



Faculty of Medicine

University of Dhaka

**FACTORS ASSOCIATED WITH LOW ADHERENCE TO
PHYSIOTHERAPY TREATMENT FOR THE CHILDREN WITH
CEREBRAL PALSY**

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Bachelor of Science in Physiotherapy (B.Sc. In PT)

DU Roll no.: 1145

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Bangladesh Health Professions Institute

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We the undersigned certify that we have carefully read and recommend to the faculty of Medicine, University of Dhaka, for acceptable this disseration entitled

**FACTORS ASSOCIATED WITH LOW ADHERENCE TO
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CEREBRAL PALSY**

Submitted by **Sraboni Biswas** for partial fulfillment of the requirement for the degree of Bachelor of Science in Physiotherapy (B.Sc. in PT)

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DECLARATION

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Acronym

CRP: Center for Rehabilitation of the Paralyzed

BHPI: Bangladesh Health Profession's Institute

IRB: Institutional Review Board

WHO: World Health Organization

SPSS: Statistical Package for the Social Science

CP: Cerebral Palsy

ACDS: Adherence in Chronic Disease Scale

CNS: Central Nervous System

PVL: Periventricular Leukomalacia

HINE: Hammersmith Infant Neurological Examination

MRI: Magnetic Resonance Imaging

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Abstract

Purpose: The purpose of the study is to find out the factors associated with low adherence to physiotherapy treatment for the children with cerebral palsy. **Objectives:** The objectives of the study were to find out the prevalence of patient adherent to physiotherapy treatment for cerebral palsy, identify the sociodemography of the participants, to explore the common causes of non-adherence, to observe the association between level of adherence and several sociodemographic information like (age, gender, living area, education, comorbidities) and physical parameter related information. **Methodology:** The study design was cross-sectional. Total 105 samples were selected conveniently for this study from Centre for the rehabilitation of the paralyzed (CRP), Pediatric unit, at Savar. Data was collected by using of questionnaire, adherence level was measured by The Adherence in Chronic Diseases Scale (ACDS). The study was conducted by descriptive and inferential analysis through using SPSS software 20 version. **Results:** This study found the prevalence of high adherence people which was 9.5%, medium adherence people was 60% and low adherence people was 30.5%, a weak association found between adherence category and level of motivation. Not found any association between adherence category with gender, living area, occupation of mother, feeding problem, epileptic sign, level of adaptation, Level of motivation, Emotional states, Distance of residence, Transport hazard, Family support, family member with disability. **Conclusion:** Adherence to physiotherapy treatment is very important to improve the functional ability, physical condition and also to improve the quality of life for the cerebral palsy patients. I found in this study that the percentage of medium adherent people is high. This findings means, awareness about the importance of physiotherapy treatment is increasing gradually than before.

Key word: Adherence, cerebral palsy, physiotherapy treatment, ACDS scale.

1.1 Background

Cerebral palsy is a non-progressive irreversible lesion in one or more areas of the developing brain that results from a brain damage sustained during labor, delivery, or birth: (Cada, and O'Shea, 2008). It is caused by damage to or abnormalities in the developing brain, specifically in areas that control motor function. The exact cause of cerebral palsy is not always clear, and it can vary from case to case. Between 40% and 50% of all children who develop cerebral palsy were born prematurely (William and Carey, 2009). Most of these cases (75–90%) are believed to be due to issues that occur around the time of birth, often just after birth (Yarnell, 2013, p.190). It is the most prevalent neurodevelopmental condition, starting in the early neonatal stage and lasting throughout life (Sharma and Sinha 2016).

According to Vincer, M. J. et al. (2006), the prevalence of CP is significantly higher in preterm infants than in full-term infants. The prevalence of cerebral palsy is 2.5 per 1,000 live births worldwide (Tollanes 2014). In developing nations, the prevalence of cerebral palsy is 5 to 10 times higher (Cruz., 2006). Bangladesh is a developing nation, and there were 3.7 cases of cerebral palsy for every 1,000 live births there (murthy at al, 2014). Another study that looked at the frequency of childhood impairments and cerebral palsy in the local population concluded that the prevalence of the condition was 6.1/1000 live births in Bangladesh (Tabib, 2009). In Bangladesh, the prevalence of impairment caused by cerebral palsy was estimated to be 70/1,000 for all severity levels and 22/1,000 for substantial disability in a group of children ages 2 to 9 from both urban and rural populations (Mubarak., 2000). With a frequency of 1–7–1 per 1000 live births in high-income nations and a greater incidence in low-income countries, cerebral palsy is the most prevalent cause of severe physical disability in early childhood (E Monbaliu et al., 2017). Although CP is considered to be a nonprogressive disorder, prolonged adherence with physiotherapy is often considered necessary throughout childhood to reduce complications or slow deteriorations associated with the condition.

For many kids with cerebral palsy (CP), physical therapy is an essential part of growth and development. Even though CP is thought to be a nonprogressive ailment, it is frequently believed that long-term devotion to physical treatment is required throughout infancy to lessen difficulties or halt deteriorations brought the condition. As a result of increased medical care, 90% of children with CP live into adulthood (Rapp and Torres 2000). Along with having CP, those who have the condition also have a similar chance of developing other illnesses as the general population, necessitating more thought for their comprehensive therapeutic management (Jahnsen, Villien, Aamodt, Stanghelle and Holm 2004). The demand for therapeutic intervention rises as CP prevalence rises and is associated with a longer life expectancy (O'Grady, Crain, and Kohn, 1995, Stokes 2005). Therapeutic intervention is needed to address this rising demand. Physiotherapy recipients' perceptions of services can be used to uncover personal and developmental factors that affect adherence, which will help match therapeutic services effectively with the needs and expectations of service recipients.

Physiotherapy is an integral aspect of growth and development for many children who have cerebral palsy (CP). Although CP is considered to be a nonprogressive disorder, prolonged adherence with physiotherapy is often considered necessary throughout childhood to reduce complications or slow deteriorations associated with the condition. Approximately 90% of children who have CP survive well into adulthood as a result of improved medical intervention (Rapp and Torres 2000). In addition to the CP, persons with the condition are as susceptible to similar risk of medical conditions as the general population, which requires further consideration for their holistic therapeutic management (Jahnsen et al. 2004). As the prevalence of CP increases and is combined with a longer life expectancy (O'Grady, Crain, and Kohn, 1995, Stokes, 2005), the need for therapeutic intervention is also important.

Patients with cerebral palsy (CP) must adhere to their physiotherapy regimen since it has a substantial impact on their general health, functional capabilities, and quality of life. Damage to the developing brain is the source of the neurological condition known as cerebral palsy, which causes a variety of motor deficits and problems with movement and coordination. In order to manage CP and maximize one's chances of functional

independence and mobility, physiotherapy is crucial. Here are some key reasons why adherence to physiotherapy is important for cerebral palsy patients:

Improved motor function and movement control is the goal of physiotherapy therapies like balance training, strengthening exercises, and stretching routines. Regular attendance at physiotherapy sessions aids in creating more effective movement patterns, strengthening weak muscles, and improving muscular tone and flexibility (Hallman M, April 2012). Physiotherapy aids cerebral palsy patients in gaining more freedom in their everyday activities by focusing on specific motor impairments and resolving mobility issues (Wallwiener et al., 2012). It focuses on enhancing fundamental abilities such as sitting, standing, walking, and carrying out functional duties so that patients can take a more active role in their personal and social lives

Secondary consequences including contractures (permanent muscle tightness), muscle imbalances, joint abnormalities, and skeletal issues can be predisposed to in people with cerebral palsy. By preserving joint mobility, maximizing muscle length, and fostering appropriate alignment, physiotherapy interventions such as stretching, range-of-motion exercises, and orthotic management assist avoid and manage these issues (Keogh et al., 2013).

Physiotherapy focuses on enhancing social and communicative skills in addition to treating motor problems. For instance, it could include exercises that promote eye contact, hand gestures, and body language to help people with CP communicate and interact with others more effectively (Teng et al., 2012). Muscle imbalances, joint stiffness, and overuse injuries all contribute to the pain and suffering that many cerebral palsy sufferers endure. Exercise regimens, modalities (such as heat or cold therapy), and manual therapy techniques are all examples of physiotherapy interventions that can aid with discomfort management (Perkins EM, 2015).

Following through with physiotherapy appointments can improve how well cerebral palsy patients respond to other treatments or interventions. For instance, physiotherapy-acquired increased strength and enhanced motor function can improve the effects of occupational therapy and speech therapy. For those with cerebral palsy, consistency and long-term devotion to PT interventions produce the best benefits. Regular therapy sessions over time serve to maintain and further improve motor function, avoid

degeneration, and promote optimal physical health throughout the lifespan. It is a progressive and cumulative process (Davies et al. 2015).

Collaboration between people with cerebral palsy, their families, and medical experts is crucial for creating an individualized treatment plan and encouraging constant attendance at therapy sessions in order to optimize the benefits of physiotherapy. A healthy lifestyle outside of therapy can also help to reinforce the advancements gained during official physiotherapy sessions, as can implementing home exercise regimens.

The literature describes a number of factors that can contribute to non-adherence to treatment, including patient characteristics, the disease itself, the medications taken, and interactions between patients and medical staff (Tavares et al. 1013). Specific impediments to adherence may result from the peculiarities of various medical illnesses or treatments.

The World Health Organization (WHO) estimates that the overall population has a non-adherence rate to long-term treatment of about 50.0% (Bertoldi et al. 2014). DiMatteo (2004) found an average non-adherence rate of 24.8% in a comprehensive analysis of research published over a 50-year period.

Cerebral palsy patients require ongoing multidisciplinary care. But occasionally they are unable to continue their PT. Due to therapy discontinuity, several CRP patients are not improving as intended. I wish to investigate the reasons behind the discontinuity. If these factors are identified, CRP can take the required actions to address the issues and guarantee the patients' growth. Patients receiving Cerebral Palsy and Physiotherapy Treatment can now live more comfortably.

1.2 Rationale:

Cerebral Palsy is a serious childhood disorder. There is sensory and motor deficit due to non-progressive lesion in the developing brain. This causes intellectual disability, impaired or delayed to achieve motor function, dyskinetic posture, athetosis, increased tone, abnormal gait, visual, hearing, speech and language impairment, overall functional disability and decreased quality of life Cerebral palsy can lead to muscle contractures and skeletal deformities over time. Physiotherapy exercises and interventions can help prevent or reduce the severity of these issues. Consistent therapy can maintain joint range of motion and prevent muscles from becoming permanently shortened.

Physiotherapy plays a vital role in managing cerebral palsy and improving the functional abilities of affected individuals. Low adherence to treatment can lead to suboptimal outcomes and hinder progress. By identifying the factors that contribute to low adherence, healthcare providers can develop strategies to improve patient compliance and, consequently, enhance treatment outcomes.

Patient with cerebral Palsy need long term multidisciplinary treatment. But sometimes they cannot continue PT treatment. Several patients at CRP are not achieving proper improvement due to discontinuity of treatment. I want to explore the causative factors for the discontinuity. If these factors can be found out, CRP can take necessary steps to solve these problems and ensure the development of the patients condition and quality of life. Thus, taking Physiotherapy Treatment Cerebral palsy patients can lead their life more smoothly.

1.3 Research question

What are the factors responsible for low adherence to physiotherapy treatment of Cerebral Palsy patients?

1.4 Study Objectives:

1.4.1 General objectives:

Determining the factors associated with low adherence to physiotherapy treatment of Cerebral Palsy patients

1.4.2 Specific objectives:

1. To find out the prevalence of patient adherent to physiotherapy treatment for cerebral palsy.
2. To identify the socio-demography of the participants
3. To explore the common causes of non-adherence.
4. To observe the association between level of adherence and several sociodemographic variable.

1.5 Operational definition:

Cerebral palsy: Cerebral palsy (CP) is a group of disorders that affect a person's ability to move and maintain balance and posture. CP is the most common motor disability in childhood. Cerebral means having to do with the brain. Palsy means weakness or problems with using the muscles.

Poor Adaptation: Children cannot adapt naturally when they are put into a new environment and show behaviors like scrying, getting irritated, fearing and not communicating with people etc.

Good Adaptation: Children act normal and show positive behavior like cheering and trying to communicate with people.

Abnormal Emotion: The mother is anxious and depress, so, her normal life is obstructed and she cannot sleep or eat properly.

Transport Hazard: Unavailability of the vehicles, far distance, traffic jam, Poor road condition, slower medium of transportation etc.

The aim of this study is to analyze factors associated with low adherence to Physiotherapy treatment for children with cerebral palsy.

Cerebral palsy:

The term "cerebral palsy" (CP) refers to a range of persistent impairments of movement and posture that impede daily activities and are thought to be caused by non-progressive problems in the developing fetal or infant brain. Perception, cognition, sensation, communication, behavior, epilepsy, and secondary musculoskeletal issues are frequently present alongside the motor impairments of CP. According to Bax M. (2005), cerebral palsy is the physical disability that affects children the most frequently. According to Cada, (2008), cerebral palsy is a non-progressive irreversible lesion that affect one or more parts of the developing brain. It can also result from a brain damage that occurs during labor, childbirth, or delivery. It is the most prevalent neurodevelopmental disorder, starting in the early neonatal stage and lasting throughout life (Sharma, 2016). The mobility and posture disorder Cerebral Palsy (CP), which develops during infancy or early childhood as a result of brain injury. The brain damage is irreversible and cannot be repaired, but the earlier intervention is begun, the more progress can be made. Any non-progressive lesion to the central nervous system (CNS) that takes place within the first two (or even five) years of life is regarded as CP. Although the wording of the various definitions of CP in the literature may differ significantly, they are all comparable and can be summed up as follows:

A non-progressive interference, lesion, or anomaly of the developing or immature brain is the cause of the movement, posture, and/or motor function impairments collectively known as cerebral palsy (Dev Med Child Neurol, 2000). Progressive disorders of motor function—defined as the loss of previously learned skills in the first five years of life—are expressly excluded from this criterion. A chronic, crippling illness called cerebral palsy (CP) is brought on by irreversible harm to the developing brain. It is frequently seen all over the world (Couper, 2002).

There is a dearth of literature analyzing the connections between CP, adherence, and physiotherapy. It is crucial to emphasize the accepted medical adherence standards because physiotherapy can benefit from the same concepts. Initially, the term "adherence" referred to the traits that were similar to glue. According to O'Carroll and

Hendriks (1989), adherence in the context of physical therapy refers to a person's ability to stick with, support, and continue using the recommended regimens provided to improve their physical functioning.

According to Mullen (1997), the words "adherence" and "cooperation" are suitable, and he highlights a rise in patient collaboration. The concept that the effectiveness of physiotherapy can only exist if patients continue to engage in regimens designed to maximize their mobility and self-sufficiency, which are typically organized by professionals such as physiotherapists, is based on definitions of adherence that have significant implications for the efficacy of physiotherapy (Chappell and Williams, 2002). Since it is a mutually beneficial partnership between the customer and the physiotherapist, adhering to rules and regulations is crucial for good practice.

Etiology:

A non-progressive condition of the growing brain, cerebral palsy can have a variety of causes in the pre-, peri-, or postnatal periods. Cystic periventricular leukomalacia (PVL) is the most significant of these conditions, and it is followed by intra- and periventricular hemorrhage, hypoxic-ischemic encephalopathy, vascular issues, infections, or brain abnormalities. According to Maurer (2002), injury to the first motor neuron is always the underlying reason. The etiology does seem to differ as the contribution of severe birth asphyxia, kernicterus and central nervous system infections (e.g., tuberculosis, meningitis, cerebral malaria etc.) continues to be significant problem in many developing countries (Nottidge, 1995). The incidence of CP is 2-3 per 1,000 live births (Patel 2020). Most cases of CP are due to complications in the foetal or neonatal brain, but post-neonatal onset CP can occur. The main pathologic findings for preterm infants are intracerebral hemorrhage and periventricular leukomalacia (i.e., "diffuse injury of deep cerebral white matter, accompanied in its most severe form by focal necrosis" (Folkerth., 2006). Injuries that occur after the neonatal period and before 5 years of age are considered post-neonatal CP; these injuries are generally caused by traumatic brain injury, meningitis and near-drowning (Patel et al. 2020).

Risk factors:

Two important risk factors associated with CP are prematurity (delivery before 37 weeks) and low birth weight (less than 2.5 kg). Other factors can also increase risk such as multiple gestation, maternal and fetal infections, malformation of the brain and genetic causes (Patel et al. 2020).

Pre-conception Risk Factors

- Substance abuse
- Maternal undernutrition
- Swallowing harmful substances
- Systemic illness in the mother
- Fertility issues
- Previous spontaneous termination of pregnancy (Paul et al. 2022)

Gestation Risk Factors

- Gestational diabetes
- Maternal abnormalities of the central nervous system
- Preeclampsia
- Excessive bleeding per vagina
- Multiple gestations
- Genetics
- Encephalopathy of prematurity (Paul et al. 2022).

Delivery Risk Factors

- Vacuum-assisted delivery
- Forceps delivery
- C-section

- Labour induction
- Prolonged labour
- Asphyxia
- Delivery after due date (Paul et al. 2022).

Management strategies to help decrease prematurity prevalence include prescribing magnesium sulphate, progesterone and corticosteroids to pregnant women (Paul S et al. 2022).

Epidemiology:

It is difficult to access and clarify the prevalence and incidence rate of disabilities in poor-resource settings (Gladstone, 2010). Not only the prevalence of childhood disability is on the rise and CP is one of the costliest chronic conditions, but also life expectancies are improving, which increases the burden of CP (Papavasiliou, 2009). For comparison, in the USA, there are approximately 700'000 children with CP, 2-5/1000 born.

Cerebral palsy is the most common motor disability in childhood. The etiology of CP is very diverse and multifactorial. The causes are congenital, genetic, inflammatory, infectious, anoxic, traumatic and metabolic. The injury to the developing brain may be prenatal, natal or postnatal. As much as 75%-80% of the cases are due to prenatal injury with less than 10% being due to significant birth trauma or asphyxia. The most important risk factor seems to be prematurity and low birth weight with risk of CP increasing with decreasing gestational age and birth weight.

