with severe vision impairment, and 10 (5%), with severe hearing impairment. 46 children (25%) had Apgar scores below 7 at five minutes, while 52 (28%) were born prematurely. In conclusion, Moldova's distribution of CP subtypes differed from that of other European research. Additionally, while the proportion of children with low Apgar did not change, the estimated prevalence, the proportions of children with severe motor and related deficits, and the proportion of children born at term were all greater in Moldova. The data might point to distinct etiological processes

that lead to CP in Moldova as opposed to other European nations. A national registration is necessary for quality control and development (GincotaBufteac, E. et al., 2018). .

A study looked at a sample of persons with cerebral palsy who were over 40 years old. It sought to define the most typical comorbidity combinations and how they related to quality of life. Cerebral palsy patients who were 40 years of age or older, hospitalized within the previous five years, and received a diagnosis were included. The Patient Information Management System was used to gather demographic information and comorbidities, which was then confirmed by interviewing the patient about their illnesses. Using the telephone interview version of the EQ-5D-3L, the patients' quality of life was assessed. In order to determine the comorbidity combinations for numerous morbidities, principal component analysis was performed. 72.1% of the patients had comorbidity, while 47.5% had multimorbidity. Musculoskeletal conditions made up the top 5 comorbidities. The most frequent comorbidity combinations in the sample were constructed as a result of principal component analysis into a total of four components, which explained 66.78% of the total variance. Conclusions The demonstration of novel comorbidity combinations may provide a springboard for discovering novel associations of pathways. Future work is needed to pinpoint modifiable factors that can be changed to prevent chronic health issues in this population and to aid in early intervention (DogruozKaratekin et al., 2022).

Children with cerebral palsy were retroactively enrolled in egpyt from the neurology outpatient clinics during a 2-year period. Through caregiver interviews, a review of the patient's medical records, and a physical examination, the risk factors and motor impairments associated with cerebral palsy were identified. Results: A thousand cerebral palsy patients were enrolled. The subjects had a median age of 2.5 years and were 64.4% male. In our study, prenatal (21%), natal and post-natal (30.5%), postneonatal (17.1%), and unidentified (31.4%) were the risk factors for cerebral palsy. Pre-eclampsia (4.7%), maternal diabetes mellitus (17.6%), protracted rupture of the membranes (11.9%), maternal hemorrhage (10.4%), and CNS malformation (26.6%) are antenatal complications. Infection (16.3%), hyperbilirubinemia (12.7%), cerebrovascular accidents (8.8%), meconium aspiration (6.2%), and cerebral hemorrhage are all birth and

postpartum complications. CNS infection (34.5%) and cerebrovascular disease in post-natal life (HIMMELMANN et al., 2011).

The sample in Brazil comprised of 800 people spread throughout 50 areas in the city of Maceio. The study used a standardized questionnaire. Results: There were 5/1000 cases of cerebral palsy in the sample. All were delivered at full term, 75% of them were men, and 50% of them had moderate to severe cerebral palsy. 25% had diplegia, and 75% were quadriplegic. Meningitis caused 50% of the cerebral palsy, and protracted labor was responsible for another 50%. Conclusions: Cerebral palsy is more common in Maceió than in any other developed country, with a high frequency among low-income households and a connection to postnatal infection. Compared to wealthy nations, Maceió has a greater prevalence of cerebral palsy (CP), which is primarily caused by postnatal meningitis infection and protracted labor. This study advances information and comprehension of the issue of CP prevalence in the context of Brazilian public health. Additionally, it serves as evidence that prenatal care, labor, and breastfeeding should all receive better and more focused attention. Fundamentally important are enhanced care for infants who were born prematurely or with low birth weight. A multi-professional health team and management of the public and private health systems should make it. Similar to this, more research and multicentric studies are required to shed light on the CP's effects on both general and niche populations.(Zanon et al., 2018).

3.1 Study design

It was a quantitative type of research study, and the study design was cross-sectional. According to Hicks (1999), quantitative research was used because the data was collected from a number of participants. A cross-sectional study can be thought of as providing a snapshot of the frequency and characteristics of a disease in a population at a particular point in time. A cross-sectional study design was used for a large number of participants to collect data (Etikan et al., 2016).

Researchers can conduct a cross-sectional study over a given period of time using the same set of variables. Similar studies may look at the same variable of interest, but each study looks at a different group of people. Unlike longitudinal studies, where variables might change over time, cross-sectional analysis evaluates issues in a single instance with a clear start and stop point. Cross-sectional studies allow the researcher to look at one independent variable and one or more dependent variables as the subject of the investigation.

3.2 Study Site:

Retrospectives Data was collected from paediatricdepartment, headquarter of Centre for the Rehabilitation of Paralysed (CRP) CRP focuses on physical, emotional, social, psychological, and economic elements of medical treatment, rehabilitation, and support services. It encourages the country's development of trained professionals in health care and rehabilitation. CRP has established centers in many parts of the country in conjunction with other organizations to expand services for the disabled. It supports handicapped people's empowerment through community-based services, campaigning and networking on disability issues, and disabled girls and women's empowerment. CRP also fosters disability awareness on a national, regional, and international level.

3.3 Study population:

The children with cerebral palsy attending at rehabilitation center for rehabilitation.

3.4 Study Period:

Study period was from September 2022 to May 2023.This study started with protocol preparation and finished with submission of final report in June 2023.

3.5 Sample Size

The sample size has been calculated as the estimation of sampling scientifically and will be selected as the standard number of the sample as a calculation guide. It is also checked with EPI info software by the CDC.

Mathematical Tools:

 N = number of samples

p = sample proportion /percentageof prevalence =2.7

P is calculated according to total literature (Khandaker et al., 2018). q =1-p z =1.98 (constant) e=margin of error 5%=.00211

The equation of sample size calculation is given below

$$n = \frac{z2pq}{e2}$$

$$= \frac{(1.98)2 \times 0.211 \times (1-0.211)}{(0.00211)2}$$

$$= \frac{3.92 \times 0.211 \times 0.78}{0.004452}$$

$$= \frac{0.65}{0.004452}$$

$$= 146.001$$

3.6 Sampling scheme

Sampling is the process of determining the number and type of participants who take part in a study. A Technique Hospital based random sampling procedure is taken for this study. In the current study, a rehabilitation center from each division was selected as Technique Hospital based random sampling. Within each process, all participants who meet the inclusion criteria are chosen for an interview. There was a specific time frame for drawing samples. A sample is collected until it meets the requirements (sample size).

3.7 Inclusion Criteria

   I.   Both girls and boys with CP diagnosed by pediatrician (Chang et al., 2015).

  II.   Admitted and outdoor cerebral palsy children (Hubermann et al., 2015).

 III.   Age between 0 to 12 years (Shields, Zhou, Pratt, Taylor, Hunter & Pascoe, 2012).

 IV.   Those who are willing to participate (Munger Clary et al., 2020).

3.8 Exclusion Criteria

   I.   Patients who were not willing to communicate or participate (Citrome&Yeomans, 2005).

  II.   Significant physical and mental illness(Eldh, Ekman, &Ehnfors, 2006).

3.9 Outcome Measurement tools

- A semi-structured questionnaire
- FIM Scale
- Gillette Paediatic Questionnaire

3.10 Data Collection Procedure

At the outset, the researcher said that the participant had the right to refuse to answer any question while filling out the questionnaire. They have the option to leave the study at any time. The purpose of the study was also explained to all participants by the researcher. Participants were assured that none of their personal information would be made public. A written consent form was used to obtain permission from each volunteer participant. Following the participants' agreement, a standard questionnaire was utilized to identify the complaint and collect demographic data.

The researcher did a face-to-face interview and asked questions during the interview. The physical environment was closely considered. To ensure proper focus during the interview, distracting stimuli were removed. Interviewees were asked questions alone as much as possible with their cooperation, as close relations might sometimes guide their answers. During the interview, the researcher established rapport and clarified questions. Face-to-face interviews were the most effective method of obtaining complete participation from survey participants (Fraenkel&Wallen, 2012). Face-to-face interviews were also useful for describing population characteristics. During the conversation, a face-to-face interview was conducted to gather particular data that identifies the population descriptively. According to the participants" understanding level, sometimes the questions were described in the native language so that the patients can understand the questions perfectly and answer accurately. All the data were collected by the researcher own to avoid the errors.

3.11 Data analysis

After completing the initial data collection, each questionnaire was double-checked for any errors or ambiguous information. SPSS version 20 was used to analyze the data. In a list, the variables were labeled in sequence. The researcher named the variables and established the types, values, decimal, label alignment, and measurement level of data in SPSS' variable view. The data was then double-checked to ensure that all of the information from the questionnaire had been sent. The raw data is now ready for SPSS analysis.

Data was examined using descriptive statistics, percentages were generated, and tables were used to display the results. To adorn the data, Microsoft Office Excel 2013 was used. A lot of data was gathered as a result of this investigation.

3.12 Ethical consideration

The proposal was submitted to the Institutional Review Board (IRB) of the Bangladesh Health Profession Institute (BHPI) and after the defense, the research proposal approval was taken from the IRB (CRP/BHPI/ IRB/10/ 2022 /675). Written consent was taken from each participant before collecting the data. Permission from Headof Physiotherapy department of CRP was taken to conduct the study. Verbal consent was taken from the participant informing them about the purpose of the study, anonymity, their rights to refuse answering any question, withdrawn from the study at any point of time and other issues mentioned in the form before starting the interviews. For any kind of use of the study there was no identification of any participants only the data was used. The data was kept in a se secure place where only the researcher had the access. Informed consent was used to take permission from all participants. Participants' rights and privileges were ensured. All the participants were aware of the aim and objectives of the study. Findings of the study were disseminated with the approval of regarding authority.

