MEASURING THE GROSS MOTOR FUNCTION AND FUNCTIONAL LIMITATION AMONG THE CHILDREN WITH SPASTIC CEREBRAL PALSY

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We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation entitled

MEASURING THE GROSS MOTOR FUNCTION AND FUNCTIONAL LIMITATION AMONG THE CHILDREN WITH SPASTIC CEREBRAL PALSY

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DECLERATION

I declare that the work presented here is my own. All sources used have been cited appropriately. Any mistakes or inaccuracies are my own. I also decline that for any publication, presentation or dissemination of information of the study. I would bound to take written consent from Department of Physiotherapy of Bangladesh Health Professions Institute (BHPI).

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Acronyms

BHPI Bangladesh Health Professions Institute

BMRC Bangladesh Medical and Research Council

CP Cerebral Palsy

CRP Centre for the Rehabilitation of the Paralysed

GMFCS Gross Motor Function Classification System

ICF International Classification of Functioning

IRB International Review Board

SPSS Statistical Package for the Social Sciences

WHO World Health Organization

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Abstract

Purpose: To find out the gross motor function and functional limitation among the children with spastic cerebral palsy. *Objectives:* The objectives of this study was to find out the gross motor function, functional limitation, the socio-demographic information and association between GMFCS with WeeFIM, BMI & delivery type and WeeFIM with BMI, delivery type among the participants of spastic cerebral palsy. *Methodology:* The study design was cross sectional. The sample size were 70 and Purposive sampling technique was used for sample selection who was attended for treatment in Pediatric unite in Centre for the Rehabilitation of the Paralysed (CRP) in Bangladesh. *Results:* Among 70 cerebral palsy patients, most of the patients were 2-4 and 6-12 years of age range. The mean age was 65.24 months. Sociodemographic results found large number of participants (44.3%) was underweight. In medical factors, GMFCS level showed majority of the participants (29.9%) were in level 4. Low educational status, 45.7% (n=32) children were born through normal vaginal delivery (NVD) and 54.3% (n=38) children were born through caesarian section. In association between GMFCS and WeeFIM there was significant relationship of self eating in 2-4 years age range, transfer and locomotion in 2-4 years age range and 6-12 years age range, communication and social cognition in 2-4 years age range. Conclusion: Spastic Cerebral palsy causes gross motor functional limitation and functional limitation. The present study found different sociodemographic, medical factors and GMFCS level with status of limitations among children with spastic CP between age range of 2–4 years, 4-6 years and 6-12 years.

Key words: Spastic cerebral palsy, Gross motor function and Functional limitation.

CHAPTER –I INTRODUCTION

1.1.Background

Cerebral palsy is the most severe physical disability in Bangladesh and a cause of embarrassment to the family. In Bangladesh, there have been only a few action taken to improve medical disorder to raise awareness of persons with cerebral palsy at the community level.

In Bangladesh the majority of children with cerebral palsy are cared for at home by their families. They are among the most vulnerable to violence, abuse, exploitation and neglect. Children living with cerebral palsy are among the least likely to attend their local school due to limitation of their function (Mclntyre et al., 2011) .

Cerebral palsy (CP) is a term which used to describe a group of disorders in the development of movement and posture, causing activity limitation which is characterized by non-progressive disturbances that occur in the developing fetal or infant brain. Cerebral palsy is the most common physical disability in the children. The motor disorders of cerebral palsy (CP) are often accompanied by disturbances of sensation, cognition, communication, perception, behavior, by a seizure disorder (Soleimani *et al.*, 2011).

Study of cerebral palsy represents the condition of disable children in Bangladesh. According to the World Health Organization (WHO) 10% of total population in Bangladesh are disable and according to Bangladesh bureau of statistics 16.41% of total disabilities are child disability which is responsible for birth injury (Sultana, 2016).

Traditionally Cerebral palsy (CP) referred to as an umbrella term that varying from mild to severe impairments. There are two major subtypes of cerebral palsy, spastic cerebral palsy and non-spastic cerebral palsy. The spastic cerebral palsy are further divided by monoplegic cerebral palsy, diplegic cerebral palsy, triplegic cerebral palsy, quadriplegic cerebral palsy and hemiplegic cerebral palsy. In monoplegia, only one of the lower extremities is affected, in diaplegia, lower extremities are affected, in hemiplegia, the right or the left side of the body is affected. In triplegia, one upper limb and two lower limb or two upper limb and one lower limb of the body is affected and in quadriplegia, all four

limbs are affected (Tedroff et al., 2009). Spastic cerebral palsy is the most common type of cerebral palsy. Spastic cerebral palsy is the result of an upper motor neuron lesion from anywhere of the cortex to the spinal level and this spasticity in cerebral palsy mainly hampers the voluntary movements. In spastic cerebral palsy spasticity is a motor disorder characterized by stiff and jerky movements, increased muscle tone which is responsible to make difficult movement or even impossible (Grunt et al., 2014).

It also represents the heterogeneity of clinical symptoms, where the degree of motor and other non-motor neurological involvement give a wide spectrum, ranging from mild sometimes and barely noticeable, to severe disability and the effects of this motor disorder on patients and their families often include pain, reduced participation in society, and in many cases, a financial burden.

Disability by the spastic cerebral palsy can compromise a child's functioning and development across various area. For example, children with a disability are much likely to be engaged in education, work and community which have of course family and social implications. However, the limitation of activity is largely accompanied with a child's gross motor function which results from the secondary musculoskeletal disorders (Rosenbaum et al., 2007).

Gross Motor Functional Classification System (GMFCS) is used for describing the gross motor function of children on the basis of their self-initiated movement and helps to give ideas about limitation of function, establish goal and make decisions about the disorder. Functional deficits occurs due to physical, cognitive, emotional and social disorders which prevent the children with cerebral palsy from performing their roles in society. Poor health of this child may result in restrictions in activities of daily living, participation and may affect quality of life (Morris & Bartlett, 2004).Many children of spastic cerebral palsy leads a sedentary lifestyle with the difficulty of activities such as walking, running, walking stairs etc. Measurement of the objectives can help to develop gross motor skills, to enhance ambulation and to increase the performance of activities of daily living which is often a challenge for the children with spastic cerebral palsy (Verschuren et al., 2007).

1.2. Rationale of the study

Cerebral Palsy (CP) is one of the most common congenital disorders in the childhood throughout the world. There is increasing the number of cerebral palsy patient day by day due to lack of awareness. It is affecting a large number of individual that creates devastating effect on a family, a society as well as in whole country.

In cerebral palsy, spastic type of cerebral palsy is common. Children with spastic cerebral palsy present a variety of clinical presentations with gross motor function problem. It affects normal motor function development and this impaired motor function makes it difficult for children to perform all function. Loss of functional limitation also increases the physical burden of caregivers. Due to problems of gross motor function, functional limitation children shows difficulties to perform their daily activities and also shows problems of good posture, movement, participation in games and sports general fitness, health and wellbeing.

It is an important part of health care to prevent diseases as well as to improve or maximize independence in children with spastic cerebral palsy. As Physiotherapy is a significant part of multi-disciplinary team, it is important to make awareness about the problem of functional limitation among the children with spastic cerebral palsy.

The purpose of this research is to find out the degree of level of gross motor function and functional limitation in children with spastic cerebral palsy.

This study will help to know about activities of daily living, movement, coordination and balance which is the foundation of gross motor function and also about the functional limitation in children with spastic cerebral palsy. In future these will help to take further measures to minimize those problems, so that their activity of daily living will perform properly and more efficiently. Therefore, physiotherapy can play an absolute role in preventing Spastic Cerebral palsy and aware the people about it which is essential to strengthen our profession. Finally, participants may be beneficial and practitioner will gain knowledge from this study.

1.3. Operational Definition

Cerebral Palsy: Cerebral palsy is a disorder of movement, muscle tone or posture that is caused by damage that occurs to the immature, developing brain, most often before birth. An individual with Cerebral Palsy will likely show signs of physical impairment. Cerebral Palsy affects muscles and a person's ability to control them. Balance, posture, and coordination can also be affected by Cerebral Palsy. Tasks such as walking, sitting, or tying shoes may be difficult for some, while others might have difficulty grasping objects.

Other complications, such as intellectual impairment, seizures, and vision or hearing impairment also commonly accompany Cerebral Palsy.

Spastic Cerebral Palsy: Spastic cerebral palsy is the most common type of cerebral palsy wherein spasticity is the major impairment. Spastic cerebral palsy is caused by damage to the motor cortex and the pyramidal tracts of the brain, which connect the motor cortex to the spinal cord. It refers to increase muscle tone, stiffness and overall affects the motor function. Symptoms present according to the involvement of patient's body parts or limbs like, spastic hemiplegia, spastic quadriplegia, spastic diplegia and spastic monoplegia.

Gross Motor Function: Gross motor functions are the actions that control the movement of large muscle in the body for walking, running, sitting, crawling and other activities. The muscle which is perform gross motor functions are generally present in the arms, legs, back, abdomen and tonso. It also includes eye-hand coordination skills such as ball skills throwing, catching, kicking etc. Gross motor function develops in a very short period of time and most development occurs during childhood.

Functional Limitation: Functional independence is the ability to perform daily tasks without help. It is achieved when a person can participate in activities fully that causes meaningful and successful situation of life. By this involvement of daily routines of self-maintenance, enables humans to express themselves, establish relationships and build identity.

1.4. Aims and objectives of the study

Aim of the study: The aim of the study is to find out the gross motor function and functional limitation among children with spastic cerebral palsy.

Objectives of the study:

General objective:

To find out the gross motor function and functional limitation among children with spastic cerebral palsy.

Specific objectives:

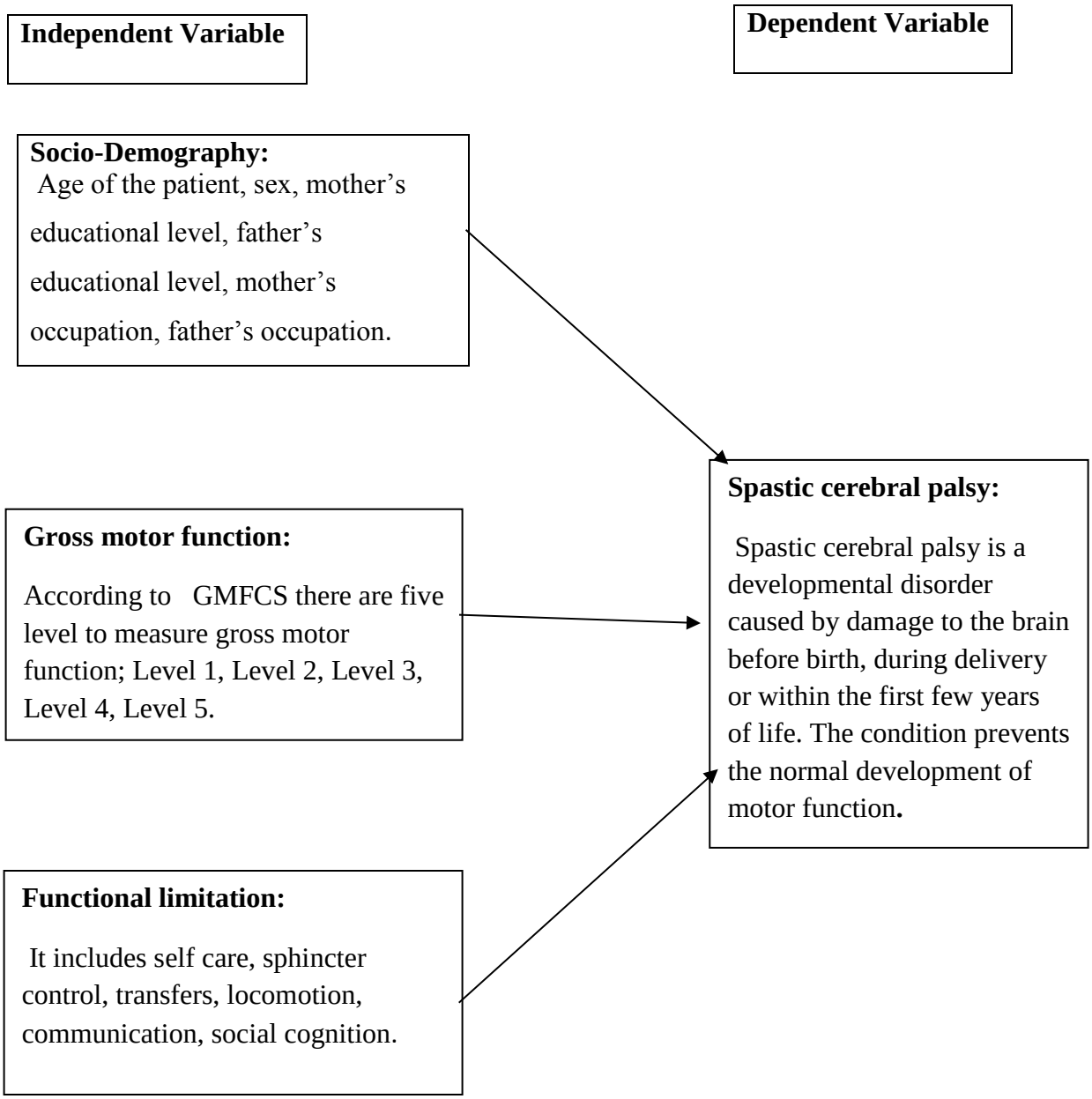
- To find out the socio-demographic status of children with spastic cerebral palsy.
- To find out the gross motor function of children with spastic cerebral palsy.
- To find out the functional limitation of children with spastic cerebral palsy.
- To find out the association of GMFCS with WeeFIM, BMI, delivery type and WeeFIM with GMFCS, BMI & delivery type among the children of spastic cerebral palsy.

1.5. Research Question:

What are the measurement of Gross Motor Function and functional limitation among children with spastic Cerebral palsy?

1.6. Variables

Conceptual Framework:



CHAPTER –II LITERATURE REVIEW

'Cerebral' refers to the brain and 'Palsy' to a disorder of movement or posture. If someone who has cerebral palsy it means that 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. It is a group of condition that affects the movement, muscle tone and posture resulting from the non-progressive damage to the immature brain tissue.

Cerebral palsy is the most common well-recognised neurodevelopmental motor disability in children. The impairments because of cerebral palsy first appear early in life, usually occurring during fetal development or infancy (Kaur et al., 2011).

Cerebral palsy is the most common chronic motor disorder of childhood, affecting approximately 2 to 2.5 infants per 1,000 live births. The increase in survival rates for preterm infants has amplified the risk of brain injuries that potentially responsible for CP. It has been estimated that about 80% of children with CP have some type of movement disorder. In addition to health, social, and psychological problems that the affected children and their families. The condition requires medical, educational, social, and rehabilitative resources throughout the lifespan. 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 (Rosenbaum et al., 2007).

In the United States estimated a prevalence of 3.6 cases per 1000 children at eight years of age (Yeargin-Allsopp et al., 2008). In Canada, the prevalence of Cerebral palsy was 2.11 per 1000 live births. There has been arise interest in the quality of life of children with Cerebral palsy in recent years (Oskoui et al., 2013). In Ireland the prevalence was 1.88 for neonatal survivors (Mongan et al.,2006). The prevalence of Cerebral palsy was 2.4 per 1,000 live birth children from 4–11 years of age born in Sweden and 2.7 per 1,000 live infants (Westbom et al., 2007).

The motor disorders of cerebral palsy are often accompanied by muscle stiffness (spasticity), poor muscle tone, uncontrolled movements, and problems with posture, balance, coordination, walking, speech, swallowing, and many other functions.

It may often involve sensation, cognition, communication, perception and behavior, by epilepsy and by musculoskeletal problems. It may also considered to be a non- life-threatening condition when the children born with the exception in severe case. 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 (Kuijper et al., 2010).

Most of the children with cerebral palsy are expected to live well. 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. (MacLennan et al., 2015).

Causes of Cerebral palsy may be various, a variety of antenatal and perinatal reasons had identified for Cerebral palsy, in many individual cases the exact etiology may be difficult but not impossible to establish. However, the post-neonatal cases of Cerebral palsy 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. Here are some common etiologies manifesting as Cerebral palsy. Brain damage leading to Cerebral palsy may develop either in prenatal, natal or postnatal period:

Prenatal: Hereditary-Genetically transmitted and may involve racial or familial predilections and often sex-linked. Examples: Hereditary athetosis, familial tremor, familial spastic paraplegia. Acquired in utero Prenatal infection (toxoplasmosis) rubella, or other maternal infection, maternal anemia, hypotension, e.g., following spinal anesthesia, placental infarcts, prenatal cerebral hemorrhage, direct trauma, Rh factor, diabetes, maternal malnutrition.

Natal: Narcotism (due to drugs), maternal hypotension, breech deliveries with delay of the after-coming head, bleeding in the first trimester.

Postnatal: Trauma-Subdural hematoma, skull fractures, wounds and contusions of the brain(accidental), infections-(more common in children than adults) meningitis, encephalitis, brain abscess, toxic causes-lead, arsenic etc., vascular accidents (more common in adults than children) congenital aneurysms, circle of Willis, hypertensive encephalopathy, emboli due to bacterial endocarditis or fat embolism, cerebrovascular thrombosis, in debilitated infants, sudden pressure changes, Anoxia-Carbon monoxide poisoning, strangulation, high altitudes, and deep pressure anoxia, hypoglycemia, neoplastic, or late development defects- Brain tumors, brain cysts, hydrocephalus(Akhter et al., 2017).