Population-based studies from around the world report prevalence estimates of CP ranging from 1.5 to more than 4 per 1,000 live births or children of a defined age range. Recent advances in neonatal management and obstetric care have not shown

a decline in the incidence of CP. With a decline in infant mortality rate, there has actually been an increase in the incidence and severity of CP. The incidence in premature babies is much higher than in term babies. Cerebral palsy is more common among boys than among girls and more common among black children than among white children (Mayo, 20 clinic Infant jaundice19)

Most of the children identified with CP have Spastic cerebral palsy (77, 4%). Over half of the children identified with CP (58, 2%) can walk independently, 11, 3% walks using a handheld mobility device and 30, 6% has limited or no walking ability. Many children with CP also do have at least one co-occurring condition (e.g. 41% Epilepsy) (Chukwukere Ogoke 2018).

The incidence of CP has not declined despite the improved perinatal and obstetric care. Even at centres where optimal conditions exist for perinatal care and birth asphyxia is relatively uncommon, the incidence of CP in term babies has remained the same.

The overall prevalence worldwide has increased during the last decades because of increased survival rates. Here are some facts on the epidemiology of CP:

- The incidence is 2-2,5/1000 live births in Western Countries
- The prevalence varies between 1-5/1000 babies in different countries.
- There are no reliable statistics from Asian countries.
- Some affected children do not survive
- Etiology

Improved medical care has decreased the incidence of CP among some children. Medical advances have also resulted in the survival of children who previously would have died at a young age (Palisano et al. 2018).

Clinical Presentation: Although brain damage typically occurs prenatally or perinatally, the clinical manifestations of this disorder become apparent gradually in infancy, as the child fails to evolve along the expected trajectory (Bax et al. 2007). Early hand preference, or hand preference, was the most often cited early sign of CP.

gleaned from history (Novak et al. 2017). Early hand preference, or hand preference, was the most often cited early sign of CP gleaned from history. The earliest age at which hand preference could be considered developmentally appropriate varied between six months and two years; the most often cited age before which the emergence of hand preference would be inappropriate was 12 months. Symptoms of irritability included jitteriness, jumpy behavior, excessive crying, and easy startling. (Murphy et al. 2003).

Clinical features

Clinical history characteristics: A number of factors from the clinical history should warrant evaluation for a CP diagnosis referral. An early aspect is parental anxiety for a developmental delay in and of itself (Chung et al. 2011). Here is a list of the early characteristics that the clinical history revealed. Davis (1997) lists jitteriness, jumpy behavior, excessive sobbing, and ease in shocking as signs of irritation. Lethargy, a lack of attention, and irregular sleep patterns were signs of a lower degree of consciousness (Jones et al. 2007). Early feeding issues, oral hypersensitivity, poor sucking, bad swallowing, and excessive drooling were all signs of oromotor abnormalities (Myers and Shapiro 1999, pp. 87–91).

Early characteristics discovered through investigation of developmental milestones: Early symptoms of CP were consistently characterized by the absence or delayed achievement of motor developmental milestones (Allen and Alexander 1997, pp. 12–16). Volitional rolling (limited to four to six months) was one particular delayed gross motor milestone that was mentioned repeatedly (Morgan et al. 2011). The maximum ages for sitting (seven to nine months), abnormally or tardily crawling, and delayed walking (15 to 18 months) are all recommended (Allen and Alexander 1997). But slow walking can't really be considered an early indicator. For six milestones in gross motor development, the World Health Organization has established windows of achievement (WHO, 2006).

Characteristics of the neurological exam the early characteristics of CP that were most frequently identified were those from the neurological examination. The Hammersmith Infant Neurological Examination (HINE) is one of many test batteries. Early signs of

CP were said to include primitive reflexes that last longer than the first four to six months of life (Murphy and Neiber 2003, pp.146-169)

Early handedness, with earliest acceptable age ranging from 6 to 24 months

- Irritability Reduced level of consciousness
- Oromotor abnormalities: feeding problems, poor sucking or swallowing, and drooling
- Developmental milestones
- Volitional rolling delayed beyond 4-6 months
- Paradoxical early rolling at 1-2 months
- Sitting delayed beyond 7-9 months
- Walking delayed beyond 15-18 months
- Neurological examination
- Persistence of primitive reflexes, beyond 4-6 months, such as the Moro, crossed extensor, and the suprapubic extensor reflex
- Delay or failure to acquire postural reflexes, such as the propping and parachute reflexes
- Asymmetry in popliteal angle, hand opening, or other signs of asymmetry in tone or movement
- Hypotonia in the early phase followed by hypertonia Fisting, scissoring, or clonus
- Toe walking.

Diagnosis

The diagnosis of cerebral palsy has historically rested on the person's history and physical examination and is generally assessed at a young age. A general movements assessment, which involves measuring movements that occur spontaneously among those less than four months of age, appears most accurate (Bosanquet et al., 2015). Children who are more severely affected are more likely to be noticed and diagnosed earlier. Abnormal muscle tone, delayed motor development and persistence of primitive reflexes are the main early symptoms of CP (Meyers et al. 2017). Symptoms and diagnosis typically occur by the age of two (Lungu et al. 2016). although depending on factors like malformations and congenital issues (*Birth Injury Guide*. 3 January 2022). persons with milder forms of cerebral palsy may be over the age of five, if not in adulthood, when finally diagnosed (Lungu et al. 2016). Cognitive assessments and medical observations are also useful to help confirm a diagnosis. Additionally, evaluations of the child's mobility, speech and language, hearing, vision, gait, feeding and digestion are also useful to determine the extent of the disorder. Early diagnosis and intervention are seen as being a key part of managing cerebral palsy (Graham et al., February 2019). Machine learning algorithms facilitate automatic early diagnosis, with methods such as deep neural network and geometric feature fusion producing high accuracy in predicting cerebral palsy from short video (McIntyre et al. 2011) .

Once a person is diagnosed with cerebral palsy, further diagnostic tests are optional. Neuroimaging with CT or MRI is warranted when the cause of a person's cerebral palsy has not been established. An MRI is preferred over CT, due to diagnostic yield and safety. When abnormal, the neuroimaging study can suggest the timing of the initial damage. The CT or MRI is also capable of revealing treatable conditions, such as hydrocephalus, porencephaly, arteriovenous malformation, subdural hematomas and hygromas, and a vermian tumour (Kolawole TM et al. 1989). (which a few studies suggest are present 5–22% of the time). Furthermore, an abnormal neuroimaging study indicates a high likelihood of associated conditions, such as epilepsy and intellectual disability (Ashwal et al. 2004). There is a small risk associated with sedating children to facilitate a clear MRI (National Guideline Alliance (UK) (January 2017) .

Chronic Disease Adherence scale : The ACDS is a 7-item questionnaire. Each question is associated with 5 predefined propositions of answers. The questions are related to patients' behaviour directly determining adherence (items 1-5) or to situations and opinions which may influence adherence (items 6-7). The ACDS is dedicated to adherence evaluation in adult patients treated due to chronic diseases. This scale is supposed to reflect real-life adherence to pharmacological treatment and explain mechanisms determining patients adherence. The results of this scale may help to undertake adequate actions aimed to improve adherence to medication in clinical practice. The ACDS is a new tool to assess the implementation of the treatment plan. The scale for chronic diseases includes 7 questions with sets of 5 suggested answers to each question. The questions consider the behavior directly determining adherence (Questions 1–5), as well as the situations and views that may indirectly affect adherence (Questions 6 and 7). The ACDS is designed for surveying adults treated for chronic diseases. This tool not only has to reflect the actual implementation of the treatment plan in terms of pharmacotherapy, but also indicate the mechanisms that determine adherence of patients (Aldona Kubica et al. 2017).

Adherence with treatment: Patients' adherence to long-term therapies is low. It translates into reduced quality of life and significant deterioration of health economics. Identification of potential barriers of medication-related adherence is a starting point allowing implementation of more advanced interventions directed to adherence improvement. Aim. The purpose of our study was to create and validate a simple instrument used to assess patients' adherence to recommended therapies, Material and methods. The Adherence Scale in Chronic Diseases is a self-reported questionnaire with 7 items and with proposed 5 sets of answers. The total score in the Adherence Scale in Chronic Diseases ranges from 0 to 28 points. Three levels of adherence were considered (low: scores of 0 to 20; medium 21 to 26; high > 26).

The Adherence Scale in Chronic Diseases is a practical, reliable, consistent and well validated instrument for identifying specific obstacles to medication adherence. Its simplicity causes that it can be successfully applied in daily practice by health care professionals. Our survey has the potential to improve patient — health care professional communication and relationship (Cramer JA, 2008).

3.1 Study design

The chosen research methodology for this study is a cross-sectional design, which offers several advantages for investigating the factors associated with low adherence to physiotherapy treatment in patients with cerebral palsy. A cross-sectional study is characterized by its descriptive nature, where both the disease and exposure status are assessed simultaneously within a defined population. This approach holds several key benefits, making it a suitable choice for this investigation, as highlighted by Bailey (1997). One primary advantage of conducting a cross-sectional study is its efficiency. This design allows researchers to collect a broad spectrum of data from a sample of individuals within the population quickly and cost-effectively. Since the goal is to analyze factors associated with low adherence to physiotherapy treatment, this approach permits the collection of a diverse set of information related to patient characteristics, treatment regimens, and potential influencing factors without the need for long-term follow-ups or costly interventions. In the context of this study, a cross-sectional survey involves selecting a representative group of individuals from the predetermined population of patients with cerebral palsy. Researchers can then systematically gather the necessary data regarding their adherence to physiotherapy treatment. This data collection method is particularly useful for understanding the current state of adherence and its correlates within this specific patient group. Survey research, a common application of cross-sectional studies, plays a pivotal role in the investigation. It involves asking a large number of participants structured questions about the topic of interest, in this case, adherence to physiotherapy treatment. Surveys typically utilize questionnaires as a tool for measuring relevant variables. Importantly, this approach maintains a non-invasive and non-manipulative stance, allowing researchers to assess adherence behaviors, patient characteristics, and potential influencing factors without introducing any artificial interventions. In essence, the cross-sectional design and survey methodology chosen for this study offer a practical and efficient means of examining the multifaceted factors associated with low adherence to physiotherapy treatment in individuals with cerebral palsy. This approach enables researchers to gain valuable insights into the current state of adherence within

the patient population and paves the way for targeted interventions to improve treatment adherence in this critical medical context.

3.2.1 Study Site:

Centre for the Rehabilitation of the Paralyzed (CRP), Savar was chosen for this study. This place had chosen because it was suitable for the study and there had the samples which met inclusion and exclusion criteria of my study. At this place patient with cerebral palsy came for rehabilitation from different area of Bangladesh. As the cerebral palsy patients were available so that this place was selected.

3.2.2 Study area:

Paediatric Unit of Physiotherapy department was preferred to accomplish this study.

3.3 Sample size calculation:

The equation of sample size calculation are given below-

$$n = \left\{ \frac{Z \left(1 - \frac{\alpha}{2} \right)}{d} \right\}^2 \times pq$$

Here,

$$Z \left(1 - \frac{\alpha}{2} \right) = 1.96$$

$$P = 0.34 \text{ (Gulam Khandaker et al., 2018)}$$

$$q = 1 - p$$

$$= 1 - 0.34$$

$$= .66$$

$$d = 0.05$$

Where,

n = Sample size

$Z (1 - \alpha / 2)$ = linked to 95% confidence interval (use 1.96)

p = expected prevalence (as fraction of 1)

q = 1- p (expected non-prevalence)

d = margin of error at 5% (standard value of 0.05)

According to this equation the sample should be more than 338 people but due to lack of opportunity the study sample was 105 patients with cerebral palsy who had come to CRP for physiotherapy treatment.

3.4 Study sampling and population:

Sample: A sample is a representative part of a population (Hannan, 2016).

The process of selecting subjects/individuals is referred to as sampling (Hicks, 1999). In this study, cerebral palsy patients were the sample population whom receiving physiotherapy treatment in pediatric Unit of Centre for the Rehabilitation of the paralyzed (CRP), Savar, Dhaka from May, 2023 to July, 2023

3.5 Inclusion Criteria

1. The patients receiving Physiotherapy service at least 2 weeks at CRP, Savar, Dhaka
2. All types of cerebral palsy as a primary diagnosis
3. Both sexes.
4. Patient and caregiver who are willingly to join the study
5. Patients with age lessn than 12 years

3.6 Exclusion criteria

1. Have other type of neurological disorder for example CP with hydrocephalus.

When considering homogeneity within the focus groups, demographic information about the participants was acquired and used to encourage talks (Bowling, 2002).

3.7 Sampling technique

For this study convenience sampling technique are used due to the time limitation and also for the small size of population and as it was the one of the easiest, cheapest and quicker method of sample selection. Samples were selected from Centre for the Rehabilitation of the paralyzed (CRP) at Savar, Dhaka by using inform consent. There are a lot of patients, from this population 105 samples were selected, according to the inclusion and exclusion criteria because it was not possible to study the total population within the time.

3.8 Data collection method

Data were collected by conducting an interview with a semi-structured questionnaire paper. The questionnaire sought information on socio-demographic information, cerebral palsy related problem adherence related questions and. Data were collected form 01-05-2023 to 1-07-2023. The English questionnaires were converted into Bengali to ask questions to the participants during interviews. Researcher must take permission from each volunteer participant by using a written consent form in Bengali.

3.9 Data collection tools

The tools were Adherence in Chronic Disease Scale (ACDS), pen, pencils, white paper, approved forms and consent forms, clip board and a bag for storing these tools.

3.10 Questionnaire

The questionnaire was semi-structured type for collecting the data for the findings of the study.

3.11 Data Analysis

The process of data analysis in this study involved the utilization of Statistical Package for the Social Science (SPSS) version 20 software, a widely-used tool for statistical analysis. To ensure an organized and structured approach, the researcher began by labeling the variables systematically and creating a computer-based data definition record file. This record file served as a comprehensive reference, containing a well-organized list of variables in a specific order. In the variable view of SPSS, the researcher inputted various details such as the variable names, types, values, decimal places, labels, alignment, and data measurement levels. This meticulous step was crucial for accurately defining and categorizing the data for subsequent analysis. The next critical task involved data verification. The researcher meticulously reviewed the inputted data set to confirm that all information from the questionnaire paper had been accurately transferred to the SPSS data view. Data accuracy is paramount in any research study, and this step ensured that the raw data were reliable and ready for analysis within the SPSS environment. For the actual analysis, the study employed descriptive statistics, a fundamental technique in summarizing and presenting data. The results were calculated as percentages and presented using a variety of graphical representations, including tables, bar charts, column charts, and pie charts. Microsoft Office Excel 2013 was also utilized to enhance the visual presentation of column charts, bar charts, and pie charts, making the findings more accessible and informative. The study's data collection efforts yielded a substantial amount of information, providing valuable insights into adherence to physiotherapy treatment among cerebral palsy patients and their functional outcomes. Additionally, the research aimed to explore associations among various variables, which was accomplished through the use of the Chi-square test, a statistical tool commonly employed to identify relationships or dependencies between categorical variables. In summary, the data analysis process in this study was characterized by meticulous data organization, verification, and presentation. The combination of SPSS and Microsoft Excel facilitated a comprehensive exploration of the collected data, enabling researchers to draw meaningful conclusions about adherence to physiotherapy treatment and its related factors in the context of cerebral palsy patients.

3.12 Informed consent

In this study interested subjects were given consent forms and the purpose of the research and consent forms were explained to the subject verbally. They were told that participation is fully voluntary and they have the right to withdraw at any time. They were also told that confidentiality will be maintained. Information might be published in any presentations or writing but they will not be identified. The study results might not have any direct effects on them but the members of Physiotherapy population may be benefited from the study in future.

Chi-Square (x²) test

Chi-Square (x²) test is the most popular discrete data hypothesis testing method. It is a nonparametric test of statistical significance for bivariate tabular analysis with a contingency table. Chi-Square test helps to analyze data come in the form of counts. This test can be applied to nominal or categorical data which can't be analyzed using the ranking technique.

3.13 Ethical consideration

The process of conducting this research involved several crucial ethical and administrative steps to ensure the well-being and rights of the participants. Before commencing the study, an oral dissertation presentation was delivered in front of the Institutional Review Board (IRB) of Bangladesh Health Professions Institute (BHPI). This presentation served as a platform to outline the research proposal and its ethical considerations. Subsequently, the proposal was officially submitted to the IRB for approval, and it received ethical clearance. This signifies that the research was thoroughly evaluated by a panel of experts who ensured that it adhered to ethical standards and guidelines. One of the fundamental ethical practices undertaken was obtaining official permission from the authorities of Bangladesh Health Professions Institute (BHPI) and the Department of Physiotherapy (Clinical). This step was essential as it demonstrated respect for the institutional guidelines and regulations governing research activities within their premises. Furthermore, when engaging with potential participants, the researcher meticulously followed ethical procedures. Interested participants were provided with written consent forms, and a clear explanation of the study's purpose was conveyed to them verbally in Bengali, ensuring

their full comprehension. It was explicitly emphasized that participation was entirely voluntary, and participants possessed the unreserved right to withdraw from the study at any time without facing any repercussions or pressure. To safeguard the privacy and confidentiality of participants, it was reiterated that their identities would remain anonymous. The data collection method, in the form of a written questionnaire, was transparently described, and participants had the opportunity to ask questions or seek clarifications. Additionally, both the consent form and questionnaire underwent scrutiny by a supervisor to further ensure their appropriateness and comprehensibility. Each interested participant actively provided their consent by signing the written consent form during the interview process. This step underscored the voluntary nature of participation and demonstrated a commitment to upholding ethical standards. Participants were well-informed about their role in the study, the research's objectives, and the procedures involved. Moreover, they were assured that while the information they provided might be published, their personal details such as names and addresses would never be disclosed or used in any manner that could identify them. Maintaining confidentiality was a paramount ethical concern throughout the research. The study's findings were shared exclusively with the supervisor, and this information was never disclosed to any other individuals. Furthermore, it was made clear that all research materials, including consent forms and questionnaires, would be securely disposed of upon the study's completion. Lastly, the researcher emphasized that while the study's immediate impact on the participants might be indirect, it had the potential to benefit rehabilitation professionals in the future. This conveyed a sense of purpose and relevance for the participants, demonstrating respect for their contribution to the research. In summary, the research process was underpinned by a robust ethical framework, from obtaining official permissions and informed consent to maintaining participant confidentiality and emphasizing the study's potential benefits. These ethical considerations were integral to the research's integrity and adherence to ethical standards.

