



Faculty of Medicine  
University of Dhaka

CHARACTERISTICS OF CEREBRAL PALSY PATIENT ATTENDED AT CRP By

Shahnaj Sultana  
Master of Science in Physiotherapy  
Registration No: 1179  
Roll No:10



Department of Physiotherapy  
Bangladesh Health Professions Institute (BHPI)

May 2016



Faculty of Medicine

University of Dhaka

CHARACTERISTICS OF CEREBRAL PALSY PATIENT ATTENDED AT CRP

By

Shahnaj Sultana  
Registration No : 1179  
Roll No:10

Submitted in Partial Fulfillment of the Requirements for the  
Degree of Master of Science in Physiotherapy



Department of Physiotherapy

Bangladesh Health Professions Institute (BHPI)

May2016

## **Approval**

We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for acceptance of this thesis entitled, “Characteristics of Cerebral Palsy Patient Attended at CRP”, submitted by Shahnaj Sultana, for the partial fulfillment of the requirements for the degree of Master of Science in Physiotherapy.

**Nasirul Islam**

**Associate Professor and Acting**

**Principal, BHPI**

**SM Ferdous Alam**

**Assistant Professor BHPI, CRP,**

**Dr Md. Jahangir Alam**

**Associate Professor Orthopedic Surgery**

**NITOR**

**Firoz Ahmed Mamin**

**Assistant Professor of Physiotherapy**

**BHPI,**

Date of approval: 30<sup>th</sup> June 2016.

## **Declaration Form**

- This work has not previously been accepted in substance for any degree and is not concurrently submitted in candidature for any degree.
- This dissertation is being submitted in partial fulfillment of the requirements for the degree of MSc in Physiotherapy.
- 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.

- I confirm that if anything identified in my work that I have done plagiarism or any form of cheating that will directly awarded me fail and I am subject to disciplinary actions of authority.
- I confirm that the electronic copy is identical to the bound copy of the Thesis.
- In case of dissemination the finding of this project for future publication, research supervisor will highly concern and it will be duly acknowledged as undergraduate thesis.

Signature:

Name: Shahnaj Sultana

Date:

Table of contents
-------------------

Acknowledgement	i
List of table	ii
List of figure	iii
List of Abbreviations or Symbols	iv
Abstract	v
1.INTRODUCTION	1-14
1.1 Background	1-8
1.2 Rationale	8-9
1.3 Objectives	10
1.5 Conceptual framework	11
1.6 Operational definition	12-14
2.LITERATURE REVIEW	15-31
3.METHODOLOGY	31-36
3.1 Study design	32
3.2 Study site	32
3.3 Study duration	32

3.4 Study population and sampling	33
3.5 Inclusion criteria	33
3.6 Exclusion criteria	34
3.7 Sample size	34
3.8 Sampling procedure of the study	34
3.9 Data collection method and tools	35
3.10 Data analysis	35
3.11 Ethical considerations	36
3.12 Informed consent	36
4.RESULTS	37-69
5.DISCUSSION	70-79
LIMITATION OF THE STUDY	80
6.CONCLUSION AND RECOMMENDATION	81-82
BIBLIOGRAPHY/ REFERENCE	83-95
APPENDICES	vi-xviii

## Acknowledgement

I am immensely grateful to my supervisor, Nasirul Islam, Associate Professor & Principal of BHPI, for his valuable guidance, cordial cooperation, support and encouragement during the entire period of the study.

I would like to express my deepest gratitude to the Bangladesh Health Professions Institute, to give me the opportunity to perform this study. I would like to thank my honorable teacher Firoz Ahmed Mamin, Assistant Professor of Master of Science in Physiotherapy program BHPI, and S.M.Ferdous Alam, Assistant Professor, Department of Rehabilitation Science and other board members for their support and guidance. I also pay my thanks to Ummul Ambia and Parvin Akter, Physiotherapist, Department of Physiotherapy for their enthusiastic help throughout the study. I would like to give special thanks to Mohammad Rashadur Rahaman Sarker for his encouragement and support. I would pay to special gratitude to the Physiotherapist and Intern Physiotherapist of the Paediatric Unit of CRP Savar for helping me in data collection.

I would like to express my gratitude to mother of cerebral palsy patient, who gave me their valuable time and provided the information, related to my study and helped me to make my work successful.

## List of Tables

Table-1: Age distribution of the patients	37
Table-2: Type of CP and patient's sex	41
Table-3: Educational status of the mother	43
Table- 4: Educational status of the father	44
Table -5: Association between maternal age and type of CP	47
Table- 6: Position of child and Type of CP	49
Table-7: Association between Cousin Marriage and type of CP	51
Table-8: Association between time of Child born and type of CP	57
Table-9: Association between birth asphyxia and place of delivery	59
Table-10: Association between type of delivery and type of CP	62
Table-11: Labor pain and birth asphyxia	65
Table-12: Distribution of child's suffering condition after birth	68



## List of Figure

Figure-1: Sex of the participants	38
Figure-2: Types of CP according to tonicity	39
Figure-3: Type of cerebral palsy according to involved area	40
Figure-4: Residential area of the participants	42
Figure- 5: Distribution of the mothers' occupation	45
Figure- 6: Distribution of maternal age	46
Figure-7: Position of the child in their family	48
Figure -8: History of consanguineous parents	50
Figure-9: Availability of health care services	52
Figure-10: Distribution of maternal complication	53
Figure- 11: Participants' medical consultancy during pregnancy	54
Figure-12: Distribution of respondents' number of medical consultancy	55
Figure-13: Duration of gestational age	56
Figure- 14: Place of delivery of the participants	58
Figure- 15: Attendance of delivery	60
Figure- 16: Type of delivery	61
Figure- 17: Duration of labor pain	63
Figure- 18: Presence of birth asphyxia	64
Figure- 19: Birth weight of the participants	66
Figure-20: Jaundice history of the respondents	67
Figure-21: Respondents family support during pregnancy	69

<b>List of Abbreviations or Symbols</b>
---

<b>CP</b>	Cerebral Palsy
<b>CRP</b>	Centre for the Rehabilitation of the Paralysed
<b>BHPI</b>	Bangladesh Health Professions Institute
<b>TBA</b>	Trained Birth Attendance
<b>SBA</b>	Skilled Birth Attendance
<b>SPSS</b>	Statistical Package for the Social Sciences
<b>UNICEF</b>	United Nations International Children's Emergency Fund
<b>WHO</b>	World Health Organization
<b>BMRC</b>	Bangladesh Medical Research Association
<b>IBR</b>	Institutional Review Board

## Abstract

**Purpose:** To explore the characteristics of cerebral palsy patient attended at CRP.

**Objectives:** To describe the antenatal, natal and post natal characteristics of

cerebral palsy patient. **Methodology:** The study design was cross-sectional study.

Total 205 samples were selected through convenience sampling method for this study

from Paediatric unit of Centre for the rehabilitation of the paralyzed (CRP). Data was

collected from face to face interview with semi-structured questionnaire.

Descriptive statistics through using SPSS software version 20 was used for data

analysis which focused through table, Bar and pie chart etc. **Results:** It has found that

spastic quadriplegia is the most common type of cerebral palsy and male child (71%)

are more affected than female (29%). Majority of the patient came from rural area

(57%) and the parents with low educational status. Moreover cerebral palsy is

common in younger mother which was significant in test statistics. It was found that

48% delivery took place at home attended by untrained person (42%), history of birth

asphyxia was present in around 67% cases which was common in home delivery

( $p=0.017$ ). Beside this 60% mother had suffered for prolonged labor which could

influence birth asphyxia as well as cerebral palsy. One third mother of cerebral palsy

patient did not get family support during their pregnancy to have a healthy baby.

**Conclusion:** illiteracy, younger age of mother, unavailability of health care facility to

all, lack of awareness regarding pregnancy care, home delivery with untrained

attendant could play as a contributing character to have cerebral palsy. Finally,

education, awareness about child disability and its prevention and women

empowerment can prevent the development of cerebral palsy in long term.

Key words: Cerebral palsy, pre-natal, natal, post natal characteristics of CP.

## 1.1 Background

Bangladesh is considered to be one of the least developed countries in terms of average income, calories consumed per person, high infant mortality rate and low literacy rate (Rahman et al., 2012). According to the World Health Organization (WHO) 10% of total population in Bangladesh are disabled. According to Bangladesh Bureau of Statistics 16.41% of total disabilities are child disability due to birth injury (Anwar et al., 2006) where Cerebral palsy is the most common condition that is responsible for the child disability (Rosenbaum et al., 2007).

Disability is an important developmental issue all over the world (Marella et al., 2015). The medical model of disability describes disability as a result of physical condition and it is the part of that individual's body. It can reduce the quality of life of that person. In recent years the medical model is being replaced by the rights-based Biopsychosocial model that emphasizes upon the independence of the people with disabilities (PWD) as they have full rights to join in mainstream of society (Models of Disability, 2007). Worldwide, the incidence is quite the same which is 1 in 400 live births. There is no pre-birth test and no known cure for the most & the cause is still unknown (Steinbok & McLeod, 2005). Although there are little studies on disability in Bangladesh but a study shown the prevalence of disability in Bangladesh, from a descriptive study it has known that in Bangladesh the prevalence of disability in a population of children ages 2-9 years from both urban and rural populations was estimated to be 70 per 1000 for all grades of severity and 22 per 1000 for serious

disability (Khan & Durkin, 1995). And estimated 20% of infants are born prematurely in Bangladesh, and 30% have low birth weight (LBW), With a total population of greater than 146 million people, including 20 million children greater than 5 years of age, large, unrecognized populations may be at risk for neurodevelopmental morbidity, particularly considering that 85% of deliveries occur at home, often with no skilled care; only 7% of birth are ever registered (Marella et al, 2015)

A large epidemiological study of children with disabilities aged 2-9 years in Bangladesh indicated a prevalence rate of 6.8% for all grades and types of disability and of 1.5% for serious disabilities (Damiano, 2004). A recent study shows that prevalence of disability in Bangladesh, mainly in Bogra district is 10.5%, age and gender related disability prevalence is 8.9%, also reported that the higher rate of functional limitation is related to psychological distress (Marella et al., 2015).

Cerebral palsy is such a condition that leads to child disability and the prevalence of CP was 2.11 per 1000 live births (Oskoui et al., 2013). A study showed that the prevalence of CP is varies with the relation of gestational age and relation to birth weight (Oskoui et al., 2013). Cerebral palsy (CP) is the most common physical disability of childhood. CP describes a group of disorders of movement and posture that are also often accompanied by associated impairments and secondary musculoskeletal problems (Mcintyre, et al 2012).

In Australia, CP occurring in approximately 2 to 2.5 per 1000 live births which is the main cause of physical disability in children. There has been aggregate interest in the quality of life of children with CP in recent years (Davis et al., 2009)

In UK, one in five children with CP (20.2%) was found and they had severe intellectual deficit and were unable to walk, Among babies born weighting less than 1500g, the rate of CP were more than 70 times higher compared with those weighting 2500g or more at birth, the rate of CP rose during the 1970s, but remained constant during the late 1980s (Johnson, 2002).

From 1991-1985 at Canada, the prevalence of CP was 2.7 per 1000 live births (Smith et al., 2008). In Ireland the prevalence was 1.88 for neonatal survivors (Mongan et al., 2006). Another study showed that the prevalence of CP in British Columbia was 2.68 per 1000 live birth from a cohort study of 1991 to 1995 in British Columbia and birth weight and gestational age plays a significant relationship in the development of CP (Smith et al., 2008).

The prevalence of CP was 2.4 per 1,000 live birth children from 4–11 years of age born in Sweden, excluding post-neonatally acquired CP, children born abroad had a higher prevalence of CP with more severe functional limitations but in the total population, the prevalence of CP in Sweden was 2.7 per 1,000 live infants (Westbom et al., 2007).

In Turkey the prevalence of CP is higher than that in developed countries but the aetiology is almost similar, the prevalence of CP was determined as 4.4 per 1000 live

births and postnatal acquired CP also included (Serdaro et al., 2006). Origin of CP was classified as prenatal in 26.6%, perinatal/neonatal 18.5%, postnatal in 5.9% among 2- 16 years aged children (Serdaro et al., 2006).

Cerebral palsy (CP) is a term used to define a spectrum of syndromes of posture and motor impairment that results from an insult to the developing central nervous system (Rosenbaum et al., 2007). This syndrome includes the following components: aberrant control of movement and posture, early onset, and no recognizable underlying progressive pathology. Disorders of movement and posture are caused by damage to the motor cortex (Sankar & Mundkur., 2005).

Cerebral palsy (CP) is more common in males than in females, but the reasons for this disparity are uncertain. There is a slightly higher prevalence in the male population, with a male: female ratio of 1.5:1 (Clinical Key, 2012). Males born very preterm also appear to be more vulnerable to white matter injury and intra ventricular hemorrhage than females (Johnston & Hagberg, 2007).

Cerebral palsy can be divided into four main categories: spastic, athetoid, ataxic, and mixed forms, according to the type of movement disturbance (Rosenbaum et al., 2007). Cerebral palsy can be categorized according to the part of body involved; if the four limbs are affected includes poor neck control then it is considered as quadriplegic, diplegia refers to as mainly lower limb involvement, lower half of lower

limb involved CP is called as paraplegia and lastly if the child one side is affected due to CP then it is called as hemiplegic CP (Sankar & Mundkur., 2005).

Spastic type of CP was the predominant form in preterm and term infants, bilateral spastic CP was apparent in more than two-thirds of the preterm and only half of the term infants and unilateral spastic CP was apparent in 22% of the preterm infants and 37% of the term infants (Himpens et al., 2008). Spastic cerebral palsy (CP) accounts for approximately 70-80% of cases, and is sub divided into hemiplegic, diplegic, quadriplegic, and monoplegic types, depending on which limbs are affected. Athetoid and ataxic CP comprise 10-20% and 5-10% of cases, respectively. The most common mixed forms are spasticity and athetoid movements, but other combinations are also possible (Rosenbaum et al., 2007).

Numerous factors contribute on higher risks of cerebral palsy. Cerebral palsy may result from a wide range of causes including congenital, genetic, inflammatory, anoxic, traumatic, toxic, and metabolic (Nelson & Ellenberg, 1986).

There are several risk factors which are directly or indirectly responsible for developing CP (Kulak et al., 2010). Prenatal events are responsible for approximately 75%, perinatal are 10-15% and postnatal causes are 10% of all cases of CP. In 20% to 30% of cases, there is no apparent etiologic event (Reddihough, 2011). Prenatal risk factors are more nonspecific and harder to identify. Most infantile cerebral palsy result from operating prenatally or nately, it is often difficult to determine whether the



brain lesion occurred before or during birth, or in the first week of birth when the newborn resembles the fetus in many physiological respects. The prevalence of CP decreases significantly with increasing gestational age (GA), at least from 27 weeks to term (Himpens et al., 2008).

Prenatal risk factors are commonly maternal chorioamnionitis, cystic perivascular leukomalacia, preeclampsia, placenta previa, multiple birth and teratogenic exposure (Sankar & Mundkur., 2005). Perinatal causes are; infection, hemorrhage, seizure, hypoglycemia, hyperbilirubenemia and sometimes birth asphyxia (Drougia et al., 2007). Different conclusion has arrived from the study done by (Ellenberg et al., 2012) from their review study which has done to investigate whether current literature provides a useful body of evidence reflecting the proportion of cerebral palsy (CP) that is attributable to birth asphyxia. Result do not support the belief, widely held in the medical and legal communities, that birth asphyxia can be recognized reliably and specifically, or that much of CP is due to birth asphyxia.

Placental infarction and cord around the neck are significantly associated with developing spastic quadriplegic type of CP; placental infarction is four times and cord around the neck is three times more responsible risk factors (Nielsen et al., 2008). Antenatal causes of cerebral palsy are now feel to be more important than perinatal or neonatal causes by many workers in the field but the underlying causes of CP are remain largely unknown (Nelson, 2009).In the neonatal period, respiratory distress syndrome, meningitis and neonatal seizures were associated with an increased incidence of CP (Sankar & Mundkur., 2005). Risk factors can be associated with the

parents, as well as the child. One of the strongest predictors of CP is preterm birth, with the risk of CP increasing steadily with earlier delivery (Moster et al., 2008).

The mother's health is the most common risk factor. The age of the mother during the pregnancy could have a strong influence on whether a child would develop cerebral palsy (Black et al., 2012). In general, mothers who are above 40 years of age during the pregnancy are more likely to give birth to a baby who has cerebral palsy. Likewise goes for mothers who are younger than 20 years during pregnancy (Admin, 2011).

Low socioeconomic factors also may influence the risk of cerebral palsy (Sundrum, et al. 2005). Previous studies have indicated that maternal infection increases the risk of spastic cerebral palsy (CP) in term infants, whereas this association appears to be less evident in preterm infants. This could have serious effects on the baby like brain damage (Kuban et al., 2014).

Maternal trauma during pregnancy has implicated in the etiology of cerebral palsy in the surviving offspring. Twinning is associated with heightened risk of cerebral palsy. Twin pregnancies produced a child with CP 12 times more often than singleton pregnancies (Sankar & Mundkur., 2005).

Approximately 90% of children with cerebral palsy survive into their 20s and beyond (compared with 98% of the general population of children). Quadriplegic children with CP have a lower survival rate largely due to respiratory illnesses and distress (Morris, 2007).

The consequences of chronic muscle imbalance and the resultant deformities can cause increasing disability with age. In addition to postural and motor abnormalities, people with CP may exhibit secondary consequences of brain damage, including learning disability, other cognitive and sensory impairments, speech and language disorders, orthopedic complications, and epilepsy. One of the most significant problems in children with CP is defective postural control, maintaining postural control, required for the performance of activities of daily living, is often a major challenge for children with CP.

## **1.2 Rationale**

Cerebral palsy is the most common condition of physical disability in the child hood throughout the world but in many cases the cause remain unknown (Robensum, R., 2014). However, there are several action that people can take before and during pregnancy, as well as after birth which might help to reduce the risk of developmental problems, including CP. In developed country the prevalence of cerebral palsy is around 2 to 2.25 which are quite same in last few decade .However very little evidence has been found in Bangladesh perspective.

There is no cure for cerebral palsy but appropriate treatment and rehabilitation can help many individual to improve their motor skills and ability to communicate with the world. So rehabilitation is very important to restore their function to maximize their independence.

So population based epidemiological studies of child hood disabilities are essential for identifying the characteristics, influencing factor and causes and needs assessment to facilitate planning of services for children and families with special needs and to make program for awareness raising and prevention of disability (Oskoui, et al 2013) and provide appropriate treatment and rehabilitation facilities to ensure social inclusion into the mainstream of the society.

**1.3 Aim:** To explore the characteristics of Cerebral palsy patient attended at CRP.

**Research question:**

What are characteristics of cerebral palsy patient attended at CRP.

**1.4 Study Objective:**

**1.4.1 General Objective:**

To explore the characteristics Cerebral palsy patient attended at CRP.

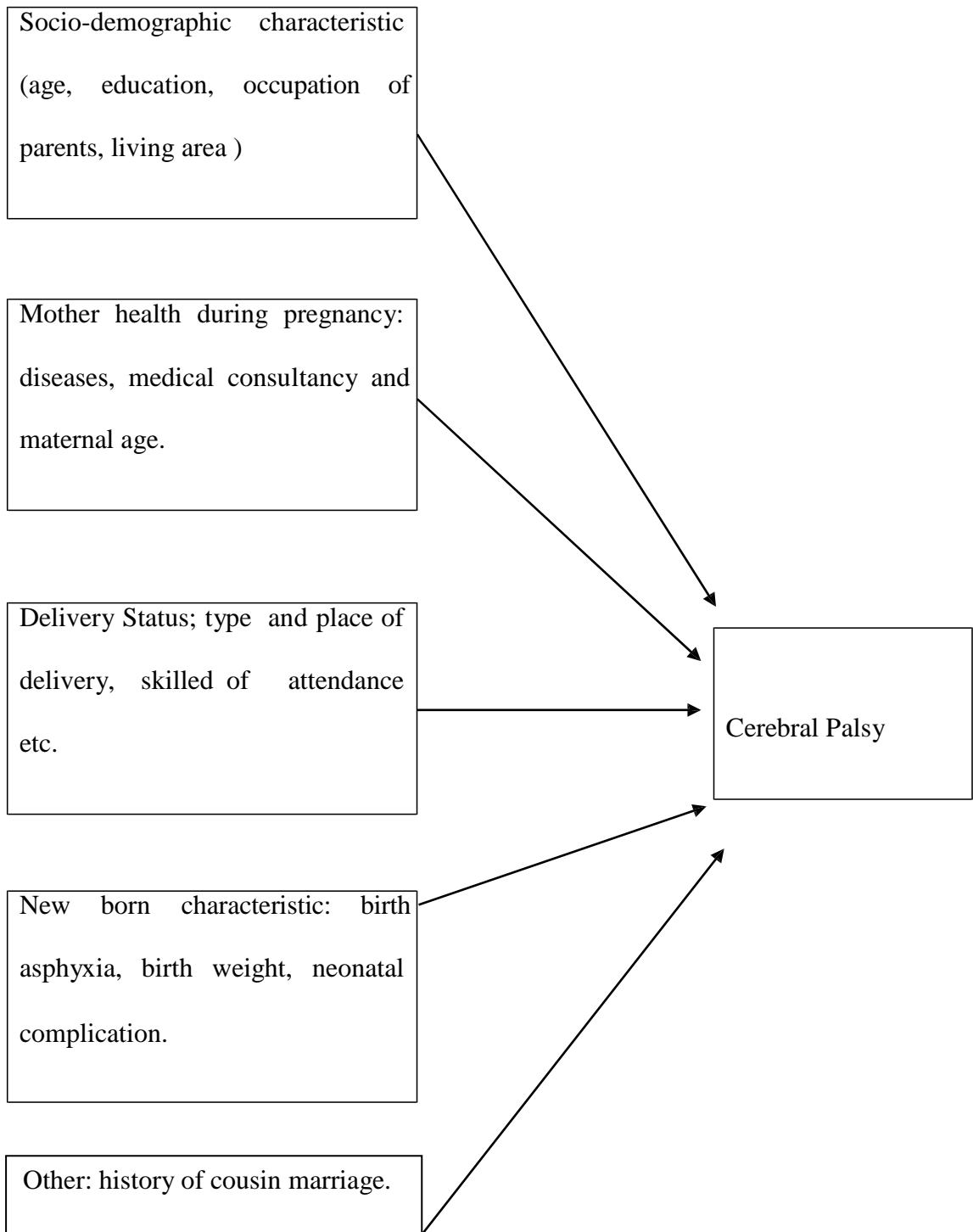
**1.4.2 Specific Objectives:**

- To explore socio-demographic characteristics of children with CP.
- To identify the common type of cerebral palsy.
- To describe the relevant antenatal, natal and post natal characteristics that present among the patient with cerebral palsy.