Risk factors for cerebral palsy do not necessarily lead to the condition but may contribute to its formation. They can be present before and during pregnancy, during labor and birth, or after birth. It is known to all that prematurity and low birth weight belong to the most important risk factors. Also multiple pregnancies (associated with prematurity and low birth weight), birth defects and complications during birth are seen as risk factors. Study stated that both urinary tract infection and periodontal disease during pregnancy are associated with an increased risk of preeclampsia. There is some evidence suggested that treating urinary tract infections during pregnancy reduces the incidence of preeclampsia. A recent study shows that risk factors could be associated with the maternal age (Reddihough & Collins, 2003).

Maternal age less than 18 years was associated with increased risk of cerebral palsy. Anaemia is very common feature during pregnancy but mild anaemia is normal during pregnancy due to an increase in blood volume. But more severe anemia may be complicated for the mother and causes a higher risk for anemia later in infancy. Pre-eclampsia is very common during pregnancy and this occur due to urinary tract infection in pregnancy and this is associated with an increased risk of cerebral palsy in term infants. During the intrapartam and antenatal period there is a chance to mothers preeclampsia and it leads to cerebral palsy though the child is in term baby (Hsiao et al., 2012).

Sometimes women who have not previously had diabetes develop a form of diabetes during pregnancy which is called gestational diabetes and this condition or other metabolic condition poses a risk for both the mother and also childs abnormality. Maternal metabolic disorders are strongly and widely associated with some neurodevelopmental disorder like autism, developmental delay, cerebral palsy among children. Gestational diabetes may causes the fetus at greater risk of cerebral palsy. Adolescent pregnancy is known a risk factor for pregnancy complications including prematurity, low birth weight, intrauterine growth retardation, and for infant mortality. For these low birth weight and intrauterine growth retardation causes a wide range of neurologic and developmental conditions (Novak et al., 2013).

The most common early sign of cerebral palsy is developmental delay. Delay in reaching key growth milestones such as rolling over, sitting, crawling and walking are cause for concern. Physicians will also look for signs such as abnormal muscle tone, unusual posture, persistent infant reflexes and early development of hand preference. Common signs of severe CP that may be noticed shortly after birth include: problems sucking and swallowing, weak or shrill cry, seizures and unusual positions. Often the body is either very relaxed or floppy or very stiff (Jacobsson et al., 2008).

In some severe cases many signs and symptoms are not readily visible. Area of brain structure damage is irreversible and permanent. The symptoms are various that changed over time. Drooling is common symptom among children with Cerebral palsy. Frequent drooling may cause skin laceration and infection, body fluid loss and recurrent pneumonia. At school and at home, children with drooling may cause damage to books, teaching materials and furniture, and it even interferes the social relationships with cerebral palsy affected children. It is informed that children with Cerebral palsy that drool are often avoided by other children, and familiar and unfamiliar adults. The drooling in children with Cerebral palsy could affect with increase their dependent level of care of daily living. Some studies advise that drooling might be associated with a reduced quality of life among children with CP (Frota et al., 2016).

Children have movement and postural disorder associated with many disabilities such as-including intellectual disability, hearing and visual deficits, nutrition, feeding and swallowing problems, respiratory infections and epilepsy. Cerebral palsy suffers for long term and it affect activities of daily living. Spastic type of cerebral palsy which is the most common type of cerebral palsy causes the muscles to be stiff and permanently contracted. The names of these types combine a Latin prefix describing the number of affected limbs with the term plegia. Plegia means paralyzed or weak: diplegia–either both arms or both leg, hemiplegia–limbs on only one side of the body, quadriplegia–all four limbs, monoplegia–one limb and triplegia–three limbs. Spastic diplegia affects the legs more than the arms (Bell et al., 2010).

Signs can appear during several stages of early life. They include: neonatal – early Infancy (0-3 Months): high pitched cry, poor neck control, excessive lethargy or irritability, weak suck or tongue thrust or tonic bite, oral hypersensitivity, decreased interest in surroundings, stiff or floppy posture, abnormal or prolonged reflexes. Later infancy-inability to perform motor skills control of hand grasp by 3 months, rolling over by 5 months and independent sitting by 7 months. Abnormal developmental patterns: hand preference by 12 months, excessive arching of back, prolonged or abnormal parachute response, leg rolling. Abnormal developmental patterns after 1 year of age: W sitting means both knee flexion, legs extremely rotation, bottom shuffling means scoots along the floor, tiptoe walking or hopping (Fauconnier et al., 2009).

Cerebral palsy is classified into four categories. They are Spastic, Athetoid, Ataxia and Mixed type of CP. Spastic cerebral palsy is the most common type of CP. Usually, muscles have enough tone to maintain posture or movement against the force of gravity while at the same time providing flexibility and speed of movement. But in case of Spastic cerebral palsy increased tone, or tension, in a muscle can occurs (Bialik et al., 2009).

Spasticity is hypertonia in resistance to do passive movement which is increased with increasing velocity of movement. This term spasticity is commonly used to describe several motor symptoms found in children of Cerebral palsy and other neurological disorders, not merely to describe muscle hypertonicity. It is important to identify the various symptoms in order to choose the most effective therapeutic interventions or to design appropriate

studies. The increased muscle tone found in spasticity which is involuntary and often aggravated by external stimuli, emotional stress, and emotions, as well as by unrelated health problems such as infections or constipation (Nieuwenhuijsen et al., 2012).This affects approximately 70 to 80 percent of all individuals with children of cerebral palsy. There are some degree of spasticity which can vary from mild muscle stiffness to severe, painful, and uncontrollable muscle spasms. It occurs due to damage of motor cortex of the brain. In this type of CP muscle become stiff and the child face difficulty to move parts of the body. Spasticity is often a component of upper motor neuron syndrome which is related with hyperreflexia, clonus, reflex overflow, positive Babinski sign and caused by a hyperactive stretch reflex mechanism.

Varying degrees of spasticity works on cerebral palsy children. Some patients have mild causes that affect vary few movement and some have moderate movement due to spasticity. Other with more severe causes can have their entire bodies affected. Spastic cerebral palsy also limits stretching of muscle in daily activities. Spasticity adversely affects muscles and joints of the extremities. Children born with spastic cerebral palsy do not have any deformity of the extremity but develop them over time due to joint contracture. It is especially harmful in growing children. The adverse effects of spasticity in the body include, inhibition of movement, longitudinal muscle growth, protein synthesis in muscle cell, limited stretching of muscles in daily activities, development of muscle and joint deformities (Amin et al., 2015).

However, there are some common patterns which are seen in cerebral palsy. Effect on the upper limbs: flexion at the elbow, wrist and fingers. Effect on the lower limbs: flexion at the hip, abduction, flexion at the knees, hyperextension of the big toe. It can also be present in smaller muscles such as tongue and facial muscles. In case of spastic cerebral palsy changes in soft tissue occurs such as muscles, tendons and ligaments which are leading to muscle stiffness, atrophy and fibrosis. Muscles that are affected by spastic cerebral palsy have difficulty to stretching and this prevents a joint to achieving its normal full range of movement. For this a contracture may develop. Contracted and shortened muscles can pull on the bony structures of the body and leading to bone deformities. Over-activity by spastic

muscles can cause pain in the muscle. Pain can also occur due to changes in the joint position and deformities (Rosenbaum et al, 2008).

A multidisciplinary team approach is effective for the treatment of CP. The multidisciplinary team includes health care professionals such as pediatricians, rehabilitation specialists, neurologists and physiotherapists, occupational therapists and speech therapists. The multidisciplinary team develops an individualized treatment plan depending on the severity of cerebral palsy.

Children with spastic cerebral palsy may arise different level of gross motor function problem. Gross motor functions are those which require whole body movement and which involve the large muscles of the body to perform everyday functions, such as standing, walking, running, and sitting upright. Gross motor abilities also have an influence on other everyday functions. In case of spastic cerebral palsy children may face difficulty of Gross motor functions which are very important to perform every day functions, such as walking, running, skipping, as well as playground skills like climbing and sporting skills like catching, throwing and hitting a ball with a bat. Children at home, in school and in the community can be best described with the system of classification of the extended and revised gross motor function. GMFCS covers an ample range from the level I, at which the individual functions at an advanced level being capable or having potential to walk without limitations up to level V for individuals with own very restricted mobility which required a high level of assistance (Bjornson et al., 2003).

When a child has Cerebral Palsy (CP) it becomes difficult to perform all activities. And pattern of performing activities may change. Most of the time they are not independent in performing their own activities. Task may be completed with adaptive devices. They performed partially. Some children with severe impairment needed a long time dependency on the carer in case of performing activities of daily living (Damiano, 2006).

Functional limitations refer to difficulties in the activities of daily living and participation restrictions to limitations in life situations. In this study, we are investigating the relationship between impairments (neurological and orthopaedic), activity limitations (in

functional abilities) and participation restrictions (affecting education, social life and recreation among other things) in children and young people with severe CP.

The Gross Motor Function Measure (GMFM) and WeeFIM are representative instruments that are often used in clinical settings for measuring baseline functional limitation in children with CP (Kerr et al. 2011). The International Classification of Functioning, Disability and more important, and the effort to reflect the views of the ICF led to the development of functional classification systems. The functional classification systems for children with CP at these levels are valuable for measuring and determining the impact of health care needs on the society. Until now, studies investigating the relationship between functional classification systems and clinical measurements are being performed.

The relationships of these classification systems with other clinical measurements, including the Gross Motor Function Measure and WeeFIM (Arnaud et al. 2008). Most people with CP have limitations in walking and other physical activities. The general opinion is that experiencing such restrictions cause a reduction in Quality of Life. Children with CP are dependent on others, due to motor limitations in terms of mobility and self-care, and these limitations impact on their daily activity participation and quality of life. The WHO defines quality of life as individual's perception of their position in life, in the context of the cultural and value systems in which they live, and in relation to their goals, expectations, standards, and concerns. A multidimensional construct and an overall assessment of health in all areas depend on the limitation of function which are related to personal well-being of a child. Although most of definitions equate functional limitation and gross motor function, there are different views between theory and practice, and this equivalence to motor functioning needs to be measured (James et al., 2015).

CHAPTER –III METHODOLOGY

3.1. Study Design

Cross sectional design research was selected because it was helped the researcher to measure the objectives of the study. This study was used a snapshot about the gross motor function and limitation of activities of the children with spastic cerebral palsy for a specific time period to investigate the association between the gross motor function and functional limitation of the children with spastic cerebral palsy. So cross sectional design was chosen.

3.2. Study Site

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

3.3. Study area

The study area was selected at the pediatric Unit of Centre for the Rehabilitation of the Paralysed (CRP), Savar, Dhaka for data collection

3.4. Sample size

Sampling procedure for cross sectional study was done by following equation-

$$n=\frac{z^2pq}{d^2}$$

Here,

z = 1.96

P= 0.274

q= 1-p

d= 0.05

So, the aim is to focus the study by 305 samples following the calculation above initially. But as the study is going on as a part of fourth professional academic research project and there may be some limitations, so for the time limitation 70 participants was taken as sample.

3.5. Sampling procedure

Purposive sampling technique was used for sample selection. A sample is a subset of the population that has been selected to participate in the project. The sample was selected to include people of interest and exclude those who do not suit the purpose. Children with spastic cerebral palsy in Bangladesh those who received treatment at CRP considered as the study population. Usually, the population is too large for the attempt to survey all of its members. A small, but carefully chosen sample may be used. Sample should reflect the population as closely as possible.

3.6. Inclusion criteria

- Children's were selected for these studies that are properly diagnosed with spastic cerebral palsy (Soleimani et al., 2011).
- Patient with spastic cerebral palsy who attended for treatment in CRP.
- The complete and well fill out assessment for the necessary information (Soleimani et al., 2011).
- Both male and female was selected (Salavati, 2016).
- Mother who has children with spastic Cerebral Palsy age among 2-10 years (Salavati, 2016).
- Interview was also taken from the mother who were showed willingness to participate in the study (Salavati, 2016).

3.7. Exclusion criteria

- Children with other type of disability except spastic cerebral palsy and diagnosis was not confirmed (Amin et al., 2016).
- Incomplete document due to lack of information (Santos et al., 2011).
- Children whose ages are out of the age range 2-10 years (Amin et al., 2016).
- Mothers who have spastic Cerebral Palsy children age more than 10 years (Amin et al., 2016).
- Mothers who has mentally ill.
- Mothers who were showed unwillingness to participate in this study (Santos et al., 2011).
- Children with severe complication.

3.8. Data collection method and tools

Data was analyzed by Microsoft office Excel 2007 using a SPSS 20 version software program. Three structured standardized questionnaire was used for collecting data. We were used Gross Motor Function Classification System (GMFCS) questionnaire for gross motor function measurement and WeeFIM scale for level of functional limitation measurement. Other tools that were needed for the study are- Consent paper, paper, pen, file, calculator, computer, and printer. Following that the investigator went to participants to take permission if they are interested in this study or not. Firstly, the investigator was introduced her and the research project as well its purpose. For data collection, the investigator was used written questionnaire but easiest wording.

3.9. Data Analysis

In order to ensure that the research have some values, the meaning of collected data was presented in ways that other research workers can understand. In other words the researcher have to make sense of the results. Used descriptive data such as sociodemographic information, delivery place, duration of labor, child birth time, birth asphyxia, limb involvement and inferential data such as delivery type, GMFCS, BMI, WeeFIM by SPSS software version 20. SPSS is a comprehensive and flexible statistical analysis and data management solution. SPSS can take data from almost any type of file and use them to generate tabulated reports, charts, and plots of distributions and trends, descriptive statistics, and conduct complex statistical analyses.

3.10. Ethical Considerations

Beginning the data collection, permission must be obtained from the concerned authorities ensuring the safety of the participants. The research proposal was submitted to the Institutional Review Board (IRB) of Bangladesh Health Professions Institute (BHPI) and permission was obtained from the Board. Before starting the interview, interested participants should be given the consent form and the purpose of the research and this consent form was explained to them verbally in both Bengali and English. It was noted that the participation is fully voluntary and they have right to withdraw from the research at any time. They were told that confidentiality would be maintained strictly. It is expected that a research proposal may be submitted to the physiotherapy department of BHPI for approval and the proposal may be approved by the faculty member. After that data collection was started and completed within the allocate time frame. All information was kept in secure. Bangladesh Medical and Research Council (BMRC) and World Health Organization (WHO) research guideline also were followed.

3.11. Informed Consent

The careers of the participant was informed verbally about the title, aims and purpose of the research project. They were received a clear description of the study and aware the research is the part of the study process; they may take part as volunteer.

Before participating in the study the researcher was provided them a written consent form to sign, responsible physiotherapist sign as a witness. The researcher was also signed in the consent form. The careers of the participant should be informed clearly that their information might be there might be some changes in service delivery system of physiotherapy which might be helpful for their children future. The careers of the participants was informed that they have the right to withdraw consent and discontinue participation at any time without any prejudice.

CHAPTER –IV RESULTS

4.1. Socio-demographic

4.1.1. Age range of participants:

Among 70 participants, about 41% (n=29) were present in age range of 2-4, around 17% (n=12) were present in age range of 4-6 and around 41% (n=29) were present in age range of 6-12. Number of participants with age range are given below.

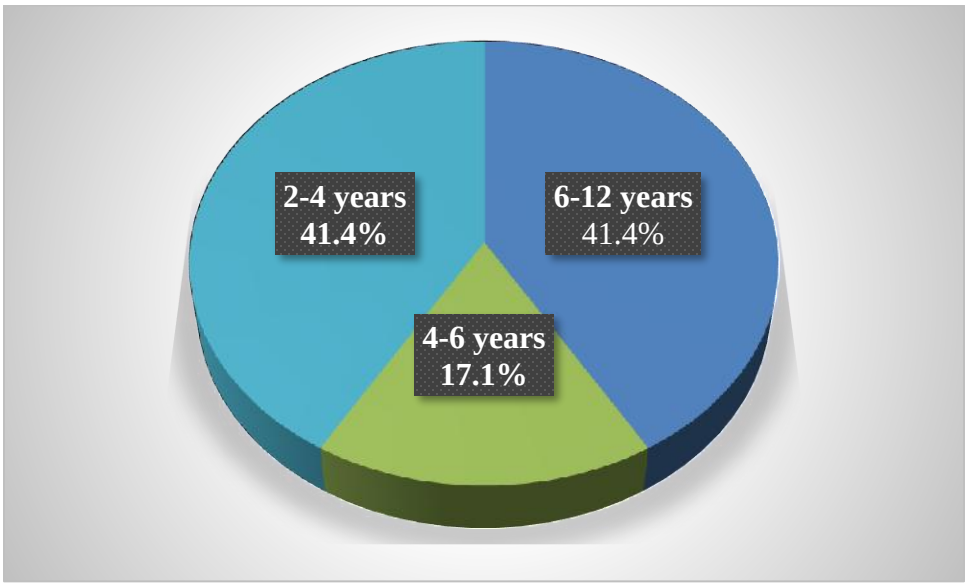


Figure -1: Age range of participants

4.1.2. Gender distribution: The study was conducted on 70 children with spastic cerebral palsy and among them about 67% (n=47) were boy and girl were around 33% (n=23).

