SELECTED GAIT PARAMETERS OF STROKE PATIENTS WHO ATTENDED AT NEUROLOGY UNIT OF PHYSIOTHERAPY DEPARTMENT,CRP

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Session: 2013-2014

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Bangladesh

August, 2018

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

SELECTED GAIT PARAMETERS OF STROKE PATIENTS WHO ATTENDED AT NEUROLOGY UNIT OF PHYSIOTHERAPY DEPARTMENT,CRP

Submitted by **Md. Sohag Miah** for partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy (B.Sc. PT)

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DECLERATION

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

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Acknowledgement

First of all, I would like to state my appreciation to Almighty Allah who has given me the ability to complete this research project in time. I would like to pay my deepest thankfulness to my honorable teacher and supervisor Muhammad Millat Hossain Assistant professor, department of rehabilitation science not only for his valuable suggestion and guidelines but also for his optimistic and courageous attitude that have inspired me throughout the project. I am also very great full to Ehsanur Rahman and Md. Shofiqul Islam, Assistant Professor, Physiotherapy, Department, BHPI, CRP, Savar, Dhaka for sanctioning my thesis.

I also would like to thanks teachers of BHPI especially my greatest gratitude to the respectable Vice Principle Prof. Md. Obaidul Haque and other respected teachers of Bangladesh Health Professions Institute (BHPI), Department of Physiotherapy, who facilitated me and given contribution to complete this studies smoothly. I remain ever grateful to help for their guidance and support without that I could not have come to this stage. And I would also like to thanks Mohammad Anwar Hossain , Head of Physiotherapy Department, CRP to give permission of data collection.

I also wish to express my heartiest to my junior brothers and sisters who played a great role of data collectors for my research and librarians of BHPI who helped me to providing information and using internet.

I also wish to convey my acknowledgement to Harun or Rashid, In charge, Physiotherapy Neurology outdoor and Masud rana clinical physiotherapist neurology unit, for their enthusiastic guidance and support without which I could not initiate this project. I would like to thanks all physiotherapy staff and interns at Physiotherapy Neurology outdoor for helping me during data collection and treating patient for this project. I also like to thank all of my friends for their valuable support. I also pay my thanks to the staffs of BHPI library for helping me to find out books and journals for collecting literature of the study.

I am grateful to my participants who gave me their valuable appointment and spend more time with me.

Acronyms

ADL: Activities of Daily Living

AVM: Arterio Venous Malformation

BHPI: Bangladesh Health Professions Institute

BMRC: Bangladesh Medical Research Council

CRP: Centre of the Rehabilitation for the Paralysed

CT: Computed Tomography

CVA: Cerebro Vascular Accident

EMG: Electro Myography

IRB: Institutional Review Board

MRI: Magnetic Resonance Imaging

TIA: Transient Ischemic Attack

WHO: World Health Organization

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Abstract

Purpose: To assess the selected gait parameters of stroke patients**.**

Objective: The aim of this study was to find out the parameters of gait of stroke patients stroke patients that got at least 10 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). The data was analyzed through descriptive statistics by using table, pie chart and bar chart by SPSS software version 20.

Results: Among 50 participant most of the stroke patients were middle and old age group and male 70% (n=35) are predominantly higher than female 30% (n=15). Majority of the participant's occupation was employer (44%). Ischemic stroke (78%) were higher than hemorrhagic stroke (22%) and most of the patient are right sided (62%) hemiplegic. Maximum number of participant (68%) received 10-20 physiotherapy session.In this study showed that difference betwe average normal and post stroke gait parameters. Average normal gait parameters are Step length(m) 0.762(Hunter et al.,2004), Stride length(m) 1.524(McCamley,2018), Speed(m/s) 1.40(Fujiyama, T. and Tyler, N., 2004) and Cadence(step/min) and post stroke gait parameters are Step length(m) .3174, Stride length(m) .2401, Speed(m/s) .2391 and Cadence(step/min) 67.44.