## 1.5 Conceptual Framework

**Independent variable**

**Dependent variable**



## **1.6 Operational definition**

**Rural:** Those who lives in a village.

**Urban:** Participants who came from city or divisional city.

**Semi- urban:** Who live in the area of Thana or Upazilla.

**Illiterate:** Those who had no academic educational or cannot write down their name in Bengali.

**Primary:** Participant who has gone to school and studied upto class iii, iv, v and can write down their name in Bangla.

**Secondary:** Those were complete primary level and continue upto class viii to x.

**Higher Secondary:** Those who has completed higher secondary level.

**Position of the child in the family:** the first issue of a parent will treat as first child of their family and 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> will treat consequently.

**Cousin marriage:** Marriage in between 1<sup>st</sup> and 2<sup>nd</sup> cousin is called cousin marriage.

**Availability of health care service:** Present of primary health care facility, community clinic within one kilometer of each participant's house or within a walking distance around each house.

**Number of visit to the Doctor:** How many time a pregnant mother went to the health Centre for pregnancy check-up as for normal visit or because of any complication.

**Weight gain during pregnancy:**

Normal: If a pregnant mother gains body weight in average 10-16 kg during their pregnancy period.

Under weight: If a pregnant mother gains body weight less than 10 kg in their pregnancy period.

Over weight: If a mother gains body weight more than 20 kg in their pregnancy period.

Home delivery: Delivery taken place at home.

Hospital or clinic delivery: Whatever normal or caesarian section, or other form of delivery take place at hospital or clinic will treat as delivery at hospital or clinic.

TBA (Trained Birth Attendance): Delivery assisted by person who got training regarding this issue. She could be a nurse or trained midwife.

SBA (skilled Birth Attendance): Delivery (normal or C/S) had done with the assistance of Doctor.

Midwife: Delivery had done with the help of untrained person or relative.

NVD (Normal Vaginal Delivery): Delivery had done in normal process with or without help of skilled person.

Caesarian section: Delivery had done through caesarian section, she may tried in normal vaginal delivery or not.

Forceps delivery: Normal vaginal delivery took place with the assistance of special equipment.



Normal birth baby's weight: If a child born with body weight 5.5 to 7.5 pound.

Low birth Weight baby: If a child born with weight less than 2.5 kg or 5.5 lb.

Over weight baby: If a child born with birth weight more than 7.5 pounds.

„Cerebral“ refers to the brain and „Palsy“ to a disorder of movement or pressure. If someone has cerebral palsy it means because of an injury to the brain (cerebral) he or she is not able to use some of the muscles of body in normal way (palsy) .CP is a group of condition that affects the movement and posture of body.

Sunder, D (2002) described that cerebral palsy is not a single or any illness. The complication of CP is cause by a non-progressive brain lesion arising before, during or after birth, during the period of brain development (Stelmach et al., 2005).

Another way Albert et al, in 2006 stated that a group of disorder of the development of movement and posture causing activity limitations that are attribute to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, cognition, communication, perception and behavior, by epilepsy and by musculoskeletal problems (Rosenbaum et al., 2007).

CP is neither progressive nor communicable disease. Nevertheless, due to lesion or damage in immature brain at early stages of development motor impairment syndrome occurs (Anwar, 2006). One literature also supported this, “Cerebral palsy is an umbrella term covering a group of non-progressive, but often changing motor

impairment syndromes secondary to lesions or anomalies of the brain arising in the early stages of development (Rosenbaum et al., 2007). Recent study shows that CP involves a variety of disorders caused by various factors acting at different points in fetal development accompanying with orthopedic & neurologic manifestation and excluded the neurodevelopmental disabilities in which movement and posture are not affected (Susan et al., 2010).

Damage of one or more parts of the brain affects the ability to control muscles in CP and ultimately muscular weakness occur (Scianni et al., 2009). Symptoms range from mild to severe but the condition does not get worse with the child age (Cerebral Palsy statistics, 2010).

Cerebral palsy is the most common neurodevelopmental motor disability in children and requires medical, educational, social, and rehabilitative resources throughout the lifespan (Hurley et al., 2011). Cerebral palsy is considered to be a non-life-threatening condition when the children born with the exception in severe case and also in adulthood, most of the children with cerebral palsy are expected to live well (Mychild, 2013). The exact prevalence of cerebral palsy is not known from any study but a study shown about the mortality rate of young people in urban and rural area of Bangladesh and focused that due to nutritional deficiency and some intrinsic and extrinsic factor mortality rate increases (khan et al., 1998)

It has been estimated that about 80% of children with CP have some type of movement disorder and CP is classified into four categories according to the type of disturbance in movement (Susan et al., 2010).

Spastic cerebral palsy is the most common type of CP. Spasticity is hypertonia in resistance to passive movement increases with increasing velocity of movement (Susan et al., 2010). This affects approximately 70 to 80 percent of individuals with the disorder. It occurs due to damage of motor cortex of the brain (cerebral palsy statistics 2010). In this type of CP muscle become stiff and the child face difficulty to move the body parts (cerebral palsy statistics, 2010). Spasticity is often a component of upper motor neuron syndrome, along with hyper reflexia, clonus, reflex overflow, positive Babinski sign and caused by a hyperactive stretch reflex mechanism (Susan et al., 2010). There are varying degrees of spastic cerebral palsy. Some patients have mild causes that affect vary few movement and some have moderate spasticity.

Other with more severe causes can have their entire bodies affected. Spastic cerebral palsy also limits stretching of muscle in daily activities, causes the development of muscle, and joints deformity and children born with spastic cerebral palsy do not have any deformity of the extremity but develop them over time due to joint contracture (Brody, 2005).

According to Raj (2006), this is a rare form of cerebral palsy, which affects an estimated 5 to 10 percent of individuals with cerebral palsy. Ataxic cerebral palsy affects sense of balance and depth perception and is caused by damage to the cerebellum that is responsible for balance and coordination and coordinates the actions for different groups of muscle (Morris et al., 2007). Ataxic cerebral palsy therefore affects coordination of movement. Ataxic cerebral palsy usually affects all four limbs and trunk (Susan et al., 2010). Typically, persons affected by ataxic cerebral palsy have poor coordination, unsteady walking and difficulty with precise movements such as using a pen or buttoning a shirt (Rosenbaum et al., 2007).

Another type of cerebral palsy is athetoid CP. Athetosis is defined as “a slow, continuous, involuntary writhing movement that prevents maintenance of a stable posture, where discrete, repetitive movements or postures cannot be identified (Sanger et al., 2010). Tone is abnormal and varies in character & intensity, ranging in the one child from hypotonia to hypertonia, frequently with surprisingly sudden fluctuations. Involuntary movement occurs which may not be a movement at all, and the lower the tone the greater the fluctuation appears to be. These tonus changes may occur as intermittent tonic spasms occurring in recognizable patterns, or as repetitive rhythmical movements, or as fleeting, irregular and localized contraction of muscle groups, muscle or muscle fibres. These children show little or no co-contraction, therefore are unable to maintain a posture or develop enough fixation for a moving limb (Morris et al., 2007).

Children with Dystonic cerebral palsy have certain features like involuntary sustained or intermittent muscle contractions cause twisting and repetitive movements abnormal postures, or both ( Morris et al., 2007). Dystonia is associated with disruption of basal ganglia (Rosenbaum et al., 2007). Recent studies stated that athetosis is very rare and can't isolate because it's not a primary movement disorder, so dyskinetic CP is used instead of athetosis (Susan et al., 2010).

CP also occurs as the result of injury of pyramidal and ex-pyramidal tract (Gillette's annual report, 2007). It was common for children to have symptoms that did not correspond to any single type of cerebral palsy. There symptoms were a mix of types (Morris et al., 2007).

There are four main types of cerebral palsy according to movement. Susan et al., (2010) stated that hemiplegic type of cerebral palsy typically affected the arm and hand on one side of the body, but it can also include the leg. Children with spastic hemiplegic generally walk later and on tip toe because of tight heel tendons. The arm and leg of the affected side are frequently shorter thinner. Some children would develop an abnormal curvature of the spine, like scoliosis, kyphosis.

In this type of cerebral palsy, muscle stiffness was predominantly in the legs and less severely affects the arms and face, although the hands may be clumsy. Another study emphasize that the characteristics of spastic diplegic CP include the legs often turn in and cross at the knees, tendon reflexes are hyperactive& toes point up (Rosenbaum et

al., 2007). Tightness in certain leg muscle makes the legs move like arms of a scissor, in which the hips are flex, the knees nearly touch, the feet are flexed, and the ankles turn out from the leg, causing toe walking. Children with this kind of cerebral palsy may require a walker or leg braces.

Spastic quadriplegia is the most severe form cerebral palsy, often associated with moderate to severe mental retardation. It caused by widespread damage to the brain or significant brain malformations. Children will often have severe stiffness in their limbs but a floppy neck (Raj., 2006).

Evidence suggests that 70%to 80%of cases of cerebral palsy are due to prenatal factors (Leviton et all. 2011). Different factor are responsible for prenatal infection and varies among hemiplegia, quadriplegia such as elevated concentration of 2 proteins are associated with increased risk of quadriparesis and 4 proteins are responsible for hemiparesis (Kuban et al., 2014) and it is known that risk factors for cerebral palsy such as low fetal birth weight and growth are more common in deprived areas.

Cerebral palsy is a static neurologic condition resulting from brain injury that is because brain development continues during the first three years of life; cerebral palsy can result from brain injury occurring during the prenatal, perinatal, or postnatal periods (Kuban et al., 2014). 70 to 80 percent of cerebral palsy cases are acquired prenatally and from largely unknown causes (Karen & Krigger, 2006).

A variety of antenatal and perinatal risk factor had identified for CP, in many individual cases the precise etiology may be difficult but not impossible to establish. However, the post-neonatal cases of CP are of particular interest because the underlying causes are often preventable by raising awareness. For example, meningitis induced brain injury could be avoided by appropriate immunization program while accident prevention strategies could reduce the rate of road and water-based trauma. A study from Turkey suggested that in Turkey the most frequently encountered risk factors were low birth weight (45.1%), preterm birth (40.5%), birth asphyxia (34.6%) and consanguineous marriage (23.8%). Low birth weight, preterm birth, birth asphyxia and consanguineous marriage were top-ranked risk factors that were determined in Turkish children with CP (Erkin et al., 2008). Another retrospective case-control study from Turkey also suggested that intrapartum risk factors were significantly more frequent in the CP group and neonatal weight of less than 2500 grams was the only significant perinatal risk factor (Gurbuz et al., 2006).

Drougia et al in 2008 stated that cerebral palsy is a group of non-progressive but often changing motor impairment syndromes secondary to brain lesions or anomalies of the brain arising in the early stages of its development. Its incidence varies between 1.5 and 2.5 per 1000 live births and it is the cause of 67% of severe motor disabilities in childhood. CP is associated with prenatal, perinatal and neonatal risk factors. They have found, incidence of cerebral palsy is higher in preterm birth. Their study conclude that gestational age appears to be inversely related with CP, with the smaller preterm infants (b28 weeks) being at highest risk. Independent risk factors for CP



were, in infants of GA N 34 weeks SGA, neonatal transfer, MV and sepsis/meningitis and in those of GA b 34 weeks.

Ancel et al., (2006) suggested that cerebral palsy has a relation with the gestational age. This was a cohort type of study and focused on the rate of cerebral palsy in duration of gestation age and also focused the rate of brain damage according to MRI history. The prevalence of cerebral palsy was 20% at 24 to 26 weeks of gestation, compared with 4% at 32 weeks. On the basis of ultrasound findings in the neonatal period, 17% of children with isolated grade III intra ventricular hemorrhage and 25% of children with white matter damage (Ancel et al., 2006). Another cohort study by Ancel et al., (2005) also discussed about the relation between gestation age and cerebral hemorrhage and suggested that preterm baby or small gestation age causes cerebral damage like cystic periventricular leukomalacia (c-PVL), grade III intra ventricular hemorrhage (IVH), and intra-parenchymal hemorrhage (IPH) but also mentioned that maternal hypertension has less chance to have cerebral damage rather than short gestational age. A population based study from Blair et al., (2011) found from his study that Placental infarction identified by macroscopic examination was associated with increased risk of CP and the CP subtype, spastic quadriplegic CP.

Agustín Conde-Agudelo, et al 2008 mention in their study that Preeclampsia complicates about 3% of all pregnancies and remains a major cause of maternal and perinatal mortality and morbidity, and is particularly devastating in developing countries. Despite recent progress towards understanding the cause of preeclampsia and/or its phenotypes, the etiology of this serious disorder remains elusive. Current

theories include abnormal placentation, cardiovascular maladaptation to pregnancy, genetic and immune mechanisms, an enhanced systemic inflammatory response, and nutritional, hormonal, and angiogenic factors.

Study result demonstrates that both urinary tract infection and periodontal disease during pregnancy are associated with an increased risk of preeclampsia. Moreover, there is some evidence suggesting that treating urinary tract infections during pregnancy reduces the incidence of preeclampsia.

A recent study stated that risk factors could be associated with the maternal age (Black et al., 2012). Maternal age less than 18 years was associated with increased risk of both any cerebral palsy and confirmed epilepsy. Adolescent pregnancy is a known risk factor for pregnancy complications such as prematurity, low birth weight, intrauterine growth retardation, and for infant mortality and these low birth weight and intrauterine growth retardation causes a wide range of neurologic and developmental conditions (Mcintyre et al., 2013). One researchers Nabors, (2007) in his research „Maternal age and parity in relation to cerebral palsy in their infants“ showed that the patient who is more than 35 years old is more likely to produce a child with cerebral palsy than younger woman. Some studies have also pointed out that the biological age of father of the baby could also be a risk factor. In many cases, a child born with the condition has a father whose age is younger than 20 years (Thomas et. al, 2009). Another cohort type of study discussed about the risk factors of cerebral palsy and pointed that maternal age also independent and strong risk factor for cerebral palsy (Wu et al., 2006).

Maternal hypertension in pregnancy or Gestational hypertension raises the likelihood of developing preeclampsia or eclampsia, conditions combining hypertension and protein in the urine. Hypertension, also known as high blood pressure, in a mother-to-be can affect her unborn baby in many ways (Doyle et al., 2009) Severe gestational hypertension can lead to preeclampsia or eclampsia and put the unborn baby at risk for IUGR, stillbirth, preterm birth and placental abruption (Mcintyre et al ., 2012). The more severe the case of hypertension, the higher the risk for developing CP ( Doyle et al., 2009 ) There are reports of a higher rate of neurodevelopment problems 8–10 in the infants of hypertensive mothers, while a large regional study found similar rates of disability for infants of mothers with or without hypertension during pregnancy (Steyn, 2013).

Anaemia is very common feature during pregnancy but mild anaemia is normal during pregnancy due to an increase in blood volume whereas more severe anemia could be complicated for the mother and causes a higher risk for anemia later in infancy (Goonewardene et al., 2012). In addition, if anaemia occurs at second trimesters, it has greater risk for having a pre-term delivery or low-birth-weight baby. Being anemic also burdens the mother by increasing the risk of blood loss during labor and making it more difficult to fight infections and has a chance to child's cerebral palsy (Mcintyre et al., 2012).

But maternal seizure disorder has no relation with stillbirth, microcephaly, cerebral palsy, mental retardation and other neurological abnormalities among infant (Vaile et al., 2015). Eventually if the women take anti-seizure drug there is no possibility to have infant's abnormalities (Mann et al., 2011).

Pre-eclampsia is very common during pregnancy and this occur due to urinary tract infection in pregnancy and associated with an increased risk of cerebral palsy in term infants (Conde-Agudelo et al., 2008). The presence of pre-eclampsia may result in elective preterm delivery, avoiding the inflammatory responses of spontaneous preterm labour with all their associated problems such as infection and precipitate delivery (VanderWeele & Hernández-Díaz., 2011). During the intrapartum and antenatal period there is a chance to mother's preeclampsia and it leads to cerebral palsy though the child is in term baby (Kulak et al., 2010). Another retrospective study in Bangladesh also pointed that from their study almost one third of the participants suffered from preeclampsia or eclampsia during their delivery time (Anwar et al., 2006).

Sometimes women who have not previously had diabetes develop a form of diabetes during pregnancy (called gestational diabetes) and this condition or other metabolic condition poses a risk for both the mother and also child's abnormality (Mcintyre et al., 2012). Maternal metabolic disorders are strongly and widely associated with some neurodevelopmental disorder like autism, developmental delay, cerebral palsy among children (Krakowiak et al., 2012). Gestational diabetes puts the fetus at greater risk of cerebral palsy (Resources and information for brain & spinal cord, 2011).

Maternal trauma in pregnancy had implicated as a possible cause of cerebral palsy; this issue is not resolved Physical trauma to a pregnant mother or the infant can cause brain damage as well as increasing the cerebral palsy risks in pregnancy. Blows to the infant's head due to an automobile accident, physical abuse or other such trauma can result in cerebral palsy (Himmelman et al., 2011). Maternal trauma during pregnancy had implicated in the aetiology of cerebral palsy. Possible mechanisms for the association between pregnancy trauma and cerebral palsy include reduced placental blood flow, placental embolisation and placental abruption (Brown., 2009). Domestic violence during pregnancy, reported at rates between 8% and 17%, had linked to fetal death, fetal distress and intrauterine growth retardation (Yost et al., 2005). Trauma occurs more commonly during the third trimester of pregnancy than at any other time in a woman's life (Brown., 2009). Maternal trauma during pregnancy to the abdomen causes placental abruption and cerebral palsy occurs after the consequences of placental abruption (Brown., 2009). Another descriptive study showed that cerebral palsy may occur among the term baby when the mother has any traumatic history during pregnancy period at any trimester (Hayes et al., 2007). On the other hand another researcher in his research pointed that though maternal trauma is rare during pregnancy; approximately 6% to 7% of all pregnant mother may suffer trauma during their pregnancy period but maternal, fetal, perinatal and natal problems are associated due to this traumatic effect (El Kady, 2007).

Incidence is higher in premature infants and in twin births and multiple born infants are four times higher risk of cerebral palsy than single ones (Topp et al., 2004). In twin pregnancies, death of one twin is recognized as being an important risk factor for the surviving co-twin having cerebral palsy and the death of one twin may impair the neurological development of the survivor throughout gestation in addition of premature birth (Glinianaia et al., 2002). It also found that if any of the babies die, the surviving babies could have a higher chance of developing the condition. This is more common among twins (Pharaoh et al., 2002). The live-born co-twin of a fetus that died in utero is at increased risk of cerebral impairment, the overall risk being 20% (Pharaoh and Adi 2000). Another important thing is that in case of twin baby, like sex are greater risk of cerebral palsy than unlike sex and also have the chance of cerebral palsy among the twin whose co twin die in the uterus compared with the normal surviving twin (Glinianaia et al., 2002). A retrospective study from Pharaoh and Adi (2000) pointed that multiple twins had a greater chance of uterine death and the causes of death was the cerebral palsy or cerebral impairment. Also mentioned that co twins death or impairment is related with the gestational age rather than normal gestational age live born co twins. A study on Australian and United States by Scher et al., (2002) discussed about the mortality rates of twins or rates of developing CP. Single baby has less chance for neonatal death compared with multiple death; approximately multiple twins had increased risk of fetal death 5 fold, increased risk of neonatal death was 7 fold and lastly increased risk of cerebral palsy was 4 fold rather than singletons (Scher et al., 2002). Previous studies have found that prevalence of cerebral palsy (CP) to be greater in multiple than in single pregnancy (Price et al., 2002). The increased risk to twins of cerebral palsy wasn't entirely explained by their increased risk of prematurity and low birth weight (Topp et al., 2004). On the

other hand, previous study suggested that cerebral palsy also occur among the triple pregnancies, 47 times more often cerebral palsy may occur in triple pregnancies and 87 percent cerebral palsy occur among twin pregnancies of multiple birth compared with single born baby (Livinecet al., 2005). Previous studies have found a possible family link with cerebral palsy, but positive findings have been hard to replicate. So researchers from Norway set out to investigate recurrence of cerebral palsy among twins and first, second, and third degree relatives to shed light on patterns of inheritance.