Number of participants with gender are given below:

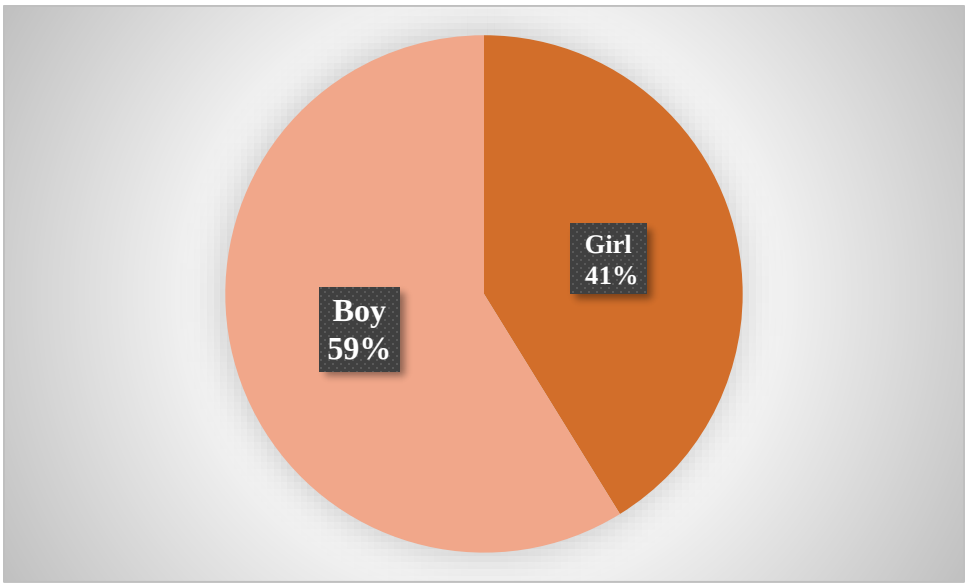


Figure-2: Gender distribution

4.1.3. Education status of mother:

Among 70 children mother's education level, about 4% (n=3) were illiterate, around 1% (n=1) was literate, around 27% (n=19) were primary level, around 39% (n=27) completed S.S.C, around 14% (n=10) completed H.S.C, 10% (n=7) completed Bachelor and around 4% (n=3) completed Masters or above.

Number of participants with mother's education status are given below:

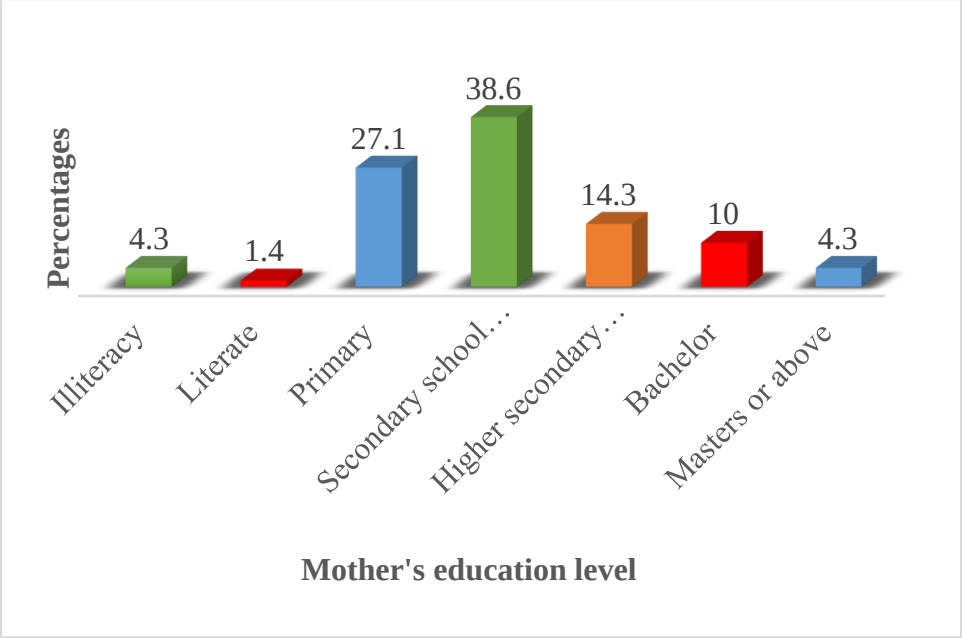


Figure-3: Education status of mother

4.1.4. Education status of Father:

Among 70 children father's education level, about 9% (n=6) were illiterate, about 3% (n=2) were literate, around 19% (n=13) were primary level, around 14% (n=10) completed S.S.C level, around 19% (n=13) completed H.S.C level, around 27% (n=19) completed Bachelor and 10% (n=7) completed Masters or above.

Number of participants with father's education status are given below:

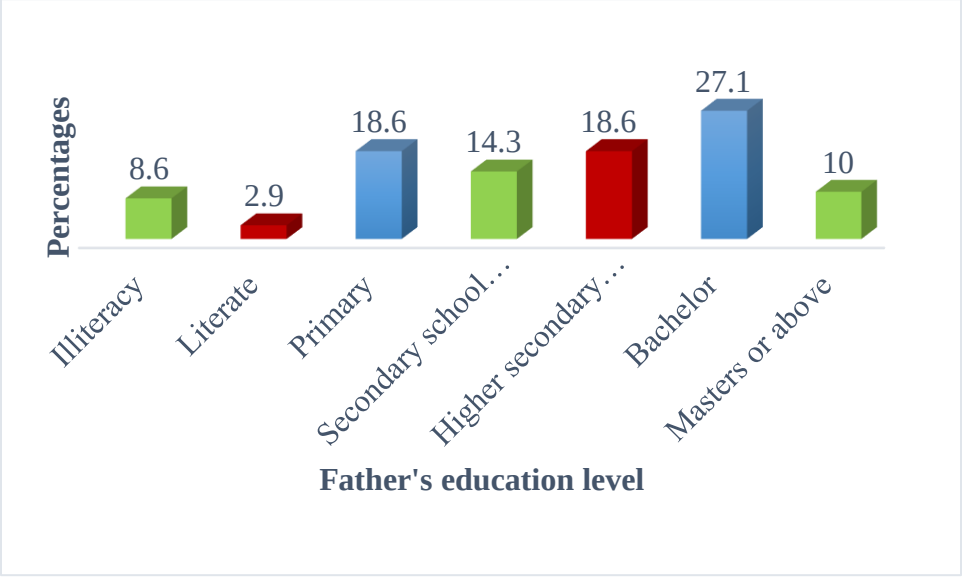


Figure-4: Education status of father

4.1.5. Occupational status of mother:

Among 70 children mother's, 99% (n=69) were housewife and 1% (n=1) were daily labor.

Number of participants with mother's occupation status are given below:

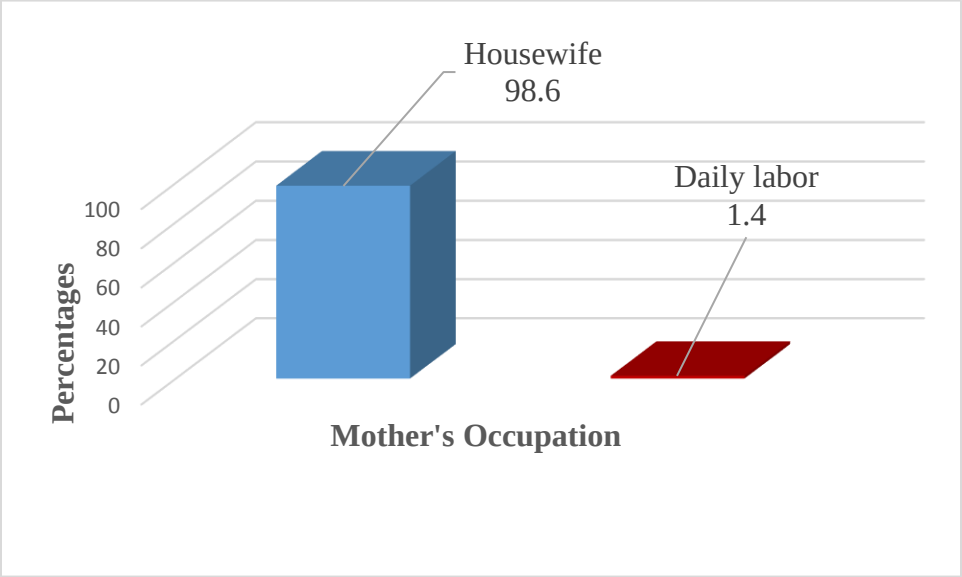


Figure-5: Occupation of mother

4.1.6. Occupational status of father:

Among 70 participants children father's, about 31% (n=22) were businessman, 30% (n=21) were farmer, around 6% (n=4) were service holder, around 3% (n=2) were daily labor and 30% (n=21) were others.

Number of participants with father's occupation are given below:

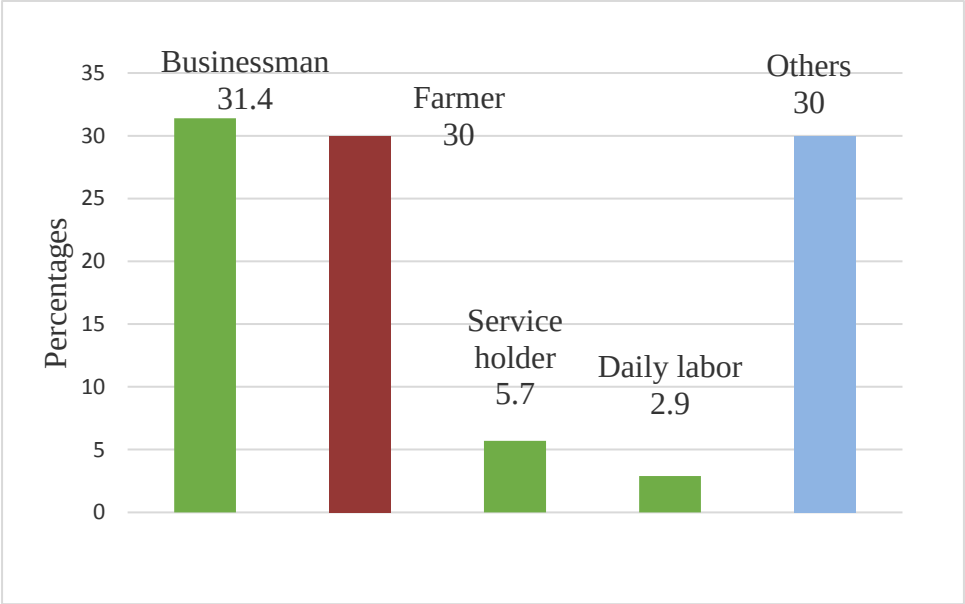


Figure-6: Occupation of father

4.2. Medical:

4.2.1. GMFCS level of participants:

In this study results, it was found that about 41% (n=29) participants were in 2-4 years, around 18% (n=12) were in 4-6 years and around 41% (n=29) were in 6-12years.

Among 29 participants, 3 were in level 1, 6 in level 2, 2 in level 3, 12 in level 4 and majority of them 6 children are in level 5 in the age range 2-4 years. Among 12 participants 2 were in level 1, 3 were in level 2, 1 were in level 3, 4 in level 4 and 2 children were in level 5 in the age range 4-6 years. Among 29 participants 2 children were in level 1, 2 in level 2, 10 in level 3, 5 in level 4 and 10 in level 5 in the age range 6-12 years.

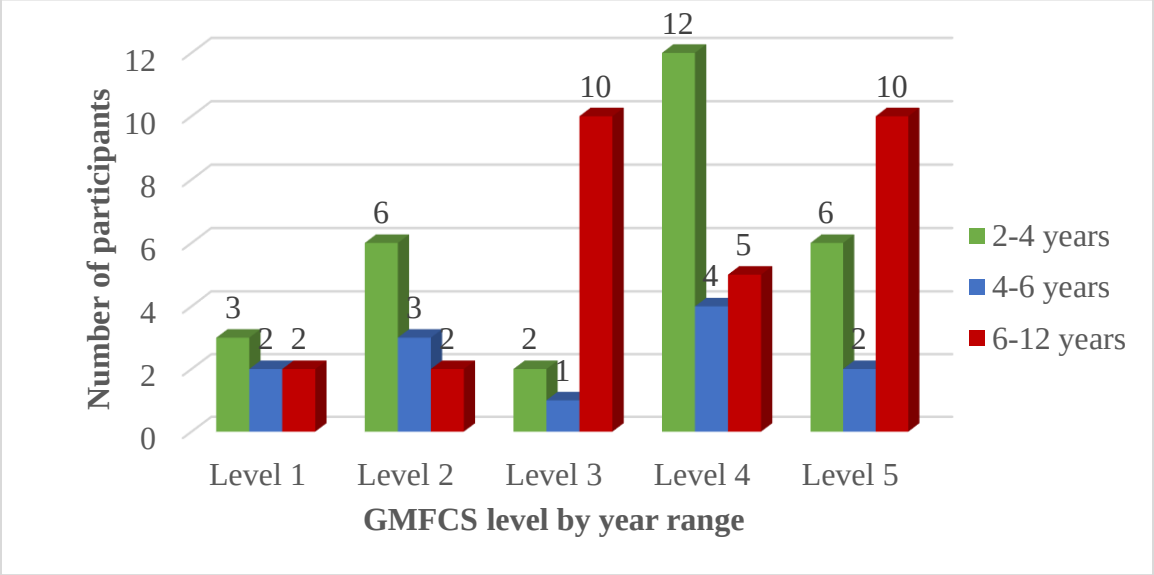


Figure-7: GMFCS Level of Participants

4.2.2. Child birth time:

Among 70 children, about 57% (n=4) were born before 38 weeks, around 41% (n=29) were born after 38 weeks and around 1% (n=1) was born after 42 weeks.

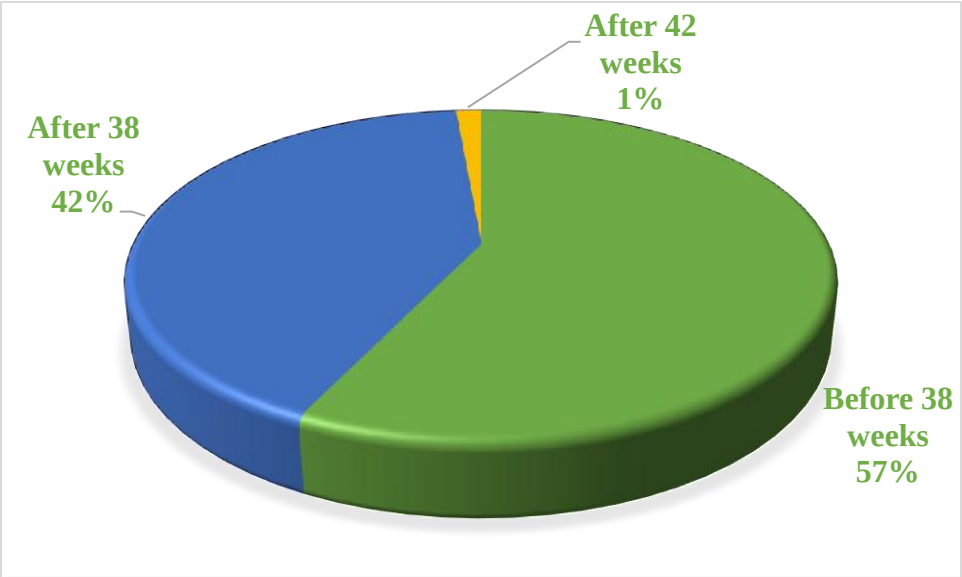


Figure-8: Child birth time

4.2.3. Place of delivery:

Among 70 participants about 24% (n=17) children were born at home and around 75% (n=53) children were born at hospital.

Number of participants with their mother's delivery place are given below:

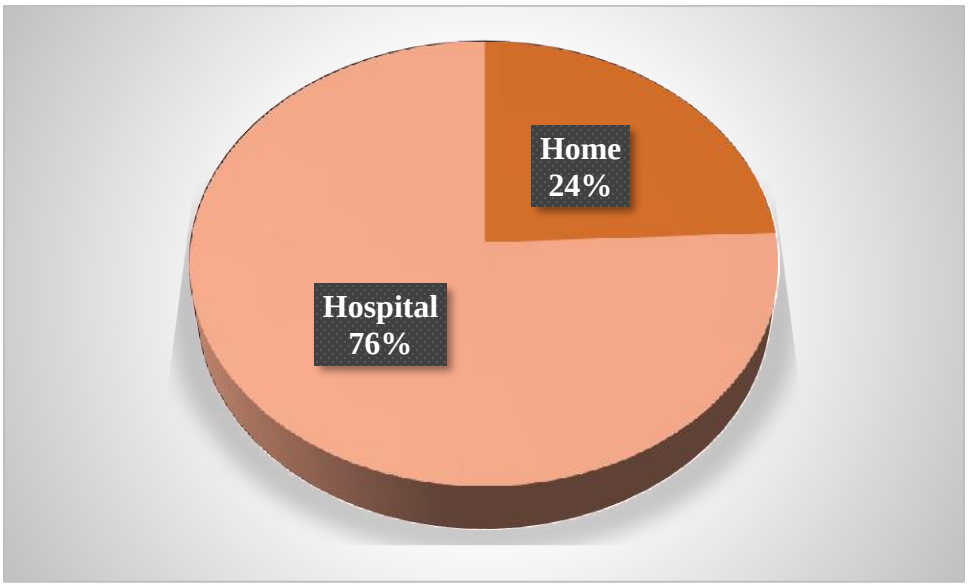


Figure-9: Place of delivery

4.2.4. Delivery type:

Among 70 participants about 46% (n=32) children were born through normal vaginal delivery (NVD) and around 54% (n=38) children were born through caesarian section.

