

# **FUNCTIONAL OUTCOME OF GAIT USING A FIM SCALE AMONG STROKE PATIENTS AT CRP NEUROLOGY UNIT**

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

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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

**FUNCTIONAL OUTCOME OF GAIT USING A FIM SCALE  
AMONG STROKE PATIENTS AT CRP NEUROLOGY UNIT**

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## **Declaration**

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 declare that for any publication, presentation or dissemination of information of the study. I would be bound to take written consent of my supervisor.

**Signature:**

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## **Acronyms**

<b>ADL</b>	Activities of Daily Living
<b>AVM</b>	Arterio Venous Malformation
<b>CT</b>	Computed Tomography
<b>CVA</b>	Cerebro Vascular Accident
<b>EMG</b>	Electro MyoGraphy
<b>MRI</b>	Magnetic Resonance Imaging
<b>TIA</b>	Transient Ischemic Attack
<b>WHO</b>	World Health Organization

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## Abstract

*Purpose:* To assess the functional outcome of gait using a FIM scale among stroke patients. *Objective:* The aim of this study was to describe the functional outcome of gait using a FIM scale among stroke patients that got at least 15 session of treatment by physiotherapist at CRP neurology unit. *Methodology:* The study design was cross-sectional. The sample size was 50 and purposive sampling technique was used for sample selection from neurology unit of Centre for the Rehabilitation of the Paralyzed (CRP). Gait was measured by FIM scale. The data was analyzed through descriptive statistics by using table, pie chart and bar chart by SPSS software version 16.0. *Results:* Among 50 participant most of the stroke patients were middle and old age group and male 72% (n=36) are predominantly higher than female 28% (n=14). Majority of the participants were came from rural area (64%) and majority of the participant's occupation was business (30%). Ischemic stroke (72%) were higher than hemorrhagic stroke (28%) and most of the patient are right sided (60%) hemiplegic. Maximum number of participant's past medical history was hypertension (42%), smoking (42%), diabetics (20%) and tobacco chewing (18%). Maximum number of participant (32%) received 20-24 physiotherapy session. 62% participants had acceptable BMI. Majority of participant's (68 %) were not used assistive device. 50% participant's FIM score was 1 at initial stage and after physiotherapy treatment maximum number of participant's (34%) FIM score was 5. *Conclusion:* The results of this study provided more insight into the functional outcome of gait of a group of patients with stroke. This information would assist the professional to justify the physiotherapy practice. More research is needed to evaluate the rehabilitation program for these patients.

**1.1 Background**

Stroke or CVA is one of the most common causes of severe disability in adults. About 50% to 65% of persons have persistent physical disability who survive stroke. Approximately 70% are able to walk independently after rehabilitation. It appears that only a small percentage of these persons are able to walk functionally in the community (Mudge & Stott, 2009). Stroke affects the areas of cognitive, psychosocial and physical functioning. It is the leading cause of serious long-term disability (Rabin et al., 2012).

Worldwide, stroke is the second leading cause of death, responsible for 4.4 million (9 percent) of total 50.5 million deaths each year (Sudlow et al., 1996). Stroke is currently the second leading cause of death in the western world ranking after heart diseases and before cancer and causes 10% of deaths worldwide (Braunwald et al., 2003). According to the World Health Organization, 15 million people suffer stroke worldwide each year. Of these, 5 million die and another 5 million are permanently disabled (Engstrom et al., 2001). Stroke is the most common cause of adult disability. Stroke in older age incidence- 2/3<sup>rd</sup> of stroke patients aged over 60 years (Boon et al., 1999).

Stroke occurs at an equal rate in men and women, but women are more likely to die. Stroke was an underlying cause in 63.6% of female deaths and 54.1% of male deaths from stroke in Australia. Among adults age 20 and older, the prevalence of stroke in 2005 was 6,500,000 (about 2,600,000 males and 3,900,000 females) (Mensah, 2008). Stroke accounted for about one of every 17 deaths in the United States in 2005. Stroke mortality for 2005 was 143,579 (56,586 males, 86,993 females). Every seven minutes, a Canadian dies of heart diseases or stroke. Europe averages approximately 650,000 stroke deaths each year (Braunwald et al., 2003).

Of all strokes, 87 percent are ischemic, 10 percent are intracerebral hemorrhage, and 3 percent are subarachnoid hemorrhage. Ischemic stroke occurs more frequently in people over age of 65. And hemorrhagic stroke is more common in younger people (Carr & Shepherd, 2003). Stroke is the third most common cause of death in

developed countries. The incidence of stroke increases with age. The age adjusted annual death rate from stroke is 116 per 100000 populations in the USA and some 200 per 100000 in UK. Among stroke, ischemic infraction constitute 85% to 90% and 15% to 10% is caused by intracranial hemorrhages in the western world. In Asia hemorrhages constitute a larger percentage (Hossain et al., 2011).

A systematic review of population-based studies from 1970–2008 showed a 42% decrease in stroke incidence in high income countries and a greater than 100% increase in stroke incidence in low to middle income countries (Feigin et al., 2003). Bangladesh is a South Asian country and one of the most densely populated country in the world. Stroke is the 3<sup>rd</sup> leading cause of death in Bangladesh (Haque, 2003). In India, among stroke survivors 72.7% rural had severe disability (Ferri et al., 2011).

Cerebral vascular disease is a leading cause of impairment of walking or gait, resulting in long-term disability and handicap. Gait recovery is a priority goal for most patients (Pizzi et al., 2007). Ninety percent of stroke survivors have some functional disability and mobility being a major impairment. During the acute and sub-acute phases some individuals with stroke will have received some rehabilitation. Sometimes rehabilitation extends beyond one year post-injury. 65% to 85% of stroke survivors learn to walk independently by 6 months post stroke, although gait abnormalities persist through the chronic stages of the condition (Eng & Tang, 2007).

## **1.2 Rationale**

Stroke is a common neurological condition, mostly seen in developing country. Day by day there is increasing the number of stroke patient, in different areas. In this condition, only medical management is not enough rather than the therapeutic management which is also essential for people stroke management. Stroke rehabilitation mainly completed by multi-disciplinary team. Physiotherapy is a significant part of this multi-disciplinary team. As the physiotherapy profession is newly introduced in Bangladesh, many people are not aware of its purpose. But it is an important part of health care to prevent diseases as well as to improve or maximize independence in people with disabilities. Therefore, physiotherapy can play an absolute role in the management of the people with stroke. Eventually, other professionals as well as general public will become aware about this service and this will be helpful to establish this profession at different institution, hospitals and clinics to fulfill the health care needs of the patient.

Walking abnormality is a major problem after stroke. So recovery of walking is a major and priority goal for most of the patient. The main aim gait training by a physiotherapist is to improve walking ability. Specifically, gait improvement will determine the activities of daily living. Physiotherapy practice will promote improvement of gait ability. By this result we get appropriate measure of improvement of gait. The study also helps to play more attention to perform gait training. The researcher would like to conduct this study in order to develop an evidence to improve gait in relation to physiotherapy intervention of stroke patient. So that after doing this study patient will be aware of physiotherapy management.

In Bangladesh, most of the patient come at later stage and their improvement are not satisfactory. It is thought, if we can identify the specific factors, then we can give concentration on those specific factors for the better outcome of the people who are suffering stroke and they will get maximum benefit from physiotherapy treatment. The goals of physiotherapy are to provide opportunities for an individual to regain walking ability. As a result it will improve the functional outcome, reducing limitation of activity. A proper outcome aims to provide the evidence for the stroke person with gait deficit and thus help to improve quality of service of physiotherapy.

### **1.3 Research question**

- What are the functional outcome of gait after stroke?