That study was involved 1,991,625 single births and 45,116 twins born in Norway between 1967 and 2002. Study had observed prevalence of cerebral palsy was 1.8 per 1,000 for children born during 1967-2002. The rate was higher in twins (5.1 per 1,000) than in singletons (1.7 per 1,000).The highest risk was seen in co-twins of affected children. If one twin had cerebral palsy, the relative risk of recurrence of cerebral palsy was 15 times higher in the other twin.

Beside this In families with an affected single child, there was a six to nine fold increased risk in a subsequent full sibling (first degree relatives) and up to a threefold increased risk in a half sibling (second degree relatives). Moreover, affected parents carried a 6.5 times increased risk of having an affected child compared with unaffected parents.

Researcher suggested that cerebral palsy includes a genetic component, with a stronger recurrence among relatives with closer genetic relationship, and that the underlying causes of the condition extend beyond the clinical management of delivery. However, they suggest that genetic influences are only part of a wide range of causes (Rosenbum,2007)

Infections during pregnancy- Certain infections in the mother, including rubella (German measles), cytomegalovirus (a usually mild viral infection) and toxoplasmosis (a usually mild parasitic infection) can cause brain damage and result in cerebral palsy (Conde-Agudelo et al., 2008). Recent studies suggest that maternal infections involving the placental membranes (chorioamnionitis) may contribute to cerebral palsy in full-term as well as preterm babies (those born before 37 completed weeks of pregnancy) (Neufeld et al., 2005). A 2003 study at the University of California at San Francisco found that full-term babies were four times more likely to develop cerebral palsy if they were exposed to chorioamnionitis in the womb. Reproductive/urinary tract infections also may increase the risk of preterm delivery, another risk factor for cerebral palsy (American Pregnancy Association, 2011). Maternal infection causes neurological disorder if the mother is affected by any kind of infection during preterm and term deliveries at their hospitalization period during delivery and risk of mostly autism spectrum disorder (Atladottir et al., 2010).



Study shows that more miscarriage, still births, physical and more weakness of the living child and diseases of nervous system such as epilepsy and cerebral palsy result from consanguineous marriage (Bittle., 2003)). Risk for first cousins is still low (i.e. 4% instead of 2%, 96% have healthy children) but this is doubled, not a 2% increase. Child of random first cousins has risk that 6% (1/16) of genes are homozygous (Saggar & Bittle., 2008). Child of first cousins from UK communities preferring consanguinity has risk that 11% of genes are homozygous (Woods 2006). Birth incidence data has shown that congenital or genetic disorders occur at a rate of 2% for childbirth in the world. This risk increase about 4% for first cousin couples and this genetic risk is a recessive disorder .Another study from Turkey also suggested that consanguineous marriage (23.8%) is an important risk factor for developing CP and compared with other countries, consanguineous marriage is still an important problem in Turkey (Erkin et al., 2008).

Prolonged labor pain also an important risk factor. During the delivery period mother who had prolonged labor pain had a chance of developed cerebral palsy (Anwar et al., 2006). It has observed that many infants who were born in the feet-first position could be found to have cerebral palsy. It also observed that babies who are first born to a couple could have greater chances of having the condition (Admin, 2011).

Birth asphyxia is a common responsible factor to provoked cerebral palsy and much of cerebral palsy occurred due to birth asphyxia (Ellenberg and Nelson et al., 2012). After birth many children needs oxygen supplementation; due to lack of oxygen to the brain, cell damage occur to the brain and thus causes cerebral palsy to the infants

(Kulak et al., 2010). Another population based case control study also discussed about the asphyxia related risk factors for cerebral palsy and pointed that placental and cord complications accounted for the majority of asphyxia conditions. In multivariate analysis, placental infarction was significantly associated with a four-fold increased risk for spastic quadriplegia and cord around the neck was significantly associated with a three-fold increased risk for spastic CP overall. Also the combination of placental infarction and being small for gestational age afforded an especially high risk for spastic quadriplegia. Placental and cord complications were present in 21% of cases and 12% of controls (Nielsen et al., 2008). A study from Bangladesh focused that perinatal asphyxia was a responsible risk factor for developing CP and majority (53.6%) of that CP cases reported to had perinatal asphyxia (Anwar et al., 2006).

Perinatal hyperbilirubinemia causes cerebral palsy and other neurological condition. Though hyperbilirubinemia cannot directly causes cerebral palsy, hyperbilirubinemia causes periventricular leukomalacia and periventricular leukomalacia was the main predictor of cerebral palsy in preterm infants (Ikonen et al., 1992).

Transmission of respiratory diseases is common in this type of housing (Behrman 2004). The area of residence had a significant influence on low birth weight, which were closely related with cerebral Palsy of children. There is a small but inconclusive literature on the relationship between cerebral palsy and socio- economic status. It could be expected that, as low birth weight is a strong risk factor for cerebral palsy and is strongly socio-economically related (Dolk et al., 2010). The prevalence of acquired CP is higher among communities with poorer socioeconomic conditions (Sundrum et al., 2002).

## **Methodology**

To explore the characteristics related with Cerebral Palsy (CP) a descriptive cross sectional study was conducted following the methodology describe in this chapter. It includes method used in varies levels of this study; from design to sampling, data collection and analysis.

### **3.1 Study design**

Descriptive Cross sectional study design was undertaken to identify the characteristics of cerebral palsy patient attended at CRP. This study has provided baseline information and further research hypothesis will be developed from the finding of this study. In addition, it was feasible within the stipulated time and resources available.

### **3.2 Study place**

This study was done at Pediatric Unit of Centre for the Rehabilitation of the Paralyzed (CRP), Savar, Dhaka. CRP is one of the specialized rehabilitation centers for those types of children. That is why this study place was selected for sample collection.

### **3.3 Study duration:**

This study was started from November 2015 with protocol preparation and has finished with submission of final report in May2016.

### **3.4 Study population and sampling**

Population is the total group or set of events to which hypothesis can apply. The population shares a specific set of characteristics or criteria that has established by the investigator. The criteria of study population are determined from a literature review and the goals for the study. All mother of a child with cerebral palsy in Bangladesh those were received treatment at CRP considered as the study population. A sample is a subset of the population that has been selected to participate in the project. Sample should represent the population as closely as possible. For survey research, it is better to get as many subjects as possible with the consideration of the size of the ideal population.

205 samples were selected through convenience sampling from the population for this study from the Mother who has children with cerebral palsy and have been receiving intervention at pediatric unit (both as inpatient and outpatient service) CRP, Savar.

### **3.5 Inclusion criteria**

- Children with Cerebral palsy and diagnosis was confirmed by pediatrician.
- Mother who has children with Cerebral Palsy age below 12 years.
- Interview has taken only from the mother who was willing to participate in the study
- Mother who has been receiving intervention (for their children) at paediatric unit from January 2016 to March 2016.

### **3.6 Exclusion criteria**

- Other neurological condition except Cerebral palsy and diagnosis was not confirmed by pediatrician.
- Mothers who was mentally ill.
- Mothers who have Cerebral Palsy children age more than 12 years
- Mothers who were unwilling to participate in this study

### **3.7 Sample Size:**

Sampling size for cross sectional study was calculated by following equation:

$$n = \frac{Z^2 P Q}{d^2}$$

$$= 324$$

The calculated Sample size was 324 but due to time constrintion, the feasible sample size was 205.

### **3.8 Sampling procedure of the study**

Finding the appropriate number and type of people to take part in the study is called sampling (Hicks 2000). The researcher has used Convenience sampling procedure to collect the samples in this study.

### **3.9 Data collection method and tools**

Data was collected through the face-to-face interview with participants and the researcher. Data was analyzed Microsoft office Excel 2007 using a SPSS 20 version software program. The tools that needed for the study were- Consent paper, questionnaire, paper, pen, file, calculator, computer, and printer.

In the study data were collected by both structured and semi structured mixed type questionnaire. Mixed type questionnaire include both open and close ended questions. Following that the investigator was gone to participants to take permission if they are interested in this study or not. Firstly, the investigator introduced her and the research project as well its purpose. For data collection, the investigator used written questionnaire but easiest wording.

### **3.10 Data Analysis**

The result of this study was consisted of quantitative data. The collected data were illustrated with bar graphs, pie chart & table. By this study a lot of information was collected. All these results gave a basic idea about the factors which can increase the chance to have cerebral palsy in Bangladesh. The results were calculated in percentages and descriptive statistics were presented, and chi-square test was used to explore the relationship between independent and dependent variables. However, the three most commonly used form of descriptive are: Measure of central tendency and Measure of dispersion, bar graph, histogram, pie chart and frequency polygon (Hicks 1999).

### **3.11 Ethical Considerations**

Ethical permission was taken from appropriate authority. Before starting the interview, interested participants were given consent form and the purpose of the research and this consent form was explained to them verbally in both Bengali and English. They were told that participation was fully voluntary and they have right to withdraw from the research at any time. The investigator did follow the guideline given by local ethical review committee and followed the WHO & BMRC guideline. They were told that confidentiality would be maintained strictly.

### **3.12 Informed consent**

The aim and objectives of this study was informed to the subjects verbally. The researcher gave the consent form to the subjects and explained them. The subjects have the rights to withdraw themselves from the research at any times. The name or address would not be used. The information of the subjects might be published in any normal presentation or seminar or written but they would not be identified the participants or subject will also be informed or given notice that the research result will not be harmful for them, but in future participants will be benefited. Every participant has the right to discuss about his or her problem with senior authority.

#### 4.1 Age distribution of the patients:

This table shows that among the participants (n=205) majority had age range 0-3 years (42%), 4-6 years age range had 32.2% (n=66) and 7-9 years age range were 13.7% (n=28) and only 12% (n=25) were at age range between 10-12years. Here the participants mean age was 1.96yrs and standard deviation was 1.023.

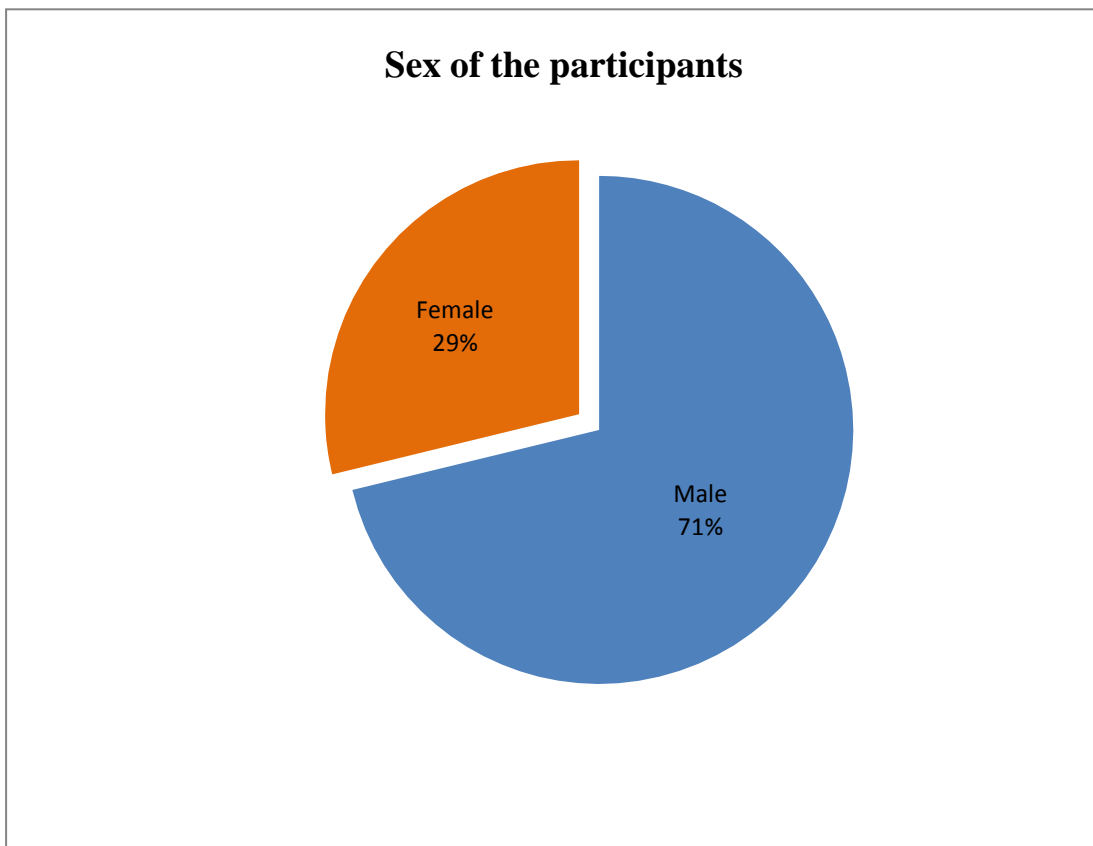
**Table-1: Age distribution of the patients**

<b>Age Range</b>	<b>Frequency (n)</b>	<b>Percent (%)</b>	<b>Mean Age</b>	<b>Standard deviation</b>
0-3yrs	86	42.0		
4-6yrs	66	32.2		
7-9yrs	28	13.7	1.96yrs	1.023
10-12yrs	25	12.2		
<b>Total</b>	<b>205</b>	<b>100</b>		



#### 4.2 Sex of the patients:

Among the total participant (n=205), male participants were 71% (n=145) and female participants had 29% (n=60). The following pie chart shows that cerebral palsy is more common in male rather than female.

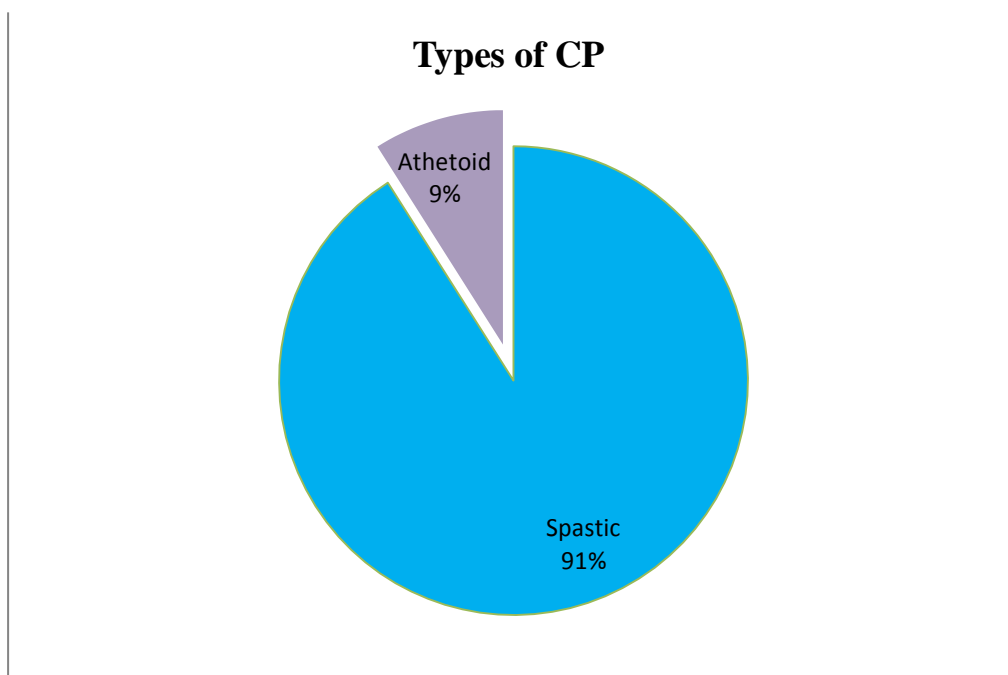


**Figure-1: Sex of the participants**

### 4.3 Types of CP

#### According to tonicity

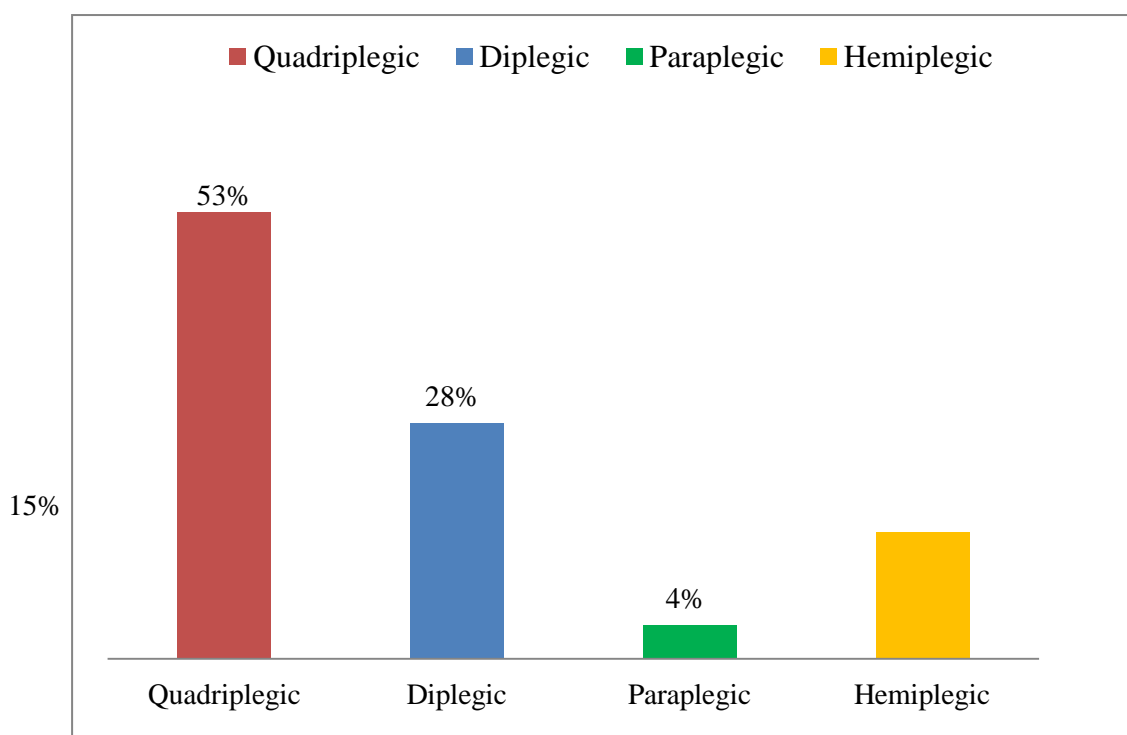
Among 205 participants of this study, about 91% (n=187) were spastic type of CP and 9 % (n=18) were athetoid type of cerebral palsy (CP). The pie chart below shows the portion of spastic types of Cerebral Palsy (CP) among the participants which were more commonly found in this study.



**Figure-2: Types of CP according to tonicity**

**According to involved area:**

The study shows that among the participants (n=205), 53% (n=108) had Quadriplegic type of CP, 28% (n=58) had diplegic CP, only 4% (n=8) had paraplegia and other were hemiplegic type of CP (n=31). So Quadriplegic type of CP is a common form of cerebral palsy participates in this study.



**Figure-3: Type of cerebral palsy according to involved area**

#### 4.4 Types of Cerebral Palsy and Sex distribution:

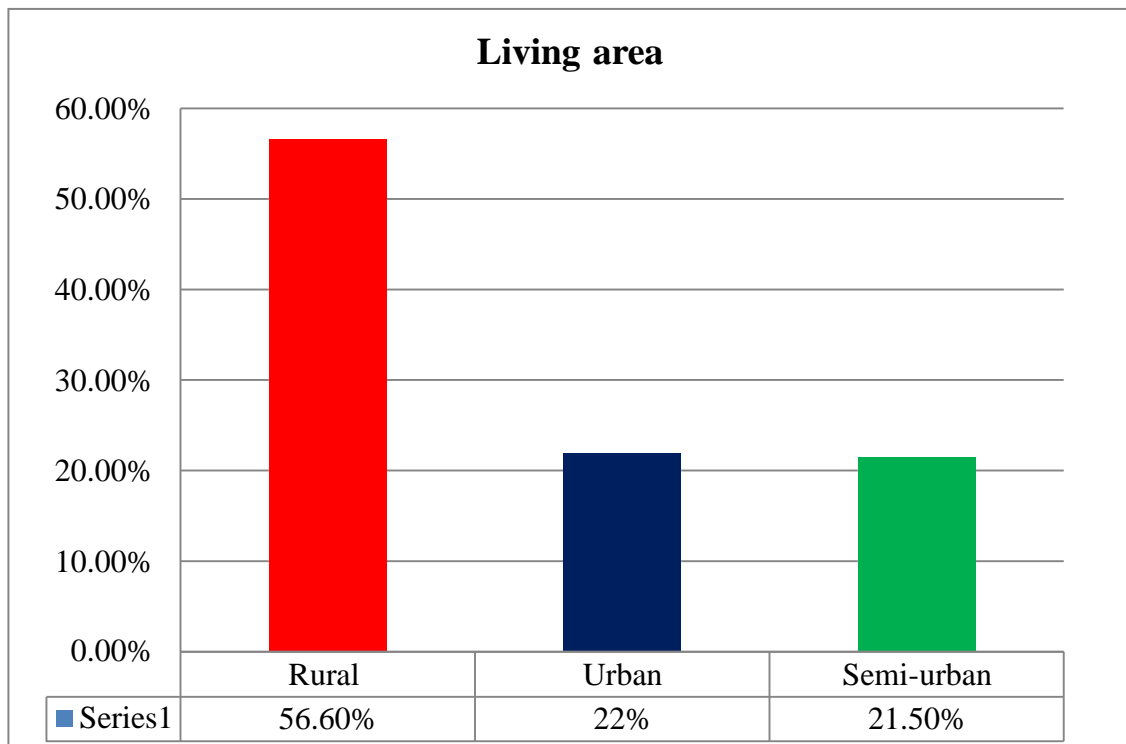
Table shown that among the 205 clients 187 were spastic type of CP where 134 were male and 53 were female. Similarly among 18 athetoid type of CP, 11 were male and 7 were female. So, from the table it has observed that spastic type of cerebral palsy is more common among male client.