Table 1: Continuous data table

Variable	Mean	SD	Median
Age (in year)	3.53	2.10	
Family member	5.00	3.16	
Number of children	1.8	0.89	
Total score of adherence scale	22.15	2.93	

**Median value was considered in case of non-normally distributed continuous data

4.1 Age:

Among the 105 participants in this study, minimum age was of participant .8 yr and the maximum age of the participant was 8.6 yr. Their mean age was 3.53 and standard deviation was 2.1.

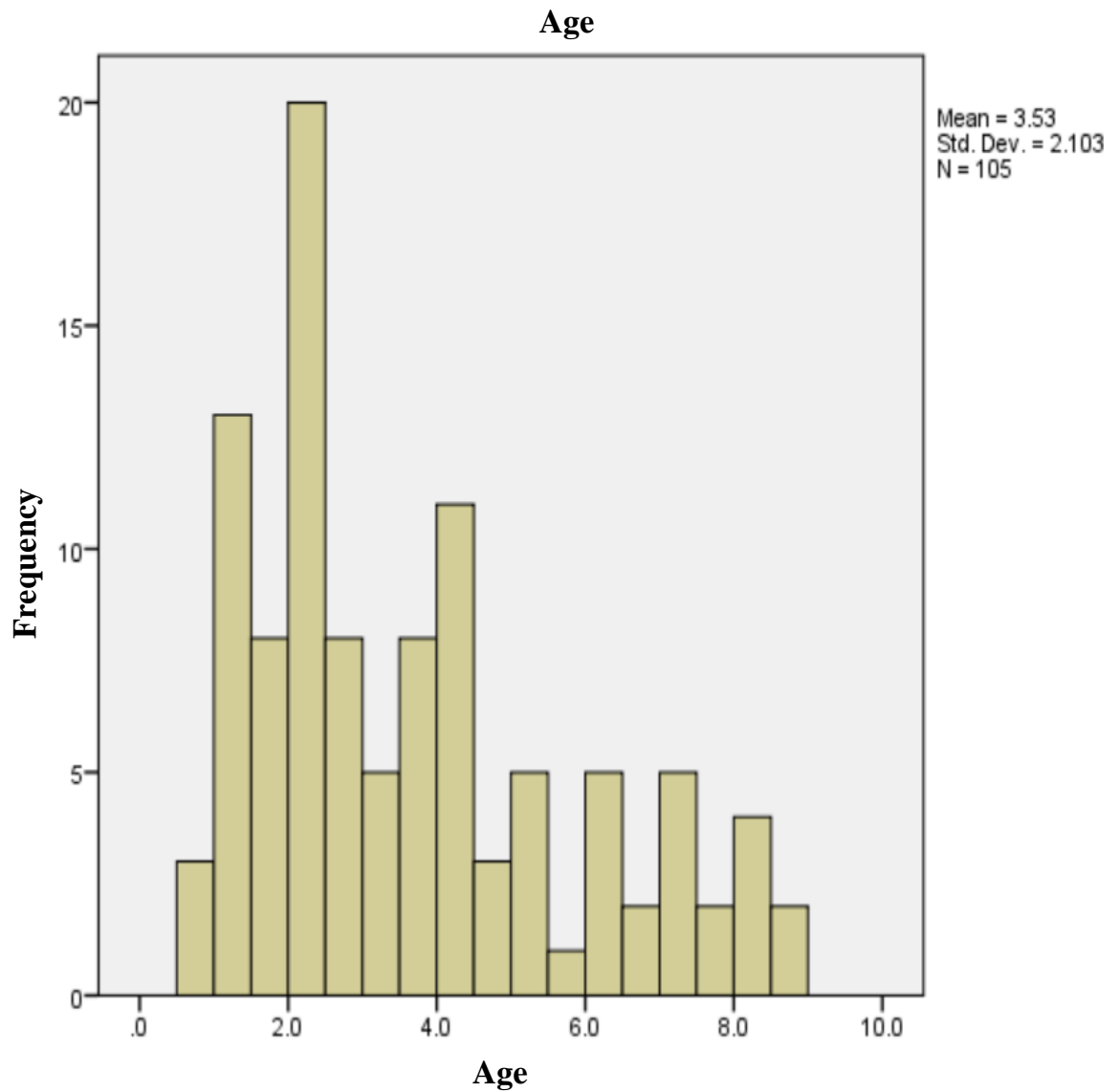


Fig 4.1: Age of the participants

4.2 Number of children:

Among 105 participants maximum 50 participants has 1 child in their family and minimum 5 participants has 4 children in their family. The mean number of children is 1.8 and standard deviation is 0.89.

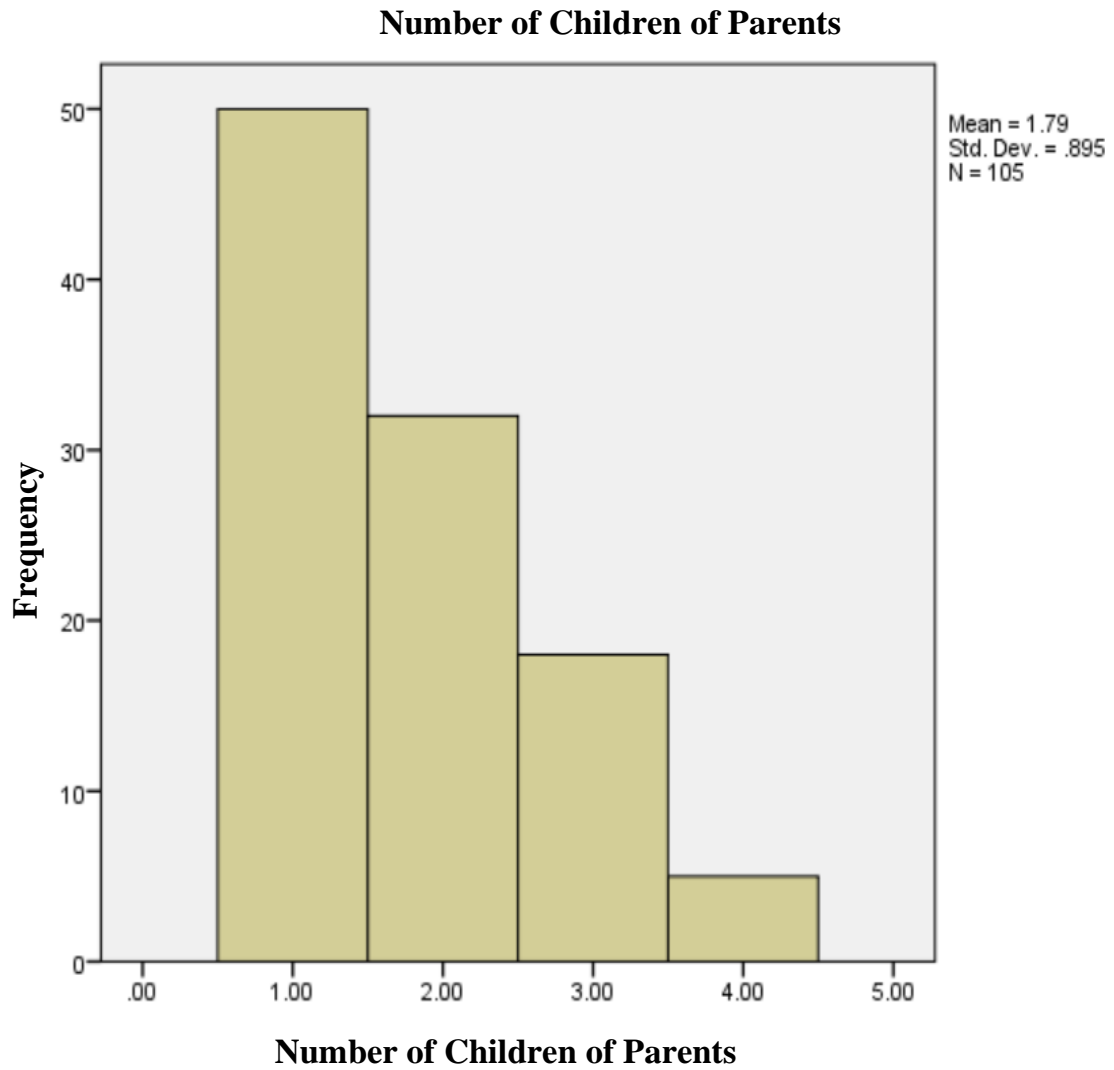


Fig 4.2: Number of children of parents

4.3 Total score of adherence scale:

Among 105 participants the maximum adherence scale score was 28 (n=1) and minimum adherence scale score was 15 (n=1). Mean score is 22.15 and their standard deviation is 2.93.

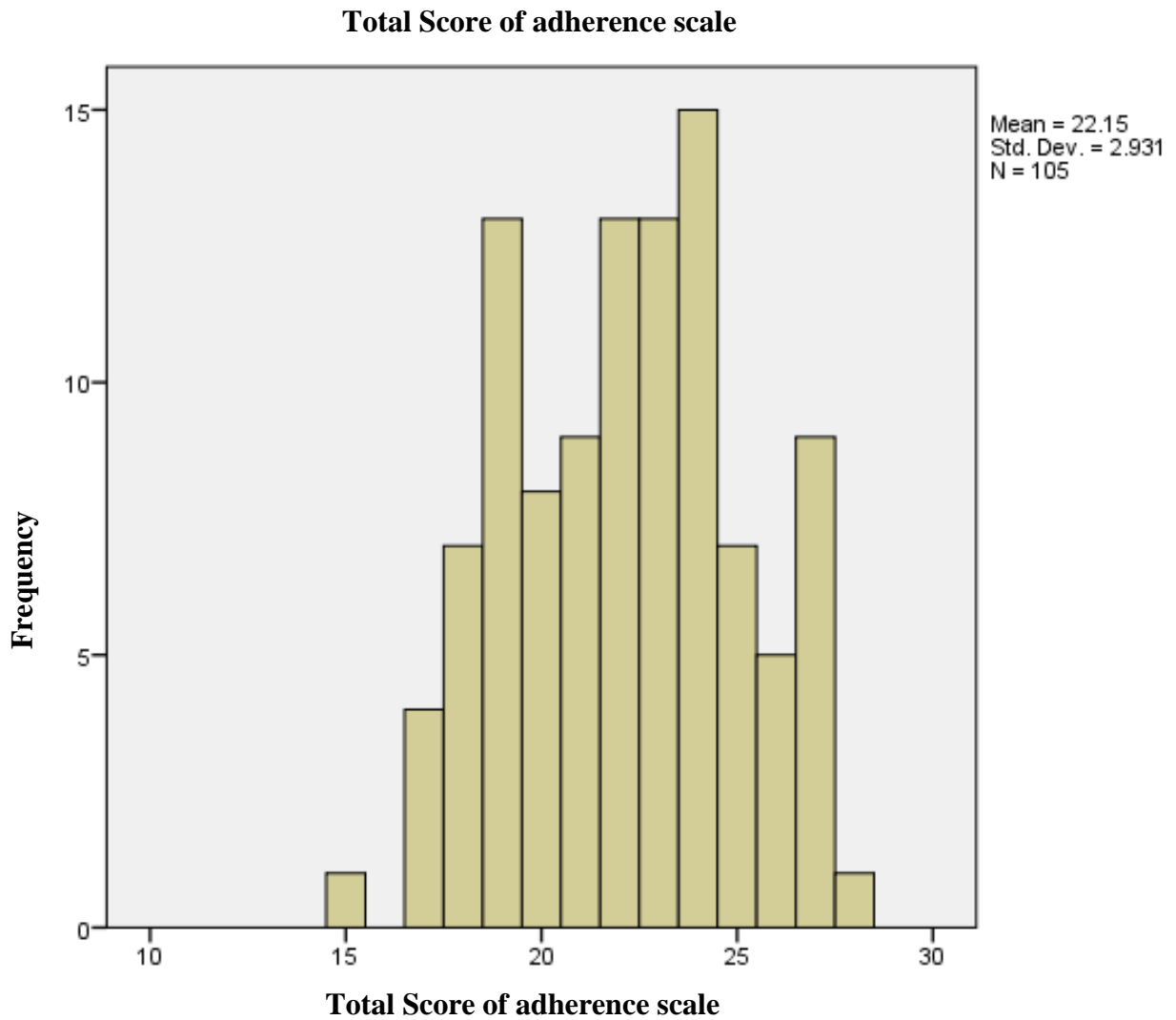


Fig 4.3: Total score of adherence scale

4.4 Categorical data table:

Table-2:

Variables		Frequency	Percentage
Adherence Category	Low (<20)	32	30.5
	Medium (21-26)	63	60
	High (>27)	10	9.5
Gender	Male	58	54.7
	Female	47	44.3
Living area	Rural	59	56.2
	Urban	46	43.8
Co-Morbidities	No	76	71.7
	Single	22	20.8
	Multiple	7	6.6
Feeding Problem	Yes	34	32.1
	No	71	67.0
Epileptic sign	Yes	41	38.7
	No	64	60.4
child's level of adaptation	Poor adaptation	46	43.8
	Good Adaptation	59	56.2
Mother's education	Illiterate	7	6.7
	Primary	14	13.3
	High School	26	24.8
	SSC	22	21
	HSC	14	13.3
	Hon's	14	13.3
	Masters	8	7.6
Occupation of Mother	House wife	100	95.2
	Service holder	5	4.8
Family member with Disability	Yes	21	20.2
	No	83	79.8
Transport Hazard	Yes	41	39
	No	68	61
Family Support	Yes	85	81
	No	20	19
Distance of residence from the institute	Near (1-2 km)	16	15.2
	Far (>2km)	89	84.8
Emotional State of the Parents	Normal	67	63.8
	Abnormal	38	36.2
Level of motivation	High	74	70.5
	Low	31	29.5

4.4.1 Gender:

Among 105 participants 44.30% (n=58) are female and 54.70% (n=47) are male.

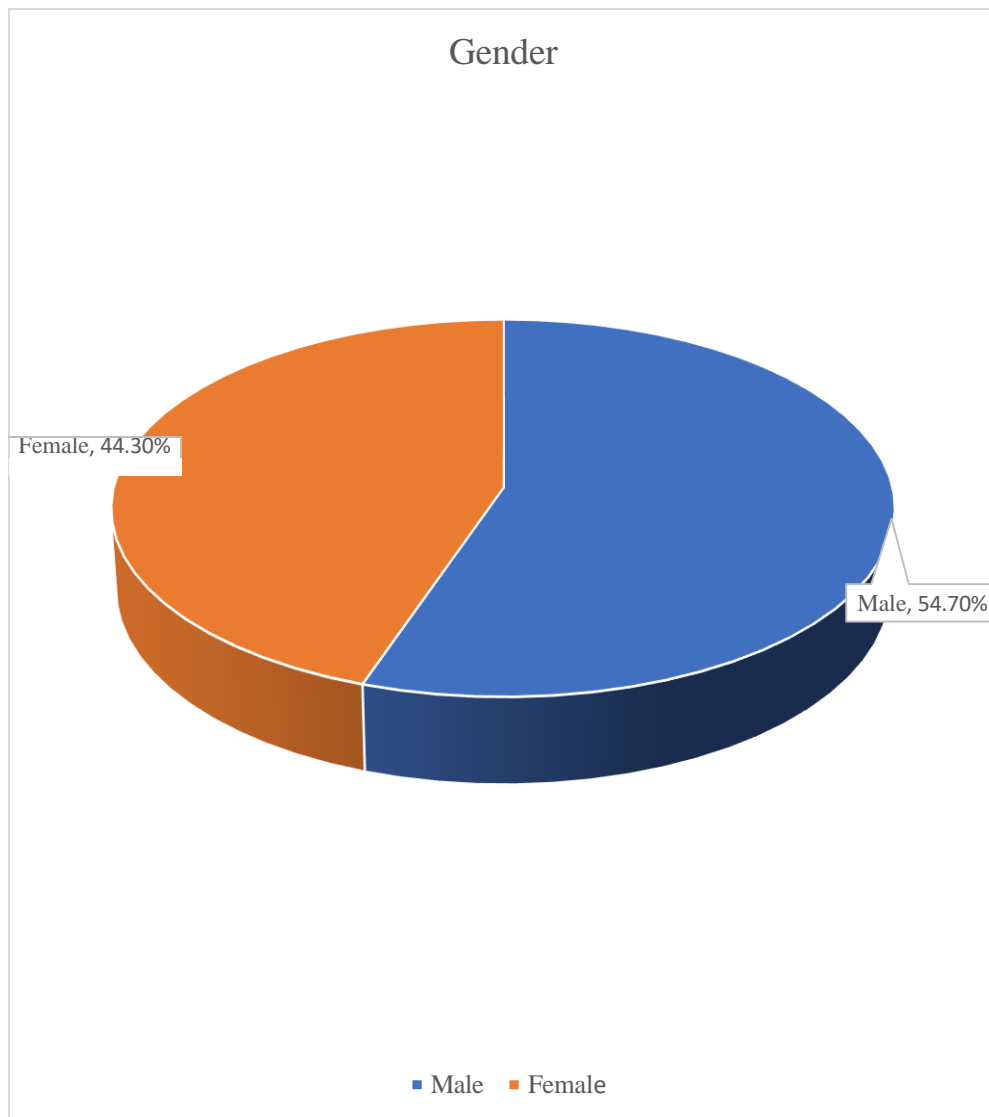


Fig 4.4.1: Gender.

4.4.2 Living Area:

48.80% (n=59) participants live in the urban area and rest 56.20% (n=46) live in the rural area.