3.13 The research rigor of the study

A rigorous manner was maintained to conduct the study. The study was conducted cleanly and systemically. During the data collection, it was ensured that participants were not influenced by experience. The answer was accepted, whether they were of a negative or positive impression. No leading questions were asked or important questions were avoided. The participant's information was coded accurately and checked by the supervisor to eliminate any possible errors. The entire information was handled with confidentiality. In the result section, the outcome was not influenced by showing any personal interpretation. Every section of the study was checked and rechecked by the research supervisors who strictly maintained the confidentiality regarding the participant's condition.

4.1 Socio-demographic profile of cerebral palsy children

4.1.1 Patient gender
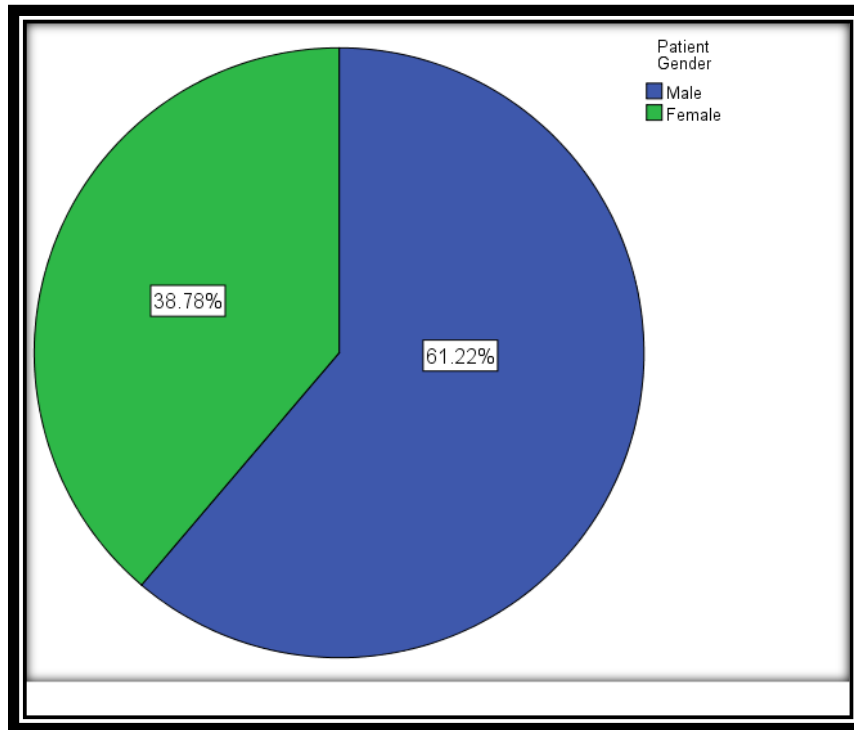
.Fig 1: Gender of the cerebral palsy children

On 147 cerebral palsy children, 61.2 %(n=90) were male and 38.8 %(n=57) were female

4.1.2 Age group of cerebral palsy children
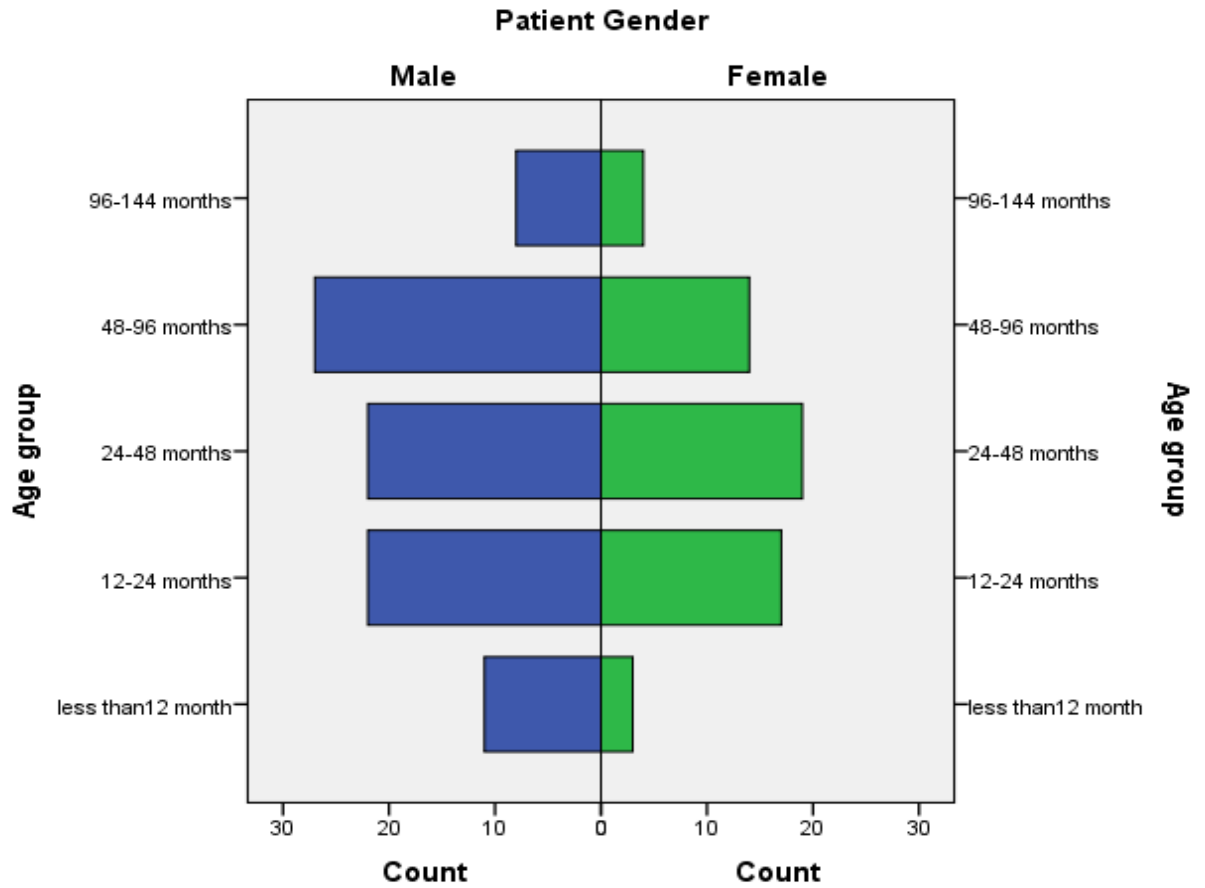
Fig 2: Age group of cerebral palsy children

while less than 12 month of age 9.5%(n=14), 12-24 months 26.5%(n=39),24-48 months 27.9%(n=41),48-96 months 27.9%(n=41) and 96 -144 months 8.2%(n=12). Average 48-96 are male and 24-48 months are female group.

4.1.3   Family Members
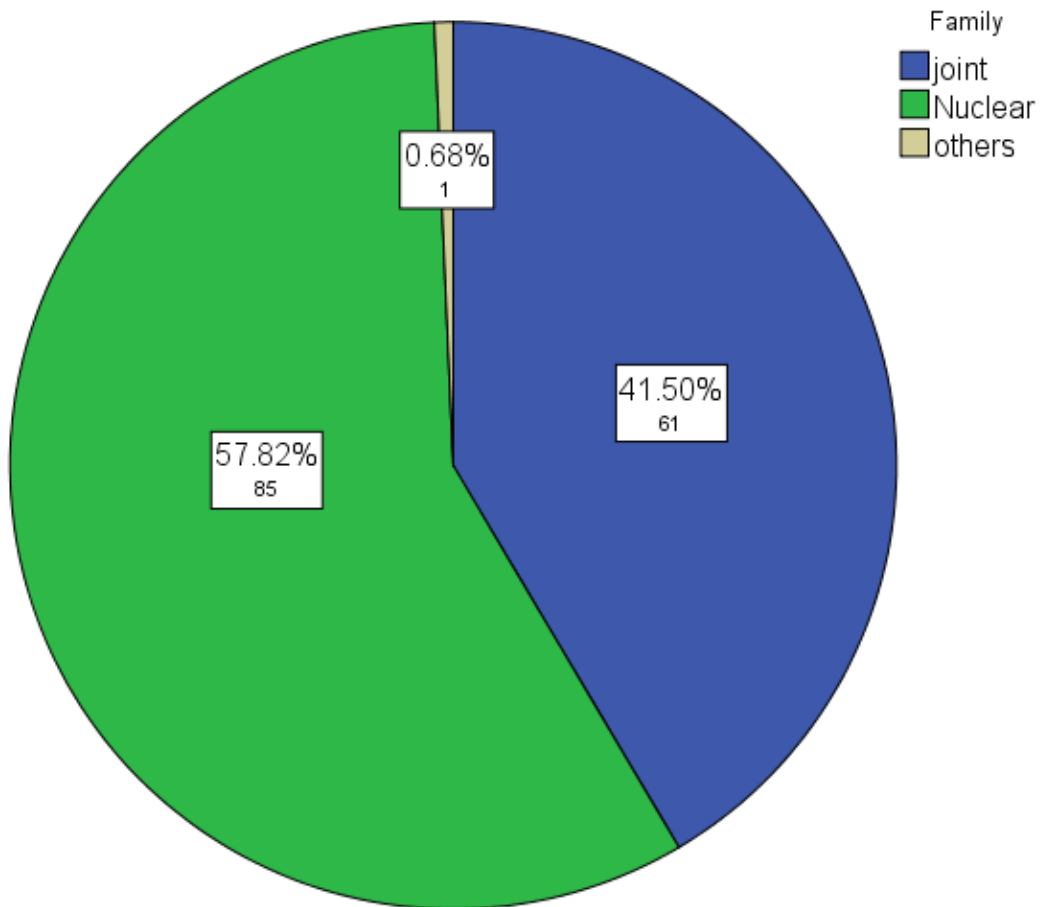
Fig 3:Family members of cerebral palsy children

Nuclear family were 57.8 %(n=85), rather than joint family 41.5 %(n=61), others .7 %(n= 1). Family members were in Bangladesh perspectives more than 4, 55 %(n=82), rather than below 4 or only 4 members 23.1 %(n=34), 21.1 %(n=23.1).