**Table-2: Type of CP and patient's sex**

Sex of the patient	Type of CP		Total
	Spastic	Athetoid	
Male	134	11	<b>145</b>
Female	53	7	<b>60</b>
<b>Total</b>	<b>187</b>	<b>18</b>	<b>205</b>

#### 4.5 Living area of the participants:

The following figure shows that among the interviewed participants, 56.6 percent (n= 116) were from rural area, followed by 22% (n=45) were from urban area and 21.5% came from semi urban area. Participants living place are shown in the following bar chart:



**Figure-4: Residential area of the participants**

#### 4.6 Educational status of the mother

Majority of the respondents' mother educational level were secondary 39% (n=80) followed by primary level which was 35.6% (n=73) and Higher secondary level was 11.2% (n=23). Some participants were illiterate also and that was 7.80% (n=16), rest of the mother were well educated but this number was very few and approximately 6%. The following table shows the educational status of mother with frequency:

**Table-3: Educational status of the mother**

---

<b>Educational level</b>	<b>Frequency</b>	<b>Valid Percent</b>
Illiterate	16	7.8
Primary	73	35.6
Secondary	80	39.0
Higher Secondary	23	11.2
Graduation	10	4.9
Post- Graduation	2	1.0
Others	1	0.5
<b>Total</b>	<b>205</b>	<b>100</b>

---

#### 4.7 Educational status of the father:

Majority of the respondents' father educational level were secondary 31.7% (n=65) followed by primary level which was 31.2% (n=64), higher secondary level 17.6% (n=36), rest of the fathers were well educated .A significant number of father were illiterate and this was 10.2% (n=21). The following table shows the educational status of father with frequency:

**Table- 4: Educational status of the father**

---

<b>Educational level</b>	<b>Frequency</b>	<b>Valid Percent</b>
Illiterate	21	10.2
Primary	64	31.2
Secondary	65	31.7
Higher Secondary	36	17.6
Graduation	11	5.4
Post- Graduation	8	3.9
<b>Total</b>	<b>205</b>	<b>100</b>

---

#### 4.8 Occupation of the mother:

The following figure shows that most of the mothers were housewife (n=182) and this was 88.8% and service holder was 8.3% (n= 17) and rest were engaged in other type of activities like student, daily labor etc.

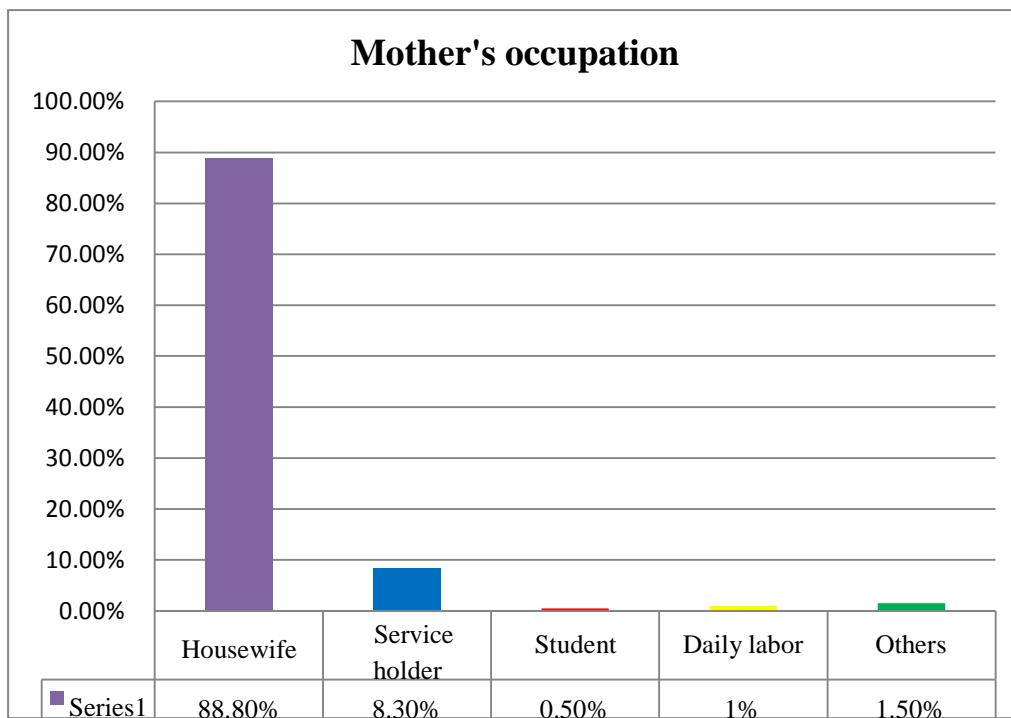
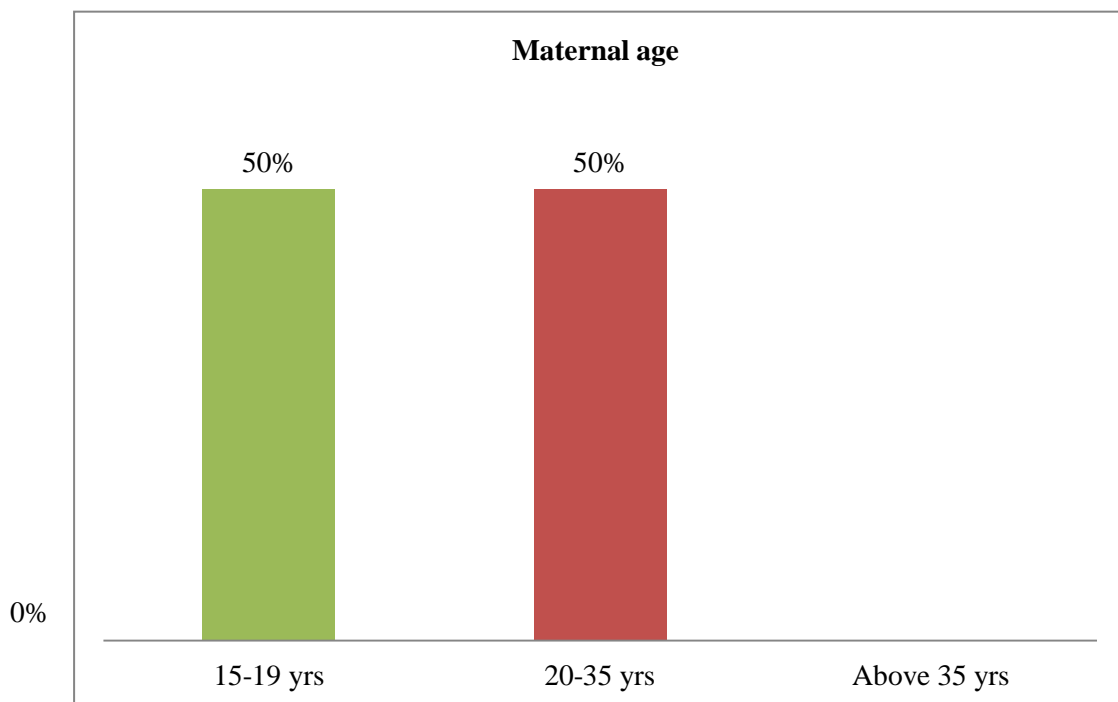


Figure- 5: Distribution of the mothers' occupation



#### 4.9 Maternal age:

The following bar chart shows that approximately 50% of the mothers maternal age ranged were between 15-19 years and age ranged between 20-35 years were 50% participants. But no participants' age were above 35 years.



**Figure- 6: Distribution of maternal age**

#### 4.10 Association between maternal age and type of CP

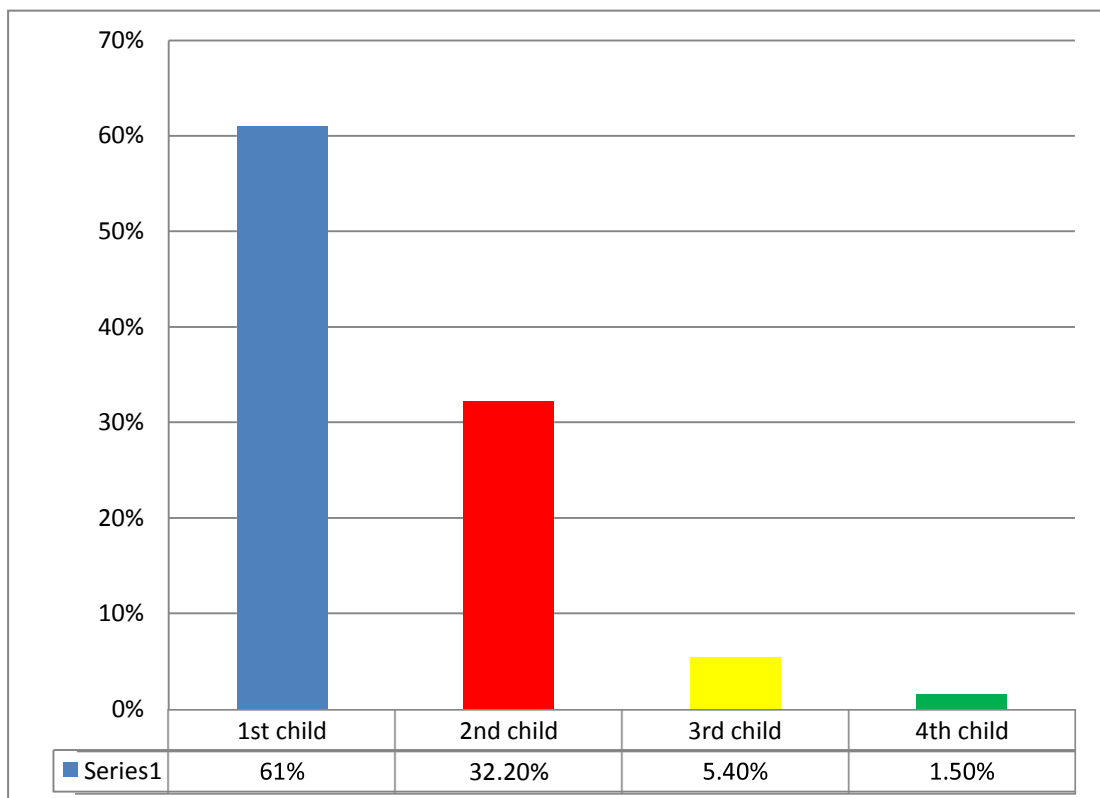
From the 205 respondents, 187 children were Spastic CP, among of them 87 respondents were age ranged 15-19 years and 90 respondents were age between 20-35 years. It also found that 18 children were representing Athetoid CP, 05 respondents were age ranged 15-19 years and 13 respondents were age between 20-35 years. Result found significant (p=.030) association between maternal age during Pregnancy and type of CP.

**Table -5: Association between maternal age and type of CP**

Maternal age				P Value
	Below20	Above20		
	Years	Years		
Types of CP	Spastic CP	95.1	87.4	0.030
	Athetoid CP	4.9	12.6	

#### 4.11 Position of the child in their family

This bar chart shows that the rate of cerebral palsy in case of 1<sup>st</sup> issue of the parent were 61% and 32.2% had CP in case of 2<sup>nd</sup> child. CP also found among 3<sup>rd</sup> and 4<sup>th</sup> issue of the family but its rate was fewer 5.4% and 1.5% occurred respectively. So CP was more common in 1<sup>st</sup> issue of the family.



**Figure-7: Position of the child in their family**

#### 4.12 Position of the child and type of CP:

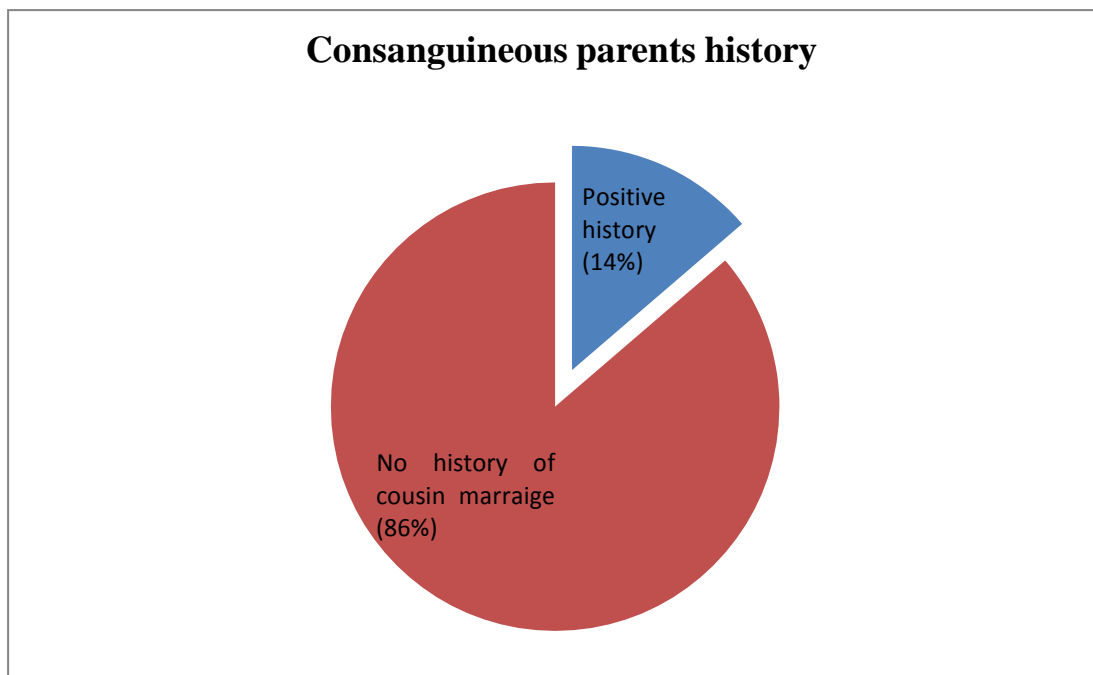
The following table shown that out of 205 patients, 1<sup>st</sup> child of their parents were 125, among them 65 were quadriplegic, 29 were diplegic, 6 patients were paraplegic and 25 were hemiplegic respectively. Similarly quadriplegic were 34, diplegic 24, hemiplegic 6 and paraplegic type of CP only 6 in case of 2<sup>nd</sup> child. CP also found in case of 3<sup>rd</sup> and 4<sup>th</sup> child which were only 15 and majority were quadriplegic.

**Table- 6: Position of child and Type of CP**

Position of the child	Type of CP				Total
	Quadriplegic	Diplegic	Paraplegic	Hemiplegic	
1st child	65	29	6	25	<b>125</b>
2 <sup>nd</sup> child	34	24	2	6	<b>66</b>
3 <sup>rd</sup> child	6	5	0	0	<b>11</b>
4 <sup>th</sup> child	3	0	0	0	<b>3</b>
<b>Total</b>	<b>108</b>	<b>58</b>	<b>8</b>	<b>31</b>	<b>205</b>

#### 4.13 History of consanguineous parents

This figure shows that only 14% parents had history of cousin marriage (consanguineous parent) and rest of them had no positive history of cousin marriage (Non- consanguineous parents).



**Figure -8: History of consanguineous parents**

#### 4.14 Association between Cousin Marriage and type of CP

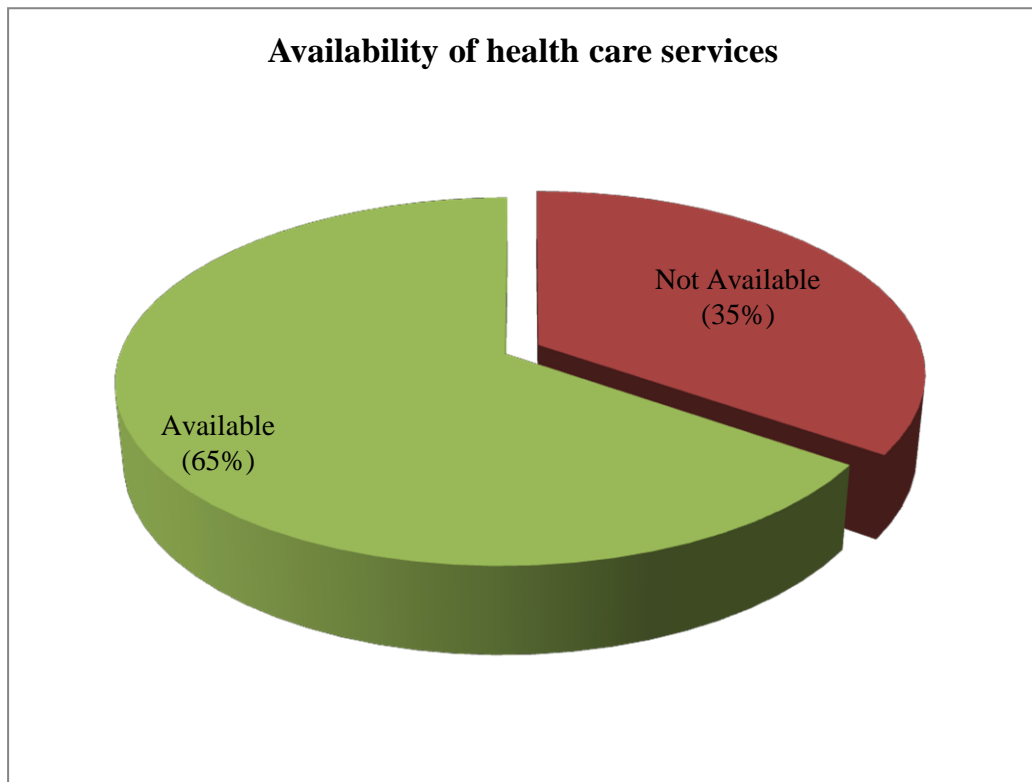
From the 205 respondents, 187 children were Spastic type of CP, among of them 25 had history of cousin marriage and 162 had no history of cousin marriage. It also found that 18 children were representing Athetoid type CP, among them 3 respondents had positive cousin marriage history and 15 respondents had no history of cousin marriage. Result did not find significant ( $p=0.458$ ) association between cousin marriage and type of CP.

**Table-7: Association between Cousin Marriage and type of CP.**

		Cousin Marriage		P Value
		Yes	No	
<b>Types of CP</b>	Spastic CP	25	162	0.151 0.458
	Athetoid CP	3	15	

#### 4.15 Availability of health care services:

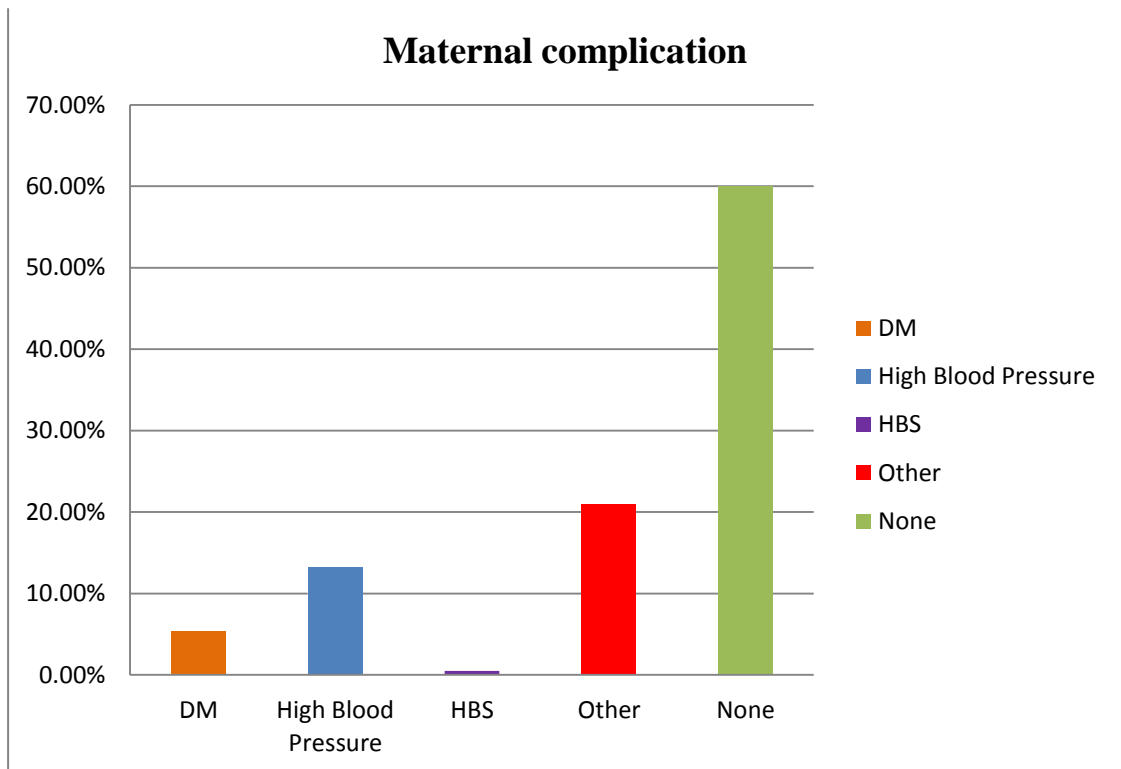
Health care services were available to the 65% (n=134) respondent and on the other hand 35% (n=71) had no available health care services.