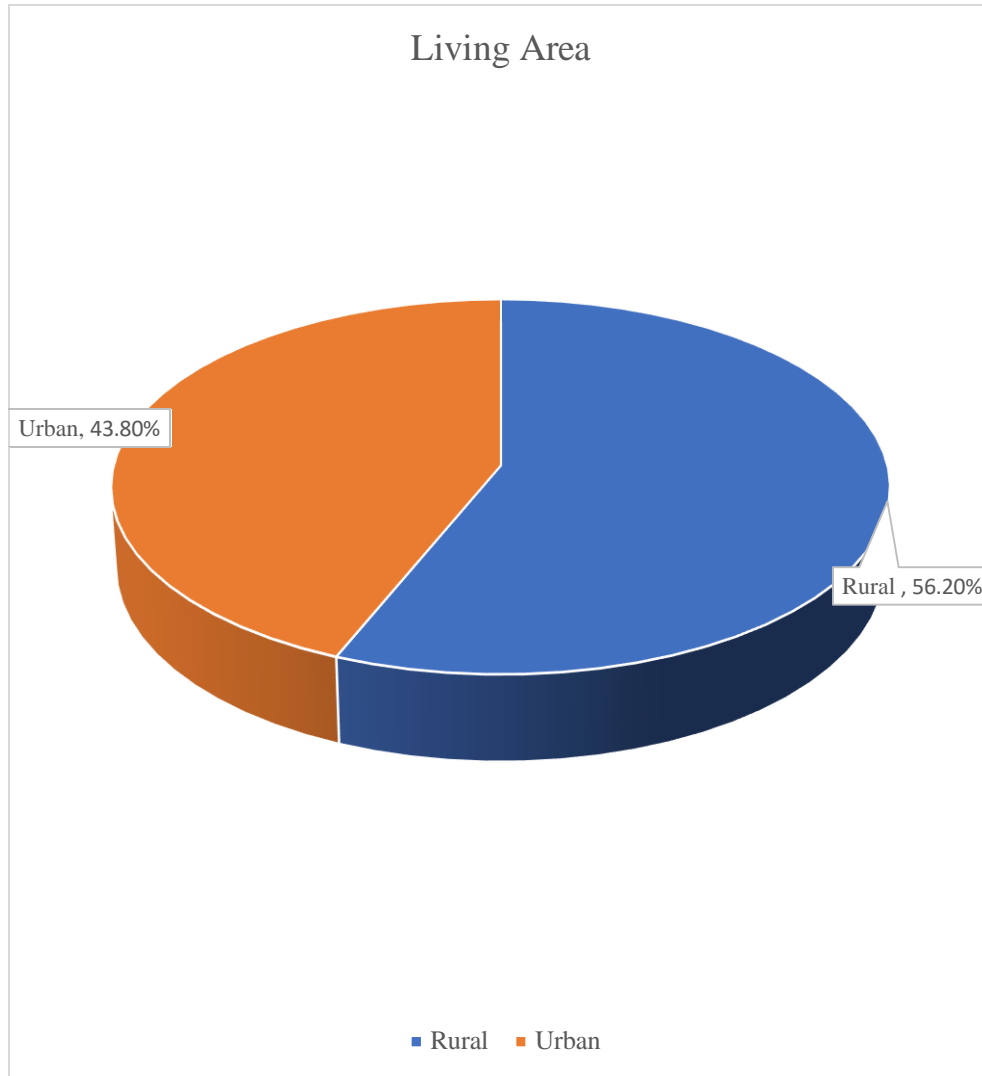


Fig 4.4.2 : Living Area

4.4.3 Co-morbidities:

Co-morbidity rate is 71.7% (n=76) for no morbidities, 20.8% (n=22) for single morbidity and 7% (n=7) for multiple morbidities among 105 participants.

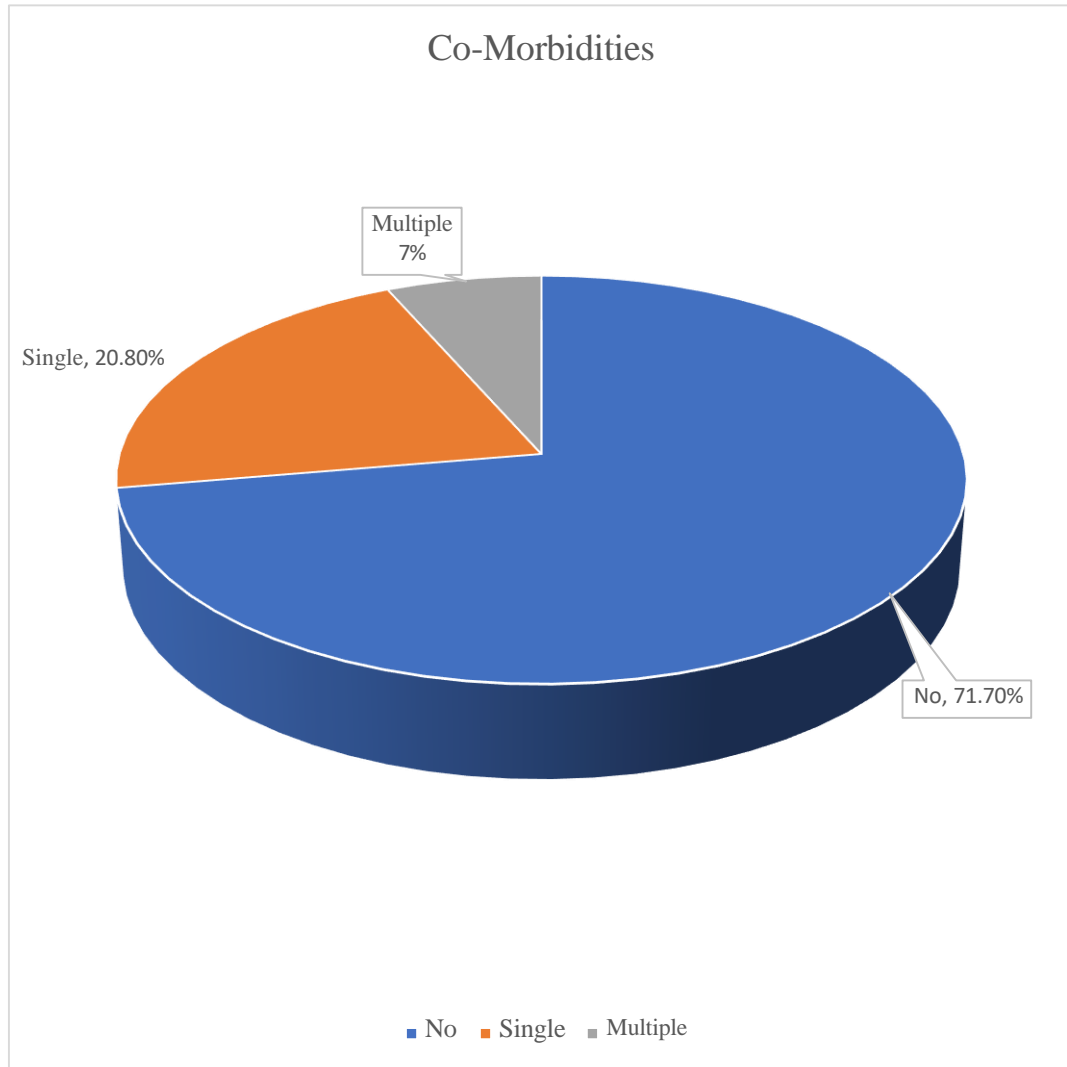


Fig 4.4.3: Co-morbidities

4.4.4 Feeding Problem:

There are 32.1%(n=34) participants who had feeding problem and 67%(n=71) with no feeding problem among 105 participants.

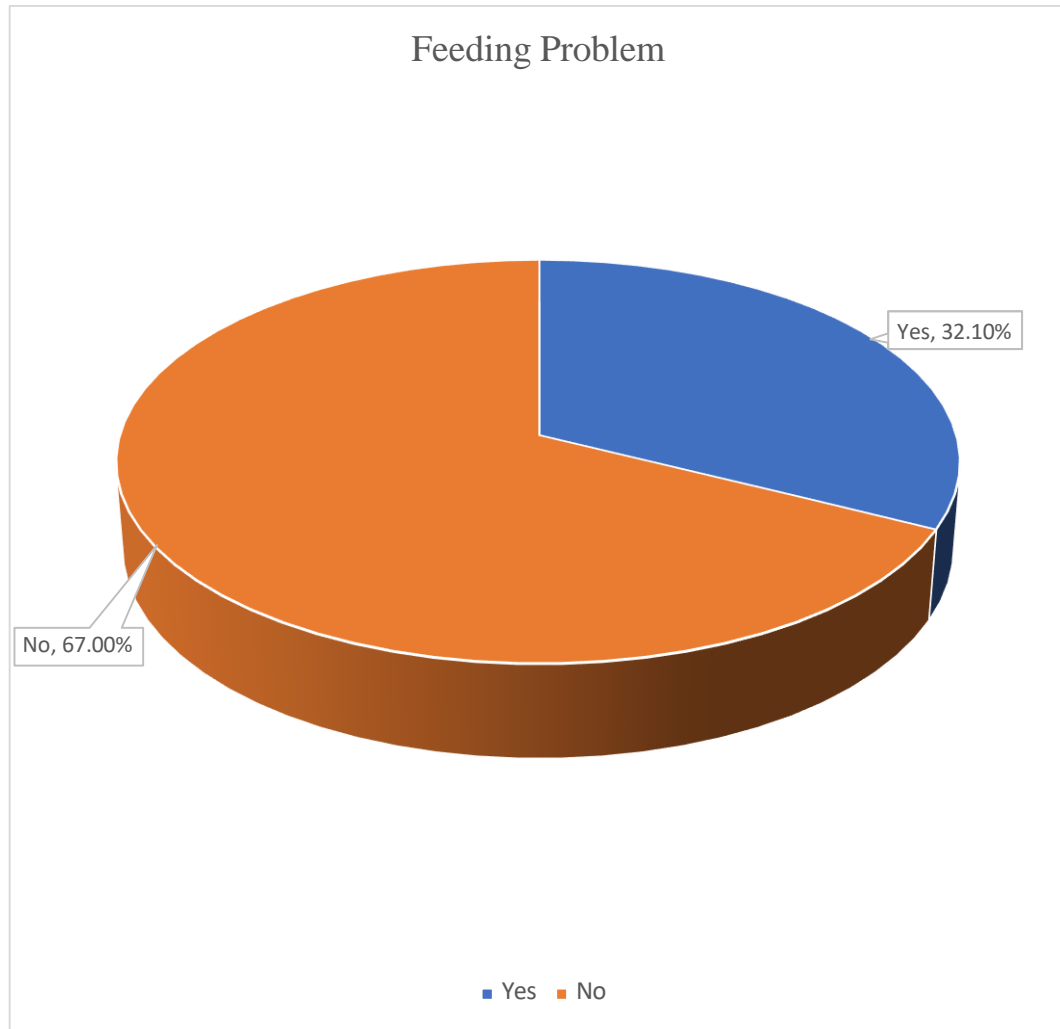


Fig 4.4.4: Feeding Problem

4.4.5 Epileptic sign:

There are epileptic signs in about 38.7% participants and 60.4% participants has no epileptic signs.

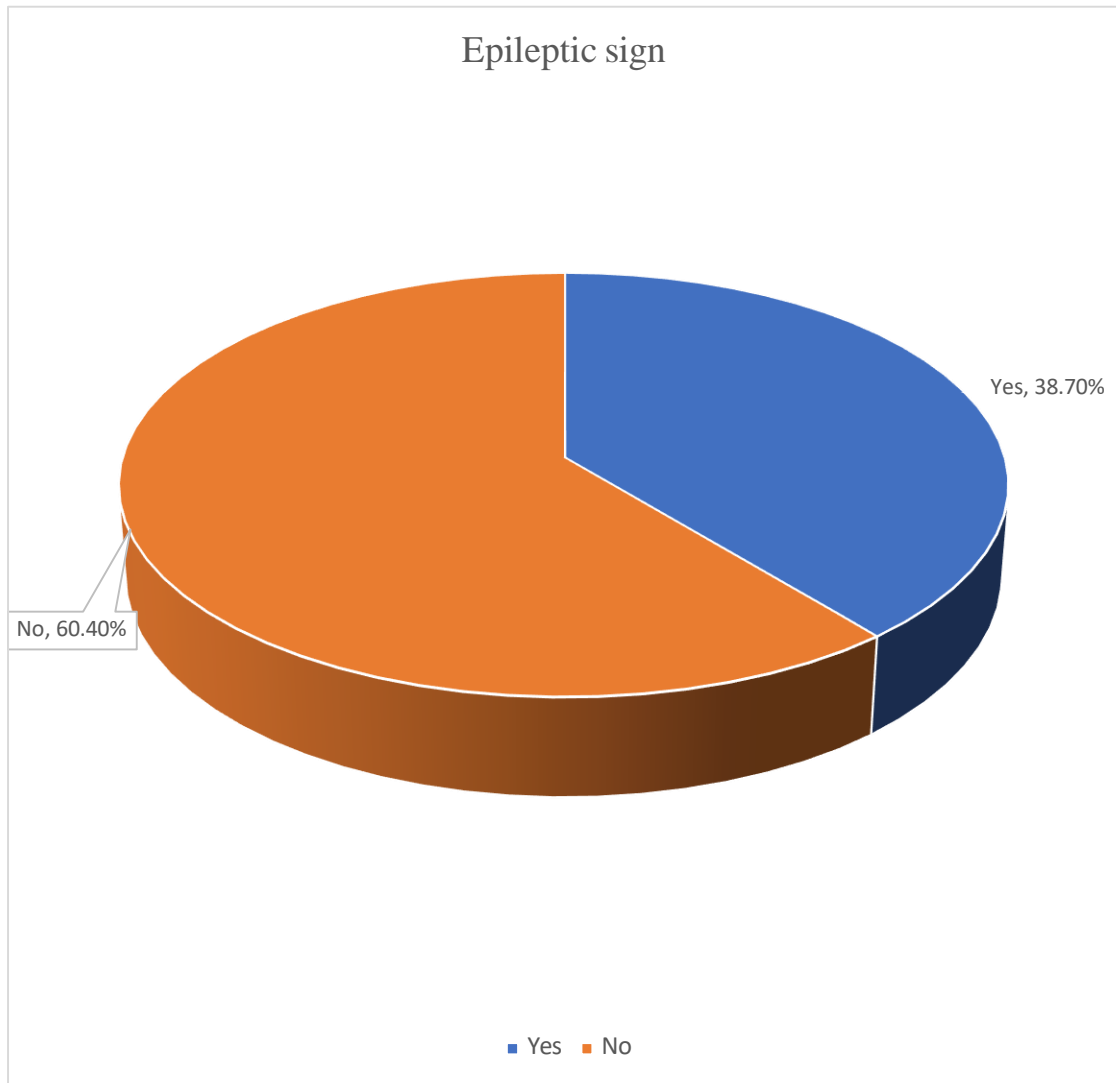


Fig 4.4.5: Epileptic Sign

4.4.6 Child's Level of Adaptation:

43.8% of the 105 participants' child are adapted poor and 56.20% of them are adapted good.

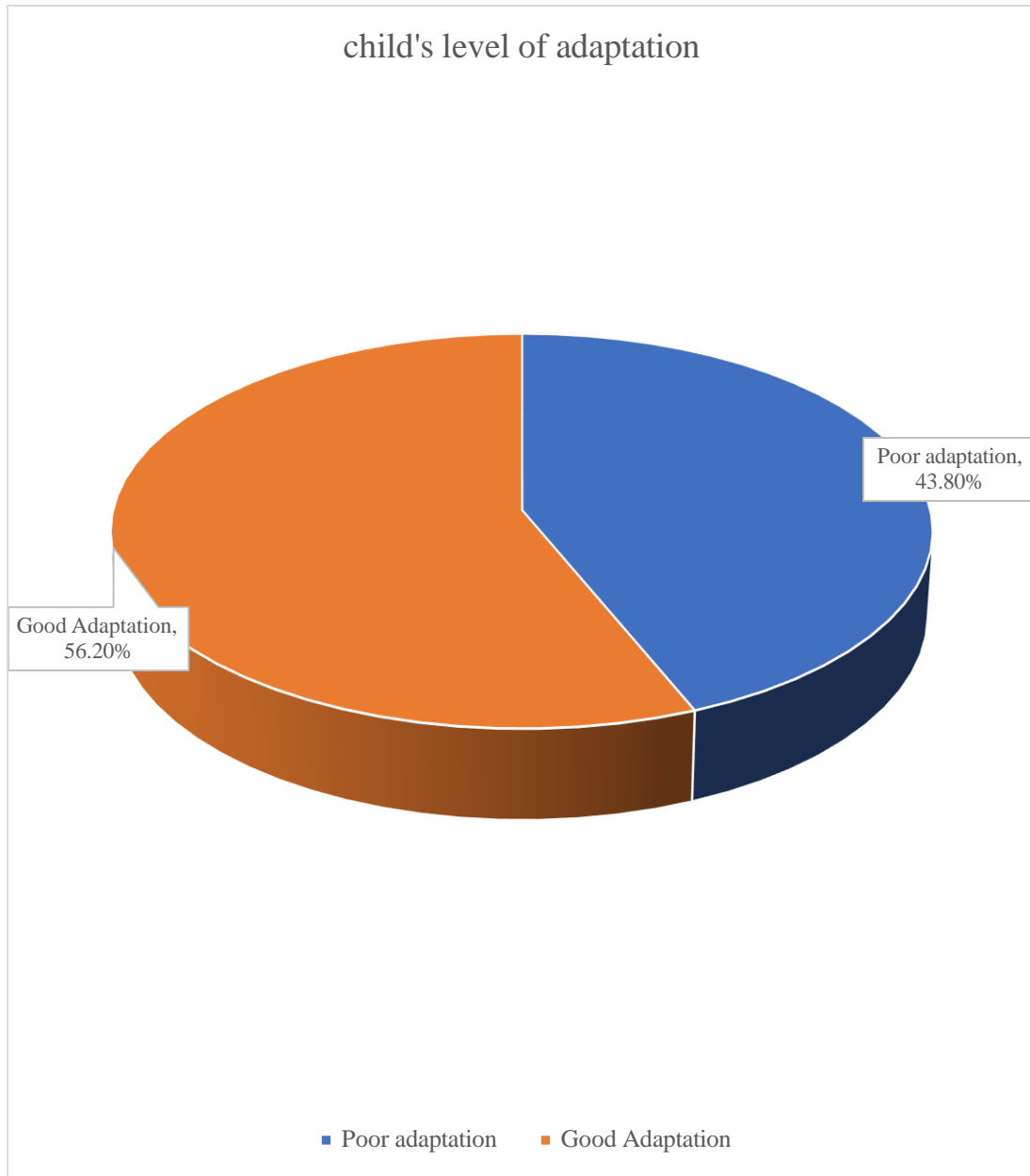


Fig 4.4.6: Child's Level of Adaptation

4.4.7 Mother's Education:

Among 105 participants, 6% mother are illiterate, 13.3% mother had completed primary schooling, 24.8% participant mothers were at high school level, 21% were SSC passed, 13.3% were HSC passed, 13.3% participant were Hon's graduate and only 7.6% participants had master's degree.