Conclusion: The results of this study provided the average selected gait parameters of stroke patients such as step length, stride length, speed and cadence.Caparision of normal and after stroke gait parameters are excluded. Male and female gait parameters are different. This information would assist the professional to justify the physiotherapy practice. More research is needed to evaluate the rehabilitation program for these patients.

CHAPTER –I: INTRODUCTION

1.1 Background:

Stroke is responsible of severe disabilities in adults .Disability rate of stroke is 50 to 65%.After a successful rehabilitation program about 70% patients walk independently. It appears a small number of patients are able to walk functionally in the community (mudge and Stott et al.,2009).By occurring stroke cognitive, psychological and physical function has been lost. It responsible for long-term disability (Rabin et al,2012)

Approximately, 600.000 individuals incur a stroke each year and stroke is the leading cause of long term disability in the United States(Mozaffarian et al.,2013). In the western world ranking stroke is currently the second leading cause of death after heart diseases and before cancer and causes 10% of deaths worldwide (Braunwald et al., 2003).

Male and female ratio in stroke are same. In Australia Stroke is responsible for 63.6% of female deaths and 54.1% of male deaths. 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). In the United States in 2005 stroke is responsible for about one of every 17 deaths Stroke mortality for 2005 was 143,579 (56,586 males, 86,993 females). A Canadian dies of heart diseases or stroke, every seven minutes. Europe averages approximately 650,000 stroke deaths each year (Braunwald et al., 2003).

In all strokes, 87 percent are ischemic, 10 percent are intracerebral hemorrhage, and 3 percent are subarachnoid hemorrhage. Most frequently ischemic stroke occurs above the age of 65.For younger people haemorragic stroke is familiar (Carr & Shephered, 2003).

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:

For disability stroke is the leading cause in adults. Forty percent of stroke patients show moderate functional impairment, and 15% to 30% stroke patients show severe disabilities. Though intensive rehabilitation, valuation of the balance, gait, and functional independence are offered to many patients within six months of a stroke, many of them continue to have motor deficits. Suitable therapy increases chronic patient survival, highlighting the importance of appraising the overall motor profile subsequent the initial recovery period. Therefore, research in the chronic phase of the stroke is also important.

After stroke ambulation is an important part of the functional recovery and it depends of many factors, consists of size and location of the infarct and premorbid health .For monitoring gait performance and functional recovery following stroke quantitated gait analysis is important; But gait patterns can be changed .This change is described for velocity, cadence, stride length and patterns of asymmetry even in a clinical homogenous group.

It is recognized that after stroke gait parameters will very effective a patient overall functional recovery .After stroke who want to live a quality full life must be improvement in gait velocity, cadence, stride length, step length, stride time, single limb support, and stance over time, after 3 month improvement rate is very high following stroke. Our aim is the describe the patients gait after stroke by using a practical gait analyzer and assess the temporal changes of these parameters.

1.3 Research question:

What are the parameters of gait after stroke?

1.4 Study objectives:

General objectives:

To find out the parameters of gait of stroke patients.

Specific objectives:

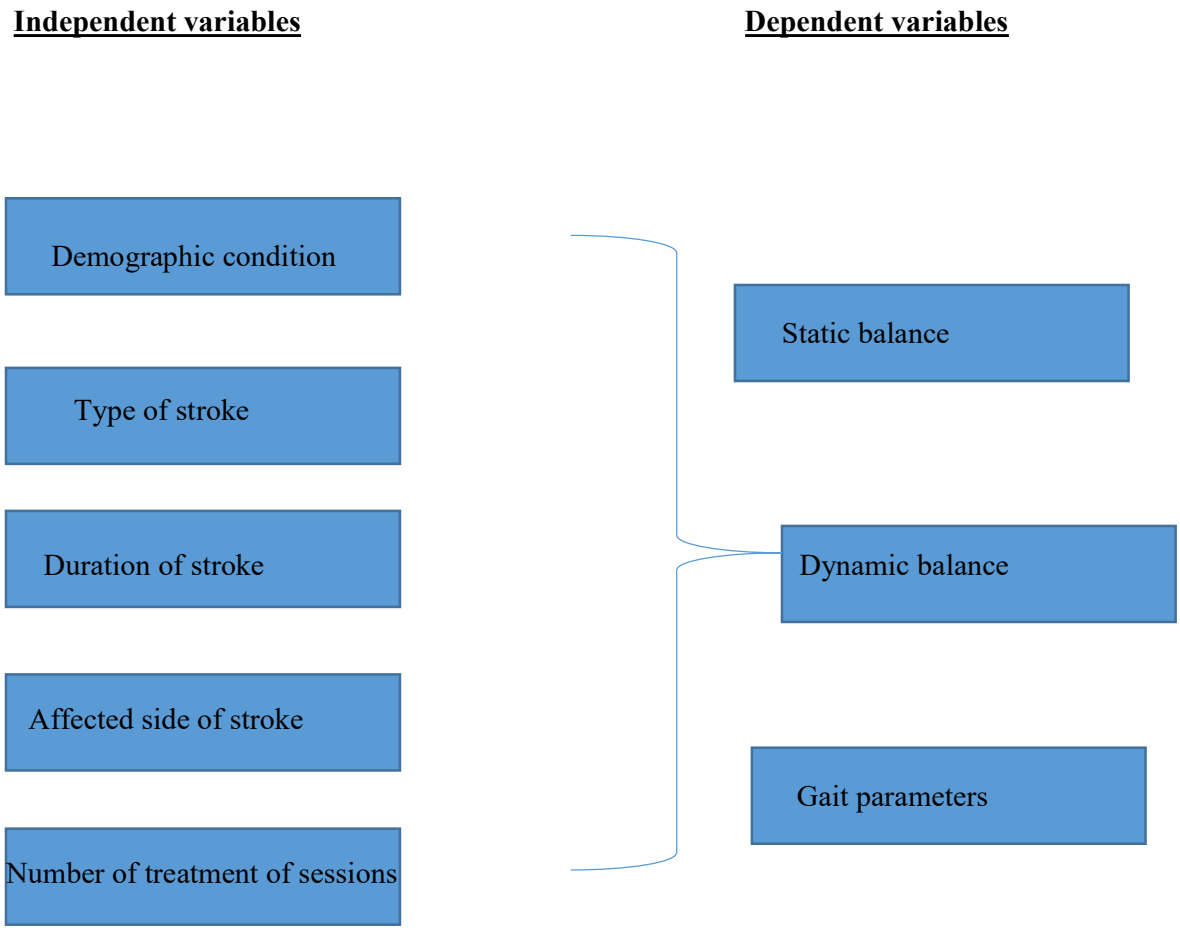
1. To find out the socio-demographic characteristics of stroke patient.

2. To find out the comparison between normal and post stroke Gait Parameters(step length, stride length, cadence and speed).

3. To find out the comparison between post stroke male and female Gait Parameters(step length, stride length, cadence and speed).

4. To find out association between socio demographic characteristics and Gait Parameters(step length, stride length, cadence and speed).

1.5 Conceptual framework



1.6 Operational definition:

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.

Stride length:

"The stride length is the distance between two successive placements of the same foot. It consists of two step lengths, left and right, each of which is the distance by which the named foot moves forward in front of the other one.

Step length

It is the linear distance in the plane of progression between two successive points of foot floor contact of the opposite feet.

Speed:

It is distance / time.

Cadence:

It means number of steps per unit time.

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.

CHAPTER –II: LITERRATURE REVIEW

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).

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 intra cerebral 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/m2) (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).

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).