**Figure-9: Availability of health care services**

#### 4.16 Maternal complication

Among the 205 mothers of this study 13.2% had suffered for high blood pressure during pregnancy, 5.4 % percent had DM and 21% faced other complication during pregnancy. But 60% participants had no complication or no other diseases during that time. Another thing is that among these participants 19.5% had express the history of trauma in different trimester of their pregnancy.

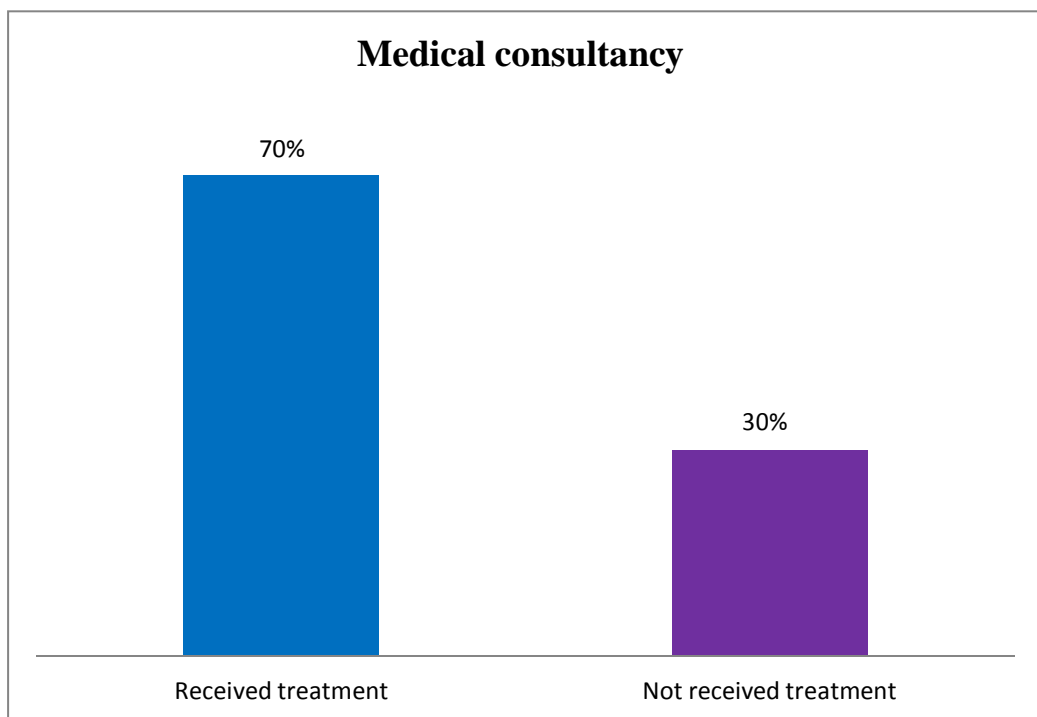


**Figure-10: Distribution of maternal complication**



#### 4.17 Medical consultancy during pregnancy:

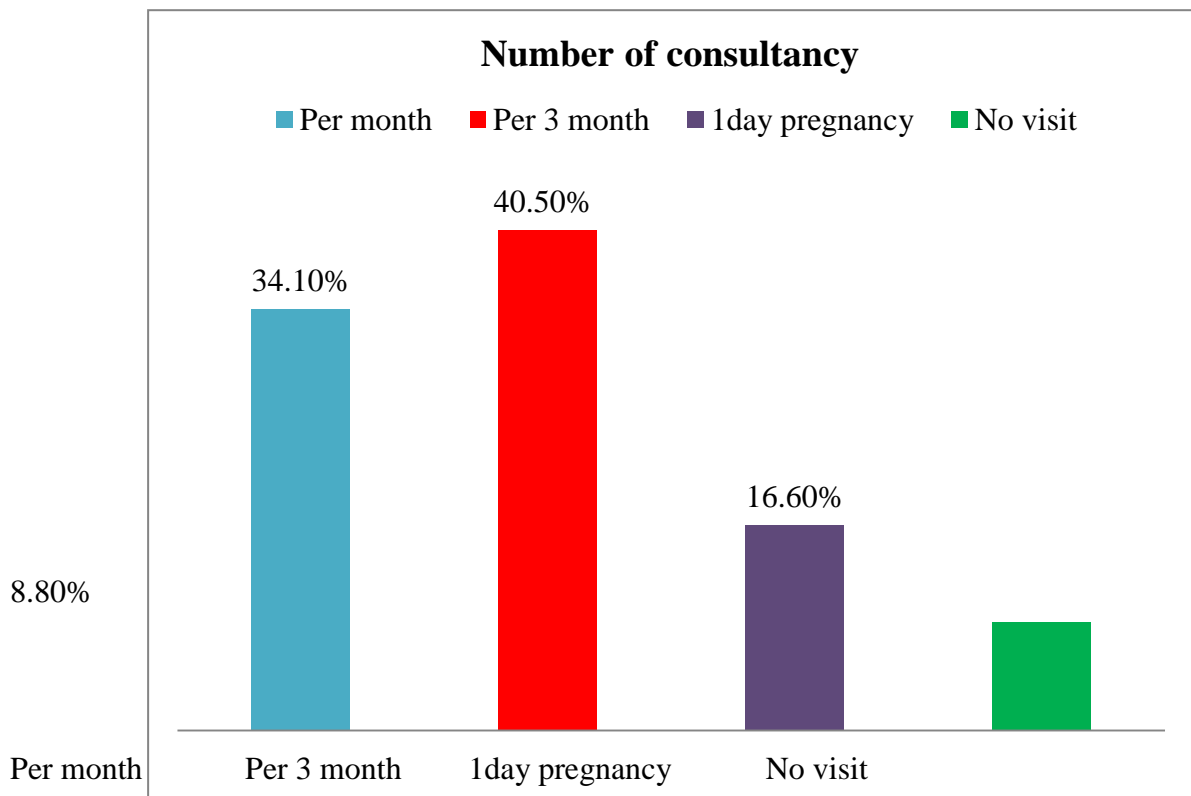
The following bar chart shows that among the participants, 70% (n=143) went to the doctor for medical consultancy and 30% (n= 62) never visited to the doctor for treating any condition during their pregnancy period.



**Figure- 11: Participants' medical consultancy during pregnancy**

#### 4.18 Number of medical consultancy during pregnancy

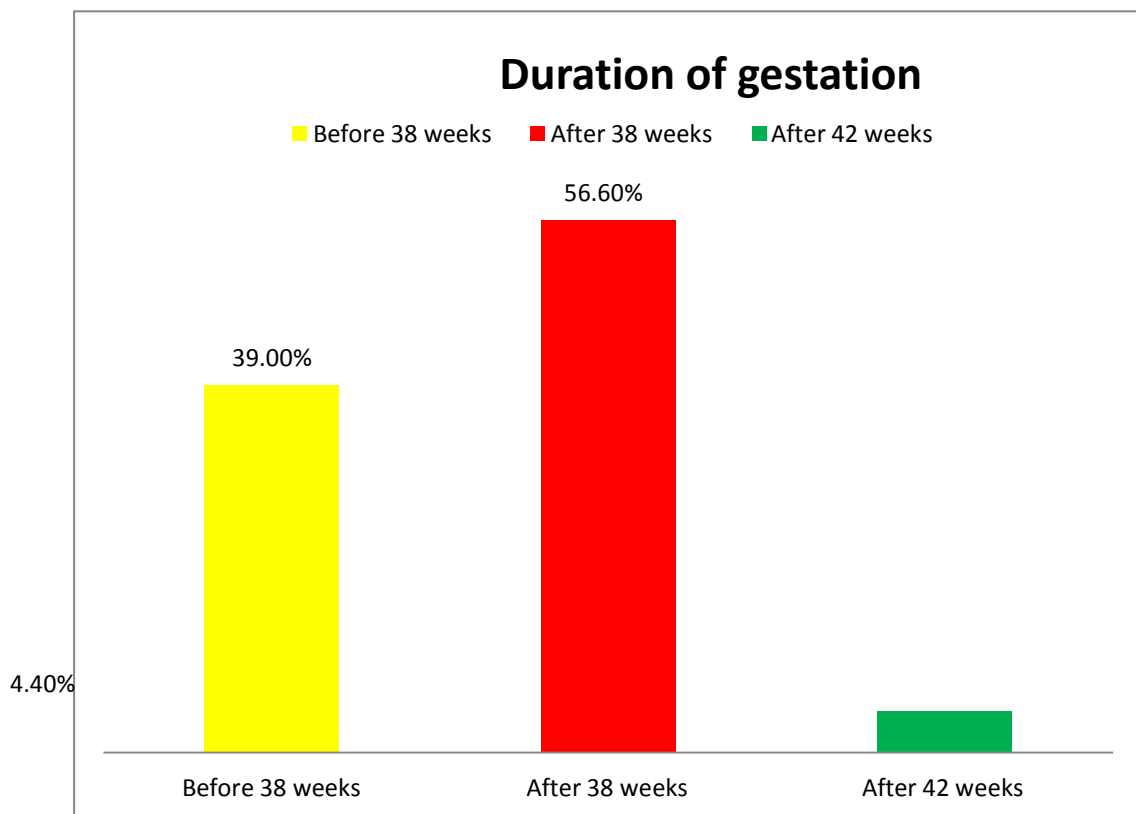
Among the total respondents, 69.8% participants visit to the doctor during pregnancy period but rest of them were not take consultancy from the doctor during that period. Among the participants those were taken medical consultancy, 34.10% visited for per month, 40.5% visited per 3 month and 16.6% visited only 1 day in their pregnancy period. Beside this, 8.8% mother never visited to the doctor during their pregnancy period.



**Figure-12: Distribution of respondents' number of medical consultancy**

#### 4.19 Duration of gestational age:

This study shows that among the total cerebral palsy patient 39% were born before 38 weeks of gestation and 56.6% were born after 38 weeks of gestation and rest were born after 42 weeks.



**Figure-13: Duration of gestational age**

#### 4.20 Association between gestational age and type of CP

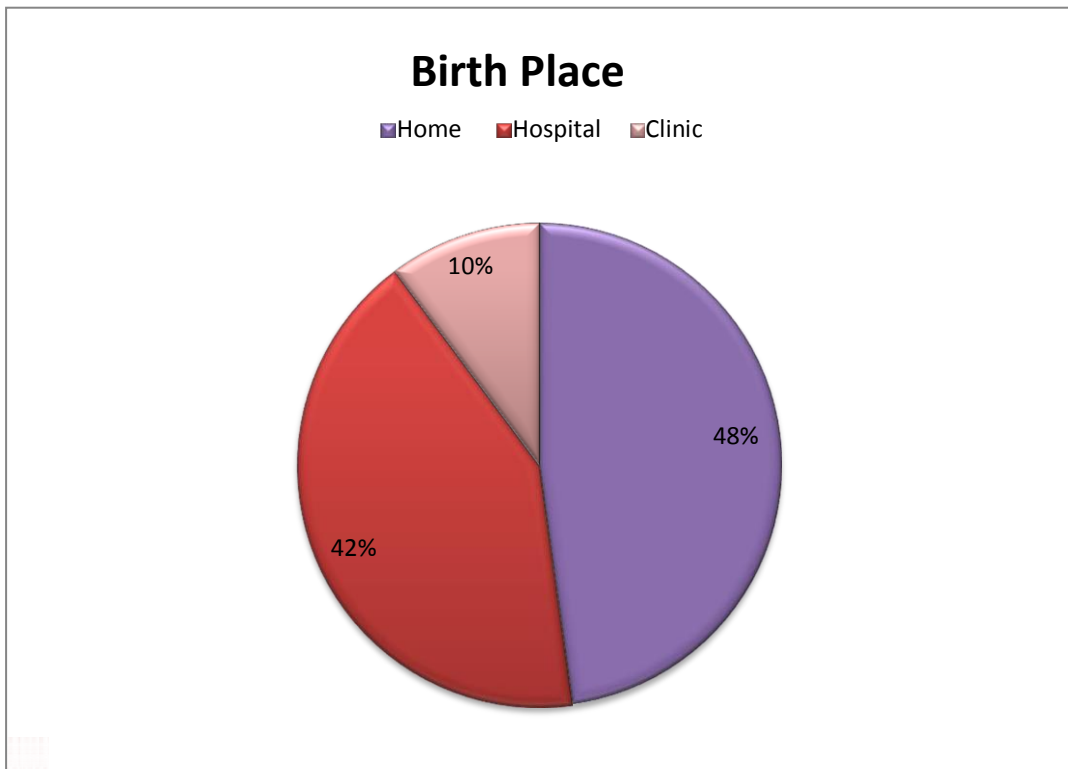
From the 205 respondents, 187 Children were Spastic CP, among of them 75 children was born before 38 weeks of pregnancy, 108 children was born after 38 weeks and only 9 children were born after 42 weeks of gestation. It was also found that 18 children were presenting Athetoid type of CP, among them 10 children were born before 08 weeks and only 08 child was born after 38 weeks but no athetoid child were born after 42 weeks The result were not shown significant ( $p= .251$ ) association between time of child born & type of CP.

**Table-8: Association between time of Child born and type of CP**

	Duration of gestational age			P Value
	Before 38 weeks	After 38 weeks	After 42 weeks	
Spastic CP	70	108	9	2.762
Athetoid CP	10	8	0	

#### 4.21 Place of delivery:

Among the total patient (N=205) with cerebral palsy, 48% children were born at home, 42 % were born at hospital and only 10% were born at clinic.



**Figure- 14: Place of delivery of the participants**

#### 4.22 Association between place of delivery and birth asphyxia:

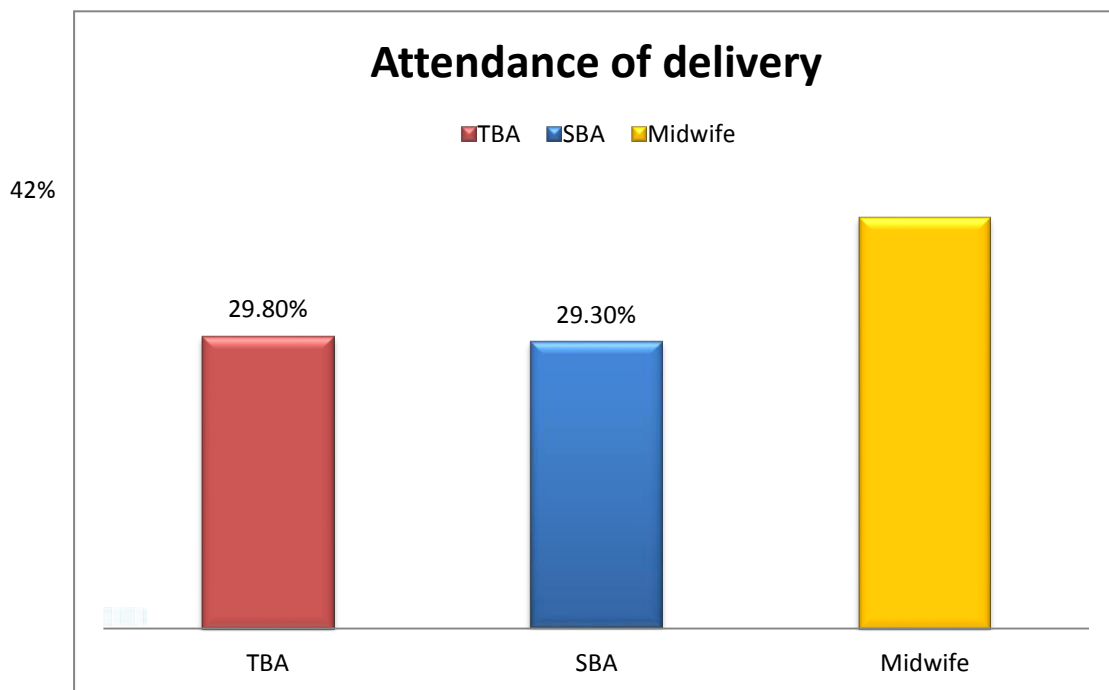
From the 205 respondents, 98 respondents had home delivery and among them majority had present birth asphyxia (n=75). On the other hand, 49 clients had suffered for birth asphyxia that was born at hospital. Similarly those who were born at clinic (n=21), among them 13 clients had positive history of birth asphyxia. Result found significant (p=.017) association between birth asphyxia and place of delivery.

**Table-9: Association between place of delivery and birth asphyxia**

		Birth Asphyxia		P value
		Present	Absent	
Place of delivery	Home	75	23	8.156 0.017
	Hospital	49	37	
	Clinic	13	8	

#### 4.23 Attendance of delivery

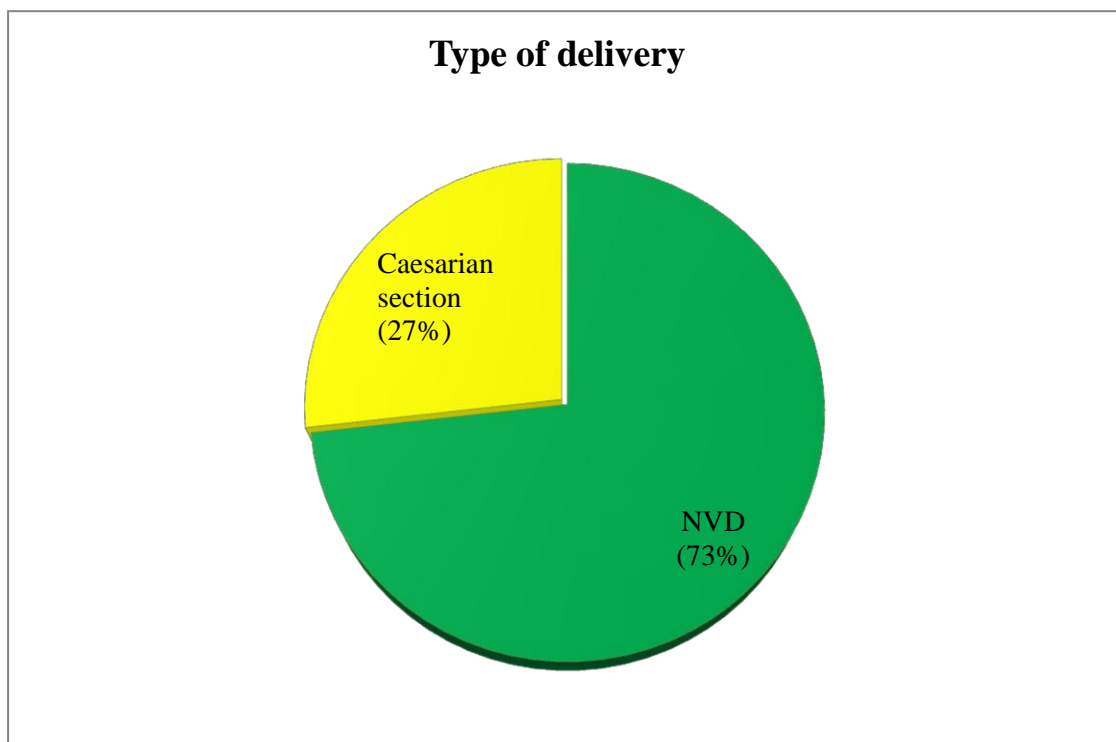
This figure shows that 42% delivery was attended by midwife. On the other hand, approximately 29% delivery was attended by skilled birth attendance (SBA) and trained birth attendance (TBA) respectively.



**Figure- 15: Attendance of delivery**

#### 4.24 Type of delivery

This figure shows that among the participants 73% children were born through process of the Normal Vaginal Delivery (NVD) and rest of the delivery was completed through Caesarian Section.



**Figure- 16: Type of delivery**



#### 4.25 Association between nature of delivery and type of CP

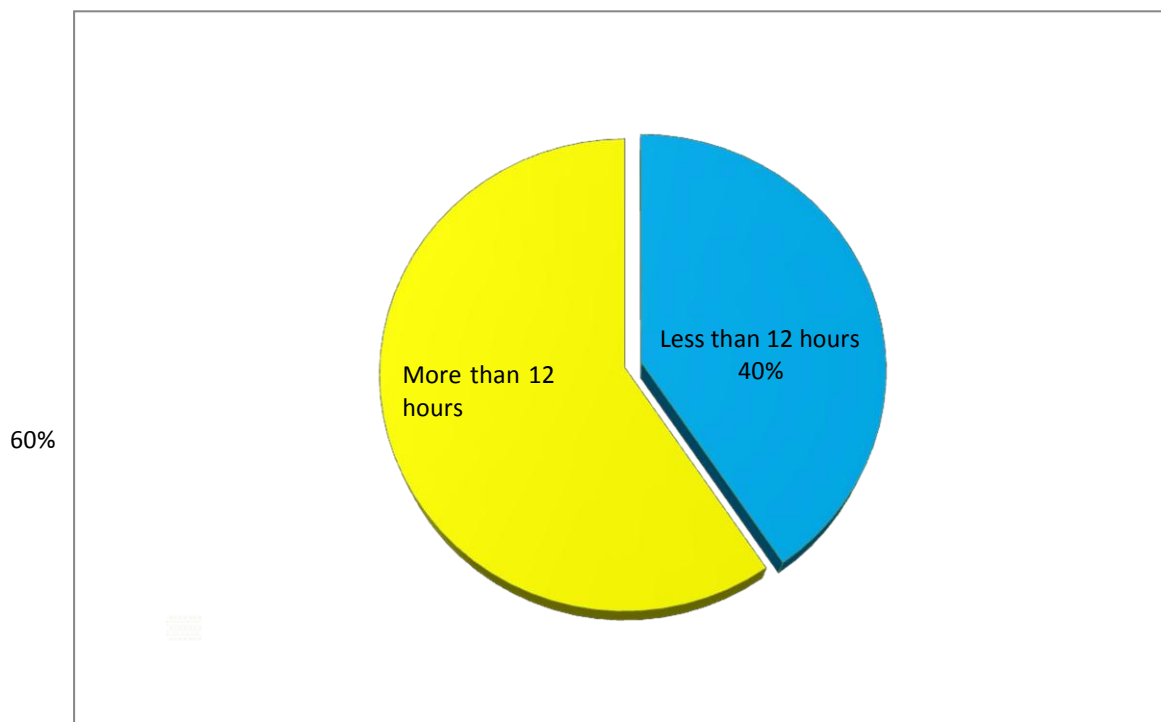
From the 205 respondents, 187 Children were Spastic CP, among of them 139 children were born through the normal vaginal delivery (NVD) and 48 respondents were caesarian section. It was also found that 18 children were representing Athetoid type CP, 11 respondents were NVD and 07 respondents were caesarian delivery. The result were not to be significant ( $p = .175$ ) association between nature of delivery & type of CP.