Number of participants with their mother's delivery type are given below:

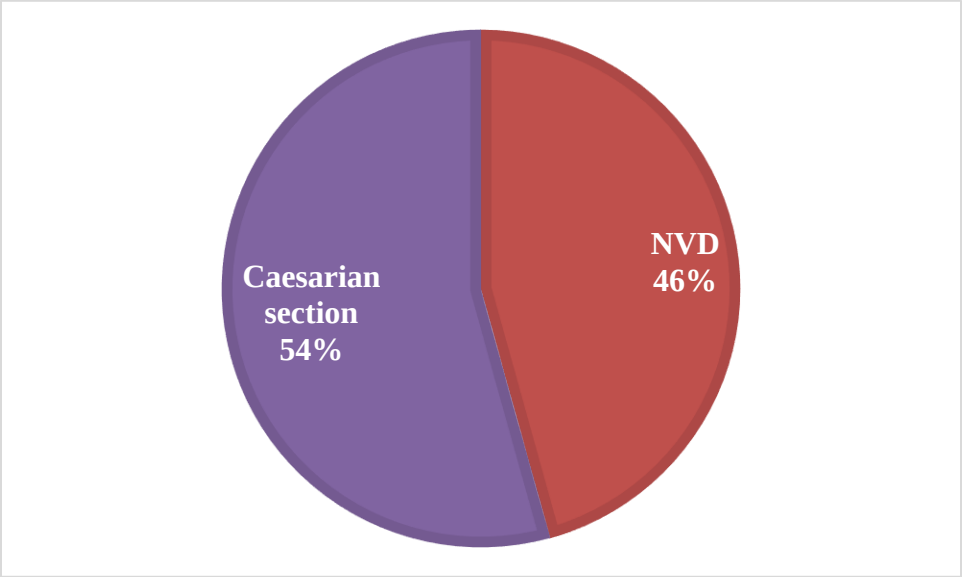


Figure-10: Type of delivery

Association between type of delivery with GMFCS:

Table 1(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
NVD	1	0	2	5	0	2	1	0	5	2	3	4	1	2	4
Caesarian Section	2	2	0	1	3	0	1	1	5	10	1	1	5	0	6

Table 1(b):

Age range	Chi square	P value
2-4 years	9.08	0.059
4-6 years	8.91	0.063
6-12 years	5.50	0.240

Table 1(b) showed chi square test for delivery type with GMFCS levels. In level 4, total participants was 21 where most of them about 57% (n=12) had caesarian section. The results revealed that gross motor function was insignificant (P>0.05) at age 4-6 years and 6-12 years with delivery type which indicates simultaneous gross motor function delay. The result also revealed that there was statistically significant association (<0.05) between type of delivery and gross motor function in 2-4 years age range. This means type of delivery delay vary the gross motor function level delay among children with spastic cerebral palsy.

4.2.5. Duration of labor pain:

Among 70 participants 27% (n=19) children mother's duration of labor pain were more than 12 hours and 73% (n=51) children mother's duration of labor pain were less than 12 hours.

Number of participants with their mother's duration of labor pain are given below:

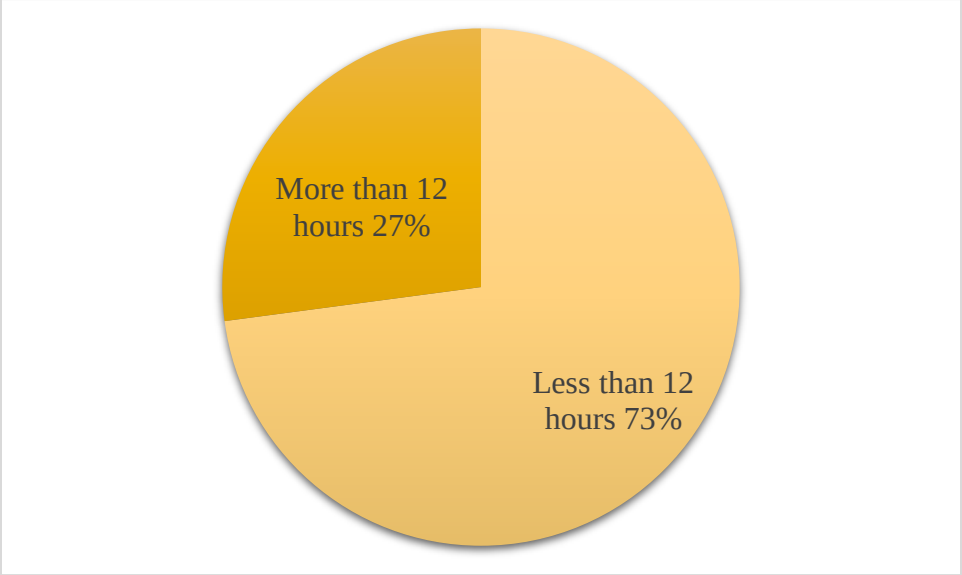


Figure-11: Duration of labor pain

4.2.6. Birth asphyxia:

Among 70 participants 53% (n=37) children were present birth asphyxia and 47% (n=33) were not present birth asphyxia.

Number of participants with their birth asphyxia are given below:

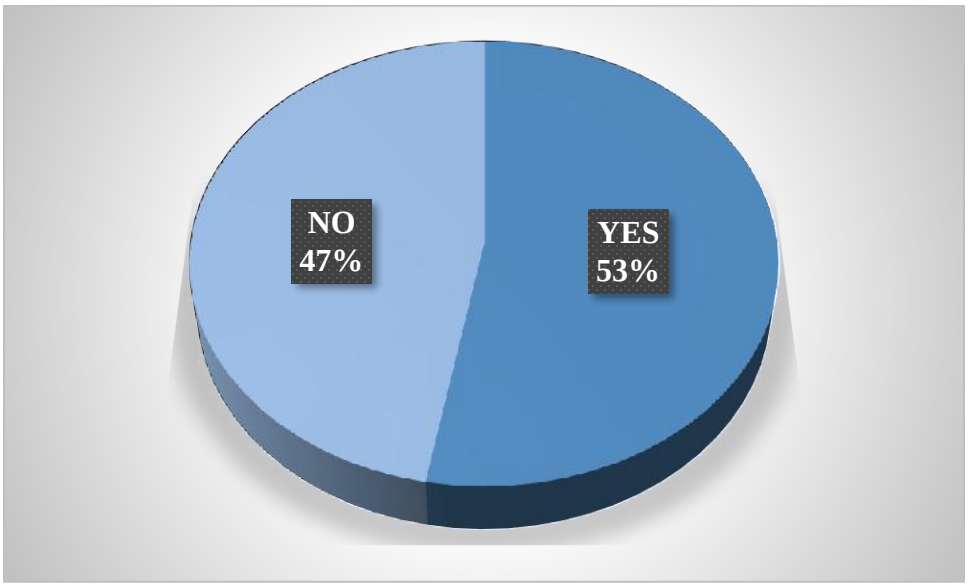


Figure-12: birth asphyxia of children

4.2.7. Limb involvement:

Among 70 participants, about 6% (n=4) children were monoplegic, around 37% (n=26) children were diplegic, around 31% (n=22) children were quadriplegic, around 13% (n=9) children were triplegic and around 13% (n=9) children were hemiplegic.

Number of participants with their involvement of limb are given below:

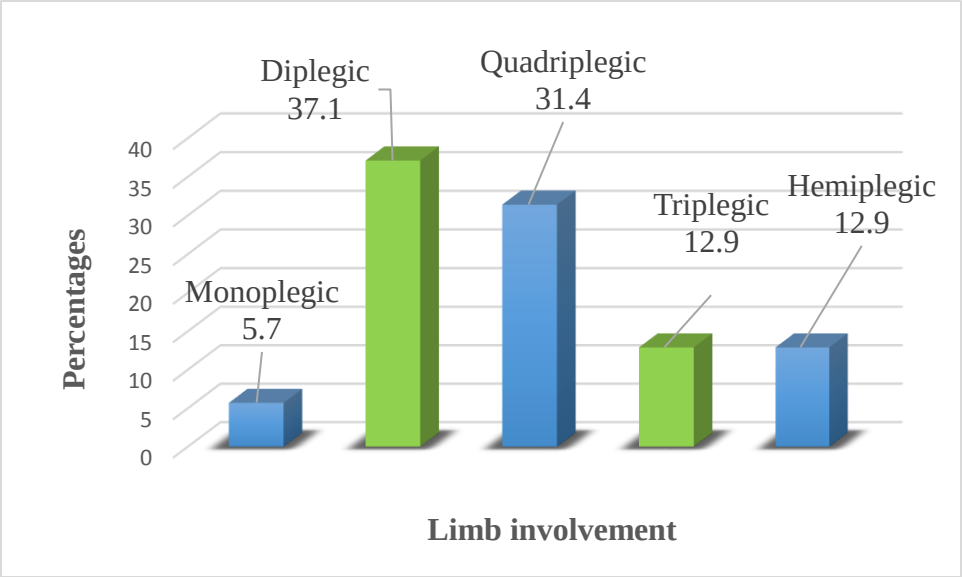


Figure-13: Involvement of limb

4.2.8. BMI:

Among 70 participants about 44% (n=31) children were underweight, 30% (n=21) were normal weight, around 6% (n=4) were overweight and 20% (n=14) were obese.

Number of participants with their BMI are given below:

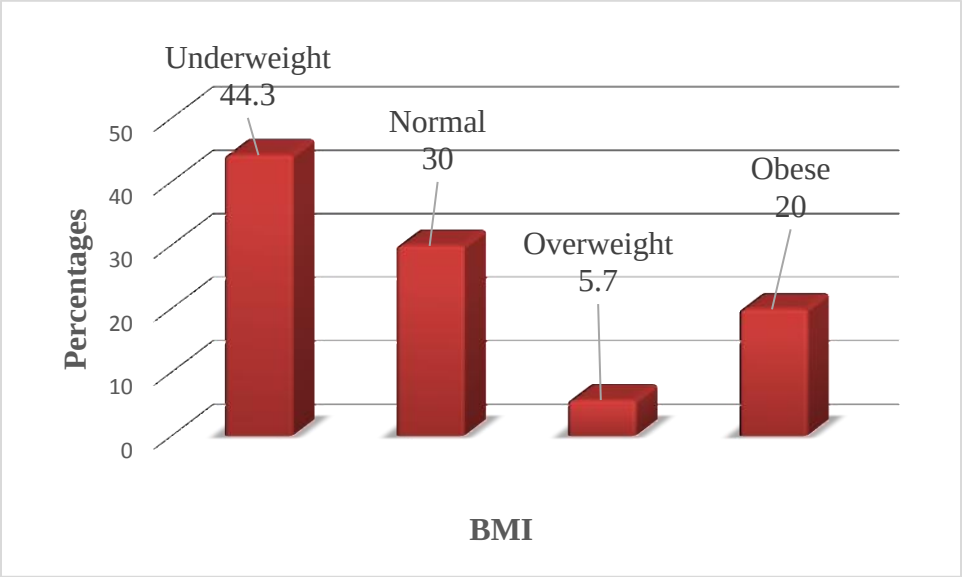


Figure-14: Child BMI

Association between child BMI with GMFCS:

Table 2(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Underweight	1	0	2	3	1	1	1	0	4	5	2	3	3	0	5
Normal	1	1	0	1	1	1	1	1	5	2	0	1	2	1	3
Overweight	0	0	0	0	0	0	0	0	0	2	0	1	0	0	1
Obese	1	1	0	2	1	0	0	0	1	3	2	0	1	1	1

Table 2(b):

Age range	Chi square	P value
2-4 years	5.258	0.949
4-6 years	5.933	0.655
6-12 years	6.380	0.896

Table 2(b) showed chi square test for BMI and GMFCS. In level 4, total participants was 21 where most of them about 24% (n=5) were underweight and in level 5, total participants was 18 where most of them about 28% (n=5) were underweight. The results also revealed that BMI was not significantly associated with child gross motor function ($p>0.05$) in age range 2-4 years, 4-6 years and 6-12 years. This means underweight, normal weight, overweight and obese of BMI showed simultaneous motor function delay among children with CP.

4.3. WeeFIM:

Frequency and percentages of self-eating, self-grooming, self-bathing, upper limb dressing and lower limb dressing:

Table-3(a):

	Self Eating	Self Grooming	Self Bathing	Upper limb dressing	Lower limb dressing
1= Total assistance	51.4% (n=36)	60.0% (n=42)	65.7% (n=46)	70.0% (n=49)	70.0% (n=49)
2= Maximal assistance	17.1% (n=12)	18.6% (n=13)	17.1% (n=12)	17.1% (n=12)	17.1% (n=12)
3= Moderate assistance	11.4% (n=8)	11.4% (n=8)	5.7% (n=4)	2.9% (n=2)	2.9% (n=2)
4= Minimal assistance	4.3% (n=3)	1.4% (n=1)	2.9% (n=2)	1.4% (n=1)	1.4% (n=1)
5= Supervision	8.6% (n=6)	7.1%% (n=5)	7.1% (n=5)	5.7% (n=4)	4.3% (n=3)
6= Modified independence	2.9% (n=2)	1.4% (n=1)	1.4% (n=1)	1.4% (n=1)	2.9% (n=2)
7= Complete independence	4.3% (n=3)	0% (n=0)	0% (n=0)	1.4% (n=1)	1.4% (n=1)

Frequency and percentages of toileting, bladder management and bowel management:

Table-3(b):

	Toileting	Bladder management	Bowel management
1= Total assistance	55.7% (n=49)	58.6% (n=41)	61.4% (n=43)
2= Maximal assistance	27.1% (n=19)	24.3% (n=17)	22.9% (n=16)
3= Moderate assistance	5.7% (n=4)	8.6% (n=6)	7.1% (n=5)
4= Minimal assistance	2.9% (n=2)	0%	1.4% (n=1)
5= Supervision	5.7% (n=4)	5.7%% (n=4)	4.3% (n=3)
6= Modified independence	1.4% (n=1)	1.4% (n=1)	1.4% (n=1)
7= Complete independence	1.4% (n=1)	1.4% (n=1)	1.4% (n=1)

Frequency and percentages of transfer through chair / wheelchair, toilet and tub / shower and locomotion through walk / wheelchair / crawl and stairs:

Table-3(c):

	Transfers: Chair/ Wheelchair	Transfers: Toilet	Transfers: Tub/Shower	Locomotion: Walk/Wheelchair/ Crawl	Locomotion: Stairs
1= Total assistance	58.6% (n=41)	60.0% (n=42)	61.4% (n=43)	52.9% (n=37)	55.7% (n=39)
2= Maximal assistance	22.9% (n=16)	22.9% (n=16)	22.9% (n=16)	30.0% (n=21)	30.0% (n=21)
3= Moderate assistance	4.3% (n=3)	4.3% (n=3)	4.3% (n=3)	1.4% (n=1)	2.9% (n=2)
4= Minimal assistance	7.1% (n=5)	7.1% (n=5)	4.3% (n=3)	5.7% (n=4)	2.9% (n=2)
5= Supervision	4.3% (n=3)	4.3%% (n=3)	5.7% (n=4)	7.1% (n=5)	7.1% (n=5)
6= Modified independence	1.4% (n=1)	0% (n=0)	0% (n=0)	2.9% (n=2)	1.4% (n=1)
7= Complete independence	1.4% (n=1)	1.4% (n=1)	1.4% (n=1)	0% (n=0)	0% (n=0)

Frequency and percentages of compression, expression, social cognition, problem solving and memory:

Table-3(d):

	Comprehension	Expression	Social interaction	Problem solving	Memory
1= Total assistance	10.0% (n=7)	24.3% (n=17)	40.0% (n=28)	45.7% (n=32)	7.1% (n=5)
2= Maximal assistance	18.6% (n=13)	32.9% (n=23)	22.9% (n=16)	24.3% (n=17)	24.3% (n=17)
3= Moderate assistance	20.0% (n=14)	10.0% (n=7)	11.4% (n=8)	10.0% (n=7)	15.7% (n=11)
4= Minimal assistance	20.0% (n=14)	11.4% (n=8)	12.9% (n=9)	7.1% (n=5)	15.7% (n=11)
5= Supervision	15.7% (n=11)	14.3%% (n=10)	10% (n=7)	10.0% (n=7)	24.3% (n=17)
6= Modified independence	1.4% (n=1)	0% (n=0)	1.4% (n=1)	1.4% (n=1)	2.9% (n=2)
7= Complete independence	14.3% (n=10)	7.1% (n=5)	1.4% (n=1)	1.4% (n=1)	10.0% (n=7)

Association between self-eating of WeeFIM with GMFCS:

Table 4(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance	1			5		1		1	3	8	2	1	4	2	8
Maximal assistance		1	1						1	4	2	1	2		
Moderate assistance	1			1	1		2		2			1			
Minimal assistance									2			1			
Supervision	1				1	1			2						1
Moderate independence					1										1
Complete independence		1	1									1			

Table 4(b):

Age range	Chi square	P value
2-4 years	28.597	0.005
4-6 years	21.600	0.363
6-12 years	28.479	0.240

Table 4(b) showed chi square test for self-eating of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 38% (n=8) and in level 5, total participants was 18 where most of them about 44% (n=8) were needed total assistance. The results revealed that gross motor function was insignificant (P>0.05) at age 4-6 years and 6-12 years with self-eating of WeeFIM. This means gross motor function delay showed simultaneous WeeFIM level delay. The result also revealed that there was statistically significant association (<0.05) between gross motor function and self-eating of WeeFIM in 2-4 years age range. This means gross motor function delay vary the WeeFIM level delay among children with spastic cerebral palsy.

Association between Grooming of WeeFIM with GMFCS:

Table 5(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance	1	1		5	1	1		1	4	9	3	1	5	2	8
Maximal assistance	1		1				2		1	3	1	2	1		1
Moderate assistance	1			1	1				4			1			
Minimal assistance					1										
Supervision			1			1			1			1			1
Moderate independence		1													
Complete independence															

Table 5(b):

Age range	Chi square	P value
2-4 years	14.068	0.080
4-6 years	14.125	0.589
6-12 years	16.281	0.179

Table 5(b) showed chi square test for self-grooming of WeeFIM with GMFCS. In level 5, total participants was 18 where most of them about 44% (n=8) were needed total assistance. The results revealed that gross motor function was insignificant (P>0.05) in age range 2-4years, 4-6 years and 6-12 years with self-eating of WeeFIM. This means gross motor function delay showed simultaneous WeeFIM level delay among children with spastic cerebral palsy.