### **1.4 Objectives**

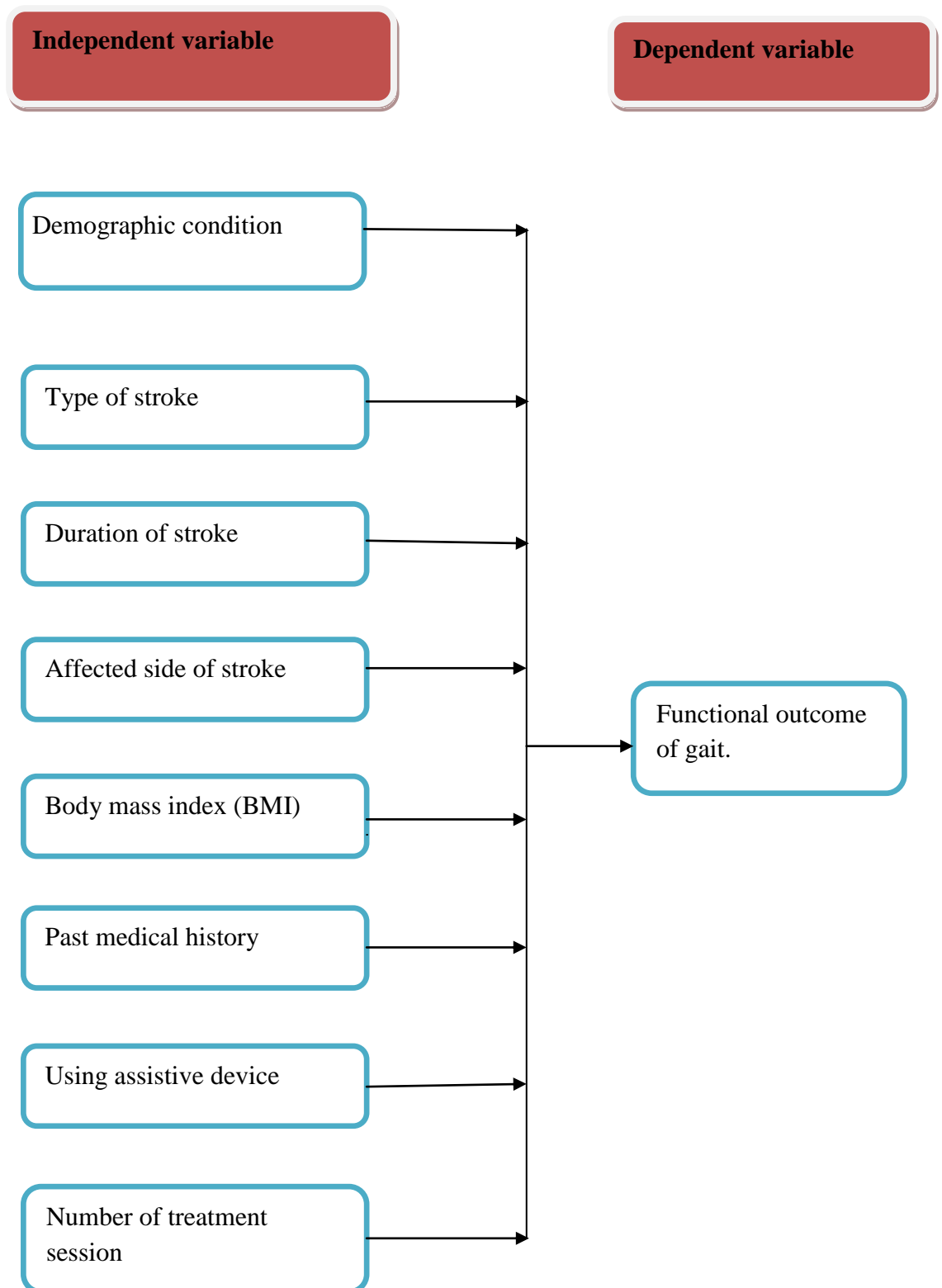
#### **1.4.1 General objective**

- To find out the functional outcome of gait using a FIM scale among stroke patient.

#### **1.4.2 Specific objectives**

- To find out the socio-demographic characteristics of stroke patient.
- To determine the most common factors that are responsible for stroke.
- To know the body mass index (BMI) among stroke patient.
- To identify the number of physiotherapy session received by the stroke patient.
- To investigate the improvement of gait after treatment.

## 1.5 List of variables



## **1.6 Operational definition**

### **Functional independence measurement scale (FIM)**

The FIM instrument refers to a scale that is used to measure one's ability to function with independence. The FIM is used worldwide in medical rehabilitation units. The FIM score ranges from 1 to 7, with 1 (Total Assistance) being the lowest possible score and 7 (Complete Independence) being the maximum possible score.

### **Functional outcome**

Functional outcome means improvement of function during goal directed task and its help to involve activity of daily living. In this study walking or gait activity are included functional recovery measure.

### **Stroke**

A stroke occur when the blood supply to part of your brain is interrupted or severely reduced, depriving brain tissue of oxygen and food. Within minutes, brain cells begin to die.

### **Risk factor**

Risk factors are trait and lifestyle habits that increase the risk of disease. Statistical studies have identified several factors that increase the risk of stroke.

### **Assistive device**

Any device that is designed made to assist a person to perform a particular task.

### **Gait training**

Gait training is the act of learning how to walk. The term is more often used in reference to a person learning how to walk again after injury or with a disability.



A stroke or cerebro vascular accident occurs when a blood vessel in the brain bursts or when the blood supply to part of the brain is suddenly interrupted. Stroke leads to spilling blood into the spaces surrounding brain cells. Lack of oxygen and nutrients from the blood or there is sudden bleeding into or around the brain causes cells die of the brain (National institute of neurological disorder and stroke, 2004). Stroke is a leading cause of long-term disability which results from brain cell damage due to either an interruption of the blood supply to the brain or hemorrhage into the brain tissue (Eng & Tang, 2007). It is the most frequent clinical manifestation of diseases of the cerebral blood vessels (Boon et al., 1999).

Cerebral vascular accident (CVA) or stroke is the most common neurological disease of adulthood that leads to disability (Pedretti & Zoltan, 2007). Transient Ischemic Attack (TIA) are episodes of stroke symptoms that last only briefly; the standard definition of duration is <24 h, but most TIAs last <1 h. The standard definition of TIA requires that all neurologic signs and symptoms resolve within 24 hour regardless of whether there is imaging evidence of new permanent brain injury; stroke has occurred if the neurologic signs and symptoms last for >24 h (Braunwald et al., 2003).

There are two forms of stroke: ischemic and hemorrhagic (National institute of neurological disorder and stroke, 2004). Ischemic stroke or cerebral infarct (80% of strokes) occurs due to blockage or a reduction of blood flow in artery that supplies brain. They are caused either by a clot which blocks the blood vessel or by the buildup of plaque often due to cholesterol within the arteries which narrows vessel resulting in a loss of blood flow. Hemorrhagic stroke are due to the rupture of an artery within the brain triggering an intracerebral hemorrhage (15% of strokes) or to the rupture of aneurysm or AVM entailing sub arachnoids hemorrhage (5% of strokes) (Braunwald et al., 2003). Stroke is most common medical emergency. The annual incidence of stroke between 180 and 300 per 100000. In many developing countries the incidence raises sequent with age due to adopting of less healthy life style (Haslet et al., 1999).

Stroke is the second commonest cause of death. The average incidence of stroke is 2:1,000. After the age of 50 the incidence rate doubles every decade (Choo et al.,

2009). Each year in United States, approximately 730,000 people have stroke. And nearly 400,000 survive with some level of neurology impairment and disability (Kelly et al., 1998). Each year in China, there were about 1.5-2.0 million new stroke patients. It has been a major public health problem in China. The clinical factors would not be the same in ischemic and hemorrhagic stroke. The pathogenesis of ischemic stroke is different from that of hemorrhagic stroke. In East China, a study showed that 78% ischemic patient and 22% hemorrhagic patients. The incidence rate of ischemic stroke was higher than that of hemorrhagic stroke (Zhang et al., 2011).

The major risk factor for stroke is hypertension. It is usually associated with other risk factors like smoking obesity, previous history of stroke or TIA, angina, atrial fibrillation, myocardial infarction and alcohol intake. History of contraceptive pills used by women is also a risk factor. Due to an ageing population strokes are increasing in number and are largely preventable (Amanullah et al., 2009). The preventable conditions that predispose to stroke are hypertension, cigarette smoking, obesity, physical inactivity, atrial fibrillation, diabetes mellitus, ischemic heart disease, hyper lipidemia, alcohol abuse, asymptomatic carotid stenosis, transient ischemic attack and other cardiac disorders are (Almani et al., 2008).

There is a positive and negative association between stroke and obesity. The outcome of stroke is associated with body weight. In a study showed that BMI is associated with stroke but the direction and strength of association depend on stroke subtype. Increased risks for both ischemic stroke and hemorrhagic stroke among men with BMI above the reference range (22 to 23 kg/m<sup>2</sup>) (Song et al., 2004). Obese stroke patient have lower prognosis. In stroke, obesity can lead to death Obesity is an independent risk factor for cardiovascular events. In Asia-Pacific region, the prevalence of obesity and overweight is much among stroke patient (Choo et al., 2009).

The impact of stroke in socio-economic condition is always considerable, both in industrialized and non-industrialized countries of the world. Stroke seems an increasing impact in terms of media attention, patient and career knowledge, service developments and research (Wolfe, 2000). The sequence of stroke varies and it's depending on the part of the brain injured, the severity of the injury and the person's

general health (Boon et al., 1999). The symptoms of a stroke include sudden numbness or weakness, especially on one side of the body; sudden confusion or trouble speaking or understanding speech; sudden trouble seeing in one or both eyes; sudden trouble with walking, dizziness, or loss of balance or coordination; or sudden severe headache with no known cause (National institute of neurological disorder and stroke, 2004).

Chest infection, epileptic seizures, DVT, pulmonary embolism, contracture, painful haemiplegic shoulder trauma, altered muscle tone, glenohumeral subluxation, pressure sore, urinary tract infection, constipation, depression and anxiety. Other psychological problems include: depression, unrealistic state, labile state and personality changes is common in patients with stroke and has been reported to affect rehabilitation(Boon et al., 1999).Problem with language, including difficulty understanding speech or writing (aphasia) and knowing words but has difficulty to saying them clearly (dysarthria), problem with memory, thinking, attention or learning, possible inability to recognize object, recognize body parts of the body, difficulty in swallowing are common after stroke (Edwards, 1996).