**Table-10: Association between type of delivery and type of CP**

	Type of delivery		P Value
	NVD	Caesarian	
0.175			
Types of CP			
Spastic CP	139	48	1.462
Athetoid CP	11	7	

#### 4.26 Duration of labor pain

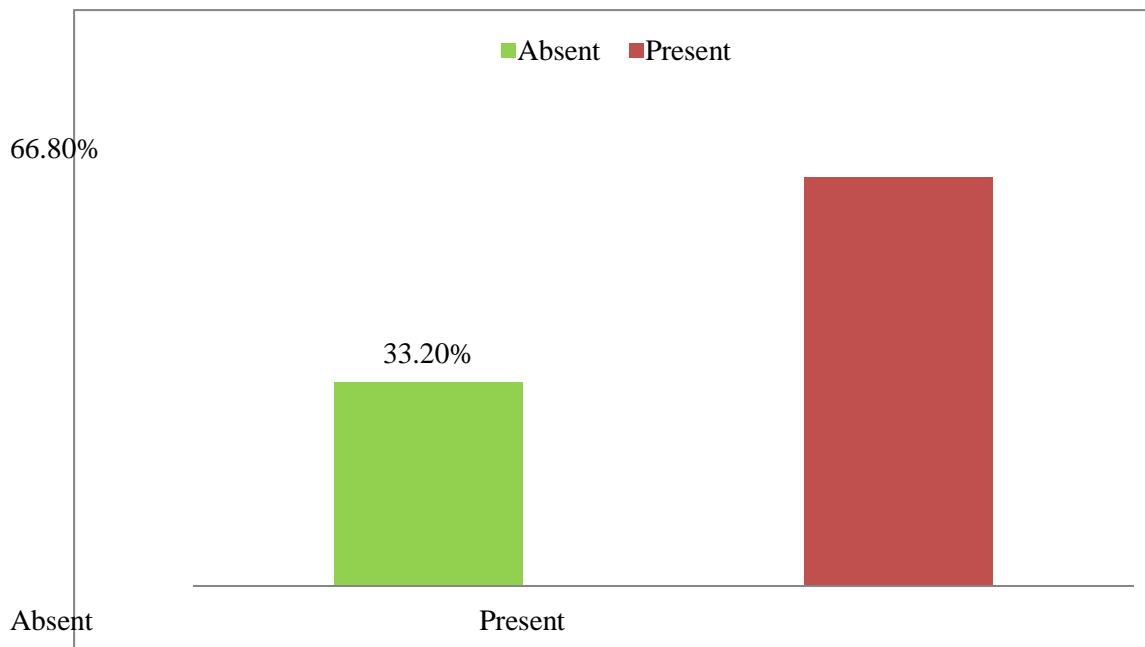
Following figure suggest that among the participants (n=205) approximately 40% (n=83) mother were suffered for labor pain for less then12 hours and 60% (n=122) had history of prolong labor which was more than 12 hours of labor pain.



**Figure- 17: Duration of labor pain**

#### 4.27 Birth Asphyxia

The following bar chart has shown the percentage of birth asphyxia which was present shortly after delivery. Among the total patient of cerebral palsy (n=205) only 33.20% (n=68) had no complain of birth asphyxia after birth but majority 66.8% (n=137) had history of birth asphyxia within after delivery.



**Figure- 18: Presence of birth asphyxia**

#### 4.28 Labor pain and birth asphyxia:

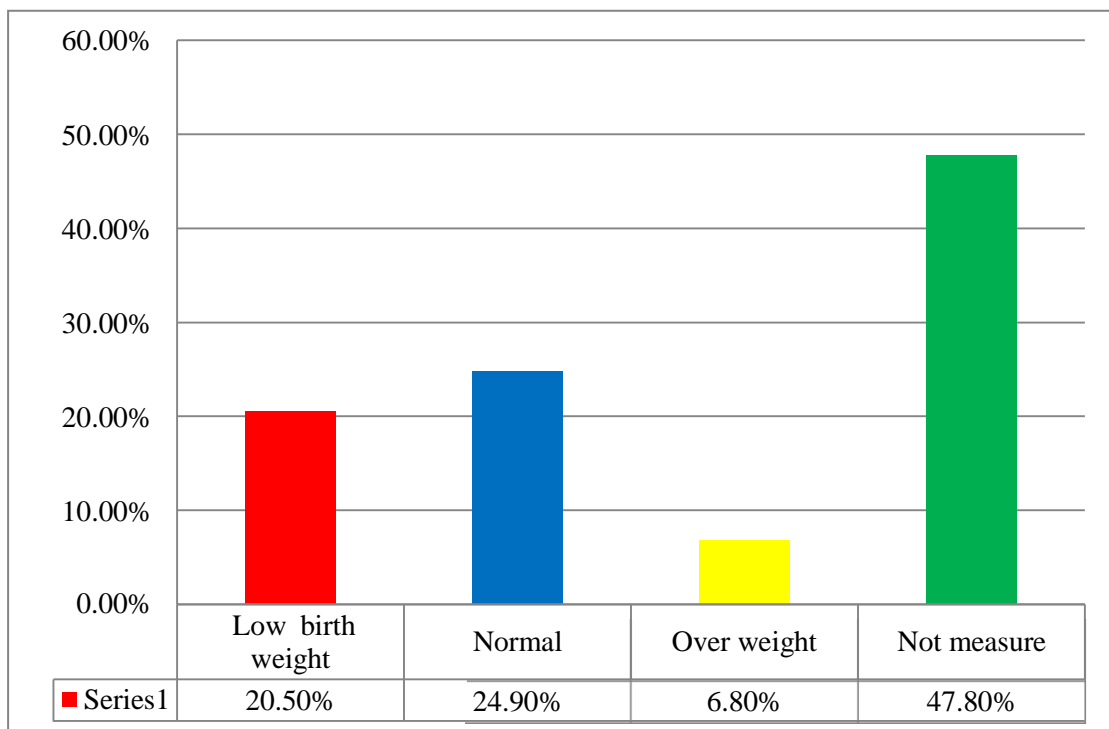
The table shows that majority of our participants had birth asphyxia (n=137) after birth and among them most of the participants' mother had prolong labor pain (n=87) during delivery. So result shown that birth asphyxia is much more common in prolong duration of labor pain.

**Table-11: Labor pain and birth asphyxia**

		Duration of the labor pain		Total
		Less than 12 hours	More than 12 hours	
<b>Birth asphyxia</b>	Present	50	87	<b>137</b>
	Absent	33	35	<b>68</b>
<b>Total</b>		<b>83</b>	<b>122</b>	<b>205</b>

#### 4.29 Baby's birth weight

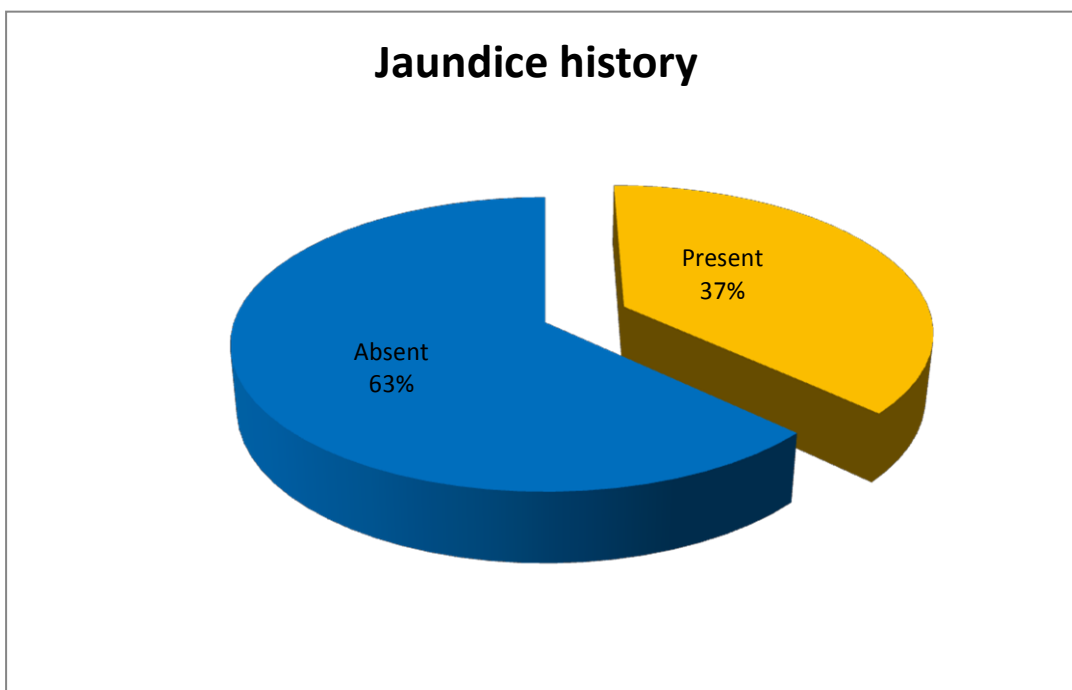
Figure shown that, 24.9% patients with cerebral palsy were born with normal birth weight and 20.5% were born with low birth weight and 6.8% had over weight after delivery. But half of the children were not measured their birth weight instrumentally after birth and that was 47.8%.



**Figure- 19: Birth weight of the participants**

#### 4.30 Jaundice after birth

The following pie chart shows that among the participants, 37.1% (n=76) suffered for jaundice after birth and rest of the participants (n=129) had no complain of jaundice after birth.



**Figure-20: Jaundice history of the respondents**

#### 4.31 Child's suffering condition after birth

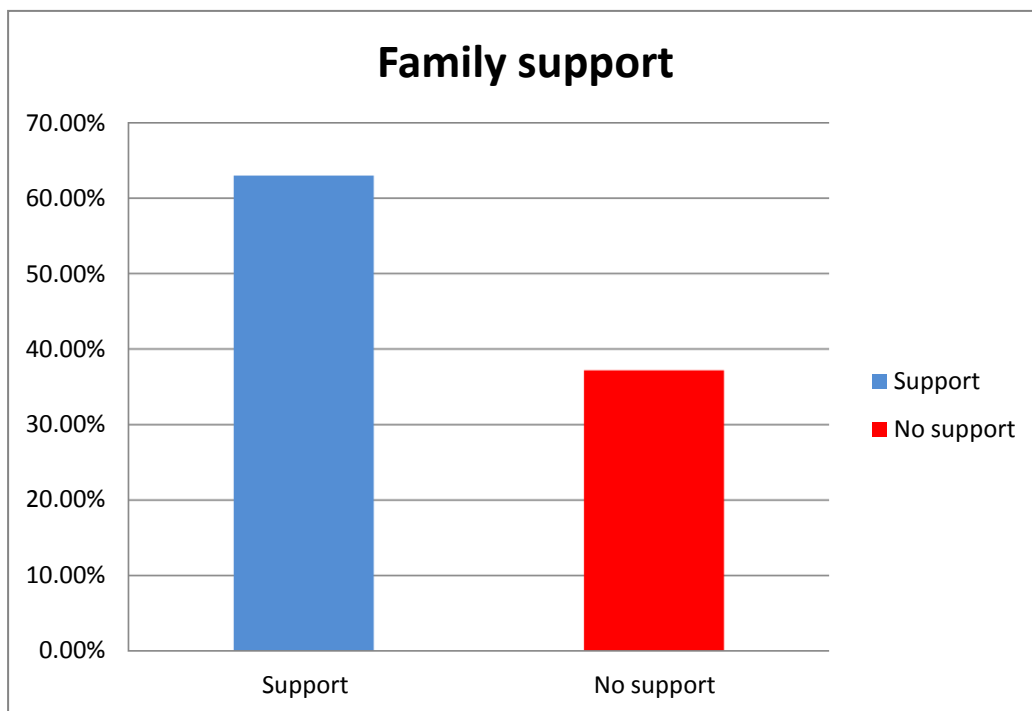
Following figure shows that 33.2% percent of the baby had suffered from convulsion and 26.30% percent of the baby had suffered from pneumonia and 10.20 percent of the baby had high fever and 26.30 percent of the baby had no diseases after birth.

**Table-12: Distribution of child's suffering condition after birth**

<b>Diseases of child</b>	<b>Frequency (n)</b>	<b>Percent (%)</b>
Pneumonia	55	26.8
Malaria	2	1.0
Diarrhea	5	2.4
High fever	21	10.2
Convulsion	68	33.2
No	54	26.3
<b>Total</b>	<b>205</b>	<b>100</b>

#### 4.32 Family support during pregnancy

Among the participants, majority of them informed that during their pregnancy period they got sufficient support from their family and the percentage were 62.9% (n=129). But on the other hand 37.1% (n=76) also reported that they couldn't get minimum support from their family member during their pregnancy period.



**Figure-21: Respondents family support during pregnancy**



The aim of this study was to explore the characteristics of cerebral palsy patient attended at CRP. To accomplish the research objective, the researcher identified thirty four related features or variable from the literature before starting the data collection. The explained variables were type of cerebral palsy in term of tonicity and the area of limb involvement, socio-demographic character included area of living, education and occupation of the parents. Moreover birth related feature included maternal age, availability of primary health care facility, state of prenatal care, taken recommended drugs, unfortunately taken drugs without prior knowledge during pregnancy, hypertension during pregnancy, infection, trauma, during pregnancy, history of well movement of baby during pregnancy, place of delivery, skill of birth attendance, history of prolonged delivery, type of delivery, maturity of fetus , birth asphyxia, state of baby crying immediately after birth, underweight baby, neonatal jaundice, pneumonia, cousin marriage and evidence of congenital malformation and family as well as social support during the period of pregnancy.

This study shown that, the main type of cerebral palsy is spastic type of CP. Among 205 participants of this study about 91 percent (n=187) were spastic and only 9 percent were athetoid (n=18) type of cerebral palsy (CP) according to tonicity. In case of limb involvement Quadriplegia is much more common (53%) than diplegic or paraplegia. Among them 71% patient with cerebral palsy were male and only 29% female participants. A systemic reviewed has done by Odding, et al in 2009 which shown that the majority of client with CP have the spastic syndrome in which the diplegic group

is the smallest. Another study shown that Fifty-seven percent of the infants with CP were male. Spastic tetraplegia 36.61% and spastic hemiplegia 30.51% were the dominant types of CP (Kulak, et al 2010). So it has found that Spastic tetraplegia is the most common type of cerebral palsy and male are more affected than female.

From the age distribution of patient with cerebral palsy it has observed that, majority of the client with cerebral palsy were under six year old and the most common age group were in between the age group of 0 to 3 year which is 42%. As a developing country it focused on the raising awareness of parents regarding the identification of disability and early intervention which is very important for disability prevention and provides appropriate rehabilitation support to minimize disease burden and facilitate good prognosis.

From this study it has found that among 205 interviewed mother of CP client, 56.6 percent were from rural, followed by 22% percent were from urban and 21.5 percent were come from semi urban area. Result shows that CP develops both in urban and rural area of the country but more in rural side.

Beside this, educational level of the parents were all most in between primary and secondary level, even around 10% were totally illiterate and only 10 percent parents were higher secondary level of education. Among the participant 88% mother are house wives and rest of them are student or involve in income generation activity which were very low in number. Literatures have given support to the association

between disability and socioeconomic status (Mcintyre, et al 2013) and the prevalence of acquired CP is higher among communities with poorer socioeconomic conditions (Sundrum, et al., 2005) due to low level of education, lack of awareness and deprived from proper health facilities . So it could be said that cerebral palsy are more common in more deprived area (Odding, et al 2009).

Study result shown that around half of the mother age were bellow twenty year of age while having this children which is not recommended age to have had a baby medically .It has found that Bangladesh has one of the world's highest rates of adolescent motherhood, based on the proportion of women under the age of 20 giving birth every year. 28% of adolescent women (age 15-19) are already mothers with at least one child and another 5 % is pregnant(Unicef,2014) and it has found that maternal age less than 20 years was associated with increased risk of both cerebral palsy and confirmed epilepsy, spastic type of CP is common in early pregnancy (Black et al., 2012). Statistical test also did show a significant association between maternal age and type of cerebral palsy. On the other hand, McIntyre, et al 2013 has done a study on “A systematic review of risk factors for cerebral palsy in children born at term in developed countries” they have reported that maternal age above 40 is increased risk but low maternal age(bellow 20) was not reported as risk.

It has observed that two forth client with cerebral palsy were first child of their parents and number of CP is less in third or fourth child. Cross table shown that, among the four type of cerebral palsy quadriplegia is more common in both first, second and multipara. It also found that babies who are first born to a couple could

have greater chances of having the condition (Admin, 2011), though the exact cause is unknown behind the involvement of first issue, but younger age of mother, awareness regarding pregnancy issue, healthcare and disability could be a matter of concern.

Though literature support the history of cousin marriage as a risk factor, this study result shown different phenomenon, only 14% parent of cerebral palsy client has given history of cousin marriage but most of them around 88% were not consanguineous parents. Previous studies have found a possible family link with cerebral palsy, but positive findings have been hard to replicate. So researchers from Norway set out to investigate recurrence of cerebral palsy among twins and first, second, and third degree relatives to shed light on patterns of inheritance. That study was involved 1,991,625 single births and 45,116 twins born in Norway between 1967 and 2002. The highest risk was seen in co-twins of affected children. If one twin had cerebral palsy, the relative risk of recurrence of cerebral palsy was 15 times higher in the other twin.

Beside this In families with an affected single child, there was a six to nine fold increased risk in a subsequent full sibling (first degree relatives) and up to a threefold increased risk in a half sibling (second degree relatives). Moreover, affected parents carried a 6.5 times increased risk of having an affected child compared with unaffected parents. However, they suggest that genetic influences are only part of a wide range of causes (Rosenbaum, 2014)

Maternal complications are responsible for having child disability which was concluded from Neufeld, et al in 2005 in their study on Maternal Infection and Risk of Cerebral Palsy in Term and Preterm Infants. The major finding of that study was that

maternal infection was associated with an approximately two-fold increased risk of CP in both term and preterm infants. The effect of maternal infection on CP risk appears to be greater in preterm than in term infants.

Literature support that the more severe the case of hypertension, the higher the risk for developing CP (Doyle et al., 2009) There are reports of a higher rate of neurodevelopment problems 8–10 in the infants of hypertensive mothers, while a large regional study found similar rates of disability for infants of mothers with or without hypertension during pregnancy (Steyn, 2013). In this study, when the mother were asked about the pregnancy complication, it has found 66% of them did not get any problem during pregnancy and rest of them were suffer for high blood pressure , diabetes mellitus ,urinary infection and other. However it is a matter of thinking that the respondent may not understand or ignore their complication because of their illiteracy, younger age of mother or unawareness about pregnancy related complication and disability . Similar finding has emerge from the study done by Huda,et al in 2012.they have said that measuring acute maternal complication is difficult, particularly in populations where not all women give birth in a hospital. The number and percentage of women in Bangladesh who suffer from acute maternal complications or medium or long-term disabilities are not yet known.

This is because, among the respondent around 17% of the mothers were taken medical consultancy only one time, even nine percent mother never treated by health professional throughout their pregnancy. However, two third of the respondent had availability of health care facility. Whereas, recommended visit of a pregnant mother

is in every four to five week up to 28 week, two or three weekly up to 36 week of pregnancy and in every week up to delivery (UNICEF, 2014). Beside this whenever the mother were asked did they take any un-prescribed drug during their pregnancy, unfortunately 11% mother responded to have un-prescribed drug, in this case illiteracy or lack of knowledge could be responsible for that. Bangladesh Maternal Health Demographic Health Survey 2007 reported that cultural barriers, traditions as well as poverty and lack of information prevent women from accessing maternal and newborn health services. Beside this, little understanding about the need for rest and additional nutritious food during pregnancy is another important mater. Moreover, the low status of women within the family means one in every two women will have her health care decided by family member.