4.1.4 Birth History
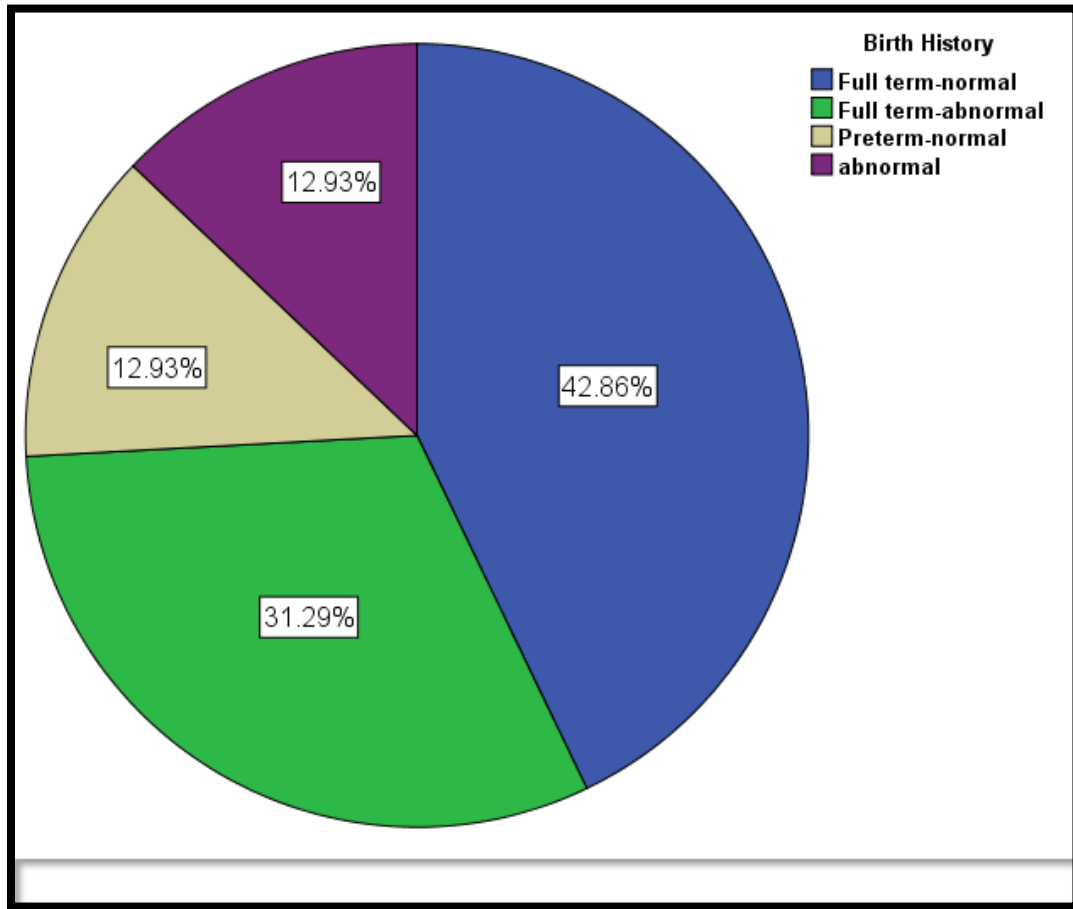
Fig4: Birth history of cerebral palsy

Birth injury were full term normal 42.9 %(n=63), full term abnormal 31.3 %(n=46), preterm normal and preterm abnormal were 12.9 %(n=19).

4.1.5 Complication, cause during and after birth

More complication occurred in postnatal complication 48.3 %(n=71),Prenatal maternal illness 25.2% (n=37), Perinatal complication 18.4 %(n=27), No significant history 8.2% (n=12), during birth prolong labor were first leading cause for cerebral palsy 30.6%9(n=45), rather than short labor (n=41),sudden birth (n=19),Birth injury(n=11) Birth Asphyxia(n=12),Delayed Crying(n=19).Seizure and jaundice was the most common cause of cerebral palsy having distribution of 44(29.9%) and 38(25.9%), 25(17%) gave a history of pneumonia and hydrocephalus 2(1.4%) patients and other condition 22(15%.41(27.9%)

Table 1: Complication, during and after birth of cerebral palsy children

Type of complication	Frequency	Percent
Prenatal maternal illness	37	25.2
Perinatal complication	27	18.4
Postnatal complication	71	48.3
No significant history	12	8.2
During birth		
Prolong labor	45	30.6
short labor	41	27.9
sudden birth	19	12.9
Birth injury	11	7.5
Birth Asphyxia	12	8.2
Delayed Crying	19	12.9
After birth		
Jaundice	38	25.9
Dehydration	9	6.1
Pneumonia	25	17.0
Hydrocephalus	2	1.4
Seizure	44	29.9
others	22	15.0

4.2 Pattern of cerebral palsy children

4.2.1 Type of cerebral palsy children
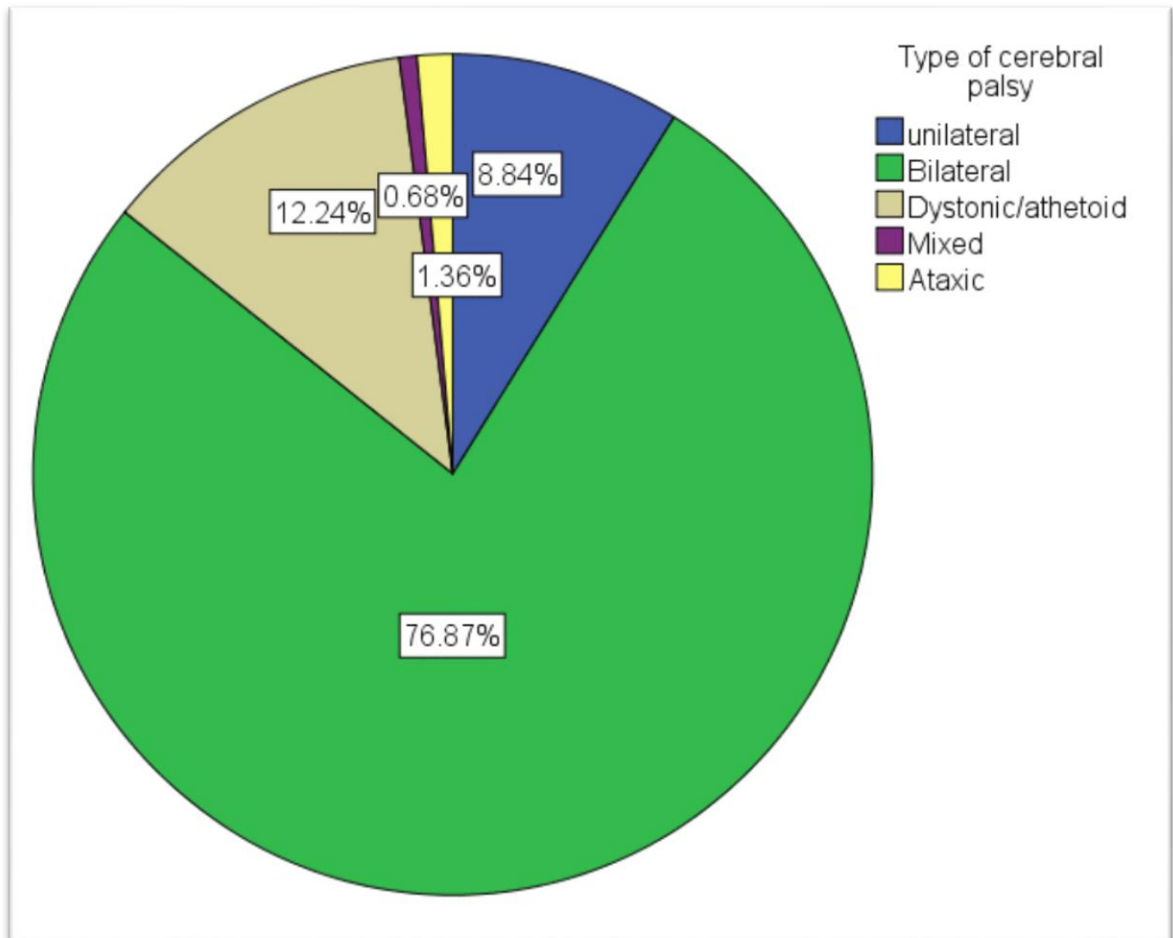
Fig5: Pattern of cerebral palsy children

Most of the cerebral palsy type were bilateral 76.9 %(n=113), rather than where the other type of cerebral palsy unilateral, athetoid, ataxic, mixed having distribution of 8.8% (n=13), 12.2% (n=18), .7 %(n=1), 1.4% (n=2).