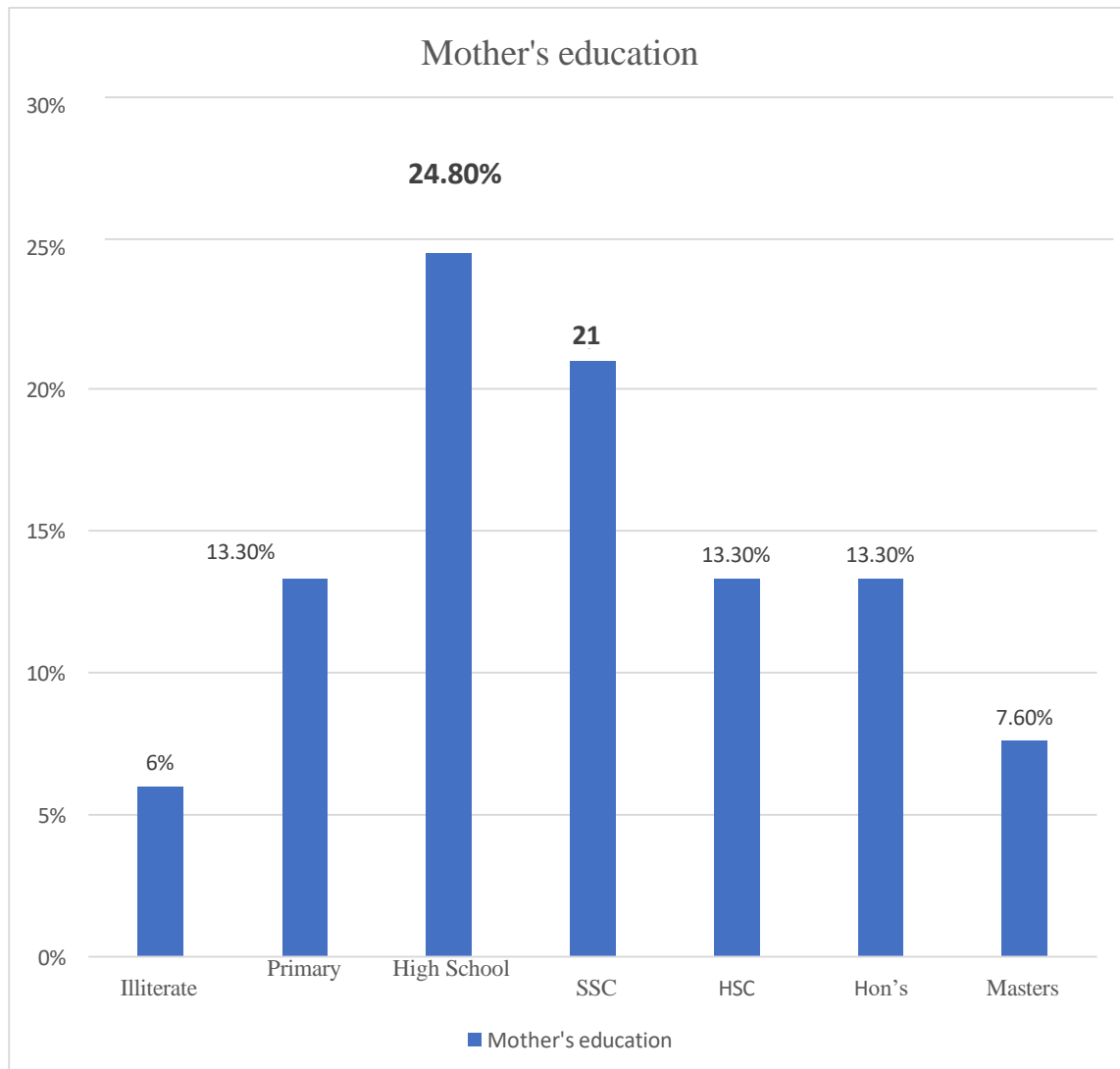


Fig 4.4.7: Mother's Education

4.4.8 Occupation of Mother:

Among 105 participants most of the mother of CP patients are housewife it is 95.20% and only 4.8 % are servis holder.

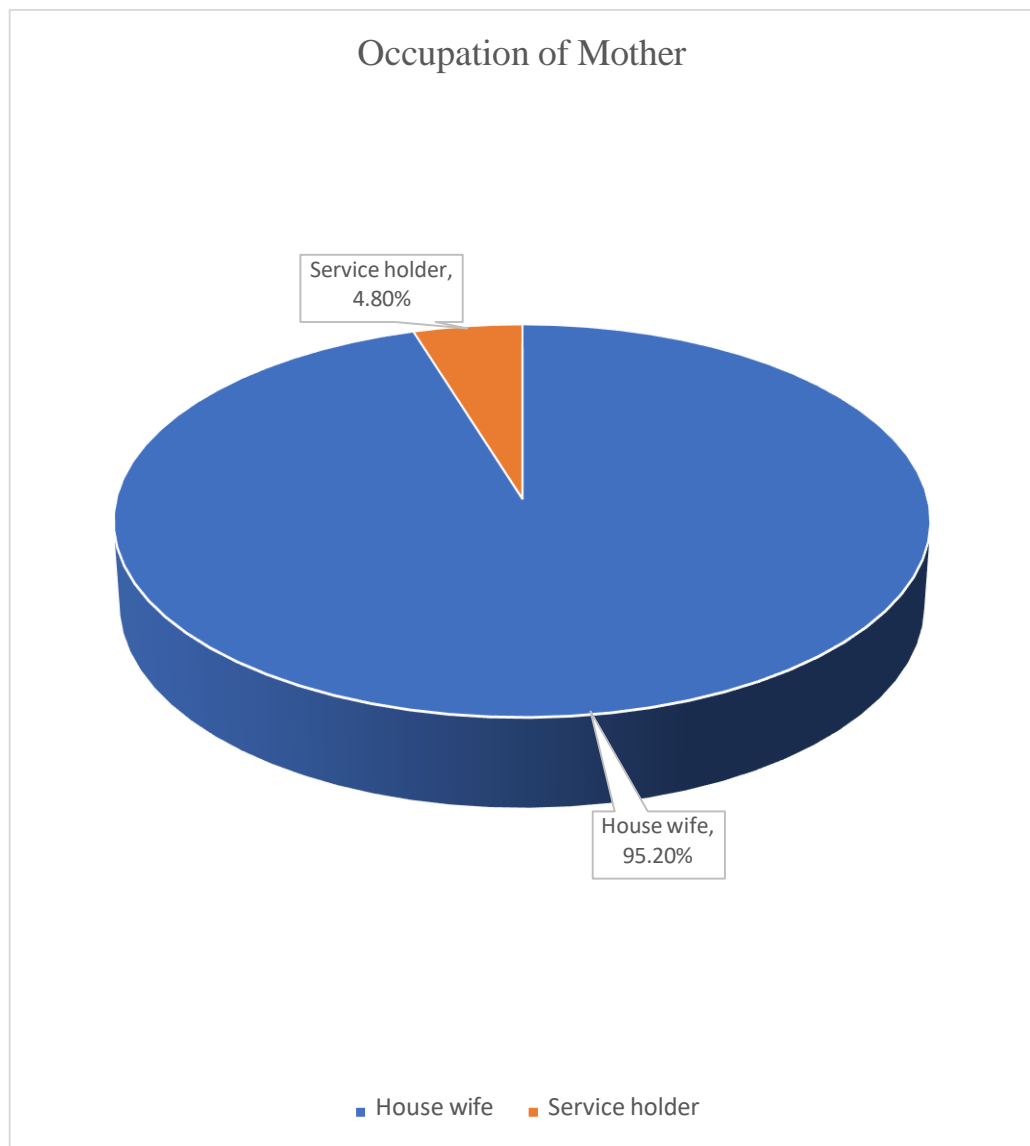


Fig 4.4.8: Occupation of Mother

4.4.9 Family Member with Disability:

Among 105 participants 20.2% patient has family member who has disabilities and 79.8% patient has family member who has no disability.

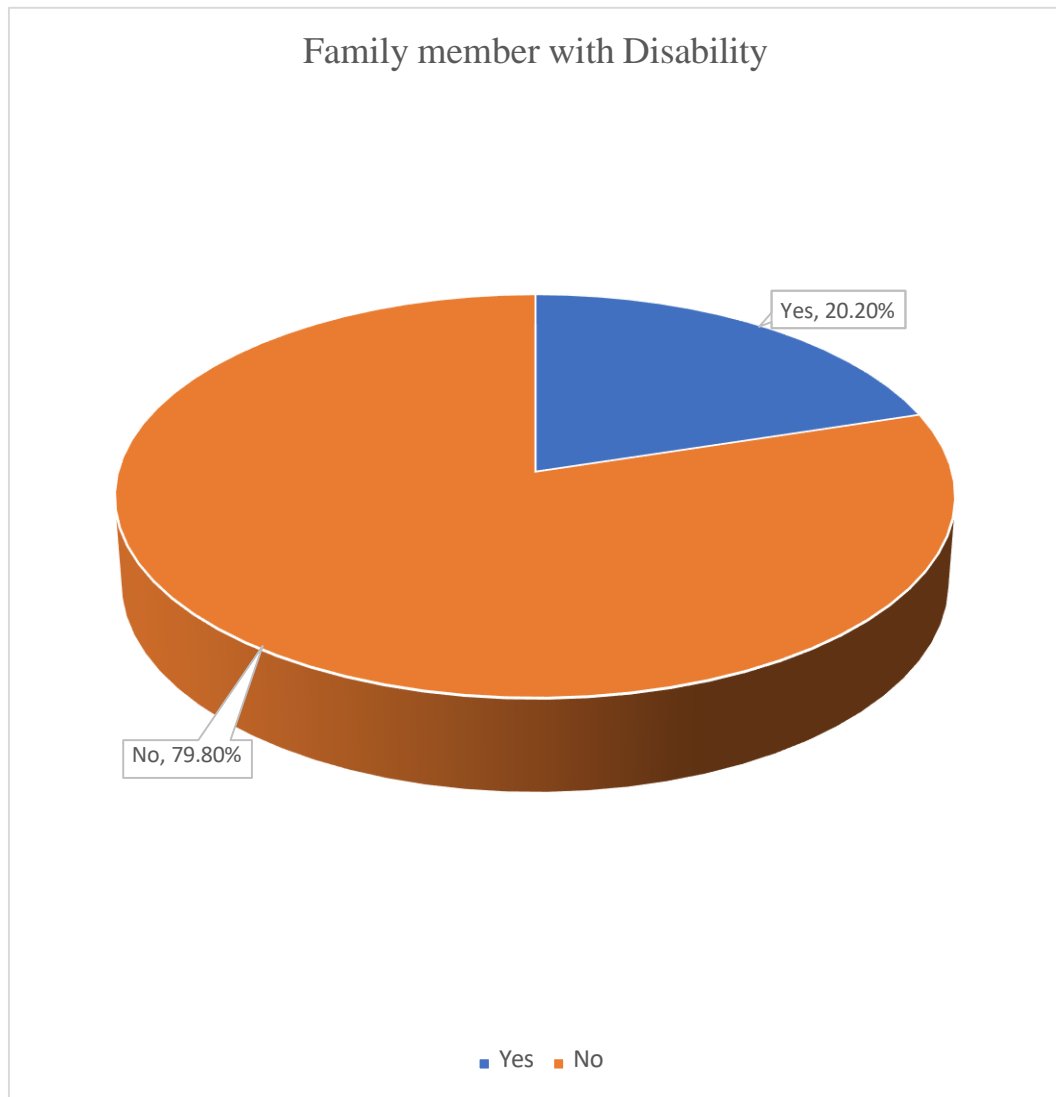


Fig 4.4.9: Family Member with Disability

4.4.10 Transport Hazard:

Among 105 participants 39% patients has transport hazard and 61% patient has no transport hazard.

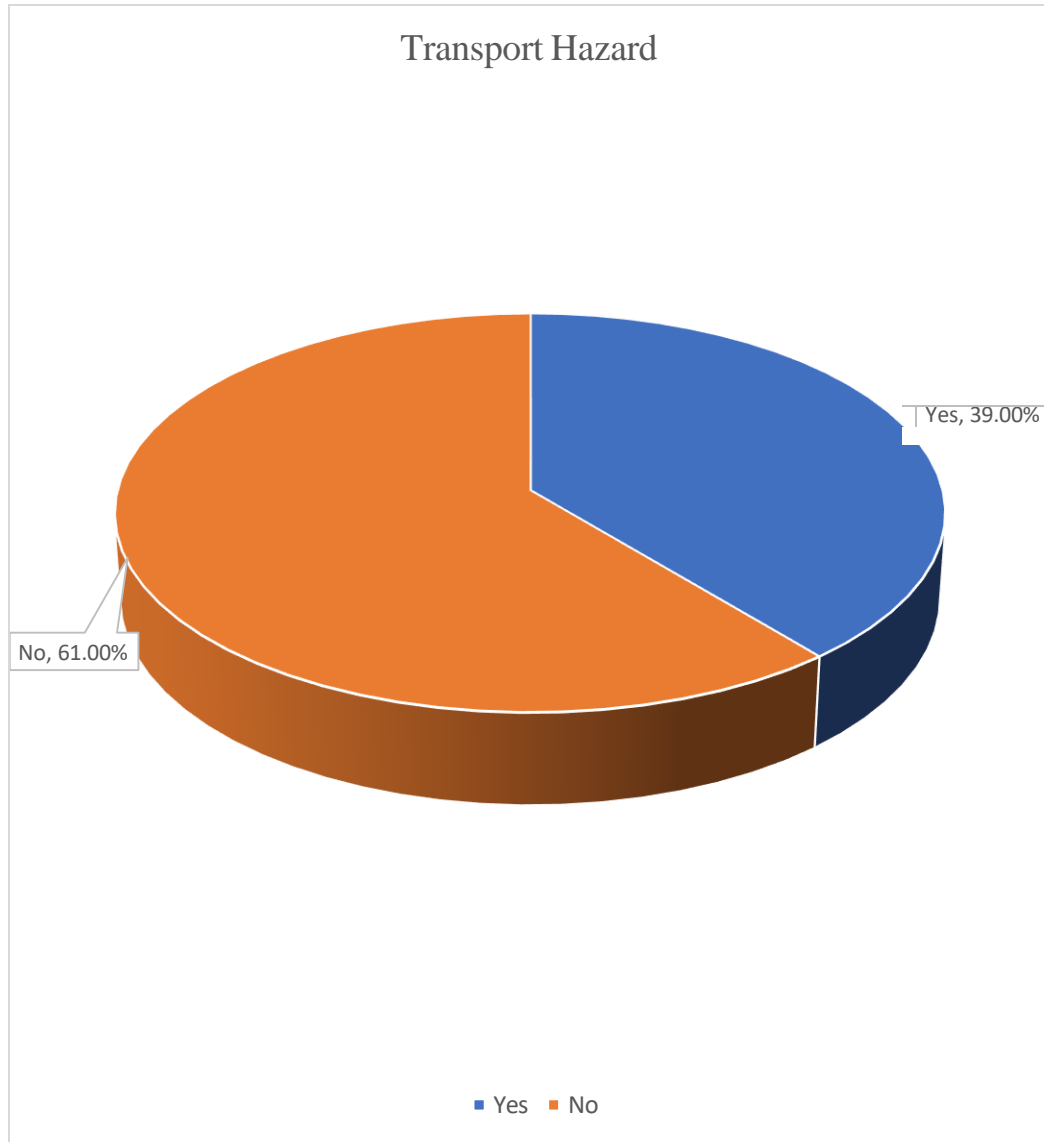


Fig 4.4.10: Transport Hazard

4.4.11 Family support:

Among 105 participants 81% patients has family support and 19 % patient has no family support.