Association between Bathing of WeeFIM with GMFCS:

Table 6(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance	1	1		5	1	1	1	1	4	9	4	2	6	2	8
Maximal assistance	2		1				1		3	3		1			1
Moderate assistance				1	1				1			1			
Minimal assistance					1				1						
Supervision		1				1			1			1			1
Moderate independence			1												
Complete independence															

Table 6(b):

Age range	Chi square	P value
2-4 years	11.717	0.164
4-6 years	12.444	0.411
6-12 years	25.472	0.184

Table 6(b) showed chi square test for self-bathing of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 43% (n=9) were needed total assistance. The results revealed that gross motor function was insignificant (P>0.05) with self-bathing of WeeFIM (P>0.05) in age range 2-4 years, 4-6 years and 6-12 years which means gross motor function delay showed simultaneous WeeFIM level delay among children with spastic cerebral palsy.

Association between Dressing-Upper Body of WeeFIM with GMFCS:

Table 7(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance	1	1		4	2	1	1	1	6	11	4	2	6	2	7
Maximal assistance	2		1	1			1		2	1		2	1		2
Moderate assistance				1					1						
Minimal assistance						1									
Supervision			1		1				1						1
Moderate independence		1													
Complete independence												1			

Table 7(b):

Age range	Chi square	P value
2-4 years	12.609	0.126
4-6 years	8.600	0.377
6-12 years	27.429	0.124

Table 7(b) showed chi square test for upper body dressing of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 52% (n=11) were needed total assistance. The results revealed that gross motor function was insignificant (P>0.05) with upper body dressing of WeeFIM (P>0.05) in age range 2-4 years, 4-6 years and 6-12 years. This means gross motor function delay showed simultaneous WeeFIM level delay among children with spastic cerebral palsy.

Association between Dressing-Lower Body of WeeFIM with GMFCS:

Table 8(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance	1	1		4	2	1	1	1	6	11	4	2	6	2	7
Maximal assistance	2		1	1			1		2	1		2			2
Moderate assistance				1					1						
Minimal assistance						1									
Supervision					1				1						
Moderate independence		1	1												
Complete independence												1			

Table 8(b):

Age range	Chi square	P value
2-4 years	12.609	0.126
4-6 years	8.600	0.377
6-12 years	27.429	0.124

Table 8(b) showed chi square test for lower body dressing of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 52% (n=11) were needed total assistance. The results revealed that gross motor function was insignificant ($P>0.05$) with lower body dressing of WeeFIM ($P>0.05$) in age range 2-4 years, 4-6 years and 6-12 years. This means gross motor function delay showed simultaneous WeeFIM level delay among children with spastic cerebral palsy.

Association between Toileting of WeeFIM with GMFCS:

Table 9(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance	1	1	0	4		1	1	1	4	10	3	1	6	2	4
Maximal assistance	2		1	1			1		3	2	1	3			5
Moderate assistance				1	2				1						
Minimal assistance						1			1						
Supervision		1			1				1						1
Moderate independence												1			
Complete independence			1												

Table 9(b):

Age range	Chi square	P value
2-4 years	10.619	0.224
4-6 years	13.857	0.310
6-12 years	30.885	0.157

Table 9(b) showed chi square test for toileting of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 48% (n=10) were needed total assistance. The results revealed that gross motor function was insignificant (P>0.05) with toileting of WeeFIM (P>0.05) in age range 2-4 years, 4-6 years and 6-12 years. This means gross motor function delay showed simultaneous WeeFIM level delay among children with spastic cerebral palsy.

Association between Bladder management of WeeFIM with GMFCS:

Table 10(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance	1	1		4		1	1	1	4	11	4	1	6	2	4
Maximal assistance	2		1	1			1		3	1		3			5
Moderate assistance				1	2	1			2						
Minimal assistance															
Supervision		1			1				1						1
Moderate independence												1			
Complete independence			1												

Table 10(b):

Age range	Chi square	P value
2-4 years	12.609	0.126
4-6 years	12.250	0.140
6-12 years	27.985	0.110

Table 10(b) showed chi square test for bladder management of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 52% (n=11) were needed total assistance. The results revealed that gross motor function was insignificant (P>0.05) with bladder management of WeeFIM (P>0.05) in age range 2-4 years, 4-6 years and 6-12 years. This means gross motor function delay showed simultaneous WeeFIM level delay among children with spastic cerebral palsy.

Association between Bowel management of WeeFIM with GMFCS:

Table 11(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance	1	1		5		1	1	1	4	11	4	2	6	2	4
Maximal assistance	2		1				1		4	1		2			5
Moderate assistance				1	2	1			1						
Minimal assistance					1										
Supervision		1							1						1
Moderate independence												1			
Complete independence			1												

Table 11(b):

Age range	Chi square	P value
2-4 years	15.205	0.065
4-6 years	17.250	0.140
6-12 years	27.814	0.114

Table 11(b) showed chi square test for bowel management of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 52% (n=11) were needed total assistance. The results revealed that gross motor function was insignificant (P>0.05) with bowel management of WeeFIM (P>0.05) in age range 2-4 years, 4-6 years and 6-12 years. This means gross motor function delay showed simultaneous WeeFIM level delay among children with spastic cerebral palsy.

Association between Transferring to Chair/Wheelchair of WeeFIM with GMFCS:

Table 12(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance				5		1			2	11	3	1	6	2	10
Maximal assistance	3				1		2	1	4	1	1	3			
Moderate assistance		1							1			1			
Minimal assistance					2	1			2						
Supervision			1	1					1						
Moderate independence		1													
Complete independence			1												

Table 12(b):

Age range	Chi square	P value
2-4 years	27.096	0.001
4-6 years	24.533	0.078
6-12 years	44.329	0.001

Table 12(b) showed chi square test for transferring to chair/wheelchair of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 52% (n=11) were needed total assistance. The results revealed that gross motor function insignificant with transferring to chair/wheelchair of WeeFIM (P>0.05) in age range 4-6 years. This means gross motor function delay showed simultaneous WeeFIM level delay. The result also revealed that there was statistically significant (<0.05) in 2-4 years and 6-12 years age range. This means gross motor function delay vary the WeeFIM level delay among children with spastic cerebral palsy.

Association between Transferring to Toilet of WeeFIM with GMFCS:

Table 13(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance				5		1		1	3	11	3	1	6	1	10
Maximal assistance	3	1			1		2		3	1	1	3		1	
Moderate assistance					1				1			1			
Minimal assistance				1	1	1			2						
Supervision		1	1						1						
Moderate independence															
Complete independence			1												

Table 13(b):

Age range	Chi square	P value
2-4 years	27.096	0.001
4-6 years	15.750	0.471
6-12 years	42.727	0.002

Table 13(b) showed chi square test for transferring to toilet of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 52% (n=11) were needed total assistance. The results revealed that gross motor function insignificant with transferring to toilet of WeeFIM (P>0.05) in age range 4-6 years. This means gross motor function delay showed simultaneous WeeFIM level delay. The result also revealed that there was statistically significant (<0.05) in 2-4 years and 6-12 years age range. This means gross motor function delay vary the WeeFIM level delay among children with spastic cerebral palsy.

Association between Transferring to Tub/Shower of WeeFIM with GMFCS:

Table 14(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance				5		1			3	11	4	1	6	2	10
Maximal assistance	3	1			1		2	1	3	1		4			
Moderate assistance					1				2						
Minimal assistance					1	1			1						
Supervision		1	1	1					1						
Moderate independence															
Complete independence			1												

Table 14(b):

Age range	Chi square	P value
2-4 years	27.096	0.001
4-6 years	21.333	0.166
6-12 years	48.112	0.000

Table 14(b) showed chi square test for transferring to tub/shower of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 52% (n=11) were needed total assistance. The results revealed that gross motor function insignificant with transferring to tub/shower of WeeFIM ($P>0.05$) in age range 4-6 years. This means gross motor function delay showed simultaneous WeeFIM level delay. The result also revealed that there was statistically significant in 2-4 years and 6-12 years age range. This means gross motor function delay vary the WeeFIM level delay among children with spastic cerebral palsy.

Association between Locomotion through walk/wheelchair/crawl of WeeFIM with GMFCS:

Table 15(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance				5		1		1	2	10	3		6	1	8
Maximal assistance	3	1			1		2		4	1	1	5		1	2
Moderate assistance									1						
Minimal assistance					1	1			1	1					
Supervision			1	1	1				2						
Moderate independence		1	1												
Complete independence															

Table 15(b):

Age range	Chi square	P value
2-4 years	28.367	0.005
4-6 years	15.750	0.471
6-12 years	43.500	0.002

Table 15(b) showed chi square test for locomotion through walk/wheelchair/crawl of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 48% (n=10) were needed total assistance. The results revealed that gross motor function insignificant with locomotion through walk/wheelchair/crawl of WeeFIM ($P>0.05$) in age range 4-6 years. This means gross motor function delay showed simultaneous WeeFIM level delay. The result also revealed that there was statistically significant in 2-4 years and

6-12 years age range. This means gross motor function delay vary the WeeFIM level delay among children with spastic cerebral palsy.

Association between Locomotion through stairing of WeeFIM with GMFCS:

Table 16(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance				3		1		1	4	11	3		6	2	8
Maximal assistance	2	1		2	1		2		4	1	1	5			2
Moderate assistance	1				1										
Minimal assistance				1		1									
Supervision		1	1		1				2						
Moderate independence			1												
Complete independence															

Table 16(b):

Age range	Chi square	P value
2-4 years	27.912	0.006
4-6 years	11.833	0.459
6-12 years	46.116	0.000

Table 16(b) showed chi square test for locomotion through stair of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 52% (n=11) were needed total assistance. The results revealed that gross motor function insignificant with locomotion through stair of WeeFIM (P>0.05) in age range 4-6 years. The result also

revealed that there was statistically significant in 2-4 years and 6-12 years age range. This means gross motor function delay vary the WeeFIM level delay among children with spastic cerebral palsy.

Association between Comprehension of WeeFIM with GMFCS:

Table 17(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance				2					2	1			1		1
Maximal assistance				1						4	1		5	1	1
Moderate assistance	2			1	1					4	2			1	3
Minimal assistance	1			1			2	1	3	2		1			3
Supervision		1			1	1			4	1		1			2
Moderate independence												1			
Complete independence		1	2	1	1	1			1		1	2			

Table 17(b):

Age range	Chi square	P value
2-4 years	26.762	0.142
4-6 years	19.333	0.252
6-12 years	27.740	0.271

Table 17(b) showed chi square test for comprehension of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 19% (n=4) were needed maximal assistance and about 19% (n=4) were needed moderate assistance. The results revealed that gross motor function insignificant with comprehension of WeeFIM (P>0.05) in age range 2-4 years, 4-6 years and 6-12 years. This means gross motor function delay showed simultaneous WeeFIM level delay among children with spastic cerebral palsy.

Association between Expression of WeeFIM with GMFCS:

Table 18(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance				3					2	5			5	1	1
Maximal assistance	1			1	1		1		1	7	3	1	1	1	5
Moderate assistance	1			1			1		2						2
Minimal assistance	1	1						1	2			2			1
Supervision		1			2	1			2		1	2			1
Moderate independence															
Complete independence			2	1		1			1						

Table 18(b):

Age range	Chi square	P value
2-4 years	26.962	0.050
4-6 years	16.650	0.163
6-12 years	28.323	0.102

Table 18(b) showed chi square test for expression of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 33% (n=7) were needed maximal assistance. The results revealed that gross motor function insignificant with comprehension of WeeFIM (P>0.05) in age range 4-6 years and 6-12 years. The result also revealed that there was statistically significant in 2-4 years age range. This means gross motor function delay vary the WeeFIM level delay among children with spastic cerebral palsy.

Association between Social-interaction of WeeFIM with GMFCS:

Table 19(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance	1			2				1	3	8	1		6	1	5
Maximal assistance	1	1		2			2		1	4	2			1	2
Moderate assistance	1								3		1	2			1
Minimal assistance			1	2	1				2			2			1
Supervision			1		2	2						1			1
Moderate independence		1													
Complete independence									1						

Table 19(b):

Age range	Chi square	P value
2-4 years	25.336	0.013
4-6 years	22.000	0.341
6-12 years	24.698	0.213

Table 19(b) showed chi square test for social-interaction of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 38% (n=8) were needed total

assistance. The results revealed that gross motor function insignificant with social-interaction of WeeFIM (P>0.05) in age range 4-6 years and 6-12 years. This means gross motor function delay showed simultaneous WeeFIM level delay. The result also revealed that there was statistically significant association (<0.05) between gross motor function and social interaction of WeeFIM in 2-4 years age range. This means gross motor function delay vary the WeeFIM level delay among children with spastic cerebral palsy.

Association between Problem solving of WeeFIM with GMFCS:

Table 20(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance	1			5	1			1	4	9	1		6	1	3
Maximal assistance	1						2		2	3	2	1		1	5
Moderate assistance	1	1							2		1	2			
Minimal assistance				1					1			2			1
Supervision		1	2		1	2									1
Moderate independence					1										
Complete independence									1						

Table 20(b):

Age range	Chi square	P value
2-4 years	24.224	0.019
4-6 years	13.750	0.617
6-12 years	35.225	0.019

Table 20(b) showed chi square test for problem solving capacity of WeeFIM with GMFCS. In level 4, total participants was 21 where most of them about 43% (n=9) were needed total

assistance. The results revealed that gross motor function insignificant with social-interaction of WeeFIM (P>0.05) in 4-6 years. This means gross motor function delay showed simultaneous WeeFIM level delay. The result also revealed that there was statistically significant association (<0.05) between gross motor function and problem solving capacity of WeeFIM in 2-4 years and 6-12 years age range. This means gross motor function delay vary the WeeFIM level delay among children with spastic cerebral palsy.

Association between Memory of WeeFIM with GMFCS:

Table 21(a):

	Level 1			Level 2			Level 3			Level 4			Level 5		
	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12	2-4	4-6	6-12
Total assistance	1			1					1	1			1		
Maximal assistance				2	1				1	4			5	1	3
Moderate assistance				1			2			5	1			1	1
Minimal assistance	2			1					1		2	2			3
Supervision		1	1	1	1	1		1	4	2	1	2			2
Moderate independence									2						
Complete independence		1	1		1	1			1			1			1

Table 21(b):

Age range	Chi square	P value
2-4 years	27.435	0.037
4-6 years	14.750	0.543
6-12 years	17.690	0.818

Table 21(b) showed chi square test for memory of WeeFIM with GMFCS. The results revealed that gross motor function was not significantly associated with memory of WeeFIM (P>0.05) in age range 4-6 years and 6-12 years. This means gross motor function delay showed simultaneous WeeFIM level delay among children with spastic cerebral palsy. The result also revealed that there was statistically significant association (<0.05) between gross motor function and memory of WeeFIM in 2-4 years age range. This means gross motor function delay vary the WeeFIM level delay among children with spastic cerebral palsy.

4.4: BMI

Association between Eating of WeeFIM with BMI:

Table 22:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Super vision	6 Modified independence	7 Complete indepen-dence
Underweight	12	6	4	3	3	1	2
Normal weight	11	4	4		2		
Overweight	1	2			1		
Obese	12	0				1	1

Association between Grooming of WeeFIM with BMI:

Table 23:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Super vision	6 Modified independence	7 Complete indepen-dence
Underweight	13	10	5		3		
Normal weight	15	2	3		1		
Overweight	2	1			1		
Obese	12			1		1	

Association between Bathing of WeeFIM with BMI:

Table 24:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Super vision	6 Modified independence	7 Complete indepen-dence
Underweight	16	7	4	1	2	1	
Normal weight	15	5			1		
Overweight	3				1		
Obese	12			1	1		

Association between Dressing_Upper Body of WeeFIM with BMI:

Table 25:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Super vision	6 Modified independence	7 Complete indepen-dence
Underweight	20	7	1	0	2		1
Normal weight	15	4	1	1			
Overweight	2	1			1		
Obese	12				1	1	

Association between Dressing_Lower Body of WeeFIM with BMI:

Table 26:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete indepen-dence
Underweight	20	7	1		1	1	1
Normal weight	15	4	1	1			
Overweight	2	1			1		
Obese	12				1	1	

Association between Toileting of WeeFIM with BMI:

Table 27:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete indepen-dence
Underweight	14	11	2	1	1	1	1
Normal weight	11	7	2	1			
Overweight	2	1			1		
Obese	12				2		

Association between Bladder management of WeeFIM with BMI:

Table 28:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete indepen-dence
Underweight	16	9	3	1	1	1	1
Normal weight	11	7	3				
Overweight	2	1		1			
Obese	12				2		

Association between Bowel management of WeeFIM with BMI:

Table 29:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
Underweight	17	9	2		1	1	1
Normal weight	12	6	3				
Overweight	2	1			1		
Obese	12			1	1		

Association between Transferring to Chair/Wheelchair of WeeFIM with BMI:

Table 30:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
Underweight	16	9	1	1	3		1
Normal weight	12	4	2	3			
Overweight	3	1					
Obese	10	2		1		1	

Association between Transferring to Toilet of WeeFIM with BMI:

Table 31:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
Underweight	17	8	1	2	2		1
Normal weight	13	4	1	3			
Overweight	3	1					
Obese	9	3	1		1		

Association between Transferring to Tub/Shower of WeeFIM with BMI:

Table 32:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
Underweight	18	8	1		3		1
Normal weight	12	5	1	3			
Overweight	3	1					
Obese	10	2	1		1		

Association betweeen Locomotion through Chair/Wheelchair/Crawl of WeeFIM with BMI:

Table 33:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
Underweight	15	11		1	3	1	
Normal weight	12	5	1	1	2		
Overweight	2	2					
Obese	8	3		2		1	

Association between Locomotion through Stairing of WeeFIM with BMI:

Table 34:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
Underweight	15	12		1	2	1	
Normal weight	12	6		1	2		
Overweight	2	2					
Obese	10	1	2		1		

Association between Comprehension of WeeFIM with BMI:

Table 35:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
Underweight	1	4	6	8	5	1	6
Normal weight	1	6	3	5	5		1
Overweight	1		1		1		1
Obese	4	3	4	1			2

Association between Exprehension of WeeFIM with BMI:

Table 36:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
Underweight	4	14	3	4	2		4
Normal weight	5	4	3	4	4		1
Overweight	1	1			1		
Obese	7	4	1		2		

Association between Social interaction of WeeFIM with BMI:

Table 37:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
Underweight	10	6	7	6	2		
Normal weight	10	5	1	1	3		1
Overweight	1	1		1	1		
Obese	7	4		1	1	1	

Association between Problem solving of WeeFIM with BMI:

Table 38:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
Underweight	11	9	5	3	3		
Normal weight	11	4	2	1	2		1
Overweight	2			1	1		
Obese	8	4			1	1	

Association between Memory of WeeFIM with BMI:

Table 39:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
Underweight	2	6	4	4	11	2	2
Normal weight	1	6	3	4	6		1
Overweight	1		1				2
Obese	1	5	3	3			2

Table 40:

	Chi square	P value
Self-eating	22.563	0.208
Self-grooming	24.532	0.067
Self-bathing	16.004	0.382
Upper body dressing	16.255	0.575
Lower body dressing	15.254	0.644
Toileting	18.687	0.411
Bladder management	17.444	0.293
Bowel management	20.312	0.316
Transfer: Chair/Wheelchair	15.633	0.618
Transfer: Toilet	6.887	0.961
Transfer: Tub/Shower	12.171	0.666
Locomotion: Walk/Wheelchair/Crawl	9.792	0.833
Locomotion: Stairs	15.247	0.434
Communication: Expression	20.484	0.154
Social interaction	19.001	0.392
Problem solving	16.488	0.559
Memory	22.355	0.217

Table 40 showed chi square test for BMI and WeeFIM. The results revealed that BMI was not significantly associated with WeeFIM ($p>0.05$). This means underweight, normal weight, overweight and obese of BMI showed simultaneous WeeFIM level delay among children with spastic CP.