4.2.2 GMFCS Level of CP children
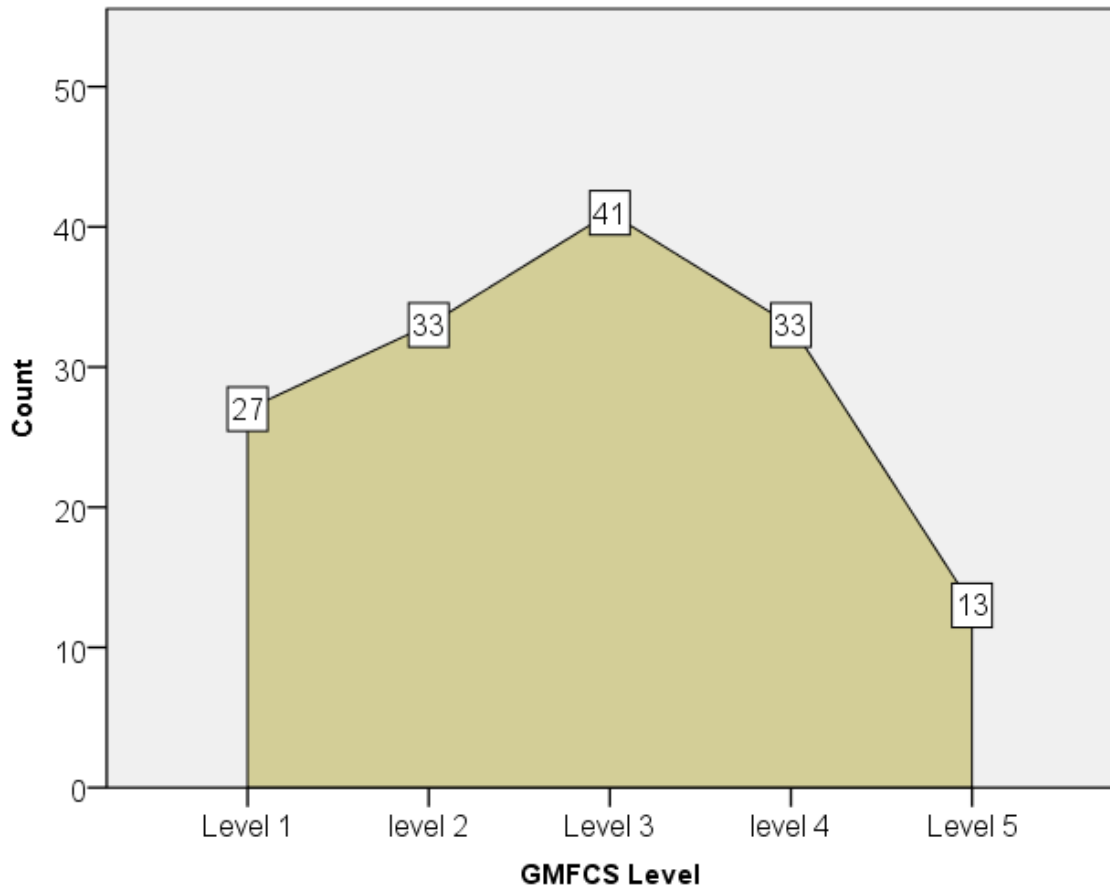
Fig 6:GMFCS Level of CP children

41(27.9%) participants gross motor function classification system level III, and level II, IV was the second common classification 33(27.9), third was level I 27(18.4%) and fourth was level V 13(8.8%).

4.3 Co-morbidities of CP Children

4.3.1 Vision
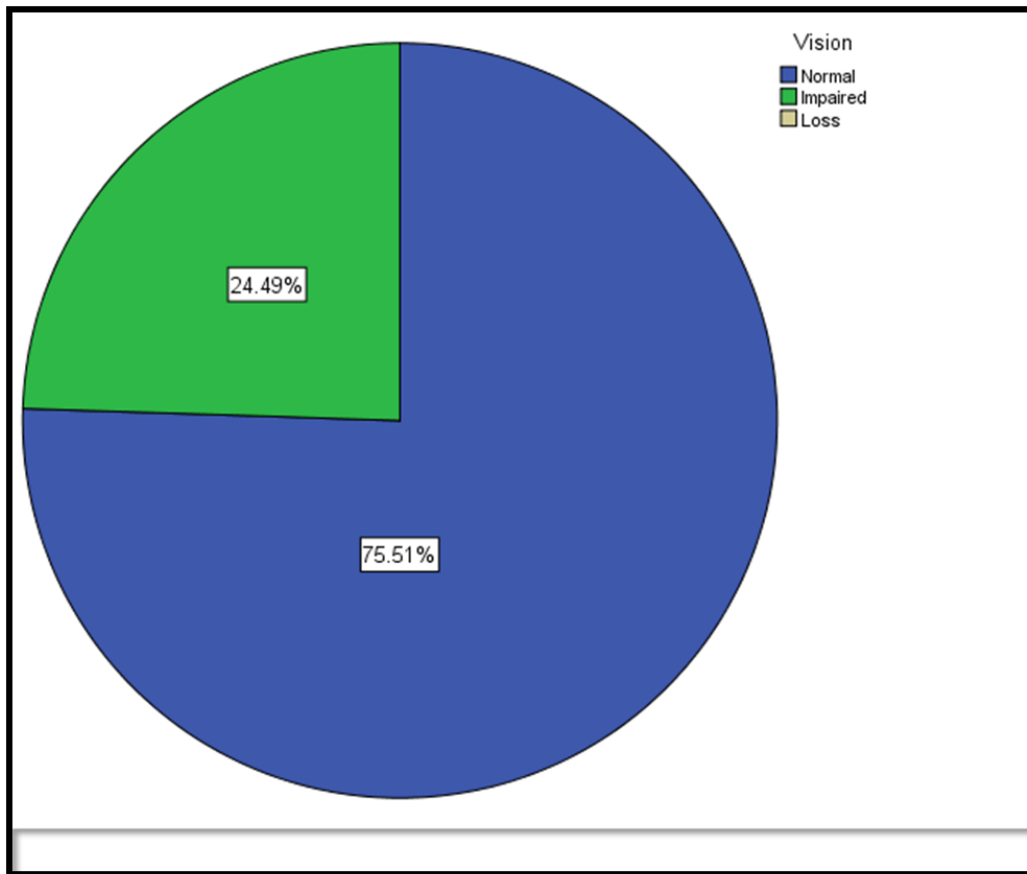
Fig 7: vision of cerebral palsy children

Vision was normal 111(75.5%), impaired 36(24.5)

4.3.2 Hearing
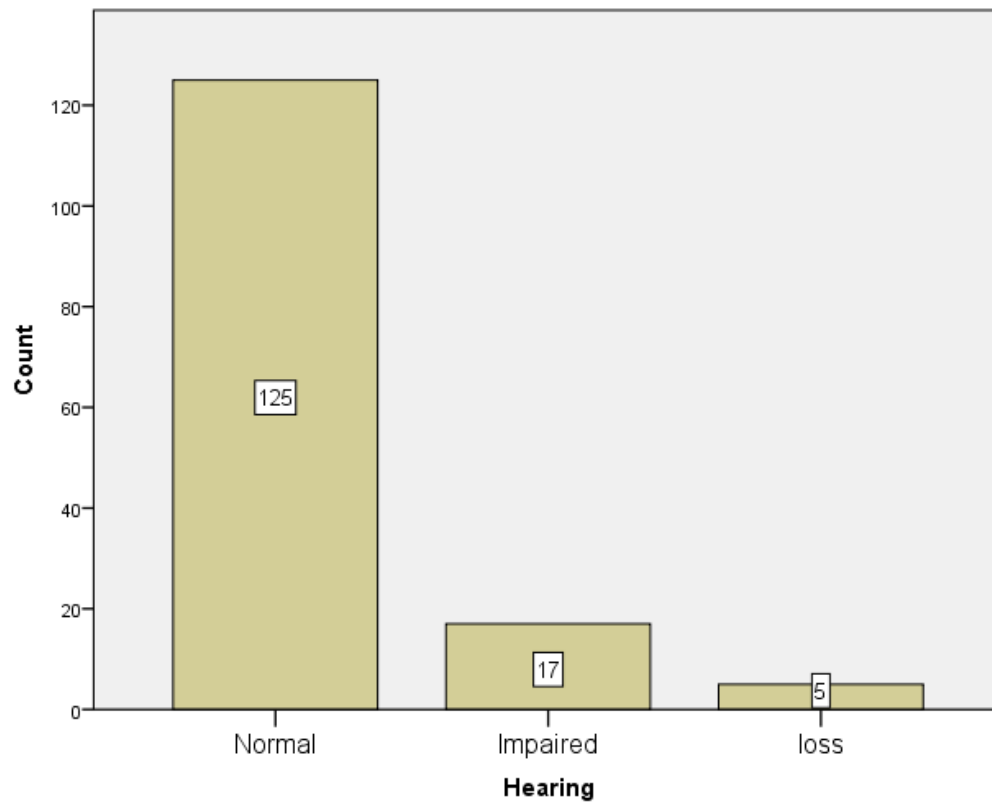
Fig 8: Hearing of cerebral palsy children

Hearing normal were 125 (85.0%) patients rather than impaired 17(11.0%), loss 5(3.4%).