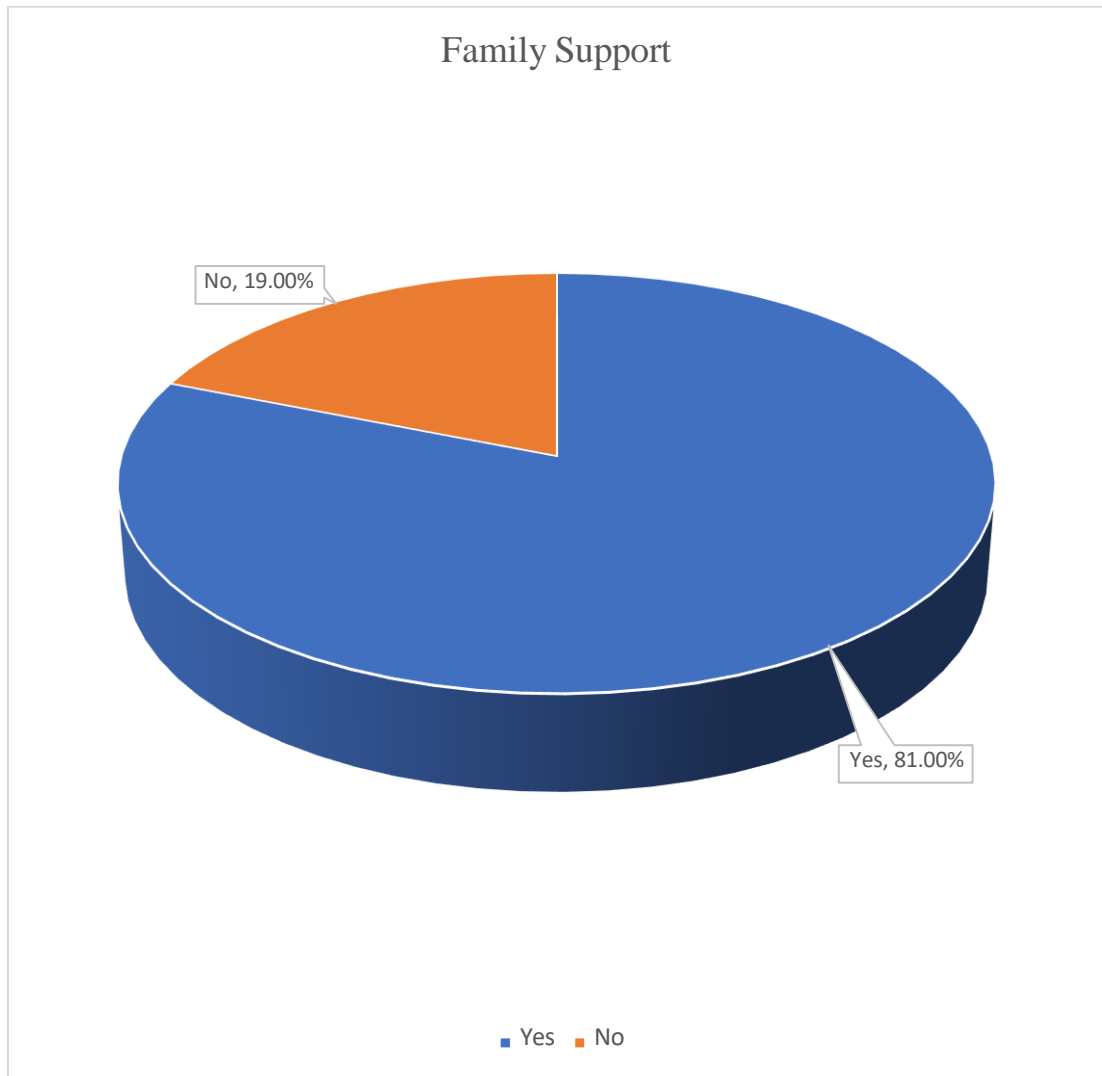
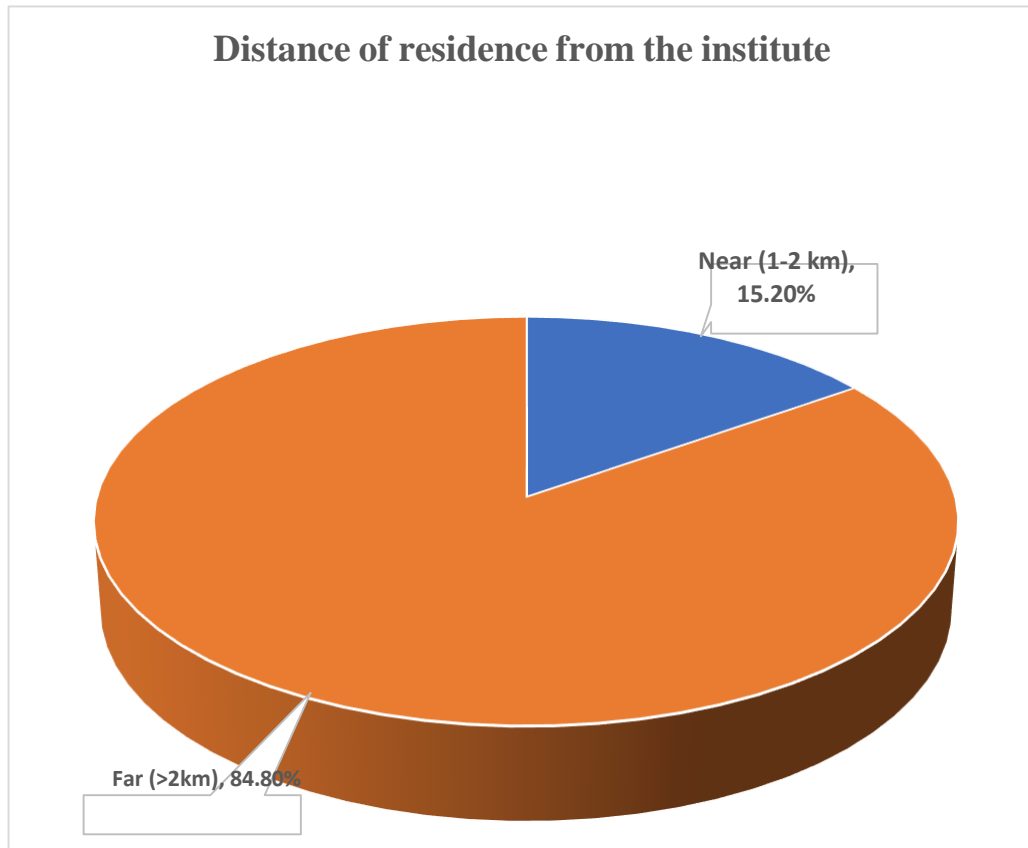


Fig 4.4.11: Family Support

4.4.12 Distance of Residence from the institute:

Among 105 participants 15.2% patient lives near from the institute and 84.8% patient lives far from the institute.



■ ■

Fig 4.4.12: Distance of Residence from the institute

4.4.13 Emotional State of the Parents:

Among 105 participants 63.8 % patient's parents have normal emotional states and 36.2% patient's parents have abnormal emotional states.

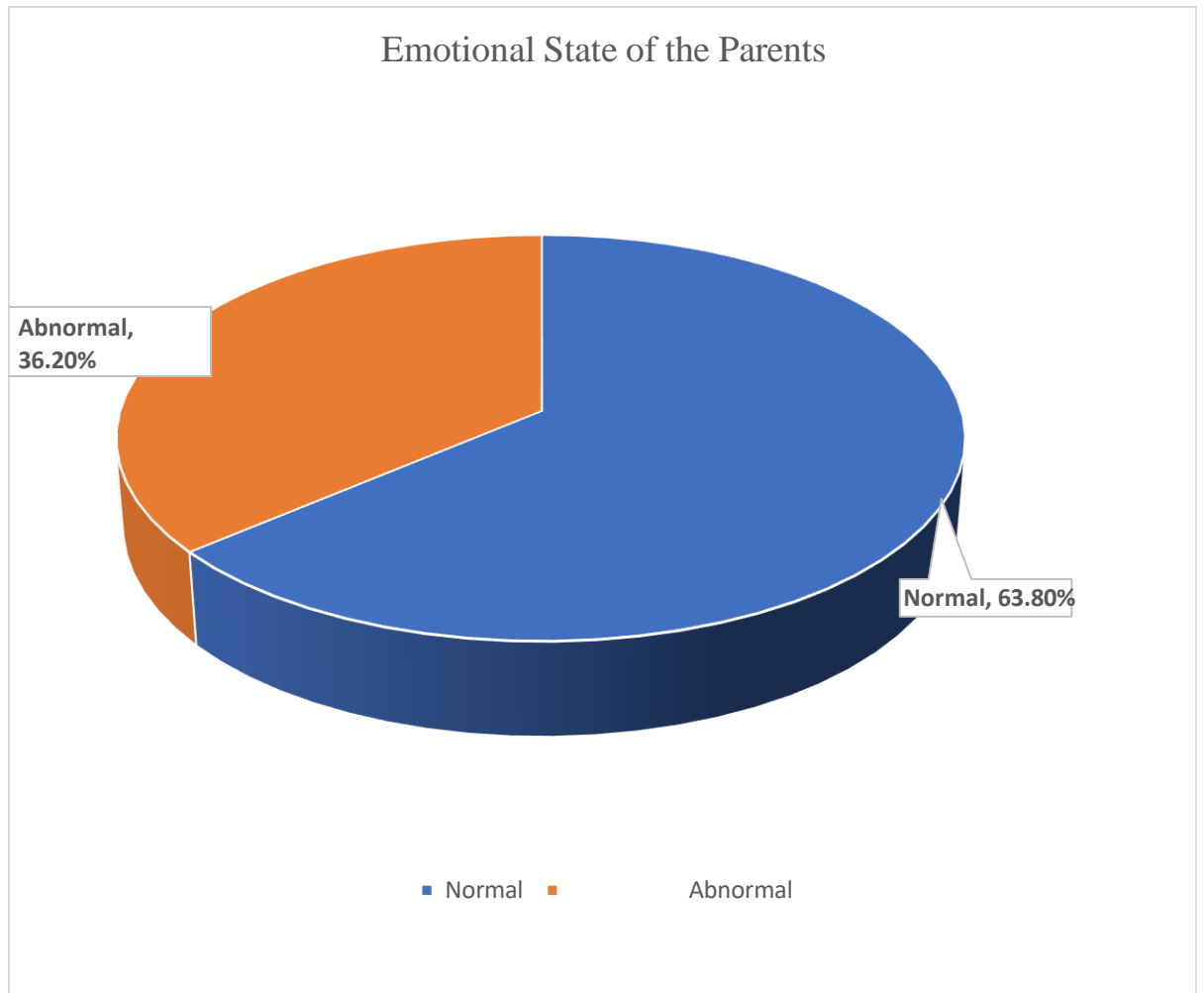


Fig 4.4.13: Emotional State of the Parents

4.4.14 Level of Motivation:

Among 105 participants most of the parents was highly motivated and it is 70.5% and the low motivated parents was 29.5%.

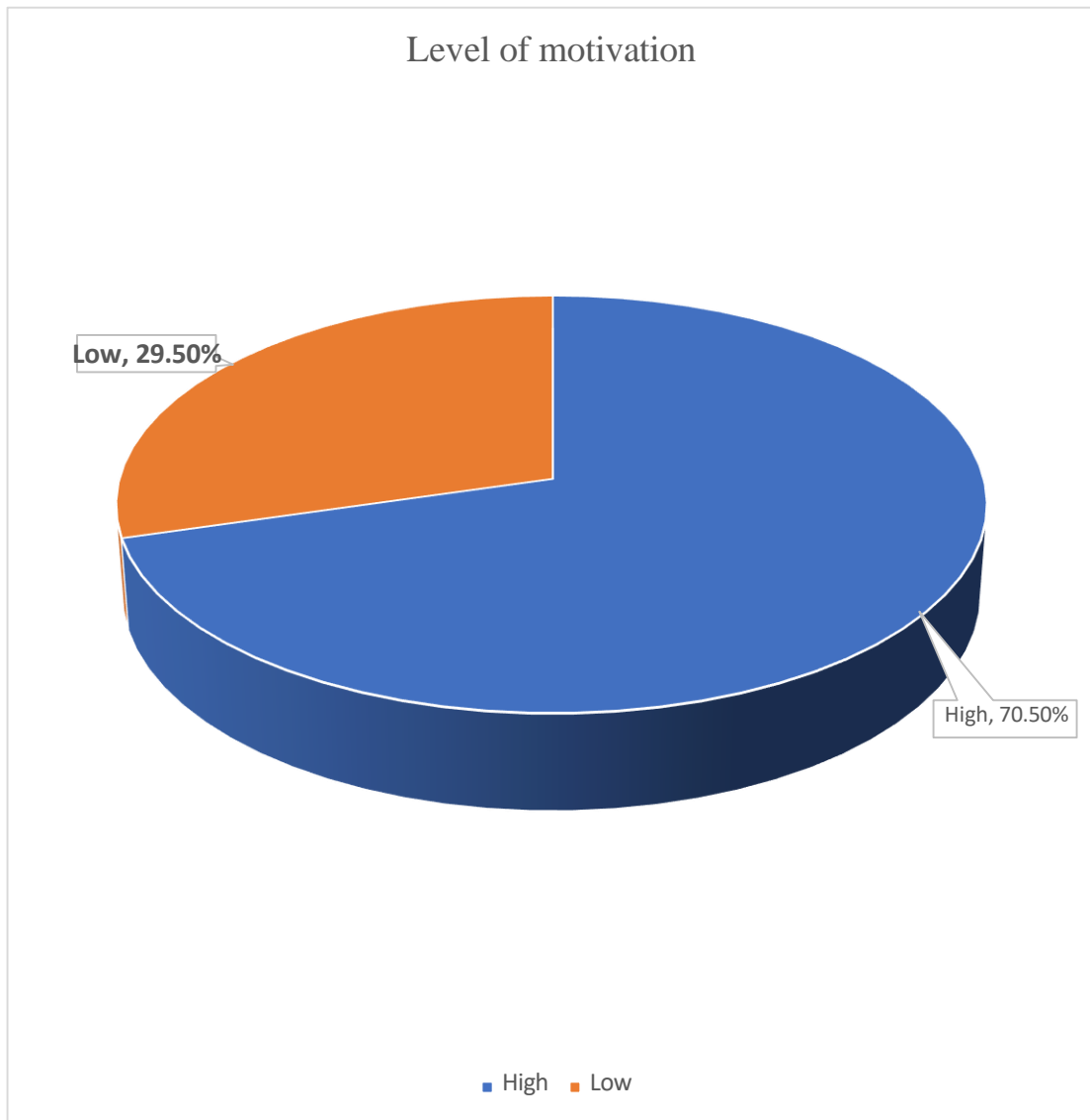


Fig 4.4.14: Level of Motivation

4.4.15 Adherence Category:

Among 105 participants 9.5% (n=10) participants had high adherence, 60% (n=63) participants had medium adherence and 30.5% (n=32) had low adherence.

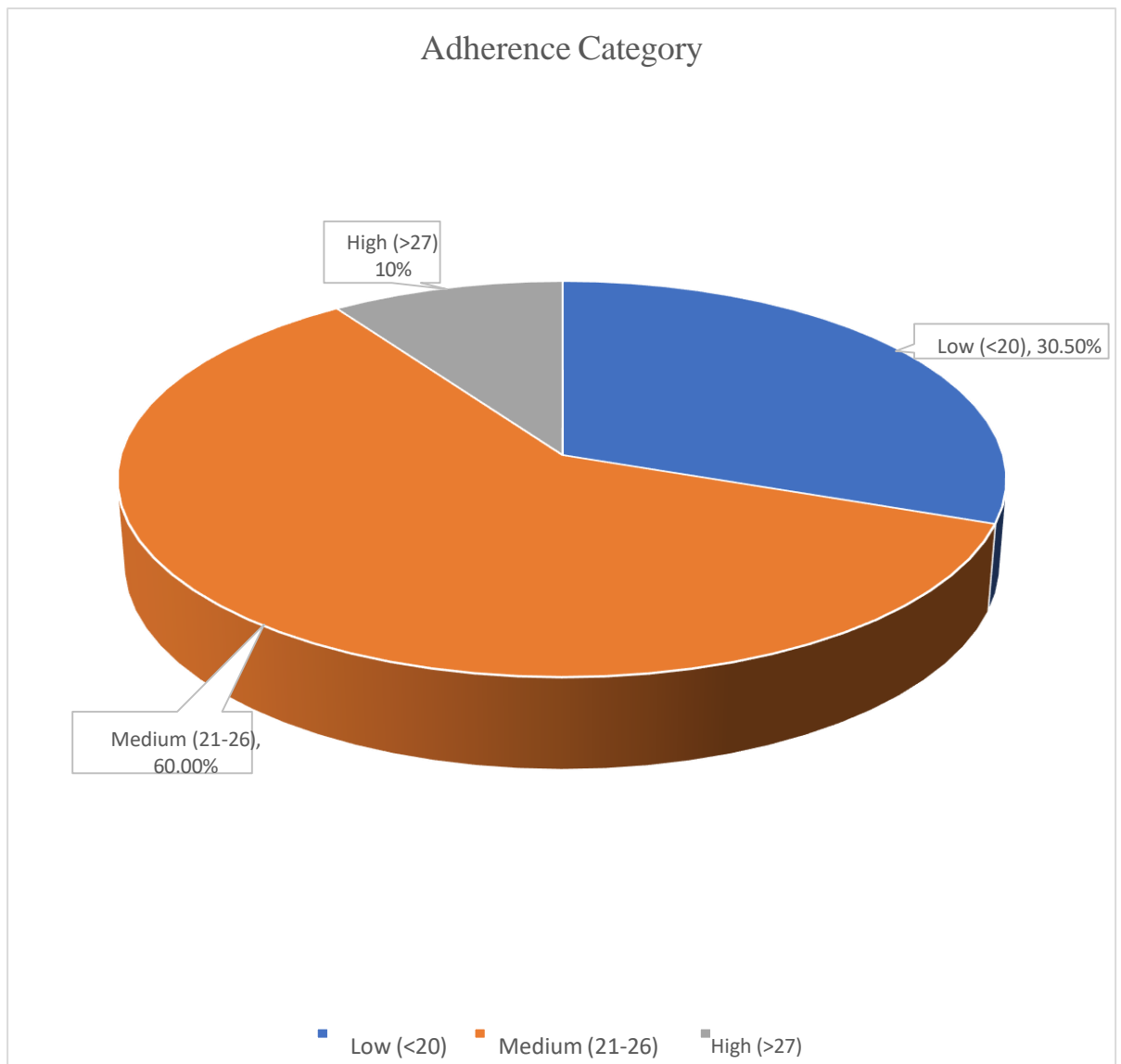


Fig 4.4.15: Adherence Category

4.5 Inferential statistical analysis:

Typically, inferential statistical analysis involves drawing inferences about a population based on data describing a sample (Lix et al., 2006). In this study associations were analyzed between adherence category with gender, living area, occupation of mother, feeding problem, epileptic sign, level of adaptation, Level of motivation, Emotional states, Distance of residence, Transport hazard, Family support, family member with disability

Table 1: Association between adherence category with gender, living area, occupation of mother, feeding problem, epileptic sign, level of adaptation, Level of motivation, Emotional states, Distance of residence, Transport hazard, Family support, family member with disability.

Null hypothesis (H₀): There has no association between adherence category with gender, living area, occupation of mother, feeding problem, epileptic sign, level of adaptation, Level of motivation, Emotional states, Distance of residence, Transport hazard, Family support, family member with disability.

Alternative hypothesis (H_A): There has association between adherence category with gender, living area, occupation of mother, feeding problem, epileptic sign, level of adaptation, Level of motivation, Emotional states, Distance of residence, Transport hazard, Family support, family member with disability.

Test assumption:

In case of Pearson chi square,

1. Two categorical variables including two or more subcategory 2.
2. 0%-20% cell have expected count less than 5.

In case of Fisher's exact test if

1. Expected frequency is <5, cell count is > 20%

Level of significance (α value < .05).

Table 3: Association between adherence category with gender, living area, occupation of mother, feeding problem, epileptic sign, level of adaptation, Level of motivation, Emotional states, Distance of residence, Transport hazard, Family support, family member with disability

Variable 1	Variable 2	Pearson Chi square co efficient value (χ^2)	Fisher's exact co-efficient value	Significant level	Comment/ Discussion
Adherence Category -High (>27) -Medium (21-26) - Low(<20)	Level of motivation -Low -High	7.451		0.024	Significant association found/ Alternative hypothesis is accepted
	Living area 1.Rural 2.Urban	0.317		0.835	No significant association found/Null hypothesis is failed to be rejected.
	Occupation of mother 1.Housewife 2.Servisholder	1.111		0.467	No significant association found/Null hypothesis is failed to be rejected.
	Feeding problem 1.Yes 2.No	5.775		0.056	No significant association found/Null hypothesis is failed to be rejected.
	Epileptic sign 1.Yes 2.No	1.338		0.519	No significant association found/Null hypothesis is failed to be rejected.

** α value is 0.05. P value is statistically significant if it is less than α value and alternative hypothesis is accepted. If P value is greater than α value then null hypothesis is accepted.