4.5. Delivery Type:

Association between self eating of WeeFIM with type of delivery:

Table 41:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	16	5	3	2	4		2
Caesarian section	20	7	5	1	2	2	1

Association between self grooming of WeeFIM with type of delivery:

Table 42:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	19	5	4	0	4		
Caesarian section	23	8	4	1	1	1	

Association between self bathing of WeeFIM with type of delivery:

Table 43:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	21	4	3		3	1	
Caesarian section	25	8	1	2	2		

Association between Upper body dressing of WeeFIM with type of delivery:

Table 44:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	21	5	2	1	2		1
Caesarian section	28	7			2	1	

Association between Lower body dressing of WeeFIM with type of delivery:

Table 45:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	21	5	2	1	1	1	1
Caesarian section	28	7			2	1	

Association between Toileting of WeeFIM with type of delivery:

Table 46:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	17	10	1	1	1	1	1
Caesarian section	22	9	3	1	3		

Association between Bladder management of WeeFIM with type of delivery:

Table 47:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	18	9	2		1	1	1
Caesarian section	23	8	4		3		

Association between Bowel management of WeeFIM with type of delivery:

Table 48:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	20	7	2		1	1	1
Caesarian section	23	9	3	1	2		

Association between Transferring to chair/wheelchair of WeeFIM with type of delivery:

Table 49:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	18	8	1	2	2		1
Caesarian section	23	8	2	3	1	1	

Association between Transferring to toilet of WeeFIM with type of delivery:

Table 50:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	18	8	1	3	1		1
Caesarian section	24	8	2	2	2		

Association between Transferring to tub/shower of WeeFIM with type of delivery:

Table 51:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	20	7		2	2		1
Caesarian section	23	9	3	1	2		

Association between Locomotion through Walk/Wheelchair/Crawl of WeeFIM with type of delivery:

Table 52:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	13	13		2	3	1	
Caesarian section	24	8	1	2	2	1	

Association between Locomotion through stairing of WeeFIM with type of delivery:

Table 53:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	15	12		2	2	1	
Caesarian section	24	9	2		3		

Association between Comprehension of WeeFIM with type of delivery:

Table 54:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	5	4	5	4	6	1	7
Caesarian section	2	9	9	10	5		3

Association between Expression of WeeFIM with type of delivery:

Table 55:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	6	11	1	4	5		5
Caesarian section	11	12	6	4	5		

Association between Social interaction of WeeFIM with type of delivery:

Table 56:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete independence
NVD	10	8	4	4	5		1
Caesarian section	18	8	4	5	2	1	

Association between Problem solving of WeeFIM with type of delivery:

Table 57:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete indepen-dence
NVD	11	9	4	2	5		1
Caesarian section	21	8	3	3	2	1	

Association between Memory of WeeFIM with type of delivery:

Table 58:

	1 Total assistance	2 Maximal assistance	3 Moderate assistance	4 Minimal assistance	5 Supervision	6 Modified independence	7 Complete indepen-dence
NVD	3	8	4	4	8	1	4
Caesarian section	2	9	7	7	9	1	3

Table 59:

	Chi square	P value
Self-eating	4.127	0.659
Self-grooming	4.391	0.495
Self-bathing	5.407	0.368
Upper body dressing	5.862	0.439
Lower body dressing	5.191	0.520
Toileting	4.210	0.648
Bladder management	3.849	0.571
Bowel management	3.504	0.743
Transfer: Chair/Wheelchair	2.984	0.811
Transfer: Toilet	2.226	0.817
Transfer: Tub/Shower	4.310	0.506
Locomotion: Walk/Wheelchair/Crawl	5.185	0.394
Locomotion: Stairs	7.244	0.203
Communication: Comprehension	9.167	0.164
Communication: Expression	9.642	0.086
Social interaction	5.207	0.518
Problem solving	6.345	0.386
Memory	1.594	0.953

Table 59 showed chi square test for delivery type and WeeFIM. The results revealed that delivery type was not significantly associated with WeeFIM ($p>0.05$). This means normal vaginal delivery and caesarian section showed simultaneous WeeFIM level delay among children with spastic cerebral palsy.

CHAPTER –V DISCUSSION

The aim of the study was to find out the gross motor function and functional limitation among the children with spastic cerebral palsy. The Gross Motor Function Classification System (GMFCS) and WeeFIM has been widely used in research and clinical practice and it is a valid and reliable instrument that evaluates the gross motor function (Palisano et al., 2006) and functional limitation of children with spastic cerebral palsy (Harvey et al., 2000). Total participants were 70 divided in age range of 2-4 years, 4-6 years and 6-12 years. Among them, 29 participants were in age range of 2-4 years, 12 were in 4-6 years and 29 were in between 6-12 years. There were 47 male participants and 23 were female participants. One study (Soleimani et al., 2011) investigated the gross motor function and associated disorder among children with cerebral palsy. Total participants were 200. Among them, 103 participants were male and 97 were female participants. Thus it was disclaimed that male participants were greater in number in both studies. In the current study, participants were included in three different age range (2-4, 4-6 and 6-12 years) based on GMFCS level but Soleimani only studied children with CP between age range of 4-12 years.

Among 70 fathers of the participants, majority 38.6% (n=27) of mothers educational level were completed S.S.C. Among 32 parents 35.3% of mothers education level were completed S.S.C (Vetra & Bertule, 2014)). Both study revealed that mother's were completed middle school level. In the current study, 27.1% (n=19) of fathers education level were completed Bachelor but Sunil Karandi showed 44.5% of fathers education level was completed middle school level.

About 98.6% (n=69) mother's of children were housewife and 31.4% (n=22) father's were businessman and included from very varied socio-economic backgrounds. Another study showed that the unemployed ratio favored mothers (42.2%) as compared to fathers (13.3%). However, majority of both fathers (31.1%) and mothers (26. 6%) were unskilled workers. Most of the fathers (28.9%) were found to be clerk or self-employed whereas mothers (15.5%) were skilled and semi- skilled workers (Sahay et al., 2013).Total participants were 35 but in the current study participants were 70.

The current study found that among the 70 children, 24.3% (n=17) of children mother's place of delivery was at home and rest of 75.7% (n= 53) mothers place of delivery was at clinic or hospital. Given that in Pakistan one cross sectional study (Bangash et al., 2014) identified majority of children birth place was at home (75%) and others (25%) was at hospitals.

Conversely, Bangash and colleagues attributed major risk factors of CP as home delivery in addition with infection and lack of ante natal care. In this current study, majority of the children were full term baby. So, the cause of CP most prominently pointed to post natal conditions in majority of the children.

In the light of length of intra uterine life and among 70 participants majority of the children 41.4% (n=29) was term baby and minority consequently was premature baby 57.1% (n=40) and post term baby 1.4% (n=1). Erkin et al. (2008) conducted a study on motor function level of CP children and found majority (83%) of the children were born as a full term baby, 13% born as a preterm baby and only 4% were born as a post term baby. Both study found almost similar findings. A total of 625 consecutive Turkish children with CP, who were rehabilitated in the pediatrics rehabilitation clinic between 2000 and 2004 years, were included but in this current study, 70 Bangladeshi children, who were attended at the pediatric unit of CRP, in 2018 years included.

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 54.3%(n=38) and normal vaginal delivery is 35.7% (n=32). In another study 34.8% (n=61) of the children were born by normal vaginal delivery and 65.1% (n=114) were born by caesarian section (Hasegawa J et al., 2016) and it is the similarity between this two study. But the total participant was 175 where the current studies participant was 70.

Involvement of the limb of the children among the 70 children 5.7% (n=4) of the children had one leg or arm involved, 12.9%% (n=9) were one side of the body part, 12.9% (n=9) of the children had one hand and two legs involved, 37.1%(n=26) of the children had two legs involved, 31.4% (n=22) had four limb involved and this is the largest group of children among the participants. However, lower limb muscle involvement was highly associated

with GMFCS age range 2-4 (p=0.009), 4-6 (p=0.029), 6-12 (p=0.301). A growing number of evidence (Sigurdardottir et al., 2009; Bangash et al., 2014) found spastic type among all CP children. In Bangash and colleagues study, there was 75% spastic type of cerebral palsy in which diplegic 35%, quadriplegic 30% and hemiplegic 10%. Conversely, in Sigurdardottir study there was 78% spastic CP in between 1990–1996 and 87% in between 1997–2003 and thresultsis study also concluded that there was significant association between spastic CP and motor impairments in GMFCS level; I to V.

Among the 70 participants, 31 (44.3%) participants were underweight, 31(30.0%) normal weight, 4 (5.7%) overweight and 14 (20.0%) were obese. However, in a correlation analysis, there was not significant correlation between BMI and level of GMFCS ($p>0.05$). Delalic et al. (2014) conducted a study to find out the relation between BMI and various motor severities among children with CP. The authors concluded that there is a significant negative correlation between BMI and the degree of functional disability according to the GMFCS ($p<0.05$). Both the studies found almost similar results compare with the current study. Nutrition and level of caring depends on parents income and education.

Among the 70 participants, GMFCS level varies in accordance to age range of the participants. In GMFCS level with age range 2-4 years there were 29 patients in which 4.3% in level 1, 8.6% in level 2, 2.9% in level 3, 17.1% in level 4 and 8.6% in level 5. In 4-6 years age range of GMFCS, there were 12 participants in which 2.9% in level 1, 4.3% in level 2, 1.4% in level 3, 5.7% in level 4, 2.9% in level 5. In 6-12 years age range of GMFCS, there were 29 participants in which 2.9% in level 1, 2.9% in level 2, 14.3% in level 3, 7.1% in level 4 and 14.3% in level 5. However, in reviewing one study (Reid et al., 2011) it was found that in age group 4 years there were 29.2% in level 1, no participants occupied in level 2, 12.5% in level 3 and 83.3% cumulatively in level 4 and 5. In addition, the authors speculated age group of 5 years in which there percentages of participants were 15.4% in level 1, 0% in level 2, 15.4% in level 3, 69.2% in level 4 and level 5. At age group of 6, there percentages were 13% in level 1, 8.7% in level 2, 0% in level 3, 73.9% in level 4 and 5. Final age group was 7 years in which the percentage was 20% in level 1, 20% in level 2, 0% in level 3, 60% in level 4 and level 5. In addition, to these classification issues, there were few similarities between both the studies. The main reason was disclaimed that

children functioning at GMFCS level I may be less likely to utilize disability services, resulting in a higher likelihood of their relative under-ascertainment. Clinicians may also have divergent views on the lower severity threshold for a diagnosis of CP and on whether a child should receive a diagnosis of CP based on clinical signs or function, or both. Alternatively, there was variation in classifying GMFCS age range level in which the current study relied on Palisano, classification of GMFCS but Reid and his colleagues study only focused on grouping of participants with one statement of age rather age range.

In the current study during eating with hands, majority of the participants (n=36) required total assistance and few (n=2) was modified independence. During grooming, majority of the participants (n=42) requires total assistance and few (n=1) requires minimal assistance.

During bathing, majority of the participants (65.7%) required total assistance and few (1.4) were modified independent. During dressing in upper body, highest number of the participants (n=49) required total assistance and very low number (n=1) required minimal assistance, (n=1) was modified independent and (n=1) was completely independent. During dressing through lower body, maximum percentage of participants (70%) required total assistance and minimum percentage (1.4%) required minimal assistance and (1.4%) was complete independent.

During toileting, maximum number (n=39) of participants required total assistance, minimum number (n=1) was modified independence and complete independence. During bladder bowel management, highest number (n=41) children with CP required total assistance and lowest (n=1) in number were modified independence and complete independence.

During transferring to chair/wheelchair, highest number of the participants (n=41) required total assistance and very low number (n=1) was modified independent and (n=1) was completely independent. During transferring to toilet, highest number of the participants (n=42) required total assistance and very low number (n=1) was completely independent. During transferring to tub/shower, highest number of the participants (n=43) required total assistance and very low number (n=1) was completely independent.

During locomotion through walk/wheelchair/crawling, highest number of the participants 52.9% required total assistance and very low number 2.9% was modified independent. During stairing, highest number of the participants 55.7% required total assistance and very low number 1.4% was modified independent. The level of GMFCS was significant ($p<0.05$) in transformation and locomotion. Kim et al. (2017) conducted a study and showed that the level of gross motor ability on self care activity was significant in transformation and locomotion. But the difference was their participants was 4 or more than 4 years old. In this thesis, eating with hands, dressing upper and lower body, toileting ability and bladder, bowel management was compared with GMFCS. Majority of the CP children required assistance and this assistance thereby exhibited the caring mind of parents. However, level of GMFCS was significant ($p<0.05$) in eating with hands, except grooming, dressing upper and lower body, toileting ability bladder and bowel management. Reflecting Palisano et al. (2008) study has reflected these issues and the study aimed to identify differences in the number and types of family needs expressed by parents based on the age and gross motor functional level of their children with CP and needs that differ on gross motor function level.

Among 70 participants, majority of them communicate with parents by comprehension majority requires maximal assistance 20% and minimum assistance is 20% and by expression majority requires maximal assistance 32.9% and 7.1% were completely independence and level of GMFCS was significant ($p<0.05$) in case of expression. Baltor et al. (2014) showed how important communication was to have parents positive attitude and level of caring. The researchers concluded that parents especially mothers of children with CP played a vital role in execution of child's daily activities demand. During social interaction majority of participants (40%) required total assistance, few participants (1.4%) were modified independence and (1.4%) were completely independence. Majority of participants 45.7% required total assistance, few participants 1.4% required modified independency and 1.4% required complete independency for problem solving. In case of memory capacity 7.1% of participants required total assistance and 10% of participants were completely independence. The level of GMFCS was significant ($p<0.05$) in social interaction, problem solving and memory capacity.

In this thesis, eating with hands, grooming, bathing, dressing upper and lower body, toileting ability and bladder, bowel management was compared with GMFCS. Majority of the CP children required assistance and this assistance thereby exhibited the caring mind of parents. However, level of GMFCS was not significant ($p<0.05$) in eating with hands, grooming, dressing upper and lower body, toileting ability, bladder and bowel management. Reflecting study has reflected these issues and the study aimed to identify differences in the number and types of family needs expressed by parents based on the age and gross motor functional level of their children with CP and needs that differ on gross motor function level. However, the current study and study conducted by Kim found almost similar results that the influence of gross motor ability on self-care activity was not significant. In contrast, the basic differences between them were in this study is and social function are significant factors influencing self-care activity and among 25 participants majority of children were girls (14) and few were boys (11). In addition, all functional activities except complete independence required assistance or supervision from parents. Hence, lack of supervision or assistance from parents showed delay in progression of gross motor development among children with spastic CP.

Limitation:

Complete accuracy is not possible in any research so that some limitation may exist. Regarding this study, there were some limitations or barriers to consider the result of the study as below:

- The samples were collected only from the selected area at Centre for the Rehabilitation of the paralyzed (CRP). So the result of the study could not be generalized to the whole population in Bangladesh.
- The sample size was 70 for this study, which is very small to generalize the result for the wider population.
- There was lack of representative chance.

CHAPTER –VI CONCLUSION AND RECOMMENDATION

6.1. Conclusion:

Cerebral palsy is the most common condition in Bangladesh that is responsible for child disability. But most of the people in this country are not aware about the Cerebral palsy. It occurs due to impairments in the central nervous system resulting in activity limitations in daily life.