4.3.3 Communication
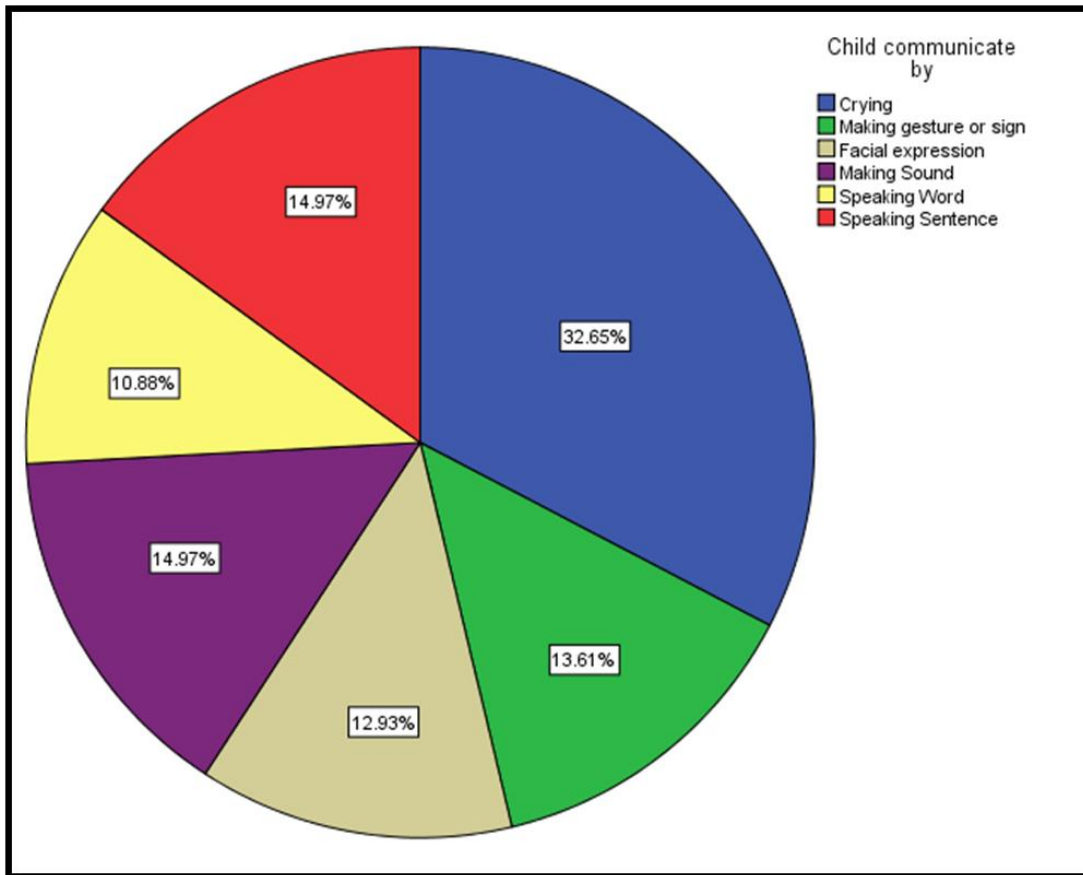
Fig 9: Communication of cerebral palsy children

Most of the children communicated by crying 48(32.7%), making gesture 20(13.6%), facial expression 19(12.9%), making sound 22(15%), speaking word 16(10.9%), speaking sentence 22(15%).

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4.4 Gross and transitional Function

4.4.1 Supine to Prone
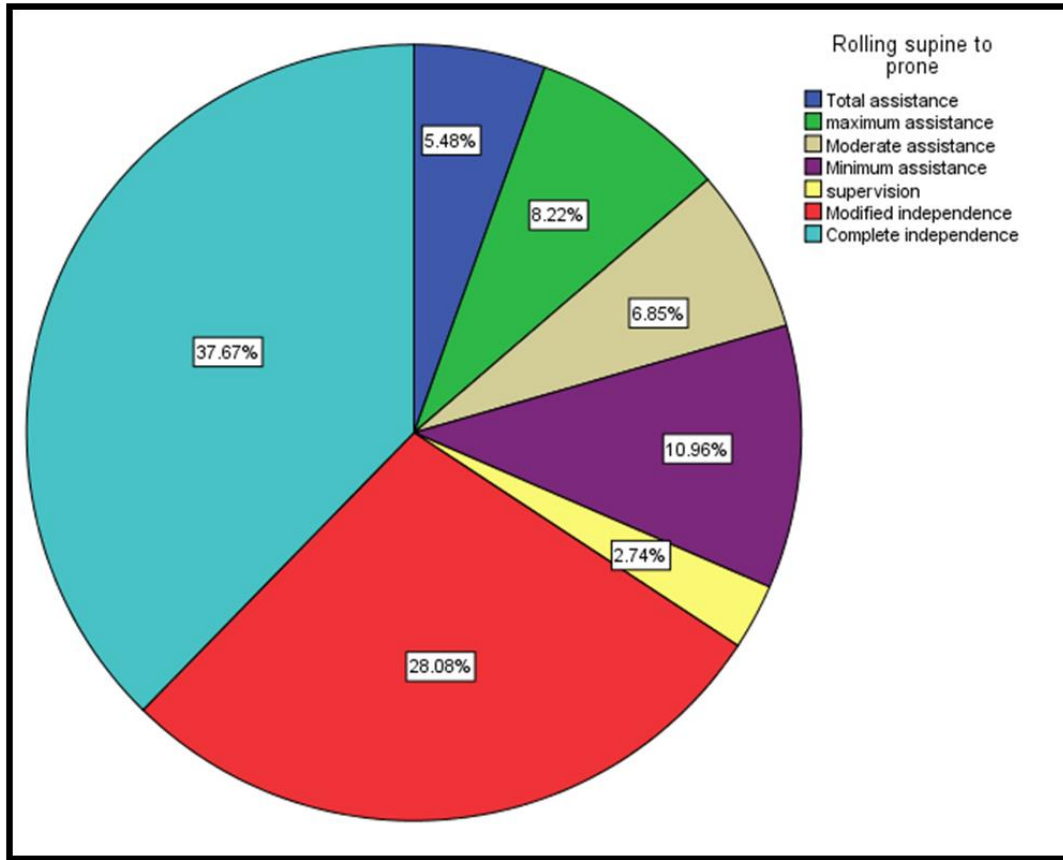
Fig 10: Supine to Prone of cerebral palsy children

55(37.4%) children were complete independence, rather than Modified independence 41(27.9%), supervision 4(2.7%),Minimum assistance 16(10.9%), maximum assistance 10(6.8%), Moderate assistance 12(8.2%) and total assistance 8(5.4%)

4.4.2 Prone to Supine
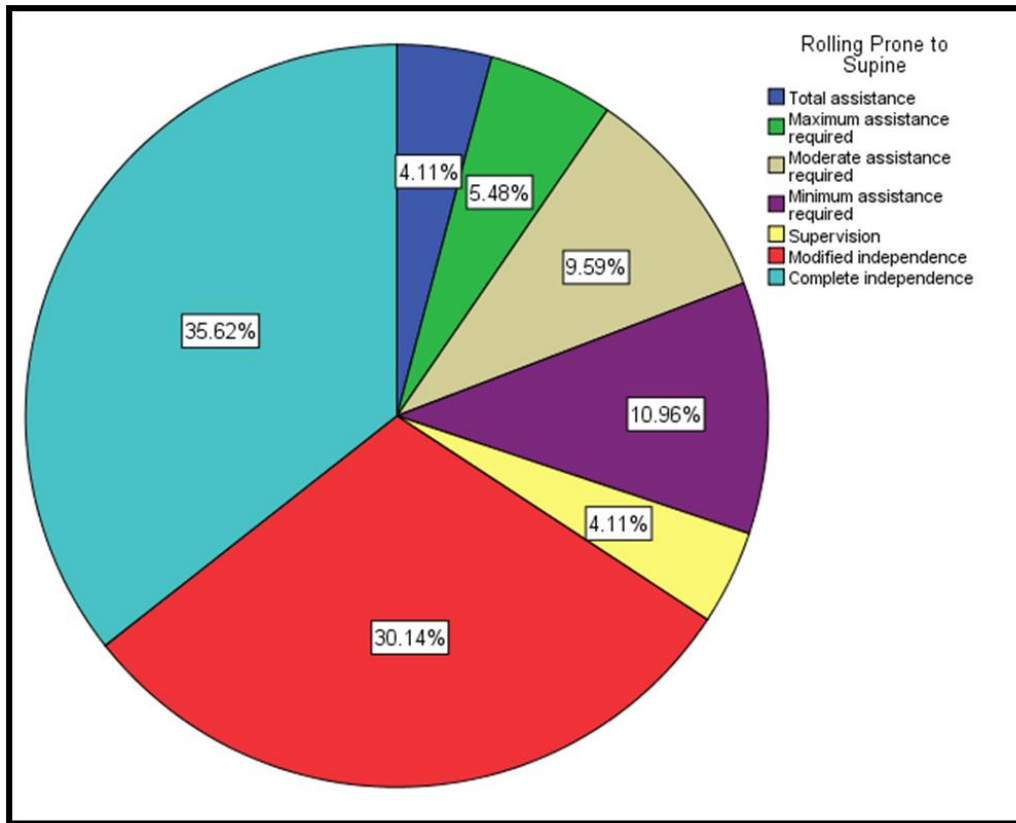
Fig 11: Prone to supine of cerebral palsy children

52(37.4%) children were complete independence, rather than Modified independence 44(27.9%), supervision 6(2.7%),Minimum assistance 16(10.9%), maximum assistance 14(6.8%), Moderate assistance 8(8.2%) and total assistance 6(5.4%)

4.4.3 Moving supine to box sitting

Fig 12: Moving supine to box sittingof cerebral palsy children

27(18.4%) children were complete independence, rather than Modified independence 20(13.6%), supervision 16(10.9%),Minimum assistance 18(12.2%), maximum assistance 13(8.8%), Moderate assistance 27(18.4%) and total assistance 23(15.6%)

4.4.4 4 point kneeling

Fig 13:4 point of cerebral palsy children

38(25.9%) children were complete independence, rather than Modified independence 22(15.0%), supervision 8(5.4%),Minimum assistance 16(10.9%), maximum assistance 14(9.5%), Moderate assistance 29(19.7%) and total assistance 17(11.6%).

4.4.5 Squatting

13(8.8%) children were complete independence, rather than Modified independence 9(6.1%), supervision 6(4.1%),Minimum assistance 31(21.1%), maximum assistance 39(26.5%), Moderate assistance25(17%) and total assistance 20(13.6%).

Table 2: squatting

Squatting	Frequency	%
Total assistance	20	13.6
Maximum assistance required	25	17
Moderate assistance required	39	26.5
Minimum assistance required	31	21.1
Supervision	6	4.1
Modified independence	9	6.1
Complete independence	13	8.8

4.4.5 High Kneeling

17(11.6%) children were complete independence, rather than Modified independence 13(8.8%), supervision 14(9.5%), Minimum assistance 18(12.2%), maximum assistance 28(19%), Moderate assistance 24(16.7%) and total assistance 29(19.7%).

Table 3: High kneeling

High Kneeling	Frequency	%
Total assistance	29	19.7
Maximum assistance required	24	16.3
Moderate assistance required	28	19
Minimum assistance required	18	12.2
Supervision	14	9.5
Modified independence	13	8.8
Complete independence	17	11.6

4.4.6 Half Kneeling

8(5.4%) children were complete independence, rather than Modified independence 3(2%), supervision 5(3.4%), Minimum assistance 17(11.6%), maximum assistance 26(17.7%), Moderate assistance 32(21.8%) and total assistance 52(35.4%).