Stroke can affects the areas of cognitive, psychosocial and physical functioning. It is the leading cause of serious and long-term disability. Cognitive impairments post-stroke are largely dependent on area of lesion of the brain. Depression is also common vulnerable neuro-cognitive functions that occur after stroke. Post-stroke hemiplegic may result in unilateral upper extremity weakness, reduced active range of movement and arm function, and consequently, diminished independence in performing activities of daily living (ADLs). (Rabin et al., 2012). About 80% motor function loss completely or partially after stroke. In North of England, a study estimated that the prevalence of stroke was 46.8 per 10,000. Cognitive impairment (33%), problems with lower limbs (30%) and speech difficulties (27%) were the most common residual impairments (Wolfe, 2000).

Recovery after stroke is related to the site of lesion, extent and nature of the lesion, the integrity of the collateral circulation and the pre morbid status of the patient (Braunwald et al., 2003). The neurological deficit is usually maximal at the outset and if not severe, the patient can be managed at home satisfactorily. In practice, many patients are admitted to hospital for a short period of treatment and investigation.

Patients with more severe stroke will require admission to hospital (Edwards, 1996). Some degree of recovery can experience by most of the patient following stroke. Improvement of motor function, sensation and language are representative of neurological recovery. Neurological recovery occurs within first 1 to 3 month following stroke. Further motor and sensory recovery may continue 6 month to 1 year later (Duncan, 1994).

CT scan or MRI usually done for confirm ischemic or hemorrhagic stroke. These investigations also help to confirm other vascular lesion. Lumbar puncture usually done for confirm diagnosis of sub arachnoids hemorrhage. Along with full blood count, blood glucose level, cholesterol level, ESR is investigating that help to know about risk factor (Boon et al., 1999). CT scan is important to differentiate between cerebral infarction and intracerebral hemorrhage. CT scan of brain can performed to confirm the clinical diagnosis and type of stroke (Amanullah et al., 2009).

Approximately 50%-60% of stroke patients still experience some degree of motor impairment and approximately 50% are at least partly dependent in activities-of-daily-living after completing standard rehabilitation (Belda-Lois et al., 2011). Physical fitness is important for the performance of everyday activities. In stroke patients, muscle strength and cardio respiratory fitness are impaired and it is not known whether improving fitness by physical fitness training reduces disability after stroke (Saunders et al., 2004). Following a stroke recovery and improvement of function is very very much important during the first year after the stroke (Pyörriä et al., 2004). Approximately 14% of stroke survivors achieve a full recovery in physical function, and between 25% and 50% require at least some assistance with activities of daily living, and half experience severe long-term effects such as partial paralysis. As a result, activity intolerance is common among stroke survivors, especially in the elderly (Gordon et al., 2004).

The physiotherapist plays a major role in the physical management of stroke using skills acquired during education and professional development, to identify and manage problems of stroke using scientific principles (Carr & Shepherd, 2003). The physiotherapist is able to identify and measure the disorders of movement and to design, implement and evaluate appropriate therapeutic strategies. This process

includes dealing with the social and psychological factors which affect the stroke patient (Edwards, 1996). Stroke is one of the major causes of morbidity, mortality and a socioeconomic challenge. This is obviously true for developing countries like Bangladesh, where health support system especially the rehabilitation system is poor and beyond reach from general people (Hossain et al., 2011).

In several prospective cohort studies, showed that approximately 85% of patients regain gait by 6 months who have had a stroke. And about 20% of all stroke survivors show significant abnormality in mobility status between 1 and 3 years after stroke (Wevers et al., 2011). After stroke, between 52% and 85% of patients re-gain the capacity to walk but their have some abnormality in walking pattern and different from that of healthy subjects (Pradon et al., 2013). Improved walking ability is always associated with improved motor control of the paretic lower limb. It also associated with the development of compensation movement strategies and improved coping with loss of function in enhancing the ability to maintain balance over the non-paretic lower limb (Outermans et al., 2010).

Gait training or improving walking ability has been considered to be one of the most important goals for rehabilitation of stroke patients. In acute stage the physical therapy intervention in the walking training is generally recognized as beneficial in the treatment of the patient with stroke. But it is important what type of physiotherapy intervention has been given to the stroke patient. Most of the time emphasis give in training for independent walking has included weight bearing exercise, balance and co-ordination exercise (Nilsson et al., 2001). The physiotherapist plays a major role in the physical management of stroke using skills acquired during education and professional development, to identify and manage problems of stroke using scientific principles (Carr & Shepherd, 2003).

Walking ability is a major determinant of independent living. So that improvement of walking functions is the most commonly stated priority of stroke patient. About 80% of the condition affecting balances (Obembe et al., 2012). Problems with muscle activity, hyper tonicity, and mechanical changes in soft tissues, gait speed, stride length, and cadence are below than normal values are common characteristics among

stroke patient. During the stance phase common kinematic deviations in gait cycle are decreased peak hip extension angles, decreased lateral pelvic displacement, changed knee extension, and decreased plantar-flexion angles. During the swing phase, common kinematic deviations are gait cycle is decreased hip flexion, knee extension, and dorsiflexion (Lennon, 2001).

Within first 11 week after stroke Recovery of walking ability usually occurs in 95% of the patient. The time and degree of recovery are related to both to the degree of initial loss of walking disability and the severity of the lower extremity paresis (Nilsson et al., 2001). After stroke physical rehabilitation or physiotherapy interventions have been used to reduce pain and spasticity. Also it helps to increase range of motion (ROM), muscle force, mobility, walking ability, functional status, physical fitness, and quality of life (Goljar et al., 2010). Good balance is utmost importance for independence in ADL (Jayne et al, 2003). Approximately 75 to 85% are discharged home after stroke. Ninety percent of stroke survivors have some functional disability with mobility being a major impairment (Eng & Tang, 2007).

After stroke, between 52% and 85% of patients re-gain the capacity to walk. However, their gait usually remains different from that of healthy subjects (Pradon, 2013). Several prospective cohort studies showed that approximately 85% of patients who have had a stroke regain gait by 6 months post-stroke, approximately 20% of all stroke survivors show significant difficulty in mobility status between 1 and 3 years after stroke (Wevers et al., 2011). Gait speed is a spatial-temporal parameter commonly deficient after a CVA and scientific evidence demonstrated considerable associations between this variable and those related to indicators of function and quality of life in this population (Perry et al., 1995).

To improve the walking ability various approaches to stroke rehabilitation have been studied of people with hemiparesis. Improvements in walking ability provide people with stroke and make opportunities to participate more easily in the community (Yang et al., 2007). Ankle plantar flexors have been found to be the primary contributors to forward propulsion and critical for increasing walking speed (Hall et al., 2012). To rehabilitate stroke patients and to improve their gait, physiotherapists apply different treatment techniques, including a functionally oriented traditional approach and other

techniques based on neurophysiologic models, such as the Bobath neurodevelopment technique (NDT) and the Brunn stroem, Rood, and proprioceptive neuromuscular facilitation (PNF) concepts (Hesse et al., 1994).

The physical management process aims to maximize functional ability and prevent secondary complications to enable the patient to resume all aspects of life in his or her own environment (Braunwald et al., 2003). Exercise is the most common therapeutic intervention currently used to improve walking. Traditional approaches to stroke recovery have a focus on neurodevelopment techniques (NDT) to inhibit excessive tone, stimulate muscle activity (Eng & Tang, 2007). Gait speed timed over short distances mostly 5–10 meters has been used frequently as a determinant of mobility in both healthy elderly individuals and stroke patients (Flansbjer et al., 2005).

In healthy walking Step length asymmetry has been shown to be negatively related to self-selected walking speed and hemi paretic severity and to be indicative of compensatory mechanisms used by hemi paretic walkers (Hall et al., 2012). Approximately 80% of stroke survivors achieve this goal though the quality of walking performance often limits endurance and quality of life. Both physiotherapists and patients spend a lot of time in rehabilitation aimed at restoring walking ability and functional independence. Treatment goals are usually determined by analyzing patient's gait characteristics during rehabilitation. Observational gait analysis is a simple means of determining the gait deviation in patients that have ambulatory problems (Obembe et al., 2012).

Among the different strategies of gait training for individuals with stroke, the use of a partial body weight support system has continued to gain popularity. Gait training humans affected by stroke using a body weight support system on a treadmill increased walking speed and endurance when compared to conventional gait training over ground or when using only a treadmill (Sousa et al., 2011). Gait outcome studies have focused on the walking ability of acute stroke patients admitted to a general hospital and its predictors. Little has been done to evaluate the gait outcome and prognostic factors of a comprehensive stroke rehabilitation of ambulatory patients in a later stage of recovery. The purpose of this investigation was to study gait outcome in a large group of mildly affected stroke patients, defined as those who were

ambulatory and competent for the most part in the basic activities of daily living (Hesse et al., 1994).

Balance is an essential part of sitting, sit-to stand and walking activities. Impaired balance and increased risk of falling toward the paretic side is found to be significantly correlated with locomotor function, functional abilities and length of stay in inpatient rehabilitation facilities (Yavuzer et al., 2006). Overweight or obesity would be anticipated to negatively affect the achievement of post stroke functional mobility and ambulation goals. A post stroke patient with a higher pre-treatment body mass index (BMI), were less likely to demonstrate improvement in their level of motor impairment and performance on an up and go mobility task in response to 12 weeks of walking training. Stroke rehabilitation physiotherapist should consider BMI when formulating rehabilitation goals (Sheffler et al., 2012).