This study was aimed to find out the gross motor function, functional limitation and demography of the spastic Cerebral Palsy patient. For the fulfillment of the study the researcher was designed a quantitative study design and collected 70 data from the samples through a standard questionnaire from the registered unit of Pediatrics.

In order to show the gross motor function and functional limitations, GMFCS and WeeFIM scale was used which have been recognized as effective tools to measure current levels of gross motor function and functional limitations among children with spastic CP recommend by different studies earlier. Assessment of gross motor function and functional limitation by these scales helps to form foundations to identity the problem behind the activities which are limited most commonly. Children may change and improve their gross motor function and functional limitation.

In the developed countries physiotherapy is considered as an important treatment for the Cerebral palsy children. As developing medical profession, it is the duty of physiotherapist working in the Bangladesh should make some strong evidence, which will improve strength and skill for the physiotherapist practice. The Physiotherapists working with spastic cerebral palsy children would have the idea to which way should be considered first during planning of treatment.

From the data base, it was found that among spastic cerebral palsy the age range between 2-4 and 6-12 years is more vulnerable to have problem of gross motor function and limitation of function. Male are pre-dominantly more affected than female. It is difficult to stop the responsible cause of spastic type of Cerebral Palsy. Spastic Cerebral Palsy management is a long time process so it is important to create awareness and receive proper

step to reduce the problem of gross motor function and functional limitation among the children with spastic cerebral palsy.

The study gave the answers of the research questions and fulfils the objectives of the study. Thus, development of validate Bengali questionnaire on GMFCS and WeeFIM scale was recommended to establish in further studies. Finally, an important efforts should be made to address the ways to increase gross motor function and reduce functional limitation of children with spastic cerebral palsy.

6.2. Recommendation:

The aim of the study was to find out the gross motor function and functional limitation of the children with spastic cerebral palsy in and the result which found from the study has fulfilled the aim of this research project. The following recommendations are:

- Should take more samples for generating the result and try to make more valid and reliable.
- In this study all children were spastic type of CP. for that reason researcher also recommended to conduct study including all type of cerebral palsy. Need to make plane for public awareness program especially about disability issues, early identification of functional limitation and management.
- To ensure the generalization of the research finding, it is recommended to investigate from different hospital or study place in Bangladesh.
- There was some limitation of the study mentioned at relevant section. It is recommended to overcome those limitations during further study.
- In future research on gross motor function and functional limitation, researcher can add quality of life with this. It will helps to make awareness and can give concentration on the children with spastic cerebral palsy.

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APPENDIX-A

IRB Permission letter

BANGLADESH HEALTH PROFESSIONS INSTITUTE

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

Ref. CRP-BHPI/IRB/10/18/1248

Date: 22/1/2018

To
Mona Rahman
B.Sc. in Physiotherapy
Session: 2013-2014 Student ID:112130192
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: Approval of the thesis proposal **"Measuring the Gross Motor Function and Functional limitation among the Children with Spastic Cerebral Palsy"** by ethics committee.

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

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

The purpose of the study is to determine the gross motor function and functional limitation among the children with spastic cerebral palsy. The study involves use of GMFCS and WeeFIM questionnaire to find out the gross motor function and functional limitation that may take 20 to 25 minutes to answer the questionnaire and there is no likelihood of any harm to the participants and participation in the study may benefit the participants by minimizing those problems.The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 11 AM on 24th January, 2018 at BHPI.

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

Best regards,

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

সিআরপি-চাপাইন, সাভার, ঢাকা-১৩৪৩, বাংলাদেশ, ফোন ঃ ৭৭৪৫৪৬৪-৫, ৭৭৪১৪০৪ ফ্যাক্স ঃ ৭৭৪৫০৬৯
CRP-Chapain, Savar, Dhaka-1343, Tel : 7745464-5, 7741404, Fax : 7745069, E-mail : contact@crp-bangladesh.org, www.crp-bangladesh.org

APPENDIX-B

Permission Letter

July 02, 2018

Head

Department of Physiotherapy,

Centre for the Rehabilitation of the Paralysed (CRP),

Chapain, Savar, Dhaka.

Through: Head, Department of Physiotherapy, BHPI.

Subject: An application to obtain permission for data collection.

Dear Sir,

With due respect and humble submission I beg to state that, I am Mona Rahman, student of 4th Professional B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI). As per course curriculum, I need to complete a research project for completion of my B.Sc in physiotherapy program. Hence, I have to conduct a research project entitled **"Measuring the Gross Motor Function and Functional limitation among the Children with Spastic Cerebral Palsy"** under honorable supervisor Mohammad Habibur Rahman, Associate Professor of Physiotherapy, BHPI, CRP, Savar, Dhaka. However, Ethical approval was taken from the Institutional Review Board (IRB) of Bangladesh Health Professions Institute (BHPI). As my research includes cerebral palsy patients, I want to collect data from the Paediatric unit of CRP, Savar. For this reason, I need your permission for data collection. I would like to assure that anything of my study will not harmful for the participants.

I therefore, pray and hope that you would be kind enough to give me permission for data collection to make this research project successful.

Forwarded
Habib
4/7/2018

Sincerely Yours,

Mona Rahman

Mona Rahman

4th Professional B.Sc In Physiotherapy,

Class roll: 01

Session: 2013-2014

BHPI, CRP, Savar, Dhaka

02/07/18
Prof. Md. Obaidul Haque
Head, Department of Physiotherapy
BHPI, CRP, Savar, Dhaka-1343

Approved
Mohammad Anwar Hossain
Associate Professor & Head
Physiotherapy Dept., CRP
CRP-Chapain, Savar, Dhaka-1343

APPENDIX-C

Consent form

Assalamu-alaikum/Namaskar

I am Mona Rahman, 4th year B.Sc in physiotherapy student of Bangladesh Health Professionals Institute (BHPI) under Faculty of Medicine, University of Dhaka. To obtain my Bachelor Degree, I have to conduct a research project and it is a part of B.Sc in Physiotheray course curriculum. The study was entitled as " **Measuring The Gross Motor Function and Functional Limitation among Children with Spastic Cerebral Palsy."** Through this study I will find out the gross motor function and functional limitation among the children with spastic cerebral palsy. If I can complete this study successfully, patients may get benefits who are suffering from spastic cerebral palsy. To fulfill my research project, I need to collect data. So, your children can be a participant of this research. I want to meet you one time which lasts for 20-25 minutes.

I am assuring you that, all collected information will be kept safely and maintained confidentiality. The participation must be voluntary. You have the right to withdraw consent and discontinue participation of you and your children at any time. You might be benefited or not, but in future may benefit the children with spastic cerebral palsy. I am informed about the above-mentioned informations and I am giving concent to include children as participants. You and your children can withdraw your participation from the study and it will not harmful for your child. If you need further assistance, you may contact with the researcher and supervisor **Mohammad Habibur Rahman**, Associate Professor of Physiotherapy, BHPI, CRP, Savar, Dhaka.

Do you have any question before I start?

So, may I have your consent to proceed with the interview?

□ Yes □ No

Signature of parents and date.....

Relationship with parents……

Signature of the witness and date.....

Signature of data collector and date.....

APPENDIX-D

ENGLISH QUESTIONNAIRE

Measuring the Gross Motor Function and Functional limitation among the Children with Spastic Cerebral Palsy.

PERSONAL INFORMATION:

Patients ID:	
Address :	
Phone No. :	
Name of Interviewer :	
Diagnosis:	
Date	……/……../…….
Time	…….am/pm

Please provide the right answer from the following questions. Each of the following question has multiple options and you have to give tick (√) mark into one correct answer that is mostly suited to you. It is realized that you may feel more than one correct answer in a particular question but please provide tick (√) mark in the best suited answer.

Part-1: Socio – demographic information

Question Number	Questions	Response
1	Age of the patient	……month
2	Sex	□ Boy □ Girl
3	Mother's educational level	□ Illiteracy □ Literate □ Primary □ Secondary school certificate (SSC) □ Higher secondary certificate (HSC) □ Bachelor □ Masters or above
4	Father's educational level	□ Illiteracy □ Literate □ Primary □ Secondary school certificate (SSC) □ Higher secondary certificate (HSC) □ Bachelor □ Masters or above
5	Mother's occupation	□ Housewife □ Service holder □ Daily labor □ others
6	Father's occupation	□ Businessman □ Farmer □ Service holder □ Daily labor □ others

Part-2: Medical – related information

7	When did your child born?	□ Before 38 weeks □ After 38 weeks □ After 42 weeks
8	Place of delivery	□ Home □ Hospital
9	Type of delivery	□ NVD (Normal Vaginal Delivery) □ Caesarian section □ Forceps delivery □ Other instrumental delivery
10	What was the duration of labor pain?	□ Less than 12 hours □ More than 12 hours
11	Did your child cry just after birth?	□ Yes □ No
12	Involvement of limb	□ Monoplegic □ Diplegic □ Quadriplegic □ Triplegic □ Hemiplegic
13	Height	……m
14	Weight	……Kg
15	BMI	……Kg/m^2

Part-3: GMFCS

16. Between 2nd and 4th Birthday	○ Level 1 • Children floor sit with both hands free to manipulate objects. • Movements in and out of floor sitting and standing are performed without adult assistance. • Children walk as the preferred method of mobility without the need for any assistive mobility device.
	○ Level 2 • Children floor sit but may have difficulty with balance when both hands are free to manipulate objects. • Movements in and out of sitting are performed without adult assistance. • Children pull to stand on a stable surface. • Children crawl on hands and knees with a reciprocal pattern, cruise holding onto furniture and walk using an assistive mobility device as preferred methods of mobility.
	○ Level 3 • Children maintain floor sitting often by "W-sitting" (sitting between flexed and internally rotated hips and knees) and may require adult assistance to assume sitting. • Children creep on their stomach or crawl on hands and knees (often without reciprocal leg movements) as their primary methods of self mobility. • Children may pull to stand on a stable surface and cruise short distances. • Children may walk short distances indoors using an assistive mobility device and adult assistance for steering and turning.
	○ Level 4 • Children floor sit when placed, but are unable to maintain alignment and

	balance without use of their hands for support. • Children frequently require adaptive equipment for sitting and standing. • Self mobility for short distances (within a room) is achieved through rolling, creeping on stomach, or crawling on hands and knees without reciprocal leg movement.
	○ Level 5 • Physical impairments restrict voluntary control of movement and the ability to maintain antigravity head and trunk postures. All areas of motor function are limited. • Functional limitations in sitting and standing are not fully compensated for through the use of adaptive equipment and assistive technology. • At Level V, children have no means of independent mobility and are transported. • Some children achieve self-mobility using a power wheelchair with extensive adaptations.
17. Between 4^{th} and 6^{th} Birthday (If patients age range is 4-6, skip Ques. No,16)	○ Level 1 • Children get into and out of, and sit in, a chair without the need for hand support. • Children move from the floor and from chair sitting to standing without the need for objects for support. • Children walk indoors and outdoors, and climb stairs. • Emerging ability to run and jump.
	○ Level 2 • Children sit in a chair with both hands free to manipulate objects. • Children move from the floor to standing and from chair sitting to standing but often require a stable surface to push or pull up on with their arms.

	• Children walk without the need for any assistive mobility device indoors and for short distances on level surfaces outdoors. • Children climb stairs holding onto a railing but are unable to run or jump.
	○ Level 3 • Children sit on a regular chair but may require pelvic or trunk support to maximize hand function. • Children move in and out of chair sitting using a stable surface to push on or pull up with their arms. • Children walk with an assistive mobility device on level surfaces and climb stairs with assistance from an adult. • Children frequently are transported when travelling for long distances or outdoors on uneven terrain.
	○ Level 4 • Children sit on a chair but need adaptive seating for trunk control and to maximize hand function. • Children move in and out of chair sitting with assistance from an adult or a stable surface to push or pull up on with their arms. • Children may at best walk short distances with a walker and adult supervision but have difficulty turning and maintaining balance on uneven surfaces. • Children are transported in the community. Children may achieve self-mobility using a power wheelchair.
	○ Level 5 • Physical impairments restrict voluntary control of movement and the ability to maintain antigravity head and trunk postures. • All areas of motor function are limited. Functional limitations in sitting and standing are not fully compensated for

	through the use of adaptive equipment and assistive technology. • At Level V, children have no means of independent mobility and are transported. • Some children achieve self-mobility using a power wheelchair with extensive adaptations.
18. Between 6th and 12th Birthday (If patients age range is 6-12, skip Ques. No,17)	o Level 1 • Children walk indoors and outdoors, and climb stairs without limitations. • Children perform gross motor skills including running and jumping but speed, balance, and coordination are reduced.
	o Level 2 • Children walk indoors and outdoors, and climb stairs holding onto a railing but experience limitations walking on uneven surfaces and inclines, and walking in crowds or confined spaces. • Children have at best only minimal ability to perform gross motor skills such as running and jumping.
	o Level 3 • Children walk indoors or outdoors on a level surface with an assistive mobility device. • Children may climb stairs holding onto a railing. • Depending on upper limb function, children propel a wheelchair manually or are transported when travelling for long distances or outdoors on uneven terrain.
	o Level 4 • Children may maintain levels of function achieved before age 6 or rely more on wheeled mobility at home, school, and in the community. • Children may achieve self-mobility using a power wheelchair.
	o Level 5

	• Physical impairments restrict voluntary control of movement and the ability to maintain antigravity head and trunk postures. • All areas of motor function are limited. Functional limitations in sitting and standing are not fully compensated for through the use of adaptive equipment and assistive technology. • At level V, children have no means of independent mobility and are transported. • Some children achieve self-mobility using a power wheelchair with extensive adaptations.

Part-4: Functional label – Analysis

Area	**Score**
SELF CARE	
19.Eating	
20.Grooming	
21.Bathing	
22.Dressing-Upper Body	
23.Dressing-Lower Body	
SPHINCTER CONTROL	
24.Toileting	
25.Bladder management	
26.Bowel management	
Self care subtotal	
TRANSFERS	
27.Transfers: Chair/Wheelchair	

28.Transfers: Toilet	
29.Transfers: Tub/Shower	
LOCOMOTION	
30.Locomotion: Walk/Wheelchair/Crawl	
31.Locomotion: Stairs	
Mobility subtotal	
COMMUNICATION	
32.Comprehension	
33.Expression	
SOCIAL COGNITION	
34.Social interaction	
35.Problem solving	
36.Memory	
Cognition subtotal	

WeeFIM® LEVELS
NO HELPER
7 Complete Independence (Timely, Safely)
6 Modified Independence (Device)
HELPER – Modified Dependence
5 Supervision
4 Minimal assistance (subject = 75% or more)
3 Moderate assistance (subject = 50% or more)
Helper – Complete Dependence
2 Maximal assistance (subject = 25% - 49%)
1 Total assistance (subject = 0% - 24%)

APPENSIX-E

সম্মতি পত্র

আসসালামু-আলাইকুম/নমস্কার

আমি মোনা রহমান, ঢাকা বিশ্ববিদ্যালয়ের অধীনে মেডিসিন অনুষদের বাংলাদেশ হেল্‌থ প্রফেশনালস ইনস্টিটিউট এর ফিজিওথেরাপির ৪র্থ বর্ষেও শিক্ষার্থী। আমার ব্যাচেলর ডিগ্রি অর্জনের জন্য, আমাকে একটি গবেষণা প্রকল্প পরিচালনা করতে হবে এবং গবেষণা কর্মটি ফিজিওথেরাপি কোর্সকারিকুলামের একটি অংশ।

গবেষণা কর্মটির শিরোনম হচ্ছে, "স্পাস্টিক সেরেব্রাল পালসি বাচ্চাদের গ্রস মটর কার্জকলাপ এবং তাদের কাজের সীমাব্ধতা নিরুপন" এই গবেষণার মধ্য দিয়ে আমি খুঁজে বের করব গ্রস মটর কার্জকলাপ এবং কাজের সীমাব্ধতা নিরুপন ।যদি আমি গবেষণাটি সফলভাবে সম্পূর্ণ করতে পারি, রোগীর লাভবান হবেন যারা স্পাস্টিক সেরেব্রাল পালসিতে আক্রান্ত। আমার গবেষণাটি পরিপূর্ণ করার জন্য আমার তথ্য সংগ্রহ করা প্রয়োজন। তাই আপনার শিশুটি এই গবেষণার একজন অংশ গ্রহণকারী হতে পারে। আমি আপনার সাথে সাক্ষাৎ করতে চায় যার সময় হবে ২০-২৫ মিনিট।

আমি আপনাকে নিশ্চয় তা দিচ্ছি, সংগ্রহকৃত সকল তথ্য নিরাপদ ও গোপনীয় রাখব। অংশ গ্রহণকারী একজন স্বেচ্ছাসেবক। আপনি যে কোন সময়ে আপনার অনুমতি ও অংশ গ্রহণ হতে বিরত থাকতে পারবেন। আপনি উপকৃত হতে পারেন বা নাও হতে পারেন কিন্তু ভবিষ্যতে অন্য শিশুরা উপকৃত হবে যারা স্পাস্টিক সেরেব্রাল পালসি তে আক্রান্ত। আমি আপনাকে আরো নিশ্চয়তা দিচ্ছি এই গবেষণা আপনার ও আপনার শিশুর কোন ক্ষতির কারণ হবে না এবং যে কোন সময়ে তথ্য দেয়া আপনারা বন্ধ করতে পারবেন ।পরবর্তীতে যদি কোন সহযোগিতার প্রয়োজন হয়, তবে আপনি আমার সুপার ভাইজার মোহাম্মদ হাবিবুর রহমানের সাথে যোগাযোগ করতে পারবেন। যিনি সি.আর.পি তে ফিজিওথেরাপি বিভাগে সহযোগী অধ্যাপক হিসেবে কর্মরত আছেন।

আমার কথোপকথনের আগে আপনার কি কোন প্রশ্ন আছে?