Literature has shown, preterm birth is increasingly common in Western industrialized societies and more babies are being born at extremely low gestational age. However, more than half of all children with CP are born at term in that cases birth asphyxia, breech presentation at vaginal birth, instrumental delivery, and emergency cesarean delivery are associated with having CP (Kulak,et al.,2010). Similarly this study had shown 57% of the child was born in term and eighty children (39%) were born in preterm. But the result were not shown significant ( $p= .251$ ) association between time of child born & type of CP. Dougia, et al 2006, concluded in their study that Gestational Age appears to be inversely related with Cerebral palsy, with the smaller preterm infants (birth before 28 weeks of pregnancy) being at highest risk of developing cerebral palsy. After 34 weeks of gestational age the chance is comparatively low. Another study explored that term-born children account for 50 to 65% of children with CP, and they tend to be more severely impaired than children

with CP born preterm. Moreover, the severity of disability in the term-born group seems to be increasing (Mcintyre, et al 2012)

Among the total number of participant half of the children were born in home and unfortunately 42% delivery were facilitate by untrained person. Beside this, history of birth asphyxia was found in both home and institution base delivery but more in case of home delivery. Result has shown significant ( $p=0.017$ ) association in between place of delivery and birth asphyxia. Report of Unicef, 2014 explore that most births occur at home without skilled attendants which causing high maternal and child mortality , there is a high death rate of children under one month and the common cause of child mortality are infection (52%) followed by birth asphyxia/unable to breath at birth (21%) and low birth weight/pre-term deliveries (11%), those who survive complications during childbirth, many are left with disabilities that often cause them to be detested from the community.

Normal vaginal delivery is the common type of delivery in our country, but the caesarian section also become familial which is found in this study ( 27%).it is a matter of re -evaluate that when and why a parent decide to go to the hospital or decide to have caesarian section. Though, the result was not found significant association between nature of delivery and type of cerebral palsy. Usually mother seek for hospital care whenever they feel any type of maternal complication (Huda, et al 2012)

Birth asphyxia is a risk factor for cerebral palsy which is supported by literature in previous study, it also recommended that birth asphyxia is a factor which could be managed or controlled with proper treatment by 10%. Around 66% of children of this study were affected by birth asphyxia just after birth. It also found that birth asphyxia is common in children of those mothers who suffered from prolonged duration of labor pain during delivery. Besides this, as majority of the participants were living in rural areas and delivery took place at home by untrained attendants which could be a provoking factor and it is difficult to manage the complications of birth asphyxia to minimize the disease burden. However, different conclusions have arrived from the study done by Ellenberg, et al 20012 from their review study which has done to investigate whether current literature provides a useful body of evidence reflecting the proportion of cerebral palsy (CP) that is attributable to birth asphyxia. Results do not support the belief, widely held in the medical and legal communities, that birth asphyxia can be recognized reliably and specifically, or that much of CP is due to birth asphyxia.

This study explored that birth asphyxia was much more common in the children whose mothers had suffered from prolonged labor pain during delivery. Literature said that in case of first child labor pain should last for eight hours and five hours in case of second child on average (Mehigan, 2014). However 60% of mothers of cerebral palsy children in this study had suffered from labor pain more than twelve hours which could influence the birth asphyxia and birth trauma. Another important matter is that how long labor pain should last and when a mother needs medical care that needs to be evaluated properly by the delivery attendant, unfortunately it has found that around half of the deliveries were assessed by untrained persons in this study.



Previous study shown, 20% of infants are born prematurely in Bangladesh, and 30% have low birth weight (LBW), unrecognized populations may be at risk for neurodevelopmental morbidity, particularly considering that 85% of deliveries occur at home, often with no skilled care( Yasmeen & Azim,2011)

Similarly, around 20% children with CP in this study were born with low birth weight and unfortunately around half of the children (98 in number) were not measured their body weight after birth as they were born in home. In between the big portion of not measured birth weight could be normal, low or over weight. Young motherhood and malnutrition are associated with several risks such as higher maternal mortality rates, pregnancy complications and low birth weight babies (UNICEF, 2010). The most important risk factors for CP are low birth weight, intrauterine infections and multiple gestations which was found by Odding, et al in 2009. This study explores that after birth children commonly suffer for jaundice, convulsion and pneumonia. A case control study result shown that Birth asphyxia occurred significantly more often in children with CP compared to controls. In the neonatal period, respiratory distress syndrome, meningitis and neonatal seizures were associated with an increased incidence of CP (kulak, et al 2010).Bangladesh Neonatal and Child Health Profile-2015 reported that in neonatal period prematurity, birth asphyxia, pneumonia and infection are the most common cause of child mortality and morbidity.

Finally whenever the participant were asked to know about the family support in the period of pregnancy, around 38% of the mother reported that they did not get proper support from their family in term of proper nutritional supplement, sufficient rest,

mental support and health care facilities. According to UNICEF Report-2014 on Maternal and Neonatal Health in Bangladesh, it has found there is also little understanding about the need for rest and additional nutritious food during pregnancy. Moreover, the low status of women within the family means one in every two women will have her health care decided by her husband. Often her mother-in-law will be a key decision-maker.

Despite being available, the utilization of emergency obstetric and neonatal care services is still low. Delays are often happened in recognizing a case of emergency, deciding to seek treatment and traveling to treatment facilities. Two in five women could not decide whether to seek treatment within six hours of recognizing complications. For one-fifth of those who decided to go to the health facility, the travel time to a treatment facility was more than one hour, which make more complicated of the situation.

### **Limitation of the study**

Though the expected sample size was 324 for this study but due to resource constrain researcher could include just 205 samples, which is very small to generalize the result for the wider population.

The researcher was able to collect data only from pediatric Unit of Centre for the Rehabilitation of the Paralyzed (CRP) for a short period of time, which could affect the result of the study to generalize for wider population.

The questionnaire was developed only through searching sufficient literature but considering the context of the demography of the population a pilot study would substantial before developing questionnaire.

A purposive sampling was used that was not reflecting of the wider population under study. Time and resources were limited, which have a great deal of impact on the study.

**Conclusion:**

Cerebral palsy is the most common condition that is responsible for child disability. This study explore that spastic quadriplegic type of cerebral palsy is the most common type of cerebral palsy and male are more affected than female but the cause is unknown. The mean age of the patient attended at CRP is 1.96 year which is positive to provide early intervention to ensure proper rehabilitation program to have a good prognosis. It has observed that cerebral palsy is much more common in rural area of the country with low educational status of the parents. Surprisingly majority of the patient are first issue of their parents and much more common in mother of younger age. Positive birth character included availability of health care service to more than half of the participant, medical consultancy, term and hospital delivery and normal birth weight are could be progressive sign to have a healthy child .

On the other hand, illiteracy, younger mother hood, unavailability of health care facility to all, lack of awareness regarding pregnancy care, home delivery with untrained attendant could play as a contributing factor to have cerebral palsy. Finally, education, awareness about child disability and its prevention and ensure women right can prevent the development of cerebral palsy in long term.

**Recommendation:**

This study was conducted to explore the characteristics of cerebral palsy patient attended at CRP, so a strong recommendation to evolve out of the context in which the study was done. So far still now in Bangladesh there is little research had been conducted about cerebral palsy including risk factor, cause, rehabilitation and prevention. That is why need to conduct more study about prevalence as well as other issue related to cerebral palsy children.

In this study all children were spastic & Athetoid type CP. for that reason researcher also recommended to conduct study including all type of condition. Need to make plane for public awareness program especially about maternal care, delivery complication, disability issues, early identification child disability and management and women right.

Need to continue and regular study with large number of the participants and conducts the research in different places. However, this research has some limitations; it has developed the basement of further researcher in this field. As it is a descriptive study there is huge scope for further research designing analytic study with random sampling.

The result of this study cannot be generalized in all over the Bangladesh as it has conducted on a single setting. So to ensure the generalization of the research finding, it is recommended to investigate large sample from different hospital or study place.

## BIBLIOGRAPHY

Admin( 2011) cerebral palsy and its risk factors. Parents of cerebral palsy children. Available from <http://www.cerebralpalsy.org.in/2011/04/cerebral-palsy-and-itsknown-risk-factor/>.

Albert, G. (2005). Foot ankle splint . Available: <http://www.footankle.com/anklefoot.htm> foot ankle centre.[Accessed on 30<sup>th</sup> March 2016] .

American Pregnancy Association, (2011). Cerebral palsy, [online]. USA: American Pregnancy Association. Available: <http://americanpregnancy.org/birthdefects/cerebralpalsy.htm>[Accessed on 9 April 2016].

Ancel, P.Y., Livinec, F., Larroque, B., Marret, S., Arnaud, C., Pierrat, V., Dehan, M., Sylvie, N., Escande, B., Burguet, A. and Thiriez, G. (2006). Cerebral palsy among very preterm children in relation to gestational age and neonatal ultrasound abnormalities: the EPIPAGE cohort study. *Pediatrics*, 117(3), pp.828-835.

and Alan, L. Systemic Inflammation and Cerebral Palsy Risk in Extremely Preterm Infants

Anwar, S., Chowdhury, J., Khatun, M., Mollah, A. H., Begum, H. A., Rahman, Z., & Nahar, N. (2006). Clinical profile and predisposing factors of cerebral palsy. *Mymensingh medical journal: MMJ*, 15(2), pp.142-145.

Atladóttir, H. Ó., Thorsen, P., Østergaard, L., Schendel, D. E., Lemcke, S., Abdallah, M., & Parner, E. T. (2010). Maternal infection requiring hospitalization during pregnancy and autism spectrum disorders. *Journal of autism and developmental disorders, 40*(12), pp.1423-1430.

Bangladesh demographic health survey (2007). Maternal and neonatal health in Bangladesh. Available: [http://www.unicef.org/bangladesh/Maternal\\_and\\_Neonatal\\_Health.pdf](http://www.unicef.org/bangladesh/Maternal_and_Neonatal_Health.pdf). [ Accessed on 10 April ,2016]

Behrman, E.R. (2004), Nelson text book of paediatrics, 17th ed, London: Churchill Livingstone.

Bittles, A. H. (2003). Consanguineous marriage and childhood health. *Developmental Medicine & Child Neurology, 45*(08), pp.571-576.

Black, Amanda Y., Nathalie A. Fleming, and E. S. (2012). "Pregnancy in adolescents." *Adolescent medicine: State of the art reviews 239*(1), pp. 123-38.

Blair, E., de Groot, J., & Nelson, K. B. (2011). Placental infarction identified by macroscopic examination and risk of cerebral palsy in infants at 35 weeks of gestational age and over. *American journal of obstetrics and gynecology, 205*(2), pp.124-e1.

Bonellie, S.R., Currie, D. and Chalmers, J. (2005). Comparison of risk factors for cerebral palsy in twins and singletons. *Developmental Medicine & Child Neurology, 47*(09), pp.587-591.

Bosanquet, M., Copeland, L., Ware, R., & Boyd, R. (2013). A systematic review of tests to predict cerebral palsy in young children. *Developmental Medicine & Child Neurology, 55*(5), pp.418-426.

Brody, J. (2005). Spastic Cerebral Palsy. Available: [http://www.cerebralpalsysource.com/Types\\_of\\_CP/spastic\\_cp/index.html](http://www.cerebralpalsysource.com/Types_of_CP/spastic_cp/index.html). [accessed on 18 January 2016 ]

Brown, H. L. (2009). Trauma in pregnancy. *Obstetrics & Gynecology*, 114(1), pp.147-160.

Callaway, L.K., Lust, K. and McIntyre, H.D. (2005). Pregnancy outcomes in women of very advanced maternal age. *Australian and New Zealand journal of obstetrics and gynaecology*, 45(1), pp.12-16.

Cerebral Palsy Statistics, (2010). Available: [http://www.marcchfimes.com/pnhee/4439\\_1208asp](http://www.marcchfimes.com/pnhee/4439_1208asp). [Accessed on 18 March 2016]

Clinical Key, (2012). Cerebral Palsy, [Online]. USA: Elsevier. Available: <https://www.clinicalkey.com/topics/pediatrics/cerebral-palsy.html> [Accessed on 5 May 2016].

Conde-Agudelo, A., Villar, J., & Lindheimer, M. (2008). Maternal infection and risk of preeclampsia: systematic review and metaanalysis. *American journal of obstetrics and gynecology*, 198(1), pp.7-22.

Damiano DJ, 2004, Physiotherapy management in cerebral palsy: Moving beyond philosophies, Management of the Motor Disorders of Cerebral Palsy. *Clinician Developmental Medicine* No. 161, 2nd edn, MacKeith Press, London, pp.161-169.

Davis, E., Shelly, A., Waters, E., Mackinnon, A., Reddihough, D., Boyd, R., & Graham, H. K. (2009). Quality of life of adolescents with cerebral palsy: perspectives



of adolescents and parents. *Developmental medicine & child neurology*, 51(3), pp.193-199.

Dolk ,H., Parkes, J., Hill, N( 2010). Trends in the prevalence of cerebral palsy in Northern Ireland, 1981–1997. *Dev Med Child Neurol* ; 48: 406–12.

Doyle LW, Crowther CA, Middleton P, Marret S. Antenatal magnesium sulfate and neurologic outcome in preterm infants: a systematic review. *Obstet Gynecol*. 2009 Jun;113(6), pp.1327-33.

Drougia, A., Giapros, V., Krallis, N., Theocharis, P., Nikaki, A., Tzoufi, M., & Andronikou, S. (2007). Incidence and risk factors for cerebral palsy in infants with perinatal problems: a 15-year review. *Early human development*, 83(8), pp.541-547.

El Kady, D. (2007). Perinatal outcomes of traumatic injuries during pregnancy. *Clinical obstetrics and gynecology*, 50(3), pp.582-591.

Ellenberg, J.H. and Nelson, K.B. (2013). The association of cerebral palsy with birth asphyxia: a definitional quagmire. *Developmental Medicine & Child Neurology*, 55(3), pp.210-216.

Erkin, G., Delialioglu, S. U., Ozel, S., Culha, C., & Sirzai, H. (2008). Risk factors and clinical profiles in Turkish children with cerebral palsy: analysis of 625 cases. *International journal of rehabilitation Research*, 31(1), pp.89-91.

Gillette, (2007).Children’s Specialty Healthcare Centre, Managing Spasticity in children with cerebral palsy Requires a team approach, Available: <http://www.gillettechildrens.Org/default.Cfm?PID=1.7.19.6.2ss>. [accessed on 18 January 2016]

Glinianaia, S. V., Pharoah, P. O. D., Wright, C., & Rankin, J. M. (2002). Fetal or infant death in twin pregnancy: neurodevelopmental consequence for the survivor. *Archives of Disease in Childhood-Fetal and Neonatal Edition*, 86(1), pp.F9-F15.

Goonewardene, M., Shehata, M., & Hamad, A. (2012). Anaemia in pregnancy. *Best practice & research Clinical obstetrics & gynaecology*, 26(1), pp.3-24.

Gurbuz, A., Karateke, A., Yilmaz, U., & Kabaca, C. (2006). The role of perinatal and intrapartum risk factors in the etiology of cerebral palsy in term deliveries in a Turkish population. *The Journal of Maternal-Fetal & Neonatal Medicine*, 19(3), pp.147-155.

Hayes, B., Ryan, S., Stephenson, J. B. P., & King, M. D. (2007). Cerebral palsy after maternal trauma in pregnancy. *Developmental Medicine & Child Neurology*, 49(9), pp.700-706.

Himmelmann, K., Ahlin, K., Jacobsson, B. O., Cans, C., & Thorsen, P. (2011). Risk factors for cerebral palsy in children born at term. *Acta obstetrica et gynecologica Scandinavica*, 90(10), pp.1070-1081.

Himpens, E., Van den Broeck, C., Oostra, A., Calders, P., & Vanhaesebrouck, P. (2008). Prevalence, type, distribution, and severity of cerebral palsy in relation to gestational age: a meta-analytic review. *Developmental Medicine & Child Neurology*, 50(5), pp.334-340.

Huda ,A., Sushil, K.,Musharrat J., Jannatul. F., Marge KC., Ronsmans, Mahbub E.(2012) Profile of Maternal and Foetal Complications during Labour and Delivery among Women Giving Birth in Hospitals in Matlab and Chandpu. *Journal of Health Population Nutrition*.;vol 30(2):pp 131–142.

Humpage, L., (2007). Models of disability, work and welfare in Australia. *Social Policy & Administration*, 41(3), pp.215-231.

Hurley, K.M., Cross, M.B. and Hughes, S.O. (2011). A systematic review of responsive feeding and child obesity in high-income countries. *The Journal of nutrition*, pp.jn-110.

Johnson, A., (2002). Prevalence and Characteristics of Children with Cerebral palsy in Europe. *Developmental Medicine and Child Neurology*, 44,pp.633-640 .

Johnston, M. V., & Hagberg, H. (2007). Sex and the pathogenesis of cerebral palsy. *Developmental Medicine & Child Neurology*, 49(1), 74-78.

Khan, N. and Durkin, M. (1995). Framework:prevalence.In: Zinkin, P.and McConachie, H. (editors). *Disabled children and developing countries*, Clinics in Developmental Medicine No. 136. London: Mac Keith Press.

Khan, N.Z. and Ferdous S. (2003). Paediatric Neurosciences: Services and Research in Bangladesh Shishu Bikash Network Report, Dhaka, Bangladesh.

Khan, N.Z., Ferdous, S., Munir, S., Huq, S. and McConachie, H. (1998). Mortality of urban and rural young children with cerebral palsy in Bangladesh. *Developmental medicine & child neurology*, 40(11), pp.749-753.

Krakowiak, P., Walker, C. K., Bremer, A. A., Baker, A. S., Ozonoff, S., Hansen, R. L., & Hertz-Picciotto, I. ((2012). Maternal metabolic conditions and risk for autism and other neurodevelopmental disorders. *Pediatrics*, 129(5), pp.e1121-e1128.

Kuban, K.C., O'Shea, T.M., Allred, E.N., Paneth, N., Hirtz, D., Fichorova, R.N. and Leviton, A. (2014). Systemic inflammation and cerebral palsy risk in extremely preterm infants. *Journal of child neurology*, 29(12), pp.1692-1698.

Kuřak, E. (2010). Risk factors for cerebral palsy in term birth infants. *Advances in medical sciences*, 55(2), pp.216-221.

Kusiako, T., Ronsmans, C. & Paal, V. D. (2000). Perinatal mortality attributable to complications of childbirth in Matlab, Bangladesh.

Leviton, A., Kuban, K., O'Shea, T.M. (2011). The relationship between early concentrations of 25 blood proteins and cerebral white matter injury in preterm newborns: the ELGAN study. *Journal of Pediatric* ; 158(6):897-903 e891-895

Livinec, F., Ancel, P. Y., Marret, S., Arnaud, C., Fresson, J., Pierrat, V., & Kaminski, M. (2005). Prenatal risk factors for cerebral palsy in very preterm singletons and twins. *Obstetrics & Gynecology*, 105(6), pp.1341-1347.

Maloni, P. K., Despres, E. R., Habbous, J., Primmer, A. R., Slatten, J. B., Gibson, B. E., & Landry, M. D. (2010). Perceptions of disability among mothers of children with disability in Bangladesh: Implications for rehabilitation service delivery. *Disability and Rehabilitation*, 32(10), pp.845-854.

Manooch, J. R., McDermott, S., Griffith, M. I., Hardin, J., & Cross, A. (2011). Uncovering the complex relationship between pre-eclampsia, preterm birth and cerebral palsy. *Paediatric and perinatal epidemiology*, 25(2), pp.100-110.

Marella, M., Huq, N. L., Devine, A., Baker, S. M., Quaiyum, M. A., & Keefe, J. E. (2015). Prevalence and correlates of disability in Bogra district of Bangladesh using the rapid assessment of disability survey. *BMC public health*, 15(1), 1.

- McIntyre, S., Taitz, D., Keogh, J., Goldsmith, S., Badawi, N., & Blair, E. V. E. (2013). A systematic review of risk factors for cerebral palsy in children born at term in developed countries. *Developmental Medicine & Child Neurology*, 55(6), pp.499-508.
- Mongan, D., & Gaffney, G. (2006). Prevalence of cerebral palsy in the West of Ireland 1990–1999. *Developmental Medicine & Child Neurology*, 48(11), pp.892-895.
- Morris, C. (2007). Definition and classification of cerebral palsy: a historical perspective. *Developmental Medicine & Child Neurology*, 49(s109), pp.3-7.
- Moster, D., Lie, R. T., & Markestad, T. (2008). Long-term medical and social consequences of preterm birth. *New England Journal of Medicine*, 359(3), pp.262-273.
- My child, (2013). Signs and symptoms of Cerebral Palsy, [Online]. USA: Stern Law Group, PLLC. Available: <http://cerebralpalsy.org/about-cerebral-palsy/symptoms/> [Accessed on 7April 2016].
- Nabors, G.C. (2007). Maternal age and parity in relation to cerebral palsy in their infants. *Obstetrical & Gynecological Survey*, 18(4), pp.586-587.
- Nelson, K. B., & Ellenberg, J. H. (1986). Antecedents of cerebral palsy. *New England Journal of Medicine*, 315(2), pp.81-86.
- Nelson, K.B. (2009). Is cerebral palsy preventable? *Curr Opin Neurol* ; 21: 129–35.
- Neufeld, M. D., Frigon, C., Graham, A. S., & Mueller, B. A. (2005). Maternal infection and risk of cerebral palsy in term and preterm infants. *Journal of perinatology*, 25(2), pp.108-113.

Nielsen, L. F., Schendel, D., Grove, J., Hvidtjørn, D., Jacobsson, B., Josiassen, T., ... & Thorsen, P. (2008). Asphyxia-related risk factors and their timing in spastic cerebral palsy. *BJOG: An International Journal of Obstetrics & Gynaecology*, 115(12), pp.1518-1528.

Oskoui, M., Coutinho, F., Dukeman, J., Jetté, N., & Pringsheim, T. (2013). An update on the prevalence of cerebral palsy: a systematic review and meta-analysis. *Developmental Medicine & Child Neurology*, 55(6), pp.509-519.