Impaired balance in post stroke patients is often related to uneven weight-bearing. The assessment of weight-shifting capacity provides information about balance recovery after stroke and can be used as an outcome parameter to develop new rehabilitation strategies (Yavuzer et al., 2006). Physiotherapy intervention was focused on restoring reduced motor control of the affected limb as well as postural control. Repetitive training of tasks results in improvement in lower limb function. A high dose of repetitions are effective for improving gait-related activities (Outermans et al., 2010). Stepping and grasping movements of the limbs also appear to play an important functional role in maintaining upright stance (Pyo'ria et al., 2004). Stepping requires relatively little muscle force even if maintaining a fixed base of support that stepping responses are even more vital to persons who suffer from impaired equilibrium reactions and muscle force, such as patients with stroke (Eng & Chu, 2002).

Walking training on treadmill with body weight support is intended to optimize locomotor related sensory inputs, which may improve the timing and co-ordination of motor activity (Nilsson et al., 2001). For less affected patient 40 minute session of aerobic treadmill training weekly for six month improve the physiologic fitness and reserve walking energy. 30 minute treadmill and over ground walking programmed, 3 times a week for 4 weeks was more effective for conventional physiotherapy



treatment in improving walking speed and walking capacity of ambulatory people residing in community after stroke (Eich et al., 2004).

The use of outcome measure in physical rehabilitation is important. A valid measurement of change can be used to determine the status of patient. The functional independence measurement (FIM) was introduced for use as a measurement. FIM has satisfactory reliability, validity and feasibility (Morgan, 1994). Patient assessed usually before and after six week treatment period and at follow-up 12 weeks after the cessation of treatment and usually measure the walking velocity and walking capacity (Eich et al., 2004).

**3.1 Study Design**

A cross sectional study design was selected to carry out the research. The cross sectional study was conduct to find out the objectives. This design involves identifying group of people and then collecting the information that requires when they use the particular service. All the measurements on each person are made at one point in time. The data was collect all at the same time or within a short time frame. A cross-sectional design provides a snapshot of the variables included in the study, at one particular point in time.

**3.2 Study Site**

The study was conducted at the Centre for the Rehabilitation of the Paralyzed (CRP).

**3.3 Study Area**

The researcher selects the Neurology Unit of Physiotherapy department at CRP for data collection. The investigator thought that this place was easy to obtain desire data for his study.

**3.4 Study population and sampling**

The target population was stroke patients and sample was taken by using purposive sampling technique.

**3.5 Sample size**

The equation of sample size calculation are given below-

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

Here,

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

$$P= 0.098$$

$$q= 1-p$$

$$=1-0.098$$

$$=0.902$$

$d = 0.05$

According to this equation the sample should be more than 135 people but due to lack of opportunity the study was conducted with 50 patients attending at physiotherapy department selected according to inclusion and exclusion criteria.

### **3.6 Inclusion Criteria**

- Patient with stroke who got at least 15 session of treatment by a physiotherapist in CRP neurology unit.
- Age level 35- 70 years.
- Duration of stroke onset 1 month to 1 year.
- Having good static balance.

### **3.7 Exclusion Criteria**

- Mentally ill and medically unstable patient.
- Patient suffering from serious pathological disease. e.g. tumors, tuberculosis etc.
- Have poor static balance and dynamic sitting balance.

### **3.8 Data collection methods and tools**

Data collection method was questionnaire and tools are pen, papers, consent form, FIM scale, tape measure, pen drive, and computer.

### **3.9 Data management and analysis plan**

Data was analyzed with the software named Statistical Package for Social Science (SPSS) version 16.0. Data was present by using bar graph, pie chart and table.

### **3.10 Informed consent**

Participants were selected for this study according to selection criteria and informed properly by using consent form. Patient and researcher signed willingly and voluntarily into the study. Participants were informed that they were completely free to decline answering any question during the study and free to withdraw their agreement and participation at anytime from the study. They were also told that the

confidentiality would be maintained and the benefits of the study to future participant and therapist were explained.

### **3.11 Ethical consideration**

Permission was taken initially from the supervisor of the research project and from the course coordinator before conducting the study. The necessary information has been approved by the ethical committee of CRP and permitted to do this research. Also the necessary permission was taken from the in-charge of the rehabilitation division of CRP. The participants were explained about the purpose and goal of the study before collecting data from the participants. Pseudonyms were used in the notes, transcripts and throughout the study. It was ensured to the participants that the entire field notes, transcripts and all the necessary information will be kept in a locker to maintain confidentiality and all information will be destroyed after completion of the study. The participants were also assured that their comments will not affect them about any bad thing.

### **3.12 Limitations**

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

- The limitation of this study was small sample size. It was taken only 50 samples.
- The one of major limitation was time. To conduct the research project on this topic, time period was very limited. As the study period was short so the adequate number of sample could not arrange for the study.
- The functional outcome that found in this study was not compared with standard functional expectation guideline which was also a limitation of this study.
- As the study was conducted at Centre for the Rehabilitation of the paralyzed (CRP) which may not represent the whole country.

**4.1 Age and gender**

The study was conducted on 50 participants. Out of the participant the mean age was 49.70 ( $\pm 8.913$ ) years. The range was 35 with minimum age 35 years and maximum age 70 years. Among 35-50 years age group, 18 participants were male and 8 participants were female. Among 51-70 years age group 18 participants were male and 6 participant were female. Overall 52% (n=26) participant were 35-50 years age group and 48% (n=24) participant were 51-70 years age group.

Age Group	Gender		Total
	Male	Female	
35 – 50 Years	18	8	26
51 – 70 Years	18	6	24
<b>Total</b>	<b>36</b>	<b>14</b>	<b>50</b>

Table 01: Age and gender of the participants

## 4.2 Occupation

The study was conducted among 50 participants. Among them 6% (n=3) were farmer, 20% (n=10) were service holder, 2% (n=1) were garment/ factory worker, 4% (n=2) were driver, 30% (n=15) were businessmen, 18% (n=9) were house wife, 14% (n=7) were teacher, 2% (n=1) were barber and 4% (n=2) were retired person.

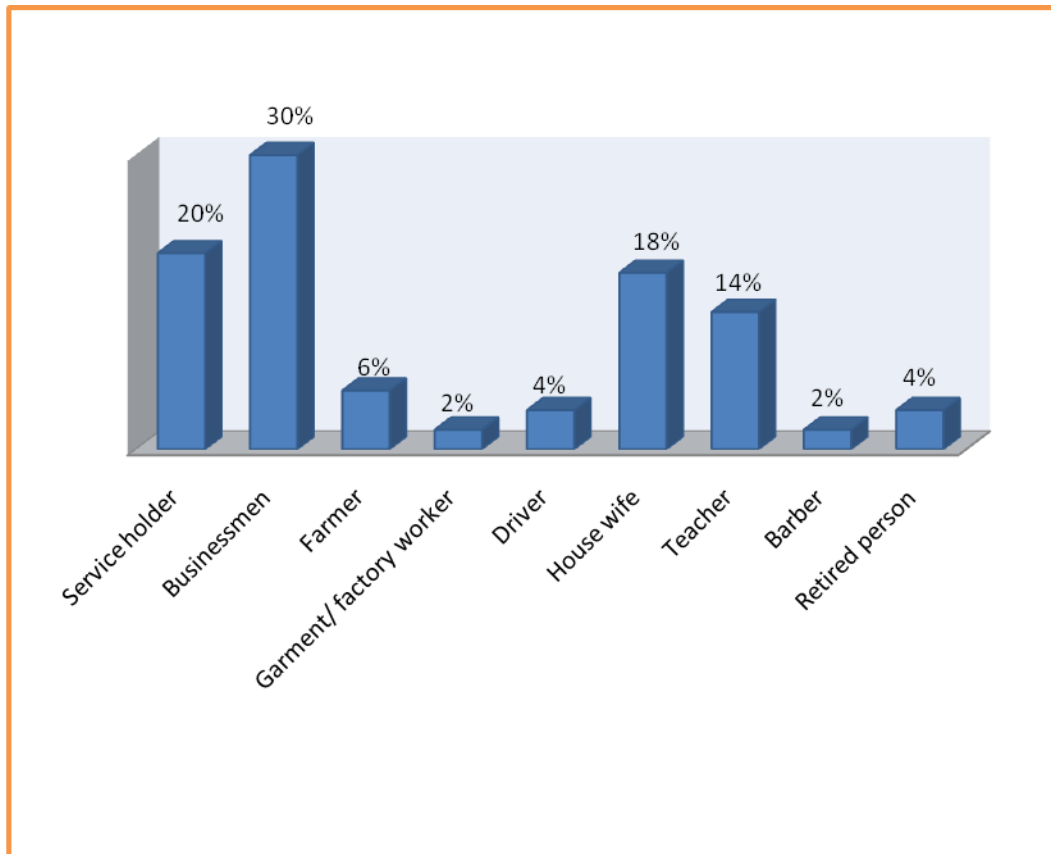


Figure 01: Occupation of the participants.

### 4.3 Residence

Study shows that among 50 participants majority of participants 64% (n=32) were lived in rural area and rest of the participants 36% (n=18) were lived in urban area.