আপনার অনুমতি পেলে আমি কাজে অগ্রসর হতে পারি।

☐ হ্যা ☐ না

পিতা-মাতার স্বাক্ষর ও তারিখ .....

পিতা-মাতার সাথে সম্পর্ক .....

স্বাক্ষীর স্বাক্ষর ও তারিখ .....

সাক্ষাৎকার গ্রহণকারীর স্বাক্ষর ও তারিখ .....

APPENDIX-F

বাংলা প্রশ্নাবলী

"স্পাস্টিক সেরেব্রাল পালসি বাচ্চাদের গ্রস মটর কার্যকলাপ এবং তাদের কাজের সীমাব্ধতা নিরুপন"

উত্তরদাতার পরিচিতি

রোগীর আউডি	
ডঠকানা	
মোবাইল নং	
উত্তরদাতার নাম	
রোগ নির্ণয়	
তারিখ	
গময়	

অনুগ্রহপূর্বক নিম্নলিখিত প্রশ্নের সঠিক উত্তর সরবরাহ করুন। প্রত্যেকটি প্রশ্ন বহুনির্বাচনী প্রশ্ন এবং আপনাকে একটি সঠিক উত্তরে $(\surd)$টিক চিহ্ন দিতে হবে যেটি সব চেয়ে গ্রহণ যোগ্য ।আপনি যদি মনে করেন একের অধিক উত্তর গ্রহণযোগ্য তবে আপনি একাধিক উত্তরে টিক চিহ্ন$(\surd)$ দিতে পারেন। কিন্তু সব চেয়ে উত্তম হবে গ্রহণ যোগ্য একটি উত্তরে টিক চিহ্ন$(\surd)$দেয়া ।

পার্ট-১ ঃ আর্থ -সামাজিক জীবনযাপন সংক্রান্ত তথ্যাবলী

প্রশ্ননং	ঈশ্ন	উত্তর
১	রোগীর বয়স	..... মাস
২	লিঙ্গ	☐ ছেলে ☐ মেয়ে
৩	মাতার শিক্ষাগত যোগ্যতা	☐ নিরক্ষর ☐ অক্ষর জ্ঞান সম্পন্ন ☐ প্রাথমিক ☐ এস এস সি ☐ এইচ এস সি ☐ স্নাতক/ডিগ্রি/বিএ ☐ স্নাতকোত্তর বা অন্যান্য ডিগ্রি
৪	পিতারশিক্ষাগত যোগ্যতা	☐ নিরক্ষর ☐ অক্ষর জ্ঞান সম্পন্ন ☐ প্রাথমিক ☐ এস এস সি ☐ এইচ এস সি ☐ স্নাতক/ডিগ্রি/বিএ ☐ স্নাতকোত্তর বা অন্যান্য ডিগ্রি
৫	মাতার পেশা	☐ গৃহিনী ☐ চাকুরীজীবি ☐ ছাত্রী ☐ দিনমজুর ☐ অন্যান্য

৬	পিতার পেশা	☐ ব্যবসায়ী ☐ চাকুরীজীবি ☐ কৃষক ☐ ছাত্র ☐ দিনমজুর ☐ অন্যান্য

পার্ট-২ ঃ মেডিকেল সম্পর্কিত তথ্যাবলী

প্রশ্ননং	প্রশ্ন	উত্তর
৭	আপনার শিশু কখন জন্ম গ্রহণ করেছিল	☐ ৩৮সপ্তাহের আগে ☐ ৩৮সপ্তাহের পরে ☐ ৪২ সপ্তাহের পরে
৮	ডেলিভারির স্থান	☐ বাড়িতে ☐ হাসপাতালে
৯	ডেলিভারির ধরন	☐ নরমাল ☐ সিজার ☐ শল্য চিকিৎসার মাধ্যমে‘ ☐ অন্যান্য যন্ত্রপাতির মাধ্যমে ডেলিভারি
১০	প্রসববেদনার সময় কতক্ষণ ছিল	☐ ১২ ঘন্টার কম ☐ ১২ ঘন্টার বেশি
১১	আপনার শিশুটি কি জন্মের সঙ্গেসঙ্গে কেঁদেছিল	☐ হ্যাঁ ☐ না
১২	অঙ্গের সম্পৃক্ততা	☐ মনোপ্লোজিক

		☐ ভাইপ্লোজিক ☐ কোয়াড্রিপ্লোজিক ☐ ট্রাইপ্লোজিক ☐ হেমিপ্লোজিক
১৩	উচ্চতা	..... মি
১৪	ওজন	..... কেজি
১৫	বি এম আই	..... কেজি/মি^{২}

পার্ট-৩ ঃ জি এমএফসি এস (G M F C S)

প্রশ্ননং	প্রশ্ন	উত্তর
১৬	২য় ও ৪র্থ বছরের মাঝে	পর্যায়ঃ- ১ ● শিশু মেঝেতে বসে উভয় হাত নিপুন তার সহিত মুক্ত ভাবে নাড়া চাড়া করে ● বয়স্ককারোসাহায্য ব্যতীত বসা থেকে দাড়ানো এবং দাড়ানো থেকে বসতে পারে । ● শিশু চলাচলের চলাচলের সাহায্যকারী যন্ত্র ছাড়াই চলাচলের সঠিক নিয়ম অনুযায়ী হাঁটতে পারে । পর্যায়-ঃ ২

		• শিশু মেঝে বসতে পারেকিন্তু যখনউভয়হাতনিপুনতার সাথে মুক্তভাবে কোন বস্তু নাড়াচাড়া করতে যায়তখন ভারসাম্য বজায় রাখা কঠিন হয়ে পড়ে । • বয়স্কদের সহযোগিতা ছাড়াই উঠাবসা করতে পারে । স্থীতিশীল তলে স্থীর ভাবে দাড়াতে পারে । • শিশুহাত ও হাঁটু দিয়ে পারস্পরিক নিয়মে হামাগুরি দেয়, আসবাসপত্র ধরে উঠা এবং চলাচলের সাহায্যকারী যন্ত্র দিয়ে চলাচলের সঠিক নিয়ম অনুযায়ী চলতে পারে । • **পর্যায়ঃ-৩** • শিশু প্রায় সময় মেঝেতে আসন করে বসে এবং বসতে বড়দের সাহায্য লাগতে পারে । • শিশু পেটের উপর ভর করে হামাগুড়ি অথবা হাত এবং হাঁটু দিয়ে হামাগুড়ি দেয় । যেটা তাদের স্বাধীন ভাবে চলাচলের প্রাথমিক পদ্ধতি • শিশু স্থির তলে দাঁড়াতে পাওে এবং স্বল্প দূরতে চলতে পারে ।

		• শিশু ঘরের মধ্যে স্বল্প দূরতে চলাচলের সাহায্যকারী যন্ত্র দিয়ে হাটতে পারে এবং চলাচল শুরু করতে এবং ঘুড়তে বড়দের সাহায্য লাগে । **পর্যায়ঃ- ৪** • যখন শিশুকে মেঝেতে বসে তখন স্থাপিত করা হয় তখন তারা হাতের সাহায্য ছাড়া সমতলতা ও ভারসাম্য বজায় রাখতে বজায় রাখতে পারে না । • শিশু বারবার বসতে এবং দাড়ানোর জন্য সাহায্যকারী উপরকণ লাগে । • অল্প দূরত্বে নিজের চলাচলের জন্য শিশু মেঝেতে ঘুরপাক, পেটে ভর দেয়া অথবা হাত এবং পা হামাগুরি দেয় । **পর্যায়ঃ-৫** • শিশুর শারীরিক অক্ষমতা তার স্বেচ্ছায় চলাচল নিয়ন্ত্রণে এবং মাথা ধড় এ্যান্টিগ্রাভিটির দিকে ধরে রাখতে বাধা দেয় । সব জায়গায় মটর ফাংশন সীমিত । • বসার ও দাঁড়ানোর কাজের সীমাবদ্ধতা যেটা মানিয়ে নেয়ার উপকরণ এবং সাহায্যকারী প্রযুক্তি দিয়ে ক্ষতি পূরণ হয় না ।

		• পর্যায় ৫, এ শিশুর স্বাধীন চলাচল এবং স্থানান্তর থাকে না। কিছু শিশু নিজের স্বাধীন চলাচলের জন্য হুইলচেয়ার ব্যবহার করে নিজেদের ব্যপক ভাবে মানিয়ে নেয়।
১৭	৪র্থ ও ৬ষ্ঠ বছরের মাঝে (যদি রোগীর বয়সসীমা ৪-৬ হয় তবে ১৬নং প্রশ্ন বাদ যাবে)	পর্যায়ঃ-১ • শিশুর হাতের সাহায্য ছাড়াই উঠতে,বসতে ও নামতে পারে। • শিশু কোন কিছুর সাহায্য ব্যতীত মেঝে ও চেয়ারে বসা থেকে দাড়াতে পারে। • শিশু ঘরের ভিতরে ও বাহিরে হাটতে পারে এবং সিঁড়িতে উঠতে পারে। • উদয়ীমান সামর্থ্য আছে দৌড়ানোর ও লাফানোর। পর্যায়ঃ- ২, • শিশু দুই হাত মুক্ত ভাবে ব্যবহার করে চেয়ারে বসতে পারে। • শিশু মেঝে থেকে দাড়াতে এবং বসা থেকে দাড়াতে পারে কিন্তু মাঝে মাঝে তার বাহুকে স্থীর কিছুর সাথে টান দিতে বা ধাক্কা দিতে হয়। • শিশু কোন প্রকার সাহায্যকারী চলাচলের যন্ত্র ছাড়াই ঘরের ভিতরের এবং বাহিরের সমতল জায়গায় অল্প হাঁটতে পারে।

		• শিশু রেলিং ধরে সিঁড়িতে উঠতে পারে কিন্তু দৌড়তে বা লাফ দিতে পারেনা । পর্যায়ঃ- ৩ • শিশু নিয়মিত চেয়ারে বসতে পারে কিন্তু তার হাতের সর্বোচ্চ সাহায্যের জন্য তার কোমড় এবং ধড়কে ব্যবহার করে । • শিশু তার বাহুকে স্থীর সমতল এর সাথে টানদিয়ে বা ধাক্কা দিয়ে চেয়ারে উঠা বসা করতে পারে । • শিশু কোন সহকারী চলাচল যন্ত্র ছাড়াই সমতলে হাটতে পারে এবং বয়সকদের সাহায্য নিয়ে সিঁড়ি দিয়ে ওঠতে পারে। শিশু অল্প দূরত্বে ভ্রমণ বা বাহিরের অসমতল ভূখন্ডে যাতায়াত করতে পারে । পর্যায়ঃ-৪ • শিশু চেয়ারে বসতে পারে কিন্তু ধড় নিয়ন্ত্রনের জন্য মানানসই বসার ব্যবস্থা এবং সর্বোচ্চ হাতের ব্যবহার দরকার হয় । • শিশুর চেয়ার থেকে উঠতে এবং বসতে কোন বয়স্ক সাহায্যকারীর দরকার হয় বা তার বাহুকে টান দিতে বা ধাক্কা দিতে কোন স্থির জায়গার দরকার হয় ।

		• শিশু স্বল্প দূরত্বে কোন ওয়াকার এবং বয়স্ক তদারককারীর সাহায্যে হাটতে পারে কিন্তু অসমতল জায়গায় ঘুরতে এবং ভারসাম্য বজায় রাখতে সমস্যা হয় । • শিশু সমাজে যাতায়াত করে । স্বাধীনভাবে চলাচলের জন্য পাওয়ার হুইলচেয়ার ব্যবহার করে । পর্যায়ঃ-৫ • শিশুর শারীরিক অক্ষমতা তার স্বেচ্ছায় চলাচল নিয়ন্ত্রণে এবং মাথা ধড় এ্যান্টিগ্রাভিটির দিকে ধরে রাখতে বাধা দেয় । সব জায়গায় মটর ফাংশন সীমিত । • বসার ও দাঁড়ানোর কাজের সীমাবদ্ধতা যেটা মানিয়ে নেয়ার উপকরণ এবং সাহায্যকারী প্রযুক্তি দিয়ে ক্ষতি পূরণ হয় না । • পর্যায় ৫, এ শিশুর স্বাধীন চলাচল এবং স্থানান্তর থাকে না । কিছু শিশু নিজের স্বাধীন চলাচলের জন্য হুইলচেয়ার ব্যবহার করে নিজেদের ব্যপক ভাবে মানিয়ে নেয় ।
১৮	৬ ও ১২ বছরের মধ্যে (যদি রোগীর বয়সসীমা ৬-১২ হয় তবে ১৭নং বাদ যাবে)	পর্যায়ঃ- ১

		• শিশু ঘরের ভেতরে এবং বাহিরে হাটতে পারে এবং কোন বাঁধা ছাড়াই সিঁড়িতে উঠতে পারে । • শিশু গ্রস মটর দক্ষতাগুলো করতে পারে যার মাঝে থাকে দৌড়ানো এবং লাফানো কিন্তু গতি, ভারসাম্য এবং সমন্বর কম থাকে । পর্যায়ঃ-২ • শিশু ঘরের ভেতরে এবং বাহিরে হাটতে পারে এবং রেলিং ধরে সিঁড়িতে উঠতে পারে কিন্তু অমসৃণ জায়গায় হাটতে, ঝুকতে এবং ভীড়ের মধ্যে বা সংকীর্ণ জায়গায় হাটতে পারে । • শিশুর গ্রস মটর দক্ষতা পূরণে সীমিত ক্ষমতা আছে যেমন দৌড়ানো এবং লাফানো । পর্যায়ঃ-৩ • শিশু সাহায্যকারী চলাচল যন্ত্র দিয়ে ঘরের ভেতরে এবং বাহিরে হাটতে পারে • শিশু রেলিং ধরে সিঁড়িতে উঠতে পারে • দেহের উপরের অঙ্গের উপর ভিত্তি করে, শিশু হাত দিয়ে হুইলচেয়ার চালাতে পারে

		অথবা দীর্ঘ দূরত্বে বা ঘরের বাহিরে অমসৃণ ভূখন্ডে যাতায়াত করতে পারে । পর্যায়ঃ-৪ ● শিশু কাজের পর্যায়গুলো ৬ বছর বয়সে আগেই অর্জন করে অথবা বাড়ি, বিদ্যালয় এবং সমাজে চলাচলের জন্য হুইলচেয়ারের উপর পূর্ণ আস্থা রাখে । ● শিশু পাওয়ার হুইলচেয়ার ব্যবহার করে স্বাধীনভাবে চলাচল করে । পর্যায়–ঃ ৫ ● শিশুর শারীরিক অক্ষমতা তার স্বেচ্ছায় চলাচল নিয়ন্ত্রণে এবং মাথা ধড় এ্যান্টিগ্রাভিটির দিকে ধরে রাখতে বাধা দেয় । সব জায়গায় মটর ফাংশন সীমিত । ● বসার ও দাঁড়ানোর কাজের সীমাবদ্ধতা যেটা মানিয়ে নেয়ার উপকরণ এবং সাহায্যকারী প্রযুক্তি দিয়ে ক্ষতি পূরণ হয় না । পর্যায় ৫, এ শিশুর স্বাধীন চলাচল এবং স্থানান্তর থাকে না । কিছু শিশু নিজের স্বাধীন চলাচলের জন্য হুইলচেয়ার ব্যবহার করে নিজেদের ব্যপক ভাবে মানিয়ে নেয় ।

পার্ট ৪ঃ ফাংশনাল পর্যায় অ্যানালাইসিস

ক্ষেত্র	হিসাব
নিজের যত্ন	
১৯ । খাদ্য	
২০ । সাজগোজ	
২১ । গোসল	
২২ । পোশাক পরিধান- উপরের অঙ্গ	
২৩ । পোশাক পরিধান - নিচের অঙ্গ	
স্ফিঙ্কটার কন্ট্রোল	
২৪ । প্রসাবপায়খানা	
২৫ । মূত্রাশয়ব্যবস্থাপনা	
২৬ । অন্ত্র ব্যবস্থাপনা	
নিজের যত্নের উপমোট ঃ	
যাতায়াত	
২৭ । স্থানান্তরন: চেয়ার/উইলচেয়ার	
২৮ । স্থানান্তরন: বাথরুম	
২৯ । স্থানান্তরন: ট্যাব/ঝরনা ।	
অবস্থান	
৩০ । স্থান: হাটা/ উইলচেয়ার/ হামাগুড়ি	
৩১ । স্থান : সিঁড়ি	
চলাচল উপমোটঃ	
যোগাযোগ	
৩২ । উপলব্ধি	
৩৩ । অভিব্যক্তি	

সামাজিক বোধশক্তি	
৩৪ । সামাজিক মিথতক্রিয়া	
৩৫ । সমস্যাসমাধান	
৩৬ । স্মৃতি	
বোধশক্তি উপমোট ঃ	

Weefim (R) Levels

সাহায্য নাই

৭. সম্পূর্ণ সাবলম্বী (যথাসময়ে, নিরাপদে)

৬. পরিবর্তিত সাবলম্বী (যন্ত্র)

সাহায্যকারী- পরিবর্তিত নির্ভরশীলতা

৫. কার্যদক্ষণ

৪. অল্পতম সহায়তা (নির্ভরশীল= ৭৫% অথবা তার বেশি)

৩. মাঝারি সহায়তা (নির্ভরশীল=৫০% অথবা তার বেশি)

সাহায্যকারী- সম্পূর্ণ নির্ভরশীলতা

২. সর্বোচ্চ সহায়তা (নির্ভরশীল= ২৫%-৪৯% অথবা তার বেশি)

১. সম্পূর্ণ সহায়তা (নির্ভরশীল= ০%-২৪% অথবা তার বেশি)