Table 4: Half kneeling

Half Kneeling	Frequency	%
Total assistance	52	35.4
Maximum assistance required	32	21.8
Moderate assistance required	26	17.7
Minimum assistance required	17	11.6
Supervision	5	3.4
Modified independence	3	2
Complete independence	8	5.4

4.4.7 Walk on Knees

6(4.1%) children were complete independence, rather than Modified independence 11(7.5%), supervision 6(4.1%), Minimum assistance 23(15.6%), maximum assistance 19(12.2%), Moderate assistance 18(12.2%) and total assistance 60(40.8%).

Table 5: Walk on Knees

Walk on knees	Frequency	%
Total assistance	60	40.8
Maximum assistance required	18	12.2
Moderate assistance required	19	12.9
Minimum assistance required	23	15.6
Supervision	6	4.1
Modified independence	11	7.5
Complete independence	6	4.1

4.4.8 Standing
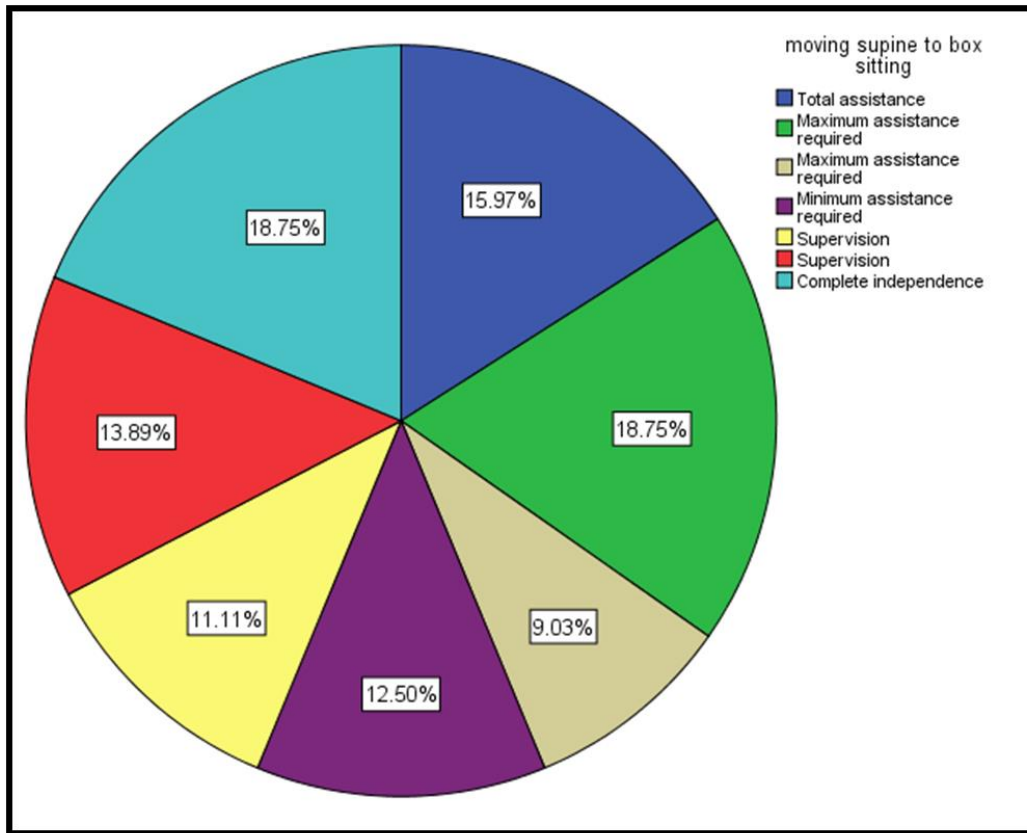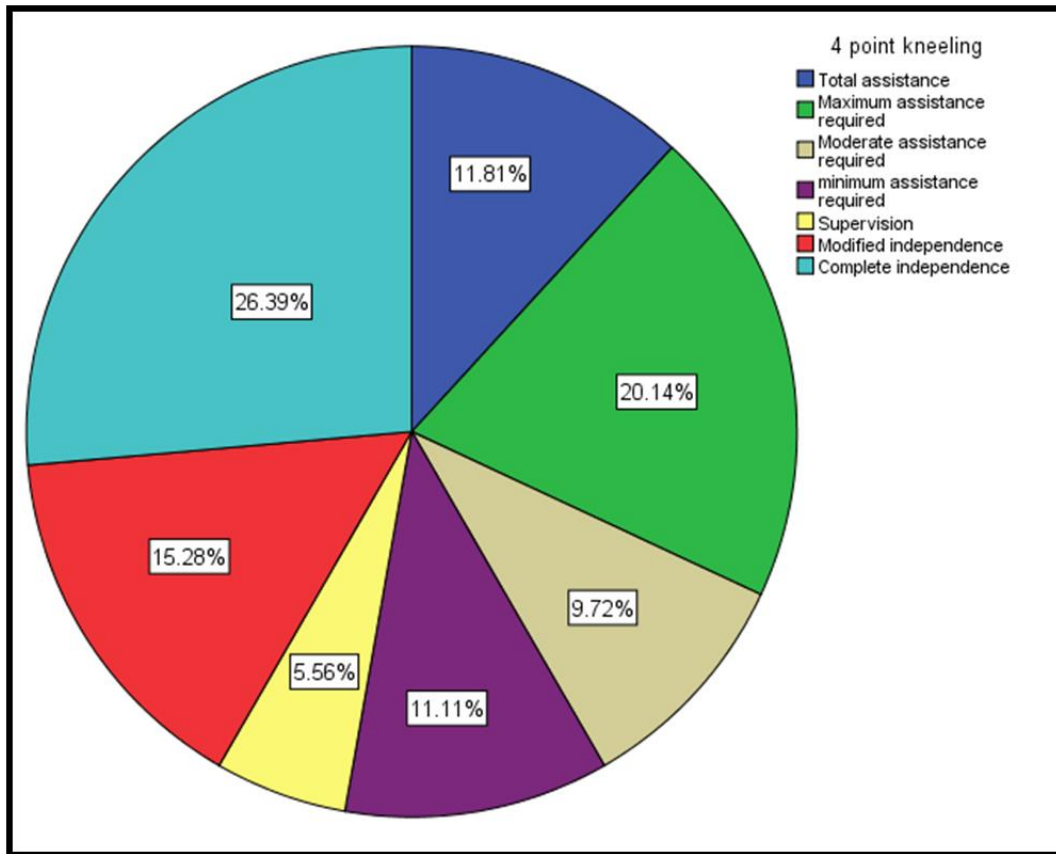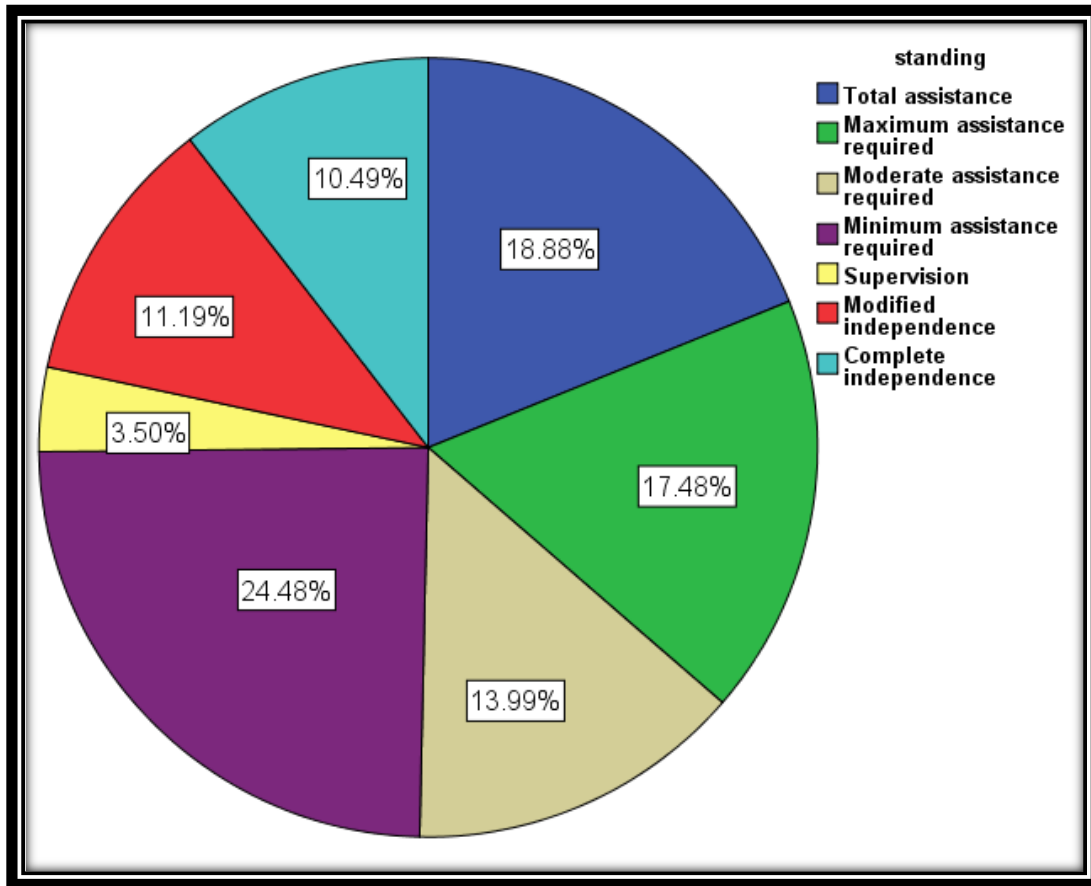

Fig 14:Standing of cerebral palsy children

15(10.49%) children were complete independence, rather than Modified independence 16(11.19%), supervision 5(3.50%), Minimum assistance 35(24.48%), maximum assistance 25(17.48%), Moderate assistance 20(13.99%) and total assistance 27(18.88%).