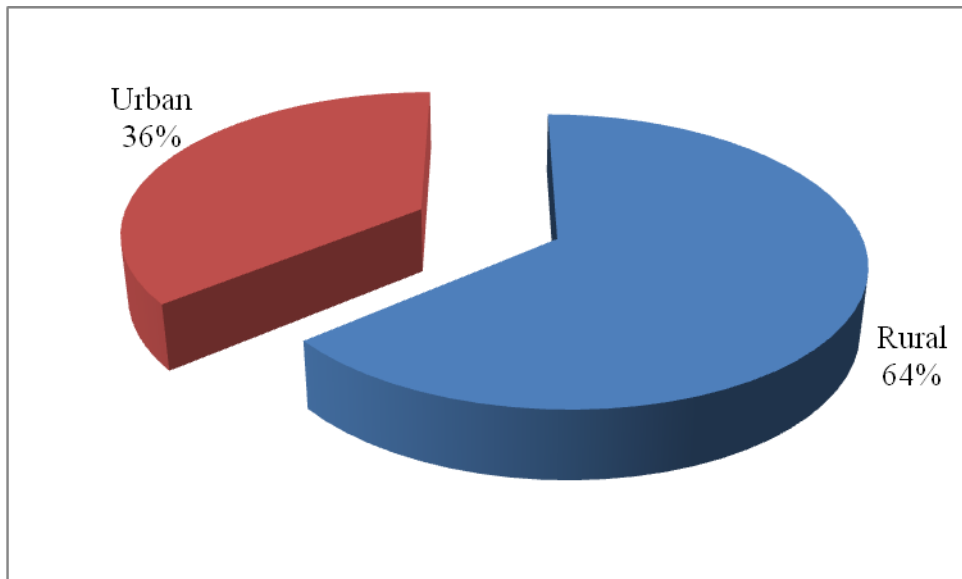


Figure 02: Area of living of participants.



#### 4.4 Economical status

Among 50 participant the study shows that 16% participant's monthly family income were 6000-10000 taka, 30% participant's monthly family income were 10001-15000 taka, 14% participant's monthly family income were 15001-20000 taka, 18% participant's monthly family income were 20001-25000 taka and 22% participant's monthly family income were above 25000 taka.

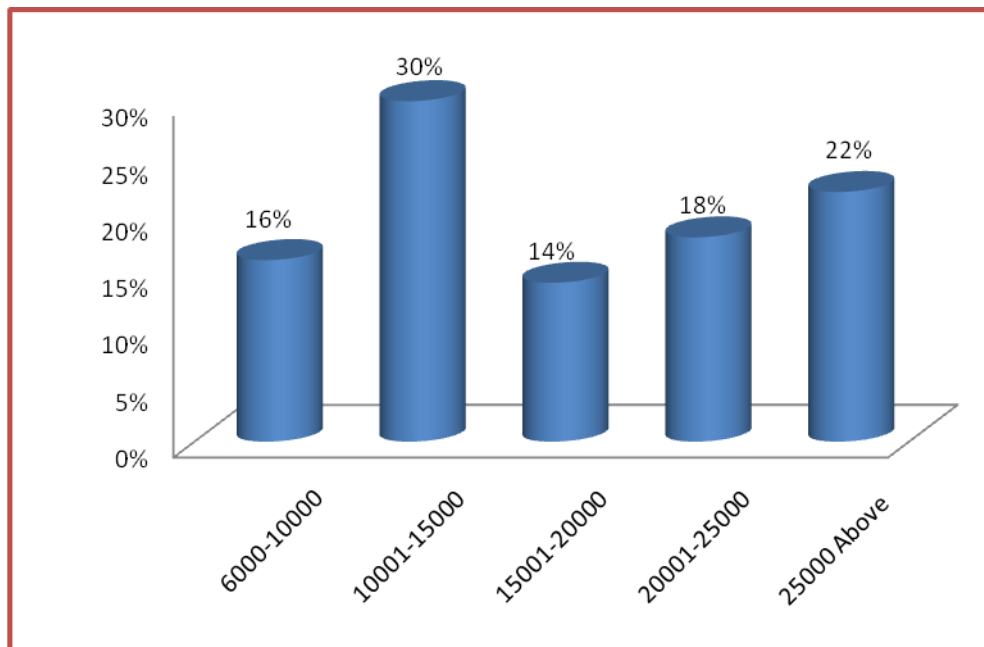


Figure 03: Economical status of the participants.

#### 4.5 Family size

Among 50 participants in this study, 74% of the participants were nuclear family and 26% participants were extended family.

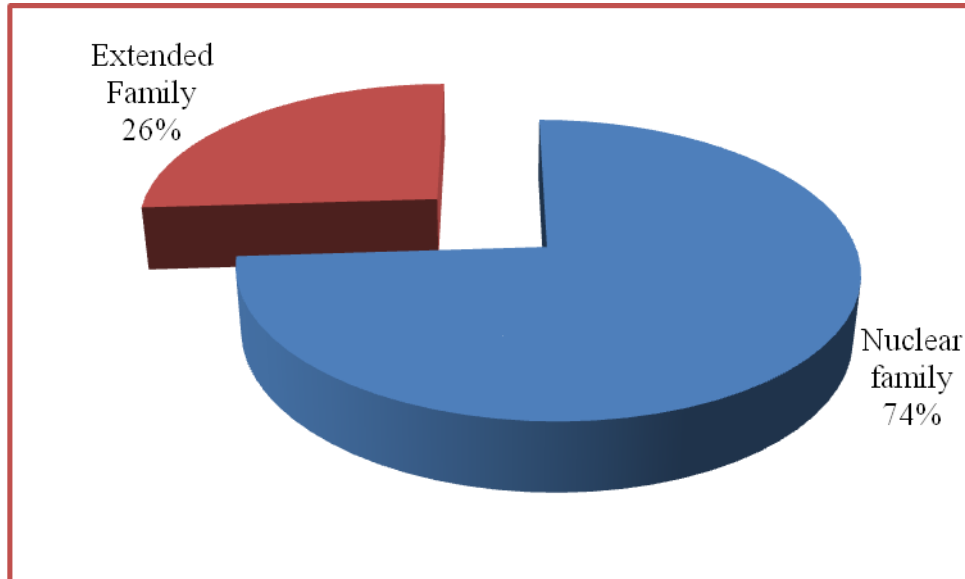


Figure 04: Family type of the participants.

#### 4.6 Educational status

Among the 50 participants 16% (n=8) participants got primary education, 12% (n=6) participants got secondary education, 6% (n=3) participants completed S.S.C level, 20% (n=10) participants completed H.S.C level, 36% (n=18) participants were graduate and 10% (n=5) participant was post graduate holder.

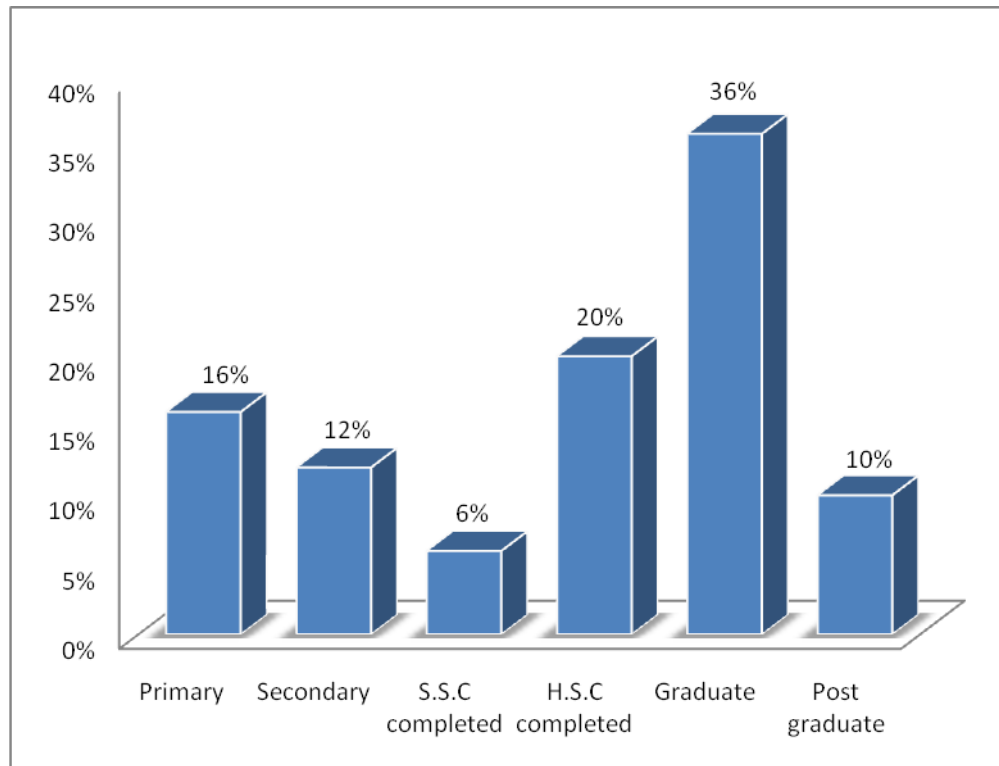


Figure 05: Educational status of the participants.

#### 4.7 Body type

In this study among the 50 participants according to the BMI 62% (n=31) participants were acceptable body weight, 34% (n=17) participant were overweight and 4 % (n=2) participant were obese. So 62% participants BMI was  $<25$  and 38% participants BMI was  $\geq 25$ .