CT scan or MRI usually done for confirm ischemic or hemorrhagic stroke. These investigations also help to confirm other vascular lesion. Lumber 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 intra cerebral 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 (Pyoria 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 & Shephered, 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 & Shephered., 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 is 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 et al., 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).

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).

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 locomotors 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 (Pyoria 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 locomotors 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). Each year at least 32 million individuals suffer with acute coronary and cerebral vascular event and at least half of these occur in people with established coronary heart disease (CHD) and cerebro vascular disease (Mendis et al, 2005). Stroke is synonyms with cerebro vascular accident (CVA) and is a clinical definition. The World Health Organization (WHO) definition of stroke is a rapidly developed clinical sign of focal disturbance of cerebral function of presumed vascular origin and of more than 24 hrs duration. This definition does not include `transient ischaemic attacks (Correia et al., 2004). The incidence of stroke increases with age and affect many people in their golden years. It is third most common cause of death in developed countries (Hossain et al., 2011). Approximately 15 million people suffer stroke worldwide each year, according to the World Health Organization. Of these, 5 million die and another 5 million are permanently disable (Engstrom et al., 2001). Strokes affect blacks more often than whites and are more likely to be fatal among blacks (Sergeev, 2004). 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). 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). The pathological background for stroke may either be ischemic or hemorrhagic disturbances of the cerebral blood circulation. Ischemic stroke (infarction): Thrombotic cerebral infarction results from the atherosclerotic obstruction of large cervical and cerebral arteries, with ischemia in all or part of the territory of the occluded artery. This can be due to occlusion at the site of the main atherosclerotic lesion or to embolism from this site to more distal cerebral arteries. Embolic cerebral infarction is due to embolism of a clot in the cerebral arteries coming from other parts of the arterial system (Thomas et al., 2006). Ischemic stroke or cerebral infarct (80% of strokes) results from a blockage or a reduction of blood flow in artery that supplies brain. They are caused either by a clot (thrombus) 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 (Braunwald et al., 2003). Hemorrhagic stroke: Spontaneous intra cerebral hemorrhages (as opposed to traumatic ones) are mainly due to arteriolar hypertensive disease, and more rarely due to coagulation disorders, vascular malformation within the brain, and diet (such as high alcohol consumption, low blood cholesterol concentration, high blood pressure, etc.). Cortical amyloid angiopathy (a consequence of hypertension) is a cause of cortical hemorrhages especially occurring in elderly people and it is becoming increasingly frequent as populations become older (Thomas et al., 2006). Stroke is a common medical emergency with an annual incidence of between 180 and 300 per 100000. The incidence rises steeply with age, and in many developing countries due to adopting of less healthy life style (Haslet et al., 1999)

In Caucasian populations approximately 80% of all strokes are ischemic, 10%-15% intra cerebral hemorrhage, 5 % subarachnoid hemorrhage, and the rest is due to other causes of stroke (Sudlow et al.,1997). Each year in China, about 1.5-2.0 million new stroke patients and it become a major public health problem in China. Pathogenesis of ischemic stroke is different from that of hemorrhagic stroke; their

clinical factors would not be the same. In east China a study showed that a total of 692 patients, 78% ischemic patients and 22% hemorrhagic patients. The incidence rate of ischemic stroke in this area was obviously higher than that of hemorrhagic stroke (Zhang et al., 2011).

A recent review study on stroke epidemiology data in Hong Kong, Taiwan, South Korea, Singapore, Malaysia, Thailand, Philippines and Indonesia, reported that the proportion of ischemic and hemorrhagic strokes varied from 17 % to 33 % (Thomas et al., 2006). There is no adequate data on incidence and mortality from stroke in Bangladesh. Among stroke, ischaemic infraction constitute 85% to90% and 15% to 10% is caused by intracranial hemorrhages in the western world, while hemorrhages constitute a larger percentage in Asia (Hossain et al., 2011).