4.4.9 Walking 5 meter
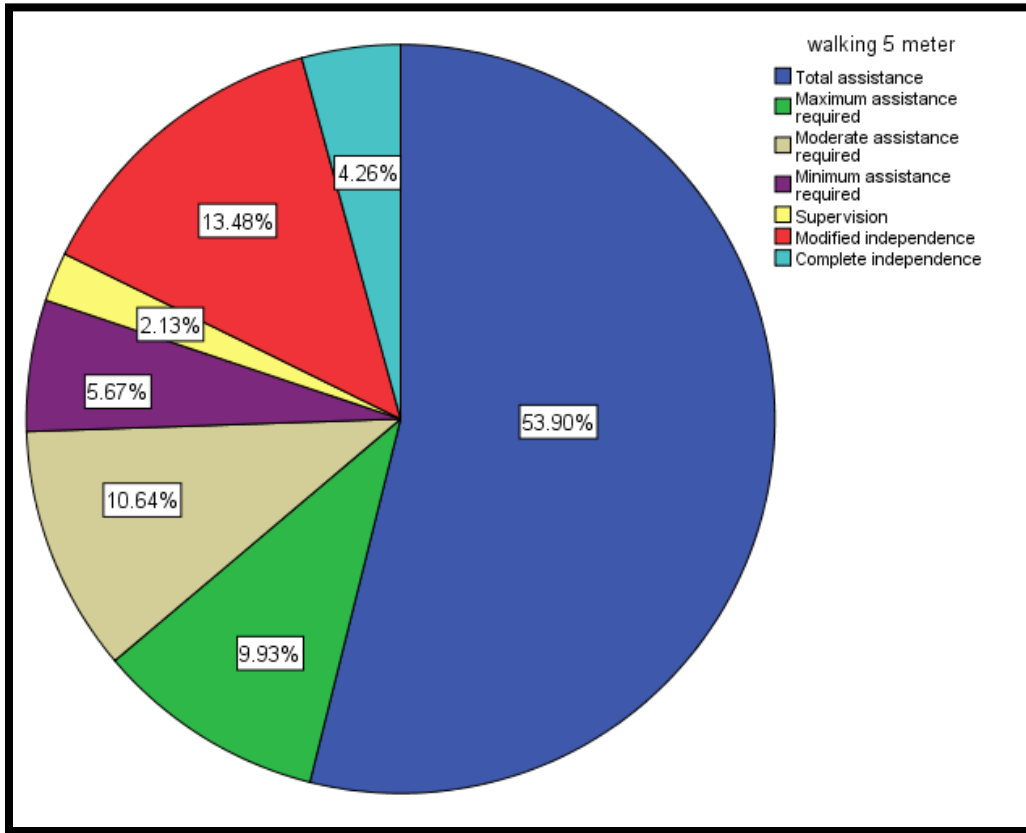
Fig 14:Walking 5 meter of cerebral palsy children

6(4.1%) children were complete independence, rather than Modified independence 19(12.9%), supervision 3(2%), Minimum assistance 8(5.4%), maximum assistance 15(10.2%), Moderate assistance 14(9.5%) and total assistance 76(51.7%).

4.4.10 Running

4(2.7%) children were complete independence, rather than Modified independence 12(8.2%), Supervision 5(3.4%), Minimum assistance 5(3.4%), Maximum assistance 8(5.4%), Moderate assistance 6(4.1%) and Total assistance 99(67.3%).

Table 6: Running

Walk on knees	Frequency	%
Total assistance	60	40.8
Maximum assistance required	18	12.2
Moderate assistance required	19	12.9
Minimum assistance required	23	15.6
Supervision	6	4.1
Modified independence	11	7.5
Complete independence	6	4.1

4.4.10 Ascending

6(4.1%) children were Complete Independence, rather than Modified Independence 11(7.5%), Supervision 6(4.1%), Minimum assistance 23(15.6%), Maximum assistance 18(12.2%), Moderate Assistance 19(12.9%) and Total Assistance 91(61.9%).

Table 7: Ascending

Walk on knees	Frequency	%
Total assistance	60	40.8
Maximum assistance required	18	12.2
Moderate assistance required	19	12.9
Minimum assistance required	23	15.6
Supervision	6	4.1
Modified independence	11	7.5
Complete independence	6	4.1

4.4.11 Descending

5(3.4%) children were complete independence, rather than Modified independence 8(5.4%), supervision 4(2.7%), Minimum assistance 14(9.5%), Maximum Assistance9(6.1%), Moderate Assistance 12(8.2%) and Total Assistance 92(62.6%).

Table 9:Descending

Walk on knees	Frequency	%
Total assistance	60	40.8
Maximum assistance required	18	12.2
Moderate assistance required	19	12.9
Minimum assistance required	23	15.6
Supervision	6	4.1
Modified independence	11	7.5
Complete independence	6	4.1

CHAPTER V	DISCUSSION

The study population consisted of a carefully chosen group of cerebral palsy patients who were required to receive therapy at a rehabilitation facility.Among the patient 90 were male and 57 were female and this male predominance was also reported in the previous studies carried out both locally (Johnston &Hagberg, 2006) . In this study most of the patients were in their 24 to 48 month which consisted 41%, followed by 4-5 years of age which was also a common finding as reported by Patel, Neelakantan, Pandher, & Merrick, 2020. Where mean age was 2.98 ± 1.12 ;Boychuck et al., 2018 found it 16.6 1 and according to Jahan et al., 2020, mean age was 6.5, but in some studies the age of the study population was little bit different. It was found that 113 of the respondent (76.9%) were Bilateral that means spastic type of cerebral palsy   which somewhat correlate withSadowska et al, who reported 90% of the patient to be unilateral CP(Sadowska et al., 2020)and also Jahan et al., according to whom place of birth at home another found that 70% place of birth at hospital correlate with researcher also found that 75(51%) of the patients birth place at hospital. Prolong labor and seizure was found main cause for CP in this study which was Neonatal jaundice (Khandaker et al., 2018) 28% of the patients had aspiration pneumoniain the other reports   (Okumura et al., 2020). Most of the respondents GMFCS LEVEL of this study had LEVEL III 41 (27.9%) Compared to other GMFCS level V (50%) (Larsen et al., 2021)and similar to GMFCS V patients had greater than 40% ("Hip Surveillance in Children With Cerebral Palsy in the Region Twente (Netherlands) Before Implementing the Dutch Guidelines for Hip Surveillance," 2019).child with cerebral palsy communicate by crying 48(32.7%) similar to the Sisskin& Goldstein, 2022.visual problems except optic atrophy were more common in spastic quadriplegic CP and hearing problem was 48.1% (Bhati et al., 2019) similar to our study vision problem was 36(24.5%) and hearing problem was 17(11.6%). And children gross motor function like supine to prone, 52(37.4%) prone to supine, 27(18.4%) Moving supine to box sitting,4 point kneeling 38(25.9%) are complete independence, rather than high kneeling 29(19.7%), Half kneeling 52(35.4%),walk on knees 60(40.8%), standing 27(18.88%),walking 5 meter 76(51.7%),Running 99(67.3%), ascending 91(61.9%) and descending 92(62.6%) are need total assistance , most affected

components across were 'sitting on a large and small bench from floor,' 'arm-free squatting,' 'half-kneeling,' 'kneel-walking,' and 'single-limb hop(Shetty et al., 2023).

CHAPTER VI	LIMITATION& RECOMMENDATION

Limitation

The limitations of this study were as follows:

- This was a hospital based study which also is not an ideal sample.
- The sample number is minimum so the result didn't represent the whole population
- Another limitation that faced us during the study was the availability and reliability of individual patient medical cards.
- In Bangladesh there was very little research about demographic profile and pattern of cerebral palsy for this reason there was a lack of upgrade and recent data in this sector.
- Time was very limited for this study.

Recommendation

However, additional research with more focused objectives is necessary to achieve these goals and enhance the quality of life for these children.Therefore, additional patients are needed for epidemiological study in the current area, for which authors will be developing in the future, in order to provide a definitive, conclusive statement.

| **CHAPTERVII** | **CONCLUSION** |

However, in order to accomplish these objectives and improve the quality of life for these children, more research with more narrowly focused goals is required. Counseling is necessary for families or parents of children with special needs to manage the handicapped child effectively. Due to ignorance, superstitious beliefs, pride, fear, prejudices, and misinformation, most families of children with special needs find it challenging to embrace them. Parental counseling is essential to bringing about behavioral change, healthy mental functioning, problem-solving, personal efficacy, and decision-making.

One of the main neurological conditions affecting children is cerebral palsy (CP), a non-progressive illness that affects movement, posture, and activity. Cases that had been identified through clinical examination and research were included in this study. The authors first obtained patient personal information from caregivers before conducting a broad and detailed analysis. Males were more likely than girls to acquire cerebral palsy, and other national and international research have shown that Bilateral is the most prevalent form of CP, GMFCS Level III are most frequent .The majority of instances have a strong correlation to socioeconomic position, which is typically low in underdeveloped nations, and the most prevalent time for CP development is during pregnancy. The most frequent cause was prolong labor and seizure. This study alerts decision-makers to possible precipitating circumstances so they can foresee and prevent them.

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APPENDIX 1

(CONSENT FROM)

Research Title: Demographic profile and pattern of cerebral palsy.

Name of Researcher:

Name of participant: ………………………….   File No:

Date of informed consent: ……………………………………..

Participant Identification Number for this research:

Participation in this study is entirely voluntary. It will involve an interview of approximately 20 - 30 minutes in length to take place by arrangement. We will initially contact you by in person but for further discussion a phone call can be placed if needed.

You may decide not to answer any of the interview questions if you wish. You may also decide to withdraw from this study at any time by advising the researcher interviewing you or by emailing gonibhpi@gmail.com or using the contact detail at the end of this document. If you notify us of your withdrawal, all identifiable data will be destroyed. Once data has been anonymised it will be impossible to identify the origin and cannot be destroyed.