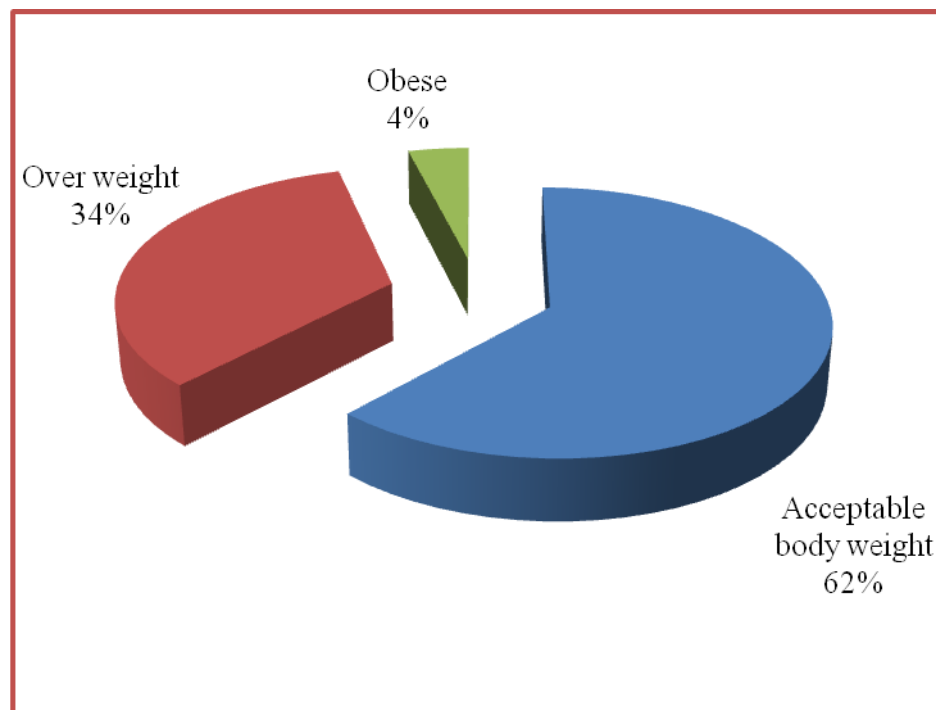


Figure 06: Body type

#### 4.8 Duration of stroke

Among 50 participants in this study, the duration of stroke where 46% were 1-3 month, 36% were 4-6 month and 18% were 7-12 month.

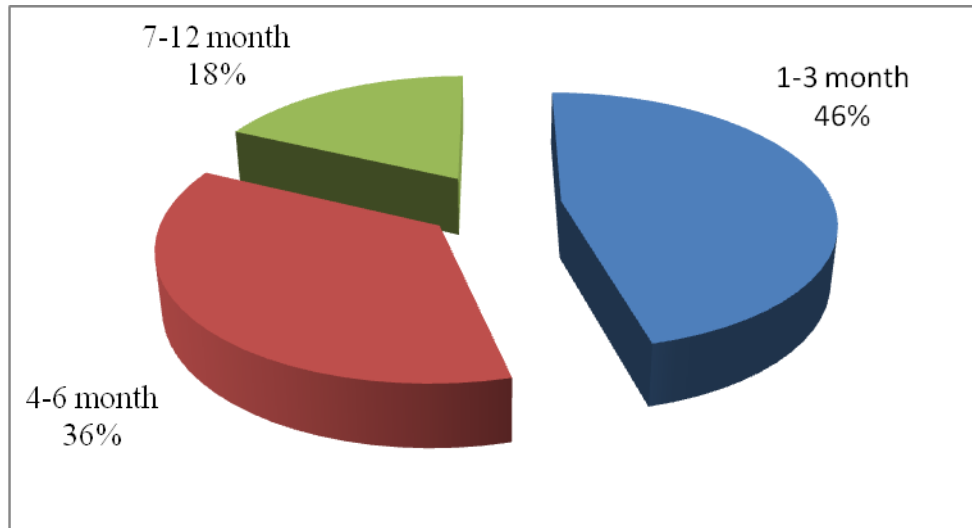


Figure 07: Duration of stroke of the participants.

#### 4.9 Type and affected site

The study was conducted on 50 participants. Among 30 right side affected participants, 25 were ischemic and 5 were hemorrhagic stroke. Among 20 left sided affected participants, 11 were ischemic and 9 were hemorrhagic stroke. Overall 72% (n=36) participants were ischemic stroke and 28% (n=14) were hemorrhagic stroke.

Affected site	Type of stroke		Total
	Ischemic	Hemorrhagic	
Right	25	5	30
Left	11	9	20
<b>Total</b>	<b>36</b>	<b>14</b>	<b>50</b>

Table 02: Type and affected site of stroke the participants.

#### 4.10 Past medical history

Among 50 participant in this study, the percentage of past medical history where 22% (n=11) participant were smoker, 20% (n=10) participant had hypertension, 12% (n=6) participant chewed tobacco, 12% (n=6) participant past medical history was both hypertension & smoking, 10% (n=5) participant had diabetics, 8% (n=4) participant had both hypertension & diabetics, 6% (n=3) participant had stressful lifestyle, only 2% (n=1) participant had heart disease. So maximum number of participants past medical history was hypertension (42%), smoking (42%), diabetics (20%) & tobacco chewing (18%).

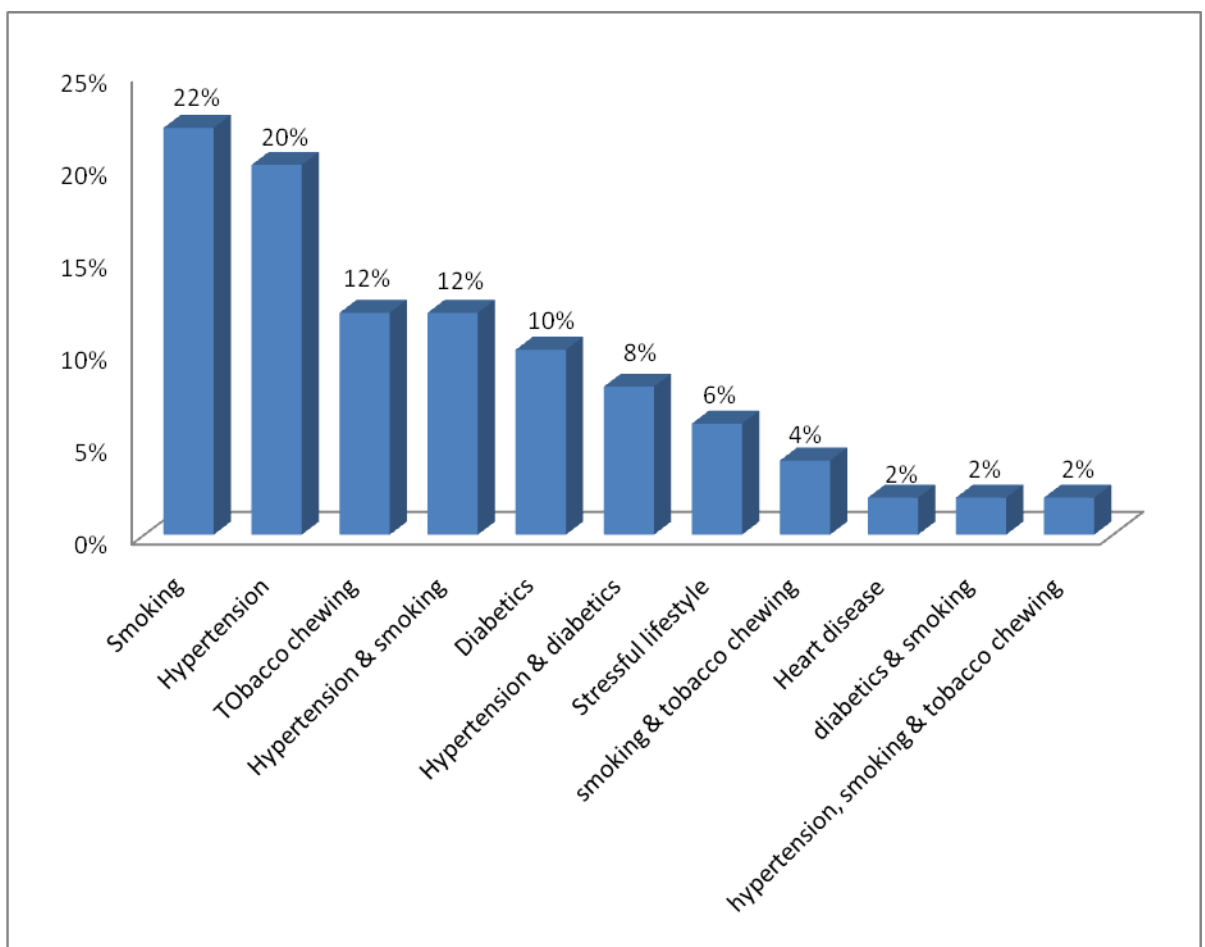


Figure 08: Past medical history of participants

#### 4.11 Received physiotherapy session

Among 50 participants in this study, 50% (n=25) participant received 15-24 physiotherapy session, 38% (n=19) participant received 25-34 physiotherapy session, and 12% (n=6) participant received more than 35 physiotherapy session.