There is a positive and negative association between obesity and strokes. While there are systematic differences in the risk factors for stroke subtypes and the proposed biological mediators (e.g. cholesterol, hypertension, and glucose) influencing the causal pathway between obesity and stroke may occur. In a study mentioned that BMI is associated with stroke but the direction and strength of association depend on stroke subtype. In Western populations with higher BMI levels, the reduced ischemic stroke risk of very low BMI level would not be elucidated. Increased risks for both ischemic stroke and hemorrhagic stroke among men with BMI above the reference range (22 to 23 kg/m2) (Song et al., 2004).

Hemiplegia is the paralysis of muscles on one side of the body, contra lateral to the side of the brain in which the CVA occurred (Braunwald et al.,2003). Stroke is a leading cause of serious long-term disability and can damage areas of cognitive, psychosocial and physical functioning. Cognitive impairments post-stroke are largely dependent on lesion localization, and can impair executive, language, visuo-spatial/perceptual, learning and memory domains. Depression is also commonand can further tax already vulnerable neuro-cognitive functions. Physically, 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). The older adult population have the chance of permanent disability or dementia is increased if age-related cognitive decline is present pre-stroke (Rabin et al., 2012).

After stroke some degree of recovery can experience by most of the patient. Recovery from impairment and disability is difficult to completely compare. 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 (Rabin et al.,2012). Hemorrhagic and ischaemic stroke present with different patterns of initial recovery. Characteristically, ischaemic infarct lesions present suddenly and the full extent of the initial insult is apparent. In contrast, with haemorrhagic strokes the extent of impairment initially seems more extensive due to localized inflammation surrounding the site of the bleed. Some of the initial recovery in haemorrhagic stroke can be attributed to the resolution of inflammation (Hossain et al.,2011). Some stroke patients fail to regain consciousness within the first 24 hours following the CVA and it is considered widely that the majority will not regain consciousness. In patients who regain consciousness within 24 hours, the first 3 months are a critical period when greatest recovery is thought to occur, although potential for improvement may exist for many months (Carr et al., 2003). Hemiplegia as a most common physical consequence of stroke is considered to be a recovering neurological condition. Other squeal of stroke could include cognitive, perceptual, sensory and communication problems. 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 (Pollock et al., 2008). Recovery is related to the site, extent and nature of the lesion, the integrity of the collateral circulation and the premorbid status of the patient (Braunwald et al., 2003). 12 Several prospective cohohort studies mentioned 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 deterioration 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. However,

their gait usually remains different from that of healthy subjects (Pradon, 2013). 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).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 et al., 2003). Operating as a clinical movement scientist, 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 (Obembe et al.,2012).mentioned that physiotherapy improves physical abilities, over and above spontaneous recovery, as two meta-analyses have reported significant improvements in independence in activities of daily living and reduction in impairments for higher intensities of physiotherapy. There are several different approaches to physiotherapy treatment after stroke. These can be divided into approaches that are based on neurophysiological, motor learning, or orthopaedic principles. Some physiotherapists provide their treatment on a single approach, whereas others use a mixture of components from a number of different approaches. At present, the Bobath Approach, based on neurophysiological principles, probably remains the most widely used approach in the Western world. Mixed approach is significantly more favorable than no treatment or a placebo control in the recovery of functional independence (Pollock et al., 2008).Approximately 80% of stroke patients 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 (Obembe et al., 2012). 13 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. 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 parameters in a group of stroke patients, defined as those who were ambulatory and competent for the most part in the basic activities of daily living (Hossain et al.,2011).

CHAPTER –III: METHODOLOGY

3.1 Study Design

A cross sectional study design was selected to carry out the research. The cross sectional study was conducted 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 collected all 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),savar,Dhaka.