	Level of adaptation 1.Poor adaptation 2.Good adaptation	0.901		0.698	No significant association found/Null hypothesis is failed to be rejected.
	Family member with disability 1.Yes 2.No	5.177		0.08	No significant association found/Null hypothesis is failed to be rejected
	Emotional states 1.Normal 2.Abnormal	1.971		0.376	No significant association found/Null hypothesis is failed to be rejected
	Family support 1.Yes 2.No	0.636		0.812	No significant association found/Null hypothesis is failed to be rejected
	Transport hazard 1.Yes 2.No	3.528		0.195	No significant association found/Null hypothesis is failed to be rejected
	Distance of residence 1.Far 2.Near		2.131	0.357	
	Gender 1.Male 2.Female	0.152		0.698	No significant association found/Null hypothesis is failed to be rejected

Result:

The table presented above provides a comprehensive overview of the results obtained from the association of adherence categories with various demographic and environmental factors. The factors examined include gender, living area, occupation of the mother, feeding problems, epileptic signs, level of adaptation, level of motivation, emotional states, distance of residence, transport hazards, family support, and the presence of family members with disabilities.

Upon careful analysis, it is noteworthy that .

Specifically, there were no discernible correlations between adherence category and gender, living area, occupation of the mother, feeding problems, epileptic signs, level of adaptation, emotional states, distance of residence, transport hazards, family support, or the presence of family members with disabilities. These findings suggest that adherence to the given treatment or protocol did not significantly vary based on these demographic and environmental variables.

However, one noteworthy outcome from the analysis was the identification of a weak association between adherence categories and the level of motivation as the Cramer's $V = 0.266$. This indicates that an individual's motivation level may play a subtle role in their adherence to the prescribed treatment or regimen. Further exploration into this specific relationship could yield valuable insights into strategies for improving adherence among certain individuals.

Additionally, Bar graph 5(A) illustrates an interesting gender-related trend. It suggests that, despite the lack of a significant overall association between gender and adherence, females appear to have a slightly higher adherence rate when compared to males. This gender difference, though not substantial, could be an area for future research and interventions aimed at enhancing treatment adherence, especially among male participants. In summary, the study's results emphasize the complexity of factors influencing adherence to medical or therapeutic protocols and highlight the importance of motivation as a potential factor in adherence behavior. Further investigation and tailored interventions may be needed to understand and improve

adherence patterns among different subgroups within the population studied.

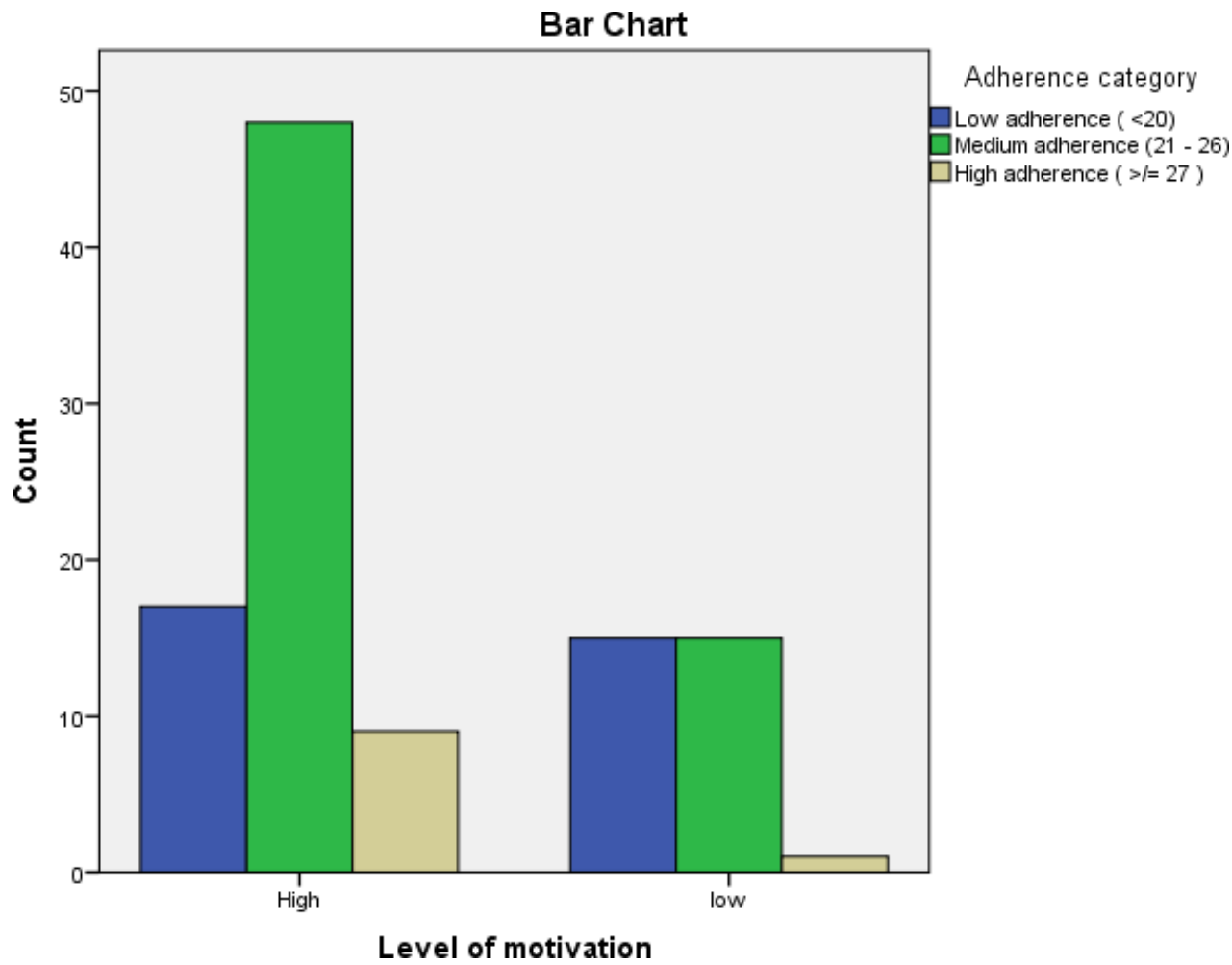


Fig 4.5.1: Association between adherence category and level of motivation

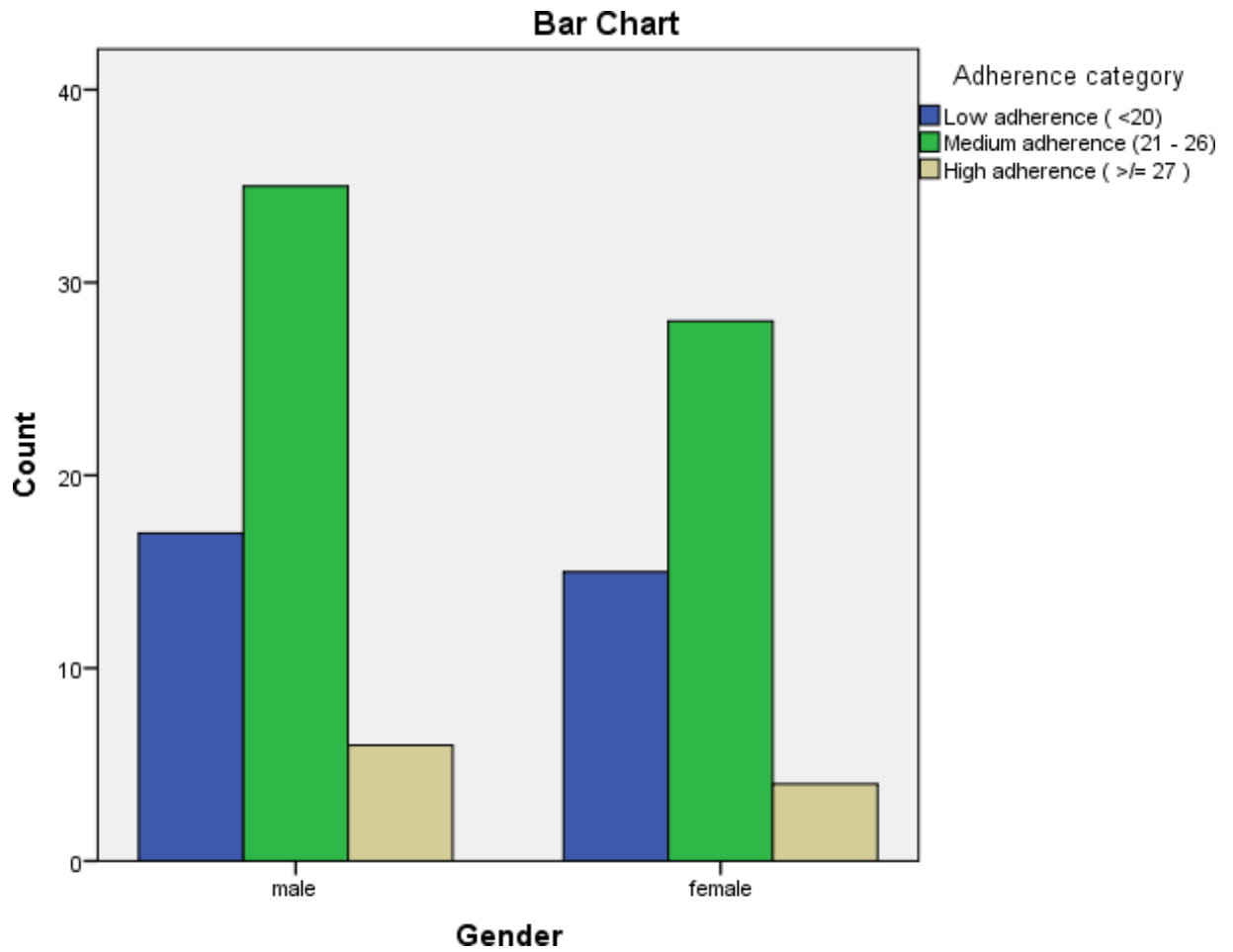


Fig 4.5.2: Association between adherence category and gender

A category of movement problems known as cerebral palsy (CP) first show up in young children. Poor coordination, tight, weakened, and trembling muscles are some of the signs and symptoms, which might change over time and from person to person. Sensation, vision, hearing, and speech issues could exist. Medicine, physical therapy, occupational therapy, speech therapy, and other treatments are used to treat them. An interdisciplinary team strives to improve them. Among these treatments, physical therapy is one of the most crucial ones. Maintaining consistency or adherence is essential for receiving physiotherapy properly. The purpose of this study was to improve the quality of services provided to this population. The findings give insight into a variety of developmental and personal factors that affect whether patients with cerebral palsy adhere to physiotherapy programs and recommendations from physiotherapists.

Finding previously published research and evaluating its applicability to the acquired data are the goals of the analysis and discussion. In regard to the study's research questions and objectives, the study's findings are discussed in this chapter. The debate is centered on determining the causes of the cerebral palsy patient's inadequate adherence to physiotherapy treatment. 54.7% of the 105 participants in my study (n = 58) and 44.3% of the participants (n = 47) were cerebral palsy patients with different types. On the basis of the ACDS scale, it was discovered that out of 105 participants, 30.5% had low adherence, 60% had medium adherence, and 9.5% had strong adherence. Mahmoud Y. Usman et al. (2017) did a study on the factors that influence caregivers of children with cerebral palsy's attendance at physical therapy appointments. According to the study's findings, there were a total of 28 (46.7%) adherents and 32 (53.3%) non-adherents. The outcome demonstrates that there was no correlation between adherence and caregivers' ages. In contrast, the findings of a 2011 study by Gbiri C.A. et al. indicated that non-attendees were more likely to be between the ages of twenty-three and twenty-seven. According to Beauchant et al. (1997), rates tend to decline in the age ranges of seventy to seventy-four years old with a minimum non-attendance rate. Regarding the age and gender of patients who miss their scheduled appointments, there are conflicting data in the literature. The majority of the 105

participants in my study—56.2%—live in rural areas, while 43.8% reside in urban areas. Even though the majority of the participants were from rural areas, they adhered to their physiotherapy treatments fairly well. From this data, it is clear that rural residents are becoming more aware of the benefits of physiotherapy for children with cerebral palsy. The results of this study indicate that the mean age of the CP kid was 42.36 months, which is about equivalent to a study conducted in India in 2018 about the clinical profile of cerebral palsy, in which the overall mean age was 48.84 months. More than half (57.5%) of the 105 participants in this study (n=61) have monthly incomes between \$25,000 and \$50,000. 60% of participants in the medium adherence group (n=63) again. The majority of the participants' family incomes are comparable to this.

According to this study, of the individuals, 67.9% had feeding issues whereas 32.1% did not. Therefore, people who have a feeding issue are less likely to adhere to physiotherapy treatment, whereas those who do not have a feeding issue are, on average, more likely to do so. A study conducted in India came to the conclusion that children with cerebral palsy had low nutritional status as a result of a number of variables. In order to start nutritional rehabilitation promptly, which can greatly improve their nutritional status and quality of life and also have an impact on adherence to long-term treatment, patients should be thoroughly screened for feeding issues and nutritional status.

In a research, 8 (or 30.8%) of the 10 caregivers with BSc/HND kept their appointment; only 2 (or 5.9%) did not. While 14 (41.2%) of the 17 caregivers who lacked formal education neglected to keep their appointment. The degree of education of the caregivers and adherence were shown to be significantly correlated (P 0.05). Mahmoud Y. Usman and others, 2004 This finding is similar to what I found in my study, which showed that educated parents or caregivers have higher levels of adherence than uneducated or illiterate people. According to the sociodemographic data from my study, the majority of CP mothers were housewives with SSC as their highest level of education. Among the 105 participants, I discover that 20.9% were highly educated and 95.2% were housewives. 19% of individuals did not receive family support, while 81% of participants did. Those who have had family support have strong levels of adherence since it's crucial for CP patients to receive regular treatment.

Among 105 participants, 63.8% of the parents had normal emotional status, whereas the remaining parents had abnormal emotional condition. It is a crucial factor for the parents of children with CP. The Pearson chi square test revealed a slight correlation between the adherence category and amount of motivation in the inferential analysis, I discovered. The value in this case is 0.024 ($p=0.05$). Given that the p value is less than the value in this test, the test is significant. As the cramer's $V = 0.3$, the association's strength is low. No correlation between the adherence category and gender, living area, mother's occupation, feeding problem, epileptic sign, level of adaptation, level of motivation, emotional states, distance from residence, transport hazard, family support, or presence of a family member with a disability was discovered in the inferential analysis because the p-value was greater than 0.05. research conducted in the UK A trustworthy relationship with the physiotherapist was determined to be essential for psychosocial influences by Rebecca Redmond and Margarete Parrish (2008). According to reports, this type of relationship helped participants and therapists reach their goals by encouraging positive feedback and support throughout sessions. Communication and interpersonal skills between the participants and the physiotherapist were valued highly. The participants stated that the physiotherapist was in charge of creating and maintaining rapport, and they frequently remarked that empathy from the physiotherapist was "highly desirable," along with trust and respect. Empathy was found to be closely related to the physiotherapist's capacity to blend participants' needs with preferences and lead enjoyable sessions. The capacity to facilitate enjoyable sessions and have a thorough understanding of the participants' physical and psychosocial demands were both crucial for fostering commitment to physical therapy.

To enhance the caliber of services provided to this population, the results of this qualitative study shed light on a variety of developmental and individual factors that affect whether young adults with cerebral palsy follow physiotherapy regimens and physiotherapists' recommendations. Young individuals with cerebral palsy between the ages of 16 and 25 were included in the study participants. Participants were enrolled in a college specifically designed to educate young adults with disabilities. I have selected a few sociodemographic, individual, and adherence-related characteristics that could affect receiving regular therapy, as I have already described. According to a clinical study by Abula, T. (2000), a combination of developmental and personal factors

influenced the participants' thoughts and perceptions of physical therapy. Four main categories emerged from the data analysis process. The categories were: (a) participants' comprehension of physiotherapy; (b) interpersonal factors; (c) personal preferences; and (d) participants' critical experiences of physiotherapy. Mahmoud Y Usman (2004) did yet another study. It demonstrated the caregivers' marital status and their attendance at their scheduled physical treatment sessions. The married caregivers showed the highest adherence rate of 10 (55.6%), while the divorced caregivers showed the highest adherence rate of 25 (62.5%). The findings demonstrated a statistically significant relationship ($p < 0.05$) between the caregivers' marital status and their attendance at physical therapy appointments. This study also discovered that, of the 28 carers who kept their appointments, 23 (82.1%) were knowledgeable about the disease, whereas of the 32 caregivers who missed their appointments, 23 (71.9%) were not. The Chi-square test revealed a significant relationship ($P < 0.05$) between CP knowledge and adherence. According to the findings in Table 1, the majority of the 12 caregivers (42.9%) who kept the appointment belonged to the upper socioeconomic class, while the carers in the lower socioeconomic class had the highest rate of non-adherence (15.4%). According to the findings (i.e., $P < 0.05$), there is a substantial link between socioeconomic position and adherence.

5.1 Limitations

Regarding this study there were some situational limitation or barriers to consider the result of the study. The limitations are as below:

The study had small sample size. Only 105 samples were taken in this study. Only 105 samples do not represent the condition of entire country's Cerebral palsy patients. It would be more effective if a large number of samples were taken. Time was one of the major limitation. I had a short period of time to complete the research so that large number of sample couldn't be managed for the study. The sample was collected only from CRP, Savar, Dhaka. If it was collected from other many institutes and rehabilitation center across the country, the result would be more reliable and appropriate and also give a clear impression about the factors associated with low adherence to physiotherapy treatment for the patients with cerebral palsy in Bangladesh. As it was the first research of the researcher so there might be some mistakes that should be overlooked by the supervisor and the honorable teachers.

The factors associated with low adherence to physiotherapy treatment for patients with cerebral palsy were explored. It was suggested by the results of the study that adherence to physiotherapy treatment is of significant importance for CP patients. Associations between age and gender with adherence category were not found. Within the study, a weak association between the level of motivation and adherence category was observed ($P < 0.05$), with high adherence being positively impacted by highly motivated parents. Poor adherence to physiotherapy may be experienced by patients with co-morbidities and feeding problems, as indicated. Furthermore, the role of family income in ensuring the continuity of physiotherapy treatment was emphasized, with a higher income level being conducive to patient adherence.