<b>Received physiotherapy session</b>	<b>Number</b>	<b>Percentage (%)</b>
15-24	25	50
25-34	19	38
Above 35	6	12
<b>Total</b>	<b>50</b>	<b>100</b>

Table 03: Received physiotherapy sessions.



#### 4.12 Using any assistive device

The study was conducted on 50 participants. Among 36 male participants, 15 participants were used assistive device and 21 participants were not used assistive device. Among 14 female participants, 1 participant was used assistive device and 13 participants were not used assistive device. Overall 32% (n=16) participants was used assistive device and 68% (n=34) participants were not used assistive device.

Gender	Using assistive device		Total
	Yes	No	
Male	15	21	36
Female	1	13	14
<b>Total</b>	<b>16</b>	<b>34</b>	<b>50</b>

Table 04: Using assistive device among the participants.

#### 4.13 Gait initial score on FIM scale

Among 50 participants in this study, 50% (n=25) participants initial gait score on FIM scale was 1 (Need total assistance), 38% (n=19) participants initial gait score on FIM scale was 2 (Need maximum assistance) and only 12% (n=6) participants initial gait score on FIM was 3 (Need moderate assistance).

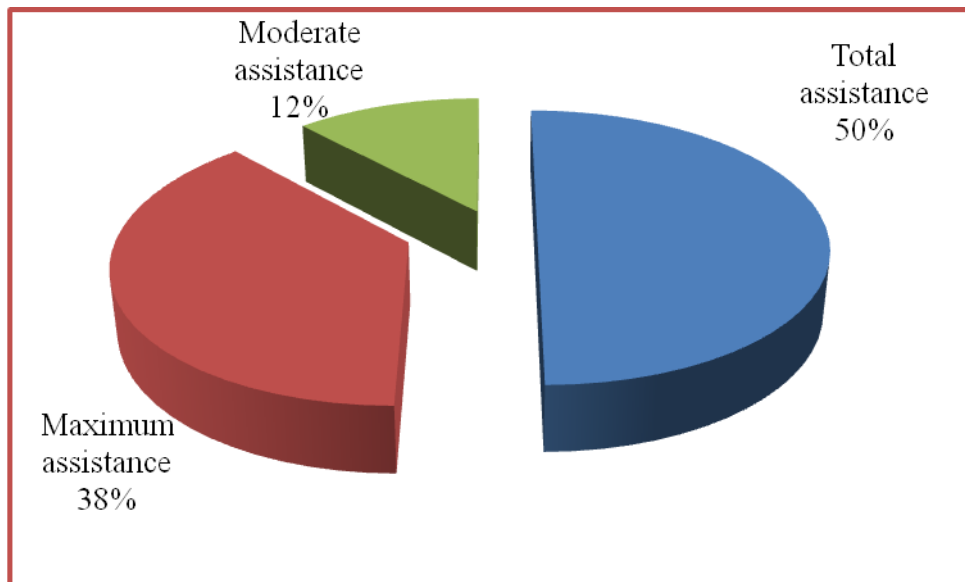


Figure 09: Gait initial score on FIM scale.

#### 4.14 Gait score on FIM scale after treatment

Among 50 participants in this study, after treatment 6% (n=3) participants gait score on FIM scale was 2 (Need maximum assistance), 24% (n=12) participants gait score on FIM scale was 3 (Need moderate assistance), 14% (n=7) participants gait score on FIM scale was 4 (Need minimum assistance), 34% (n=17) participants gait score on FIM scale was 5 (Need supervision) and 22% (n=11) participants gait score on FIM scale was 6 (Need modified independence).

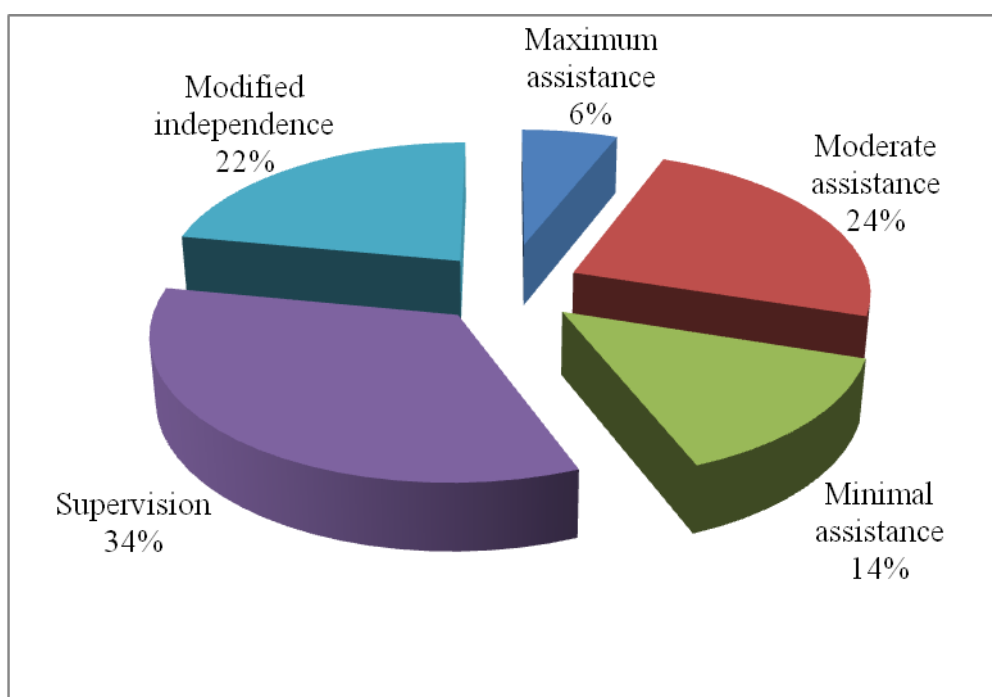


Figure 10: Gait score on FIM scale after treatment

#### 4.15 Outcome of gait after treatment

Among 50 participants, maximum number of participant's initial gait score was 1 (need total assistance). After treatment maximum numbers of participant's gait score was 5 (need supervision).

<b>FIM score</b>	<b>1 (Total assistance)</b>	<b>2 (Maximum assistance)</b>	<b>3 (moderate assistance)</b>	<b>4 (minimum assistance)</b>	<b>5 (supervision)</b>	<b>6 (Modified independence)</b>	<b>7 (Complete independence)</b>
<b>Initial score</b>	50%	38%	12%	0%	0%	0%	0%
<b>After treatment</b>	0%	6%	24%	14%	34%	22%	0%

Table 05: Outcome of gait after treatment

The study was conducted to evaluate functional outcome of gait among stroke patients. The main focus of this study was patient's gait performance before and after get physiotherapy treatment estimating on Functional independence measurement scale (FIM). Although it was realized that the sample size was small; this study provides information about patients with stroke in our country. Total 50 patients were taken in this in study period.

Age was one of variable in this study. In a study in Taiwan showed that the mean age 55.33 years (Chen et al., 2002). In this study the age range was from 35 to 70 years and a mean age of the participants was 49.70 with standard deviation ( $\pm 8.913$ ). The higher number of participants age was 54 years.

In a study in Pakistan showed that the ratio of male and female was 2.33: 1 where 70% participant was male and 30% participant was female (Amanullah et al., 2009). In the study, male: female = 2.57: 1 where 72% participant was male and 28% participant was female.

In a study in Bangladesh, 28% participant were service holder, 17% participant were businessman, 16% participant were house wife, 21% participant were farmer and 9% participant were others profession (Hossain et al., 2011). In the study, 30% participant were businessman, 20% were service holder, 18% were house wife, 14% were teacher, 6% were farmer, 4% were retired person and rest of the participant were others profession.

The study found that, 36% participant was lived in urban area and 64% participant was lived in rural area. Other study shows in Bangladesh, 54% participants lived in urban area and 46% participant lived in rural area (Hossain et al, 2011).

In America, a study showed that 18% participant monthly income was insufficient, 28% monthly income were adequate and 54% were ample (Salbach et al, 2006). In my study 16% participant's economical condition were low, 30% were poor, 14 % were adequate, 18% were good and 22% were high economic condition.

In America, a study showed that 29% participant was none primary, secondary 37% and college-university 34% (Salbach et al., 2006). In the study 16% got primary education, 12% got secondary education, 6% participants completed S.S.C level, 20% participants completed H.S.C level, 36% were graduate and 10% were post graduate holder. In the study the duration of stroke, where 46% were 1-3 month, 36% were 4-6 month and 18% were 7-12 month.

The study revealed that, 72% participants were ischemic and 28% were hemorrhagic stroke patient. In a study showed that, 71.29% participant was ischemic and 28.70% participant was hemorrhagic stroke patient (Sheffler, 2012).

In a study showed that 62% participant was right sided hemiplegic and 38% participant was left sided hemiplegic (Patterson et al., 2008). In the study 60% patient were right sided hemiplegic and 40% participant were left sided hemiplegic.

The study found that, 62% participants BMI was  $<25$  and 38% participants BMI was  $\geq 25$ . In another study showed that 56.8% participants BMI was  $<25$  and 34.3% participants BMI was  $\geq 25$  (choo et al., 2009).

In the study showed that maximum number of participants past medical history were hypertension (42%), smoking (42%), diabetics (20%) & tobacco chewing (18%). Another study showed that 63% of the stroke patients were suffering from hypertension, 53% participant were smoker, 24% had heart disease, 21% diabetes militias and 7% had hyper lipdemia (Hossain et al., 2011).