The information you provide is confidential, except that with your permission anonymised quotes may be used. If you request confidentiality, beyond anonymised quotes, information you provide will be treated only as a source of background information, alongside literature-based research and interviews with others.

Your name or any other personal identifying information will not appear in any publications resulting from this study; neither will there be anything to identify your place of work or the particular CRP organization.

The information gained from this interview will only be used for the above objectives, will not be used for any other purpose and will not be recorded in excess of what is required for the research.

Even though the study findings will be published in international conferences and journals, only the research team will have access to the interview data itself. There are no known or anticipated risks to you as a participant in this study.

If you have any questions regarding this study or would like additional information please ask the researcher before, during, or after the interview.

Do you agree to take part in this study?

If answer is YES – mark (✔) in the Yes box and If the answer is NO – mark (✔) in the

| Yes | | No |

Participant Signature: Researcher Signature

:

APPENDIX 2

Topic: **Demographic profile and pattern of cerebral palsy.**

Code no:

Patient id no:

Patient name:

Address: village/house no: PO:

PS: Dist.:

Mobile no:

A. Demographic characteristics of caregivers of CP children

1	Gender	I.	Female
		II.	Male
2	Primary caregiver	I.	Mother
		II.	Others
3	Age group (years)		
4	Education	I.	Postgraduate & more
		II.	Graduate
		III.	Secondary
		IV.	higher secondary
		V.	Primary
		VI.	Uneducated
5	Occupation	I.	House maker
		II.	Business
		III.	manager
		IV.	teacher
		V.	Farming
		VI.	Skilled labor

		VII.	small job
		VIII.	Others
6	Marital status	I.	Married
		II.	Separated
		III.	Divorced
		IV.	Widowed
7.	First cousin marriage	I.	Yes
		II.	No

B. Demographic characteristics of CP children

1.	Gender	I.	Male
		II.	Female
2	Age group (months)	I.	< 12 months
		II.	12–24 months
		III.	24–48 months
		IV.	48–96 month
		V.	96–144 months
3	Type of cerebral palsy	I.	Unilateral
		II.	Bilateral
		III.	Dystonic/athetoid
		IV.	Mixed
		V.	Ataxic
4	Type of family	I.	Joint (3 or more generations and their spouses living together)
		II.	Nuclear (a couple and their dependent children)

		III.	Others
5	Family members	I.	4
		II.	≤ 4
		III.	> 4
6	Birth History	I.	Full term—normal
		II.	Full term—abnormal
		III.	Preterm—normal
		IV.	Preterm -abnormal
7	Place of birth	I.	Hospital
		II.	clinic
		III.	Home
8	Delivery of birth attended by	I.	Doctor
		II.	Nurse
		III.	Midwife
9	Type of birth	I.	Single
		II.	Twins
		III.	Triplets or more
10	Type of complications	I.	Prenatal maternal illness
		II.	Perinatal complication
		III.	Postnatal complication
		IV.	No significant history
11	Birth weight of child	I.	> 2.50 kg
		II.	1.50–2.49 kg
		III.	1–1.49 kg
		IV.	< 1 kg
12	During birth	I.	Prolong labor
		II.	Short labor
		III.	Sudden birth
		IV.	Birth injury

		V.	Birth asphyxia
		VI.	Delayed crying
13	After birth	I.	Jaundice
		II.	dehydration
		III.	Pneumonia
		IV.	Hydrocephalus
		V.	Seizure
		VI.	Other
14	Duration of stay hospital	I.	Not Required
		II.	1–14 days
		III.	15–21 days
		IV.	> 21 days
15	Was your child in a neonatal intensive care unit (NICU) after birth?	I.	Yes
		II.	No
16	Was your child on a ventilator after birth?	I.	Yes
		II.	No
15	vision	I.	Normal
		II.	Impaired
		III.	loss
16	Hearing	I.	Normal
		II.	Impaired
		III.	loss
17	Child communicate by	I.	crying
		II.	Making gesture or sign
		III.	Facial expression
		IV.	Making sound
		V.	Speaking word
		VI.	Speaking sentence
18	GMFCS level	I.	Level 1
		II.	Level 2

		III.	Level 3
		IV.	Level 4
		V.	Level 5
19	Is the patient currently on medication to control spasticity?	I.	Yes
		II.	No
20	What assistive devices did the patient use to begin walking:	I.	None
		II.	Crutches
		III.	Walker
21	At what age was the patient when	I.	You first thought he/she had problems with his/her movements that were later determined to be part of his/her diagnosis?
		II.	You first talked to a doctor about these problems?
		III.	His/her disability was first diagnosed?
		IV.	He/she began a physical therapy program?

C. Patient's Physical Abilities:

a. Gross motor skill by FIM Scale :(1-total assistance, 2-maximun assistance required, 3-moderate assistance required, 4-minimum assistance required, 5-required supervision, 6-modified independence, 7-complete independence).

a.	Rolling supine to prone	1	2	3	4	5	6	7
b	Rolling prone to supine	1	2	3	4	5	6	7
c	Moving from supine to box sitting	1	2	3	4	5	6	7
d	4 point kneeling	1	2	3	4	5	6	7
e	Supine to cross sitting	1	2	3	4	5	6	7
f	Cross leg sitting	1	2	3	4	5	6	7

g	Cross leg sitting into 2 cycle crawling	1	2	3	4	5	6	7
h	Cross leg sitting standing	1	2	3	4	5	6	7
i	Standing	1	2	3	4	5	6	7
j	squatting	1	2	3	4	5	6	7
k	High kneeling	1	2	3	4	5	6	7
l	Walk on knees	1	2	3	4	5	6	7
m	½ kneeling	1	2	3	4	5	6	7
n	Walking 5 meters	1	2	3	4	5	6	7
o	Running	1	2	3	4	5	6	7
p	Jumping	1	2	3	4	5	6	7
q	Hopping (Rt/Lt)	1	2	3	4	5	6	7
r	Single leg stance (Rt/Lt)	1	2	3	4	5	6	7
s	Ascending	1	2	3	4	5	6	7
t	Descending	1	2	3	4	5	6	7

B physical therapy:

1	Is the patient currently involved in a physical therapy program?	I. Yes
		II. No
2. If yes, please answer the following questions	Which of the following best describes the type of physical therapy program?	I. School program with treatment provided by aregistered physical therapist
		II. School program with treatment provided by an aid or other school staff
		III. Adaptive physical education at school
		IV. Hospital or

		outpatient center program provided by a registered physical therapist
		V. Home based program by a registered physical therapist
		VI. Home exercise program only
		VII. Combination of the above
3.	How often does the patient usually participate in a therapy type program including exercising at home?	I. daily
		II. 4-6 times a week
		III. 3 times a week
		IV. 2 times a week
		V. 1 times a week
		VI. 2 times a month
		VII. Never
4	How often does the patient see a licensed physical therapist for evaluation, consultation, or treatment?	I. daily
		II. 4-6 times a week
		III. 3 times a week
		IV. 2 times a week
		V. 1 times a week
		VI. 2 times a month
		VII. Never

.

APPENDIX 3
(Ethical Permission)

বাংলাদেশ হেল্থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
Bangladesh Health Professions Institute (BHPI)
(The Academic Institute of CRP)

Ref:

Date:

CRP/BHPI/IRB/11/2021/512

04/11/2021

To
MD. Waliul Islam
Part II M.Sc. in Physiotherapy
Session: 2019-2020, Student ID: 111190070
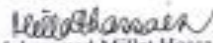BHPI, CRP, Savar, Dhaka- 1343, Bangladesh

Subject: Approval of the thesis proposal "**Scope of Rehabilitation for persons with long COVID symptoms attended for Neuro-Muscular Rehabilitation in Bangladesh.**" by ethics committee.

Dear MD. Waliul Islam,
Congratulations.
The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above mentioned dissertation, with yourself, as the principal investigator and Ehsanur Rahman as thesis supervisor. The Following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Dissertation/thesis/research Proposal
2	Questionnaire (English & / or Bengali version)
3	Information sheet & consent form.

The purpose of the study is assessing the scope of Rehabilitation for long COVID survivors in Bangladesh according to the Yorkshire Rehabilitation Screening scale (COVID-19 YRS). The study involves face to face interview by using questionnaire which will take only 20 minutes and have no likelihood of any harm to the participants and have possibility of benefit of patients on pressure sore prevention strategies. Data collectors will receive informed consents from all participants. Any data collected will be kept confidential. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 09:00 AM on March 30, 2021 at BHPI (27ᵗʰ IRB Meeting extended).

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring in the course of the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,

[signature]
Muhammad Millat Hossain
Assistant Professor, Dept. of Rehabilitation Science
Member Secretary, Institutional Review Board (IRB)
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

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APPENDIX 4
(Permission letter)

To

The head of physiotherapy department

Centre for the rehabilitation of the paralysed (CRP)

Savar, Dhaka-1343.

Subject: **Prayer for permission to collect data in order to conduct thesis**

Sir,

With due respect I am MD Shujayt Gani, a student of part 11 M. Sc. in Physiotherapy program at Bangladesh health profession institute (BHPI). As per course curriculum, I shall have to complete thesis. In these respect, my research title is "**Demographic Profile and pattern of CP**". In thesis my participants will be cerebral palsy patients who already taken treatment. I believe outdoor department of CRP (all centers) is the best place to collect data from participants.in order to materialization of the thesis, I need your kind permission to collect data. I have already obtained approved institutional review board (IRB) and reference number is CRP/BHPI/IRB/10/2022/675.

May I therefore .hope you would be kind enough to give me permission for data collection and oblige thereby.

Sincerely yours

MD Shujayt Gani

Student of part 11 M. Sc. in Physiotherapy program

BHPI, CRP, savar, Dhaka-1343

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