In addition, various factors were identified as influencing adherence to physiotherapy treatment, including patient motivation, comprehension of the treatment plan, the number of siblings of the patients, family support, and the severity of the condition. Emotional status of the parents, transport hazards, and distance from the institute were also recognized as factors in this context. Improved outcomes for patients with cerebral palsy were suggested to be attainable if regularity in physiotherapy treatment is maintained by their parents or caregivers, given its status as one of the most crucial treatments for enhancing their functional abilities and reducing the severity of their condition, thereby enabling a better quality of life.

Recommendation

After the research was completed, some recommendations were identified. Several points should be noted that could contribute to the enhanced achievement of future studies. More samples should be taken to generate more valid and reliable results.

Samples should be collected from different institutes and rehabilitation centers in various districts of Bangladesh to allow for the generalization of the results. To obtain effective and efficient results in a generalized form, consideration should be given to using other measurement scales. Increasing the sample size may enhance the statistical significance of some of the results. A long-term follow-up examination may be undertaken to assess the long-term effects of adherence to physiotherapy treatment for

children with cerebral palsy. The study's limitations, as mentioned in the relevant section, should be addressed in future research endeavors.

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APPENDIX

CONSENT FORM

(Please read out to the participants)

Assalamualaikum,

I am Sraboni Biswas, the 4th year B.Sc. (Hon's) in Physiotherapy student of Bangladesh Health Professions Institute (BHPI) under Medicine faculty of University of Dhaka. To obtain my Bachelor degree, I shall have to conduct a research and it is a part of my study. The participants are requested to participate in the study after reading the following. My research title is "Factors associated with low adherence to Physiotherapy treatment for the children with Cerebral Palsy". Through this study I will explore the factors associated with low adherence to Physiotherapy treatment for the CP patient .

To implement my research project, I need to collect data from the parents or caregiver of cp childs. Therefore, you could be one of my valuable subjects for the study.and I would like to request you as a subject of my study. I am committed that the study will not pose or any hurm oreisk to you.

I would like to inform you that this is a purely academic study and will not be used for any other purpose. I assure that all data will be kept confidential. Your participation will be voluntary. You may have the right to withdraw consent and discontinue participation within 7 days of participation without any hesitation or risk.

If you have any query about the study or right as a participant, you may contact with me by telephone (01749496670) or my supervisor Asma Islam , Assistant Professor , Department of Physiotherapy , BHPI.

Do you have any questions before I start?

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

Yes.....No.....

Signature of the participant & Date.....

Signature of the researcher & Date...

মৌখিক সম্মতি পত্র

আসসালামু আলাইকুম,

আমি শ্রাবণী বিশ্বাস, বিএসসি ৪র্থ বর্ষের (অনার্স) ঢাকা বিশ্ববিদ্যালয়ের মেডিসিন অনুষদের অধীনে বাংলাদেশ হেলথ প্রফেশনস ইনস্টিটিউটের (বিএইচপিআই) ফিজিওথেরাপির ছাত্রী। আমার ব্যাচেলর ডিগ্রী পেতে, আমাকে একটি গবেষণা পরিচালনা করতে হবে এবং এটি আমার অধ্যয়নের একটি অংশ। অংশগ্রহণকারীদের নিম্নলিখিত পড়ার পরে গবেষণায় অংশগ্রহণের জন্য অনুরোধ করা হচ্ছে।

আমার গবেষণার শিরোনাম হল "সেরিব্রাল পালসি আক্রান্ত শিশুদের ফিজিওথেরাপি চিকিৎসা সাথে লেগে না থাকা বা কম লেগে থাকার সাথে সম্পর্কিত কারণগুলি বের করা"। এই গবেষণার মাধ্যমে আমি উক্ত সম্পর্কিত কারণগুলি অনুসন্ধান করব।

আমার গবেষণা প্রকল্প বাস্তবায়নের জন্য, আমাকে সিপি বাচ্চাদের পিতামাতা বা যত্নশীলদের কাছ থেকে ডেটা সংগ্রহ করতে হবে। অতএব, আপনি অধ্যয়নের জন্য আমার মূল্যবান বিষয় হতে পারেন এবং আমি আপনাকে আমার অধ্যয়নের অংশগ্রহণকারী হিসাবে অনুরোধ করতে চাই। আমি প্রতিশ্রুতিবদ্ধ যে অধ্যয়ন আপনার কাছে পোজ বা কোন ক্ষতি করবে না।

আমি আপনাকে জানাতে চাই যে এটি একটি সম্পূর্ণরূপে একাডেমিক অধ্যয়ন এবং অন্য কোন উদ্দেশ্যে ব্যবহার করা হবে না আমি আশ্বাস দিচ্ছি যে সমস্ত তথ্য গোপন রাখা হবে। আপনার অংশগ্রহণ স্বেচ্ছায় হবে। আপনার কোনো দ্বিধা বা ঝুঁকি ছাড়াই অংশগ্রহণের 7 দিনের মধ্যে সম্মতি প্রত্যাহার এবং অংশগ্রহণ বন্ধ করার অধিকার আছে।

অধ্যয়ন সম্পর্কে আপনার যদি কোন প্রশ্ন থাকে অংশগ্রহণকারী হিসাবে, আপনি আমার সাথে টেলিফোনে যোগাযোগ করতে পারেন (01749496670) অথবা আমার সুপারভাইজার আসমা ইসলাম, সহকারী অধ্যাপক, বিভাগ ফিজিওথেরাপি, বিএইচপিআই।

আমি শুরু করার আগে আপনার কোন প্রশ্ন আছে?

তাহলে, ইন্টারভিউ নিয়ে এগিয়ে যেতে আমি কি আপনার সম্মতি পেতে পারি?

হ্যাঁ..... না.....

অংশগ্রহণকারীর স্বাক্ষর..... তারিখ.....

গবেষকের স্বাক্ষর তারিখ.....

Questionnaire

Title : Factors associated with low adherence to physiotherapy treatment for the children with cerebral palsy

A. Personal Information :		
Patient's name :		
Father's name :		
Mother's name :		
Age :		
Sex :	i) Male	ii) Female
Living area	i) Urban	ii) Rural
Mobile no :		
Co-morbidities diagnosis before :		
Feeding problem :	i) Yes	ii) No
Number of co-morbidity :	i) Single	ii) Multiple
Epileptic sign :	i) Yes	ii) No
Child's level of adaptation in different environment	i) Poor adaptation	ii) good adaptation
Improvement :	i) Yes	ii) No
B. Socio-demographic Characteristics :		
Educational level of mother	1) Illiterate	2) Primary
	3) High school	4) SSC
	5) HSC	6) Hone's
	7) Masters	
Occupation of mother :		
Duration of mother staying outside of home:		
Number of years of work of mother:	i) <1year	ii) 1-5 year
	iii) 6-10 years	iv) >10 years
Family members :		
Occupation of father :	1, Govt. service	2. Non govt. service
	3. Business	4. Agricultural work
	5. Labourer	6. Unemployed
	7. Others:	
Family income per month :	1. Tk (<10,000)	2. Tk (10,000- <25,000)
	3. Tk (25,000-50,000)	4. Tk (>50,000)
Number of children of parents :		

Family member with disability :	i) Yes	ii) No
Distance of residence from the institution:	1. Near (1-2km)	2. Far (>2km)
Transportation medium:		
Transport hazard:	i) Yes	ii) No
Emotional states of the parents or carer:	i) Normal	ii) Abnormal
Family support	i) Yes	ii) No
Level of motivation	i) High	ii) Low

The Adherence in Chronic Diseases Scale (ACDS)

1. Do you always remember to take all your physiotherapy treatment to your doctor's instructions?

- a) Always
- b) Almost always
- c) Sometimes
- d) Hardly ever
- e) Never

2. Do you happen to change the dosing of your treatment without prior consultation with your doctor?

- a) Never
- b) Only occasionally
- c) Sometimes
- d) Frequently
- e) I do not adhere to my therapist's recommendations at all

3. Do you adjust the dosing of your treatment according to how you feel?

- a) No, I strictly follow the prescribed dosing, no matter how I feel
- b) Yes, I reduce the dosage of physiotherapy treatment when I feel good
- c) Yes, I skip doses of some medications when I feel good
- d) Yes, I temporarily discontinue some medications when I feel good
- e) Yes, I discontinue all exercise when I feel good

4. On the appearance of therapy-related side effects (e.g. stomach pain, liver pain, rash, lack of appetite, oedema):

- a) I seek medical attention instantly
- b) I reduce the dosage of the medication and attempt to expedite the elective appointment with my therapist

- c) I discontinue the therapy and attempt to expedite the elective appointment with my doctor
- d) I discontinue the medication and wait for the next elective appointment with my doctor
- e) I discontinue all my therapies and wait for the next elective appointment.

5. Do you find all your therapy necessary for your health?

- a) Yes, I do
- b) I find most of my therapies to be beneficial for my health
- c) I find only some of my therapies to be beneficial for my health
- d) I find some of my therapies to be beneficial for my child's health while the others to be harmful.
- e) I find the majority of my long-term therapies to be harmful for my child

6. Does your doctor inquire about therapy-related problems that you might possibly experience?

- a) Yes, on every appointment
- b) Yes, he/she usually does
- c) Yes, but only sometimes
- d) Yes, but only occasionally
- e) No, never

7. Do you tell truth when asked by your doctor about therapy-related problems?

- a) Yes, always
- b) Almost always
- c) I try to be honest, but sometimes it is hard to admit to non-compliance with doctor's recommendations
- d) Sometimes yes, another time no
- e) No, I don't. I find it my own private business

Score

- A — 4
- B — 3
- C — 2
- D — 1
- E — 0

Total score	Centile standards
<20	Low adherence
21-26	Medium adherence
≥27	High adherence

Total score.....

Date And Signature of the Interviewer

প্রশ্নপত্র

শিরোনামঃ সেরিব্রাল পালসি আক্রান্ত শিশুদের ফিজিওথেরাপি চিকিৎসায় কম আনুগত্যের সাথে সম্পর্কিত কারণগুলি

ব্যক্তিগত তথ্য		
রোগীর নামঃ		
পিতার নামঃ		
মাতার নামঃ		
বয়সঃ		
লিঙ্গঃ	i) পুরুষ	ii) নারী
বসবাস এলাকাঃ	i) শহর	ii) গ্রাম
মোবাইল নংঃ		
অন্যান্য রোগ যা পূর্বে নির্ণিত হয়েছেঃ		
খাওয়ানোর সমস্যাঃ	i) হ্যাঁ	ii) না
অন্যান্য রোগের সংখ্যাঃ	i) এক	ii) একাধিক
ইপিলিপ্সিঃ	i) হ্যাঁ	ii) না
বিভিন্ন পরিবেশে বাচ্চার মানিয়ে নেওয়ার দক্ষতা	i) কম	ii) ভাল
উন্নতিঃ	i) হ্যাঁ	ii) না
সামাজিক-জনসংখ্যাগত বৈশিষ্ট্যঃ		
মায়ের শিক্ষাগত স্তরঃ	i) অশিক্ষিত	ii) প্রাথমিক
	iii) মাধ্যমিক	iv) এস এস সি
	v) এইচ এস সি	vi) অনার্স
	vii) মাস্টার্স	
মাতার পেশাঃ		
মায়ের বাড়ির বাহিরে থাকার সময়কালঃ		
মায়ের কাজের বছরের সংখ্যাঃ	i) <১ বছর	ii) ১-৫ বছর
	iii) ৬-৯ বছর	iv) >১০ বছর
পরিবারের সদস্যঃ		
পিতার পেশাঃ	i) সরকারি সেবা	ii) বেসরকারি সেবা
	iii) ব্যবসা	iv) কৃষি কাজ
	v) শ্রমিক	vi) বেকার
	vii) অন্যান্য	
প্রতি মাসে পারিবারিক আয়ঃ	i) (<১০,০০০)টাকা	ii) (10,000-<25,000)টাকা

	iii) (২৫,০০০-৫০,০০০) টাকা	iv) (>৫০,০০০) টাকা
পিতামাতার সন্তানের সংখ্যাঃ		
প্রতিবন্ধি পরিবারের সদস্য	i) হ্যাঁ	ii) না
প্রতিষ্ঠান থেকে বাসস্থানের দূরত্ব	i) কাছাকাছি(১-২ কিমি)	ii) দূরে(>২কিমি)
যাতায়াত মাধ্যমঃ		
যাতায়াতে সমস্যাঃ	i) হ্যাঁ	ii) না
পিতামাতা বা যত্নকারীর মানসিক অবস্থাঃ	i) স্বাভাবিক	ii) অস্বাভাবিক
পরিবারের সমর্থনঃ	i) হ্যাঁ	ii) না
অনুপ্রেরনার স্তরঃ	i) বেশি	ii) কম

অ্যাডহ্যারেন্স ইন ক্রনিক ডিজিজেস স্কেল

১) আপনি কি সবসময় আপনার ডাক্তারের নির্দেশমত সমস্ত ফিজিওথেরাপি চিকিৎসা নিতে মনে রাখেন?

- ক) সবসময়
- খ) প্রায় সবসময়
- গ) কখনও কখনও
- ঘ) খুব কম
- ঙ) কখনই না

২) আপনি কি আপনার ডাক্তারের সাথে পূর্ব পরামর্শ ছাড়াই সন্তানের চিকিৎসার ডোজ পরিবর্তন করেন?

- ক) কখনো নয়
- খ) কখনো কখনো
- গ) মাঝেমধ্যে
- ঘ) ঘন ঘন
- ঙ) আমি আমার থেরাপিস্ট নির্দেশমত চলি না

৩) আপনার সন্তান কেমন অনুভব করছেন সেই অনুযায়ী আপনি কি আপনার পছন্দ মত চিকিৎসার পরিবর্তন করেন?

- ক) না, আমি কঠোরভাবে নির্দেশ মেনে চলি, আমার সন্তান যেমন অনুভব করুক না কেন
- খ) হ্যাঁ, আমার সন্তান যখন ভাল বোধ করে, তখন ফিজিওথেরাপির ডোজ কমিয়ে দেই
- গ) হ্যাঁ, বাচ্চা যখন ভাল বোধ করে তখন কিছু থেরাপির ডোজ এড়িয়ে যাই
- ঘ) হ্যাঁ, বাচ্চা যখন ভাল বোধ করে তখন থেরাপির ডোজ বন্ধ করে দেই
- ঙ) হ্যাঁ, বাচ্চা যখন ভাল বোধ করে, তখন সমস্ত থেরাপি বন্ধ করে দেই

৪) থেরাপির পার্শ্বপ্রতিক্রিয়া (ব্যাথা) হলে,

- ক) আমি তাৎক্ষণিকভাবে চিকিৎসার সেবা চাই
- খ) আমি চিকিৎসার ডোজ কমিয়ে দেই
- গ) আমি থেরাপি বন্ধ করে দেই

ঘ) আমি খেরাপি বন্ধ করে দেই এবং পরবর্তি অ্যাপইন্টমেন্টের জন্য অপেক্ষা করি

ঙ) আমি সমস্ত খেরাপি বন্ধ করে দেই এবং পরবর্তি অ্যাপইন্টমেন্টের জন্য অপেক্ষা করি

৫) আপনি কি আপনার বাচ্চার স্বাস্থ্যের জন্য সকল খেরাপি প্রয়োজনীয় মনে করেন?

ক) হ্যাঁ, আমি করি

খ) আমি বেশিরভাগ খেরাপি বাচ্চার স্বাস্থ্যের জন্য উপকারী বলে মনে করি

গ) আমি আমার বাচ্চার জন্য শুধু মাত্র কিছু খেরাপি কে উপকারী বলে মনে করি

ঘ) আমি কিছু খেরাপি বাচ্চার জন্য উপকারী পেয়েছি যেখানে অন্যগুলো ক্ষতিকর

ঙ) আমি আমার বাচ্চার দীর্ঘমেয়াদি খেরাপির বেশিরভাগই ক্ষতিকর বলে মনে করি

৬) আপনার ডাক্তার কি খেরাপি সম্পর্কিত সমস্যাগুলি সম্পর্কে জিজ্ঞাসা করেন যা আপনার বাচ্চা অনুভব করে?

ক) হ্যাঁ, প্রতি অ্যাপইন্টমেন্টেই

খ) হ্যাঁ, সে সাধারণত করে

গ) হ্যাঁ, কিন্তু মাঝে মাঝে

ঘ) হ্যাঁ, কিন্তু খুবই কম

ঙ) না, কখনোই না

৭) আপনি খেরাপি সম্পর্কিত সমস্যা যা আপনার ডাক্তার জানতে চান তা কি সঠিকভাবে/সত্য বলেন?

ক) হ্যাঁ, সবসময়

খ) প্রায় সবসময়

গ) আমি সত্যবাদী থাকার চেষ্টা করি কিন্তু কখনো কখনো ডাক্তারের সম্মুখে এটি মেনে না চলার কথা স্বীকার করা কঠিন

ঘ) কখনো হ্যাঁ, আবার কখনো না

ঙ) না, বলি না, আমি আমার মত ভাবি

স্কোর

ক— ৪

খ— ৩

গ— ২

ঘ— ১

ঙ— ০

মোট স্কোর

মোট স্কোর	সেন্টিল মান
<২০	কম আনুগত্য
২১-২৬	মাঝারি আনুগত্য
>২৭	উচ্চ আনুগত্য

.....
সাক্ষাতকারের সাক্ষর ও তারিখ

IRB permission letter



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

Ref:

CRP/BHPI/IRB/03/2023/691

Date:

13/03/2023

To
Sraboni Biswas
B.Sc. in Physiotherapy,
Session: 2017-2018, DU Reg. No: 8629
BHPI, CRP, Savar, Dhaka- 1343, Bangladesh

Subject: Approval of the dissertation proposal “Factors Associated with Low Adherence to Physiotherapy Treatment for the Children with Cerebral Palsy”- by ethics committee.

Dear
Sraboni Biswas
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 Asma Islam, Assistant Professor, Department of Physiotherapy, BHPI, CRP as dissertation supervisor. The following documents have been reviewed and approved:

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

The purpose of the study is to find out the factors associated with low adherence to physiotherapy treatment for the children with Cerebral Palsy. Should there any interpretation, typo, spelling, grammatical mistakes in the title, it is the responsibilities of the investigator. Since the study involves questionnaire that takes maximum 20- 25 minutes and have no likelihood of any harm to the participants. The members of the Ethics committee approved the study to be conducted in the presented form at the meeting held at 09:00 AM on January 9, 2023 at BHPI, 34th IRB Meeting.

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