The study revealed that 18% participant received 15-19 physiotherapy session, 32% participant received 20-24 physiotherapy session, 20% participant received 25-29 physiotherapy session, 18% participant received 30-34 physiotherapy session and 12% participant received more than 35 physiotherapy sessions. Another study showed that among stroke patient received physiotherapy session on average 13.6 days, average number of physical therapy session per day was 1.5 and average time of per session was 38.1 minutes (Jette et al., 2005).

In the study 68 % participant were not used assistive device and 32 % participants were used assistive device. Another study showed that 9% participants were using walker, 45% participant were using cane and 46% participant were not used any assistive device (Salbach et al., 2006).

The study found that, 50% participant's initial FIM score was 1, 38% participant's initial FIM score was 2 and 12% participant's initial FIM score was 3. Another showed the initial gait score on FIM scale, where 73.07% participant FIM score was 1, 21.15% participants FIM score was 2 to 4 and 5.76% participants FIM score was 5(Morgan, 1994).

The study revealed that after treatment 6% participants gait score on FIM scale was 2, 24% participants FIM score was 3, 14% FIM score was 4, 34% participants FIM score 5 and 22%participants gait score on FIM scale was 6. Another study showed that 59.60% participant FIM score after treatment was <5 and 40.30% participant FIM score was  $\geq 5$  (Morgan, 1994).

## CHAPTER-VI: CONCLUSION AND RECOMMENDATIONS

### 6.1 Conclusion

The study concludes that maximum (50%) number of the participant's initial gait score on FIM scale was 1 (Need maximum support). After treatment maximum (34%) number of participant's gait score on FIM scale was 5 (Need supervision). Maximum participant's (32%) received 20-24 physiotherapy treatment session. Male were more affected than female and due to positive risk factor of smoking and hypertension. Most of the participant's (62%) had acceptable body weight. 32% participants were used assistive device. In the world, stroke is considered as the 3<sup>rd</sup> leading cause of death and it is becoming a major threat of neurological disability in population of Bangladesh. Bangladesh is a developing country with low socio-economic condition where people are not enough concerned about health. Health services are not sufficient at the government and non-government sector. Most of the people are not enough familiar about physiotherapy. Physiotherapy treatment can help the patient with stroke to improve their gait as well as improve their functional ability. So it is essential to increase awareness about physiotherapy and effectiveness of early physiotherapy interventions for patient.



## **6.2 Recommendations**

The aim of this study was to explore functional outcome of gait among stroke patient after discharge and the result that the researcher found from the study has fulfilled the aim of this research project. The researcher recommended the following things-

- Should take more samples for generating the result and make more valid and reliable.
- Should take more samples for pilot study to establish the accuracy of the questionnaire.
- Sample should collect from different hospital, clinic, institute and organization in different district of Bangladesh to generalize the result.
- This study can also accomplish with other individual functional problems.
- To find out an effective and efficient result in generalized form, other measurement scale should be used in consideration.
- To achieve more improvement more time with greater concentration of physiotherapy was needed.

This is an undergraduate study and doing the same study at graduate level will give more precise output. There were some limitation of this study mentioned at the relevant section; it is recommended to overcome those limitations during further study.

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## APPENDIX

### VERBAL CONSENT FORM (Please read out to the participants)

Assalamualaikum/Namasker, my name is Zahidul Islam, I am conducting this study for a B.Sc in Physiotherapy project study dissertation titled “**Functional outcome of gait using a FIM scale among stroke patients at CRP neurology unit**” under Bangladesh Health Professions Institute (BHPI), University of Dhaka. I would like to know about some personal and other related information regarding stroke. You have to perform some tasks which are mention in this form. This will take approximately 15 minutes.

I would like to inform you that this is a purely academic study and will not be used for any other purpose. The researcher is not directly related to neurology unit, so your participation in the research will have no impact on your present or future treatment in neurology unit. All information provided by you will be treated as confidential and in the event of any report or publication it will be ensured that the source of information remains anonymous and also all information will be destroyed after completion of the study. Your participation in this study is voluntary and you may withdraw yourself at any time during this study without any negative consequences. You also have the right not to answer a particular question that you don't like or do not want to answer during interview.

If you have any query about the study or your right as a participant, you may contact with me, researcher and/or Md. Shofiquel Islam, Assistant Professor, department of physiotherapy, BHPI, CRP, Savar, Dhaka.

Do you have any questions before I start?

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

Yes

No

Signature of the Participant \_\_\_\_\_ Date \_\_\_\_\_

Signature of the Interviewer \_\_\_\_\_ Date \_\_\_\_\_



## English questionnaire

**Title: Functional outcome of gait using a FIM scale among stroke patient at CRP neurology unit.**

### 1. Personal details

ID no:

1.1. Name of participant:

1.2. Address:

Village/house no.....

Post office.....

Thana.....

District.....

1.3. Contact number:

1.4. Date of interview: .....

## 2. Socio demographic information:

- 2.1. Age.....years
- 2.2. Sex:  
1= male            2= female
- 2.3. Occupation :  
1= Farmer            2= Day laborer            3= Service holder  
4= Garments/ Factory worker            5= Driver            6= Rickshaw puller  
7= Businessman            8= Unemployed            9= Housewife            10= Teacher  
11= Student            12= Other (Specify).....
- 2.4. Monthly family income:.....taka
- 2.5. Marital status:  
1= Married            2= Unmarried            3 = Widow            4 = Divorce
- 2.6. Family type:  
1= Nuclear family            2= Extended family
- 2.7. Living area:  
1= Rural            2= Urban
- 2.8. Educational level:  
1 = Illiterate            2=literate            3= Primary            4=Secondary  
  
5 = S.S.C            6=H.S.C.            7= Graduate            8= Post Graduate
- 2.9. Height in meter:..... ( 1 foot = .3048 meter)
- 2.10. Weight in Kg:.....
- 2.11. Body type according to BMI Scale:  
1= Underweight (BMI<20)            2 = Acceptable (BMI  $\geq$  20 to < 25)  
3 = Overweight (BMI  $\geq$  25 to  $\leq$  30)            4 = Obese (> 30).

### 3. Condition related information

- 3.1. Length of incident of stroke( specify.....month/year)
- 3.2. Type of stroke?  
1= Ischemic          2= Hemorrhagic
- 3.3. Affected side?  
1= Right          2 = Left
- 3.4. History of previous stroke?  
1=Yes          2= No
- 3.5. Past medical history?  
1= Hypertension          2 = Heart disease          3 = Diabetics  
4= Lung disease          5= Smoking          6= Alcohol consumption  
7= Tobacco chewing          8= Stressful lifestyle  
9= other (specify).....
- 3.6. Past history of physical exercise?  
1= Yes          2= No
- 3.7. Did you get any treatment before come to CRP?  
1= Yes          2=No
- 3.8. What type of intervention have you taken?  
1=Traditional          2= Modern
- 3.9. Received physiotherapy session/time? (specify)  
\_\_\_\_session/ \_\_\_\_month
- 3.10. Type of weight bearing?  
1=symmetrical          2=Asymmetrical

3.11. Gait –initial score: put a tick on the FIM scale score(1/2/3/4/5/6/7)

- 7=complete independent (timely, safely)
- 6=modified independence (extra time, device)
- 5=supervision (cuing, coaxing, prompting)
- 4=minimal assist (perform 75% or more of task)
- 3=moderate assistance (perform 50% to 74% of task)
- 2=maximum assistance (perform 25% to 49% of task)
- 1=total assistance (perform less than 25% of work)

3.12. Gait –after 15 session of physiotherapy treatment: put a tick on the FIM scale score(1/2/3/4/5/6/7)

- 7=complete independent (timely, safely)
- 6=modified independence (extra time, device)
- 5=supervision (cuing, coaxing, prompting)
- 4=minimal assist (perform 75% or more of task)
- 3=moderate assistance (perform 50% to 74% of task)
- 2=maximum assistance (perform 25% to 49% of task)
- 1=total assistance (perform less than 25% of work)

## Permission letter

**Date: March 16, 2013**

To  
Head of the Department,  
Department of the physiotherapy,  
Center for the Rehabilitation of the paralyzed (CRP),  
Savar, Dhaka-1343

**Subject: Application for permission to collect data to conduct a research study.**

Sir,

I respectfully state that I am Zahidul Islam student of fourth year B.Sc. in physiotherapy at Bangladesh Health Professions Institute (BHPI). In fourth year course curriculum, we have to do a research project. I have chosen a research title that "Functional outcome of gait using a FIM scale among stroke patient at CRP neurology unit" and my supervisor is Md. Shofiqul Islam, Assistant Professor of Physiotherapy department. For this reason, I need to permission for collect data from the neurology unit of CRP at Savar, Dhaka.

Therefore, I pray and hope that you would be kind enough to grant my application and give me the permission for collect data from from the neurology unit.

Yours faithfully  
Zahidul Islam

Zahidul Islam  
4<sup>th</sup> year B.Sc. in physiotherapy  
Session: 2007-2008  
BHPI, CRP, Savar, Dhaka-1343

690 Incharge  
for information, allowed  
to do the study.  
18-03-13  
Head PT

Furqana Sharmim  
C.P.T  
29.03.13