3.3 Study Area

The researcher selected 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-

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

Here,

z= 1.96

p = 0.5(Here, p = Prevalence = 0.5)

q = 1 - 0.5

=1 - 0.5

= 0.5

d = 0.05

3.6 Inclusion Criteria:

- Patient with stroke who got at least 10session of treatment by a physiotherapist in CRP neurology unit.
- Age level 20- 70 years.
- Duration of stroke onset 1 month to 1 year.
- Having good static balance.
- Have good dynamic balance
- Have ability to independently walk

3.7 Exclusion Criteria:

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

3.8 Data collection methods and tools:

Data collection method was questionnaire and tools are pen, papers, consent form, , tape measure, 5 meter long cloth, floor, eraser, pen drive, stop watch and computer.

For data collection at first took consent from the patient. Then explained the procedure to the patient. A 5 meters long cloth was in the ground. For measurement patient put his both leg on the floor, then walk fast on the cloth. We should count time by the stop watch. So we can easily find the speed by dividing distance/time. We measure step length by tape from good leg to affected leg. We measure stride length by dividing total distance/total step. After that we talk to patient for walk 1 minitue. Then we count total step which was performing by patient in 1 minitue. This is called cadence. This is the total procedure of data collection.`

3.9 Data management and analysis:

Data was analyzed with the software named Statistical Package for Social Science (SPSS) version 20. 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 any time from the study. They were also told that the 18 confidentiality would be maintained and the benefits of the study to future participant and therapist were explained.

3.11 Ethical consideration:

The research proposal was submitted to the Institutional Review Board(IRB) of Bangladesh Health Professions Institute(BHPI) and permission was obtained from the board. Bangladesh Medical Research Council(BMRC) and World Health Organization(WHO) Research guidance also were followed to conduct the study.

CHAPTER –IV: RESULTS

4.1 Age:

Ages are grouped into 2 categories that found in this study such as age group 20-50 were 62% where (n=31), age group 51-70 were 38% (n=19).

Table 1: Age of the participants

Age	Number	Percent (%)
20-50	31	62
51-70	19	38
Total	50	100

4.2 Gender:

Among 50 participants 70 %(n=35) were male and 30 %(n=15) were female.

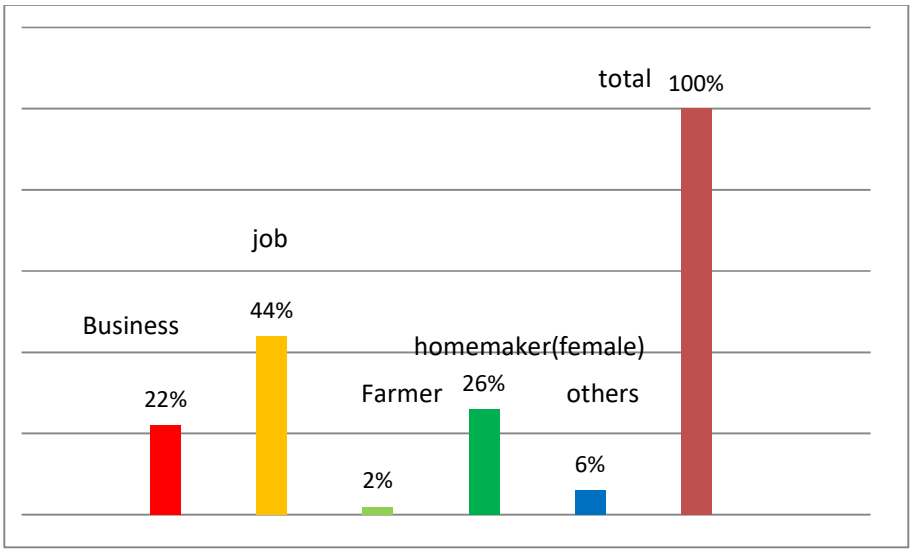
Table 2: Gender of the participants

Sex	Number	Percent (%)
Male	35	70
Female	15	30
Total	50	100

4.3 Occupation:

The study was conducted among 50 participants. Among them 22% (n=11) were bussiness, 44% (n=22) were job 2% (n=1) were farmer, 26% (n=13) were homemaker(all are female) 6%(n=3) were others.