Petterson, B., Nelson, K. B., Watson, L., & Stanley, F. (1993). Twins, triplets, and cerebral palsy in births in Western Australia in the 1980s. *Bmj*, 307(6914), 1239-1243.

Pharoah, P. O. D., & Adi, Y. (2000). Consequences of in-utero death in a twin pregnancy. *The Lancet*, 355(9215), pp.1597-1602.

Pharoah, P. O. D., Price, T. S., & Plomin, R. (2002). Cerebral palsy in twins: a national study. *Archives of Disease in Childhood-Fetal and Neonatal Edition*, 87(2), F122-F124.

Platt, M. J., Cans, C., Johnson, A., Surman, G., Topp, M., Torrioli, M. G., & Krageloh-Mann, I. (2007). Trends in cerebral palsy among infants of very low birthweight (< 1500 g) or born prematurely (< 32 weeks) in 16 European centres: a database study. *The Lancet*, 369(9555), pp.43-50.

Rahman, J., Vajanapoom, N., Van Der Putten, M. and Rahman, N. (2012). Impact of coastal pollution on childhood disabilities and adverse pregnancy outcomes: The case of Bangladesh. *Int. J. Med. Public Health*, 2(3), pp.12-20.

Raj, G.S. (2006). *Physiotherapy in Neurological conditions*, Jaypee Brothers: India.

Reddihough, D. (2011). Cerebral palsy in childhood. *Australian family physician*, 40(4), pp.192.

Rosenbaum, P., Paneth, N., Leviton, A., Goldstein, M., Bax, M., Damiano, D., Dan, B. and Jacobsson, B. (2007). A report: the definition and classification of cerebral palsy April 2006. *Dev Med Child Neurol Suppl*, 109(suppl 109), pp.8-14.

Saggar, A. K., & Bittles, A. H. (2008). Consanguinity and child health. *Paediatrics and Child Health*, 18(5), pp.244-249.

Sanger, T.D., Delgado, M.R, Gaebler-Spira, D., Hallett, M., Mink, J.W. (2010) Task Force on Childhood Motor Disorders: Classification and definition of disorders causing hypertonia in childhood. *Pediatrics* 111(1): e89-97.

Sankar, C., & Mundkur, N. (2005). Cerebral palsy-definition, classification, etiology and early diagnosis. *The Indian Journal of Pediatrics*, 72(10), pp.865-868.

Scher, A. I., Petterson, B. E. V., Blair, E., Ellenberg, J. H., Grether, J. K., Haan, E., & Nelson, K. B. (2002). The risk of mortality or cerebral palsy in twins: a collaborative population-based study. *Pediatric research*, 52(5), 671-681.

Scianni, A., Butler, J. M., Ada, L., & Teixeira-Salmela, L. F. (2009). Muscle strengthening is not effective in children and adolescents with cerebral palsy: a systematic review. *Australian Journal of Physiotherapy*, 55(2), pp.81-87.

Serdaro, A., Cansu, A., Özkan, S., & Tezcan, S. (2006). Prevalence of cerebral palsy in Turkish children between the ages of 2 and 16 years. *Developmental Medicine & Child Neurology*, 48(06), pp.413-416.

Smith, L., Kelly, K. D., Prkachin, G., & Voaklander, D. C. (2008). The prevalence of cerebral palsy in British Columbia, 1991-1995. *Canadian Journal of Neurological Sciences*, 35(3), 342-347.

Steinbok ,P. and McLeod K.( 2005).Comparison of motor outcomes after selective dorsal rhizotomy with and without preoperative intensive physiotherapy in children with spastic diaplegic cerebral palsy, *Paediatric Neurosurgery*, 36: 142-147

Stelmach, T., Pisarev, H., Talvik, T. (2005). Ante- and perinatal factors for cerebral palsy: case–control study in Estonia. *J Child Neurol* ; 20: 654–60.

Steyn, W. (2013, November). Hypertension during pregnancy–what are we talking about?. In *Obstetrics and Gynaecology Forum* (Vol. 13, No. 1, pp. 1-2). Inhouse Publishers.

Sundar, S. (2002).2nded. Text Book of Rehabilitation, Jaypee Brothers: India.

Sundrum, R., Logan, S., Wallace, A., & Spencer, N. (2005). Cerebral palsy and socioeconomic status: a retrospective cohort study. *Archives of Disease in Childhood*, 90(1), pp.15-18.

Susan,R.A., Ryan, D.D. and Kay, R.M. (2010). Classification systems in cerebral palsy. *Orthopedic Clinics of North America*, 41(4), pp.457-467.

Thomas, B., Rose, M.H., Slok, R., Sonne-Holm, S. and Jensen, B.R., (2009). Ankle torque steadiness is related to muscle activation variability and coactivation in children with cerebral palsy. *Muscle & nerve*, 40(3), pp.402-410.



Topp, M., Huusom, L. D., Langhoff-Roos, J., Delhumeau, C., Hutton, J. L., & Dolk, H. (2004). Multiple birth and cerebral palsy in Europe: a multicenter study. *Acta obstetrica et gynecologica Scandinavica*, 83(6), pp.548-553.

Unicef (2014). Neonatal and child health profile. Bangladesh. Available: [http://www.who.int/maternal\\_child\\_adolescent/epidemiology/profiles/neonatal\\_child/npl.pdf](http://www.who.int/maternal_child_adolescent/epidemiology/profiles/neonatal_child/npl.pdf). [Accessed on 10 April , 2016]

VanderWeele, T. J., & Hernández-Díaz, S. (2011). Is there a direct effect of pre-eclampsia on cerebral palsy not through preterm birth?. *Paediatric and perinatal epidemiology*, 25(2), 111-115.

Viale, L., Allotey, J., Cheong-See, F., Arroyo-Manzano, D., Mccorry, D., Bagary, M., & EBM CONNECT Collaboration. (2015). Epilepsy in pregnancy and reproductive outcomes: a systematic review and meta-analysis. *The Lancet*, 386(10006), pp.1845-1852.

Westbom, L., Hagglund, G., & Nordmark, E. (2007). Cerebral palsy in a total population of 4–11 year olds in southern Sweden. Prevalence and distribution according to different CP classification systems. *BMC pediatrics*, 7(1), pp.1.

Whiteneck, G. (2006, February). Conceptual models of disability: past, present, and future. In *Workshop on disability in America: A new look* (pp. 50-66). Washington DC: The National Academies Press.

Wood, N.S., Marlow, N., Costeloe, K. (2006). Neurologic and developmental disability after extremely preterm birth. *N Engl J Med.* ;343:378–384.

Wu, Y. W., Croen, L. A., Shah, S. J., Newman, T. B., & Najjar, D. V. (2006). Cerebral palsy in a term population: risk factors and neuroimaging findings. *Pediatrics*, 118(2), 690-697.

Yasmeen & Azim(2011)Status of low birth weight at a tertiary level hospital in Bangladesh for a selected period of time. *South East Asia Journal of Public Health* vol:1, pp24-27 .

Yost, N. P., Bloom, S. L., McIntire, D. D., & Leveno, K. J. (2005). A prospective observational study of domestic violence during pregnancy. *Obstetrics & gynecology*, 106(1), 61-65.

## APPENDICES

### সম্মতিপত্র

আমি শাহনাজ সুলতানা, ঢাকা বিশ্ববিদ্যালয়ের চিকিৎসা অনুষদের অধীনে বাংলাদেশ হেলথ প্রফেশন্স ইন্সটিটিউট (বি এইচ পি আই) এর মাস্টার্স অফ ফিজিওথেরাপি (এম পি টি) বিভাগের একজন শিক্ষার্থী। অধ্যয়নের অংশ হিসাবে, আমি ‘সি.আর.পি- তে চিকিৎসাধীন সেরিব্রাল পালসি রোগে আক্রান্ত শিশুদের বৈশিষ্ট্য সমূহ’ বিষয়ে একটি গবেষণা করছি।

এ সংক্রান্ত তথ্য আমি আপনাকে দিচ্ছি এবং আপনার শিশুকে এই গবেষণায় অংশ নেয়ার আমন্ত্রণ জানাচ্ছি। আপনার শিশুর অংশগ্রহণের জন্য আপনি রাজি আছেন কিনা এ বিষয়ে আপনাকে আজই সিদ্ধান্ত নেয়ার প্রয়োজন নেই। সিদ্ধান্ত নেয়ার পূর্বে আগে আপনি বিশ্বস্ত কারো সাথে কথা বলতে পারেন।

এই গবেষণার জন্য আপনার শিশুর চিকিৎসায় কোনরূপ সমস্যা হবে না; তার অংশগ্রহণ পুরোপুরি ঐচ্ছিক। পরবর্তিতে আপনি চাইলে অংশগ্রহণ থেকে বিরত থাকতে পারেন। এই গবেষণায় ব্যবহৃত অংশগ্রহণকারীর ব্যক্তিগত তথ্য সম্পূর্ণ গোপন থাকবে। আপনার অনুমতি ব্যতি-রেখে অন্য কোথাও প্রকাশ করা হবে না।

কিছু শব্দ থাকতে পারে যা আপনার বোধগম্য নয়। আমরা কথা চালিফয়ে যাওয়ার সময় দয়া করে আমাকে থামতে বলবেন এবং আমি সময় নিয়ে আপনাকে তা ব্যাখ্যা করব। আপনার যদি কোন প্রশ্ন থাকে, তাহলে আমাকে পরে জিজ্ঞাসা করতে পারেন।

যদি গবেষণা সম্পর্কে আপনার কোন জিজ্ঞাসা থাকে, তাহলে আপনি গবেষক শাহনাজ সুলতানা অথবা গবেষণার তত্ত্বাবধায়ক নাসিরুল ইসলাম, ( সহযোগী অধ্যাপক, ও প্রিন্সিপাল বি এইচ পি আই) এর সাথে যোগাযোগ করতে পারেন। শুরু করার আগে আপনার কোন প্রশ্ন আছে কি?

সুতরাং আমি কি শুরু করতে পারি?

হ্যাঁ \_\_\_\_\_ না \_\_\_\_\_

বাবা/মায়ের নাম: \_\_\_\_\_ বাচ্চার সাথে সম্পর্ক: \_\_\_\_\_

স্বাক্ষর:

তারিখ:

বাবা/মা যদি নিরক্ষর হন,

আমি নিশ্চিত করছি পুরো সন্মতিপত্র আমাকে পড়ে শোনানো হয়েছে।

আঙুলের ছাপ: \_\_\_\_\_

স্বাক্ষীর স্বাক্ষর:

স্বাক্ষীর স্বাক্ষর ও তারিখ:

গবেষকের স্বাক্ষর ও তারিখ:

## QUESTIONNAIRE

Question	Coding categories	Code
01. Patient ID Number.		
02. Name of the patient.		
03. Age of the patient.		

04. Diagnosis		
05. Sex.	1.Male 2.Female	
06.Living Area	Rural Urban Semi-urban	
07. Mothers Educational Label.	illiterate Primary. Secondary. Higher Secondary. Graduation. Post-Graduation. Others.	
08. Fathers Educational Label.	Illiterate Primary. Secondary. Higher Secondary Graduation.	

	Post-Graduation. Others.	
09. Mothers occupation.	House wife. Service holder.  Student. Daily Labor.  Others.	
10. Fathers occupation.	Service Holder. Farmer. Business. Student. Daily labor. Others.	
11. Monthly income of parent's.		
12. How old were you during pregnancy?	Age in year <input type="text"/>	
13. Position of the child in their family.	1 <sup>st</sup> child. 2 <sup>nd</sup> child.	

	3 <sup>rd</sup> child. 4 <sup>th</sup> child. Above.	
If the position is not first child		
14. Duration of birth spacing.		
15. History of cousin Marriage.	Yes No.	
16. Have you suffer for any disease before pregnancy?	Yes No	
If yes, What was that?		
17. Did you have any disease during pregnancy?	DM. High blood pressure. HBS Others. None	
18. Did you get trauma during pregnancy?	Yes No	
If yes, how and in which month of pregnancy?		
19. Have you ever been treated by doctor	Yes	



during pregnancy?	No	
If yes, why?		
20. Number of visit to the doctor?	Per month. Per 3 month. 1day pregnancy.	
21. Did the health care service available in your area?	Yes No	
22. Have you taken any prescribed drug during pregnancy?	Yes No	
If yes - type of drug?		
23. Have you taken any un-prescribed drug during pregnancy?	Yes No	
If yes- reason for taken?		
24. Did you feel well fetal movement during pregnancy?	Yes No	
25. Did you gain proper body weight during pregnancy?	Yes No	

	Over weight Not measure.	
26. When did your child born?	Before 38 weeks. After 38 weeks. After 42 weeks.	
27. Where did your child born?	Home. Hospital. Clinic.	
28. Who were involved in assessing delivery?	TBA SBA Midwife.	
29. Type of delivery?	NVD Caesarian section Forceps delivery. Others Instrumental Delivery	
30. What was the duration of labor pain?	Less then 12 hours. More then 12 hours.	

31. Did your child cry just after birth?	Yes. No.	
32. What was your baby's birth weight?	Low birth weight. Normal. Over weight. Not measure	
33. Did your baby have jaundice after birth?	Yes. No.	
34. Did your baby suffer from the mention condition?	Pneumonia. Malaria. Diarrhea. High fever Convulsion.	
If yes, age in year		
35. Did your child got trauma before 3 years of age?	Yes. No.	
36. Did you marked any physical abnormalities after birth?	Yes. No.	
37. Did your child's father have any major		

disease?		
If yes, what type?		
38. Did your family supportive towards you during pregnancy?	Yes. No.	
39. Do you think any other reason behind your child disabilities?	.	

প্রশ্নাবলী

প্রশ্ন	সংকেত পদ্ধতি	সংকেত
০১। রোগীর আই ডি নম্বর		
০২। রোগীর নাম		
০৩। রোগীর বয়স		
০৪। রোগ নির্ণয়		
০৫। লিঙ্গ	১। পুরুষ ২। মহিলা	
০৬। বসবাসের স্থান	১। গ্রাম ২। শহর ৩। মফস্বল	

<p>০৭। মায়ের শিক্ষাগত যোগ্যতা</p>	<p>১। অশিক্ষিত</p> <p>২। প্রাথমিক</p> <p>৩। মাধ্যমিক</p> <p>৪। উচ্চ মাধ্যমিক</p> <p>৫। ডিগ্রি / অনার্স</p> <p>৬। মাস্টার্স</p> <p>৭। অন্যান্য</p>	
<p>০৮। বাবার শিক্ষাগত যোগ্যতা</p>	<p>১। অশিক্ষিত</p> <p>২। প্রাথমিক</p> <p>৩। মাধ্যমিক</p> <p>৪। উচ্চ মাধ্যমিক</p> <p>৫। ডিগ্রি / অনার্স</p> <p>৬। মাস্টার্স</p> <p>৭। অন্যান্য</p>	
<p>০৯। মায়ের পেশা</p>	<p>১। গৃহিণী</p> <p>২। চাকুরীজীবী</p> <p>৩। ছাত্রী</p> <p>৪। দিনমজুর</p>	

	৫। অন্যান্য	
১০। বাবার পেশা	১। চাকুরীজীবী ২। কৃষক ৩। ব্যবসায়ী ৪। ছাত্র ৫। দিনমজুর ৬। অন্যান্য	
১১। পিতা-মাতার মাসিক আয়		
১২। গর্ভধারণ কালীন সময়ে মায়ের বয়স কত ছিল ?	_____ বছর	
১৩। পরিবারের কততম বাচ্চা ?	১। ১ম বাচ্চা ২। ২য় বাচ্চা ৩। ৩য় বাচ্চা ৪। ৪র্থ বাচ্চা ৫। চতুর্থের উপরে	
যদি ১ম বাচ্চা না হয় তাহলে- ১৪। দুই বাচ্চার জন্মের মধ্যবর্তী সময়ের ব্যবধান কত ছিল ?		
১৫। আত্মীয়তার (খালাতো, মামাতো, ফুফাতো)		

মধ্যে বিবাহের ইতিহাস আছে কি ?	১। হ্যাঁ ২। না	
১৬। গর্ভধারণের পূর্বে মায়ের কি কোন রোগ ছিল ?	১। হ্যাঁ ২। না	
যদি থাকে তাহলে – ১৭। গর্ভধারণ কালীন সময়ে মা কোন রোগে আক্রান্ত ছিলেন ?	১। ডায়াবেটিস ২। উচ্চ রক্তচাপ ৩। হেপাটাইটিস ৪। অন্যান্য ৫। না	
১৮। গর্ভধারণ কালীন সময়ে মা কি কোন আঘাত পেয়েছিলেন ?	১। হ্যাঁ ২। না	
যদি হ্যাঁ হয় তাহলে- গর্ভধারণের কততম মাসে কেমন আঘাত পেয়েছিলেন ?		
১৯। গর্ভধারণ কালীন সময়ে মা কি কোন ডাক্তার দেখিয়েছিলেন ?	১। হ্যাঁ ২। না	
যদি হ্যাঁ হয় তাহলে- কেন ?		
২০। কতবার ডাক্তার দেখিয়েছিলেন ?	১। প্রতিমাসে ২। প্রতিতিন-মাসে ৩। একবার	

২১। আপনার এলাকায় কোন ধরনের স্বাস্থ্য সেবা নিয়েছিলেন?	১। হ্যাঁ ২। না	
২২। গর্ভধারণ কালীন সময়ে ডাক্তারের ব্যবস্থাপত্র অনুযায়ী কোন ঔষধ খেয়েছিলেন কি ?	১। হ্যাঁ ২। না	
যদি হ্যাঁ হয় তাহলে- কোন ধরনের ঔষধ খেয়েছিলেন ?		
২৩। গর্ভধারণ কালীন সময়ে ডাক্তারের ব্যবস্থাপত্র ছাড়া কোন ঔষধ খেয়েছিলেন কি ?	১। হ্যাঁ ২। না	
যদি হ্যাঁ হয় তাহলে- কি কারণে খেয়েছিলেন ?		
২৪। আপনি কি গর্ভধারণ কালীন সময়ে ক্রনের নড়াচড়া ভালোভাবে বুঝতে পারতেন ?	১। হ্যাঁ ২। না	
২৫। গর্ভধারণ কালীন সময়ে আপনার শরিরের ওজন সঠিক মাত্রায় বৃদ্ধি পেয়েছিল ?	১। হ্যাঁ ২। না ৩। অতিরিক্ত ওজন বৃদ্ধি পেয়েছিল ৪। ওজন পরিমাপ করা হয়নি	
২৬। কত সপ্তাহে আপনার বাচ্চা জন্ম নিয়েছিল ?	১। ৩৮ সপ্তাহের পূর্বে ২। ৩৮ সপ্তাহের পরে ৩। ৪২ সপ্তাহের পরে	



<p>২৭। কোথায় আপনার বাচ্চা জন্ম গ্রহন করেছিল ?</p>	<p>১। বাসায় ২। হাসপাতালে ৩। ক্লিনিকে</p>	
<p>২৮। বাচ্চা জন্মের সময় কে আপনাকে সহায়তা করেছিল ?</p>	<p>১। টি.বি.এ ২। এস.বি.এ ৩। মিডওয়াইফ</p>	
<p>২৯। ডেলিভারির ধরন কি ছিল?</p>	<p>১। নরমাল ডেলিভারি ২। সিজারিয়ান সেকসন ৩। ফরসেপ ডেলিভারি ৪। অন্যান্য যন্ত্রের মাধ্যমে</p>	
<p>৩০। প্রসবকালীন ব্যাথা কতক্ষণ ছিল ?</p>	<p>১। ১২ ঘন্টার কম সময় ২। ১২ঘন্টার বেশি সময়</p>	
<p>৩১। জন্মের সাথে সাথেই কি আপনার বাচ্চা কান্না করেছিল?</p>	<p>১। হ্যাঁ ২। না</p>	
<p>৩২। জন্মের সময় আপনার বাচ্চার ওজন কত ছিল ?</p>	<p>১। স্বাভাবিক এর কম ২। স্বাভাবিক ৩। স্বাভাবিকের বেশি ৪। ওজন পরিমাপ করা হয়নি</p>	

৩৩। জন্মের পর আপনার বাচ্চার কি জন্ডিস ছিল ?	১। হ্যাঁ ২। না	
৩৪। আপনার বাচ্চা কি নিম্নলিখিত রোগে আক্রান্ত ছিল ?	১। নিউমোনিয়া ২। ম্যালেরিয়া ৩। ডাইরিয়া ৪। মাত্রাতিরিক্ত স্বর ৫। থিঁচুনি ৬। না	
যদি হ্যাঁ হয় তাহলে- তখন বাচ্চার বয়স কত ছিল ?		
৩৫। ৩ বছর বয়সের পূর্বে আপনার বাচ্চা কি আঘাত পেয়েছিল ?	১। হ্যাঁ ২। না	
৩৬। জন্মের পর বাচ্চার কোন অস্বাভাবিকতা লক্ষ্য করেছিলেন কি ?	১। হ্যাঁ ২। না	
৩৭। বাচ্চার বাবা কি জটিল কোন রোগে আক্রান্ত ছিলেন ?	১। হ্যাঁ ২। না	
যদি হ্যাঁ হয় তাহলে- কি ধরনের রোগে আক্রান্ত ছিলেন ?		

৩৮। গর্ভধারণ কালীন সময়ে আপনার পরিবার কি আপনার প্রতি সহায়ক ছিল ?	১। হ্যাঁ ২। না	
৩৯। আপনি কি মনে করেন, আপনার বাচ্চা প্রতিবন্ধী হওয়ার পিছনে অন্য কোন কারণ আছে ?		