Figure 1:- Occupaton of the participants

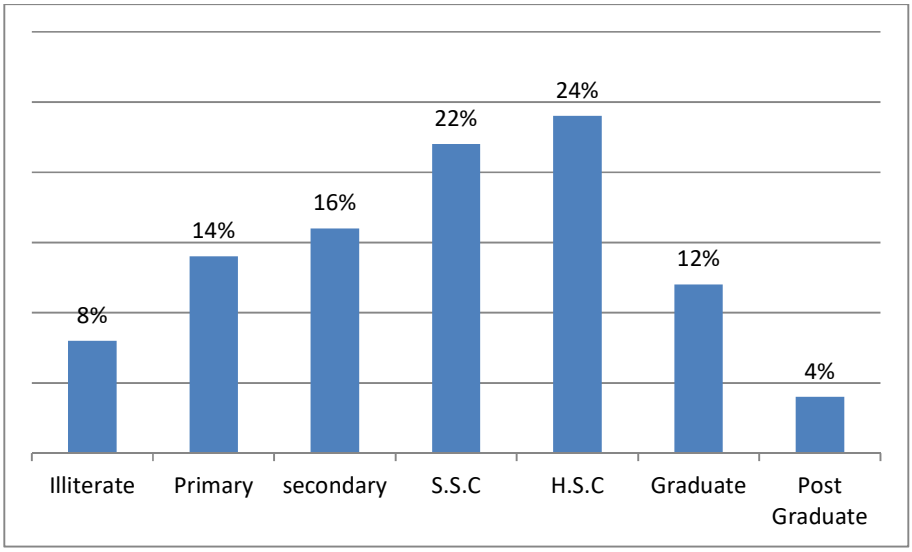


4.4 Educational status:

The study was conducted on 50 participants. So educational status of the participants are given below-

Illiterate-8%, primary level-14%, secondary level-16%, S.S.C -22%, H.S.C-24%, Graduate-12% and Post Graduate-4% peoples.

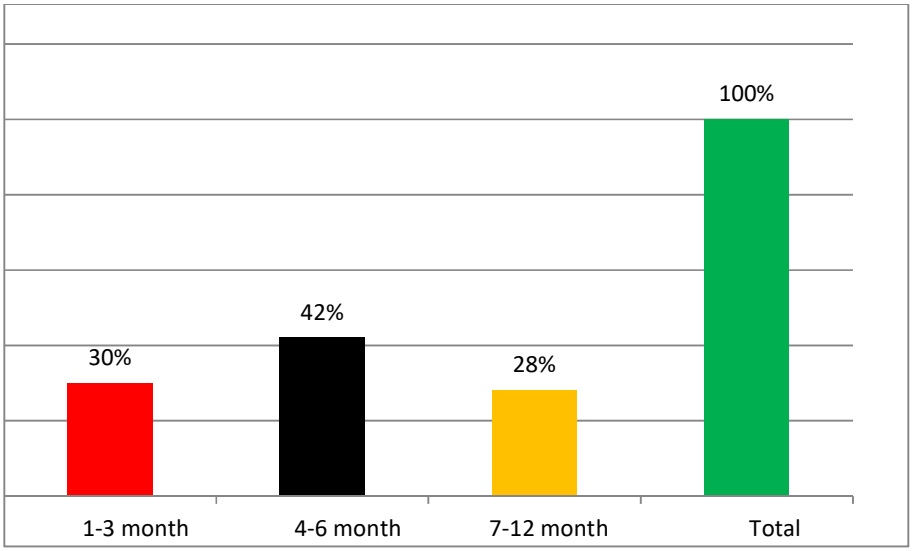
Figure 2: Educational level of the participants



4.5 Duration of stroke

Among 50 participants in this study, the duration of stroke where 30%(n=15) were 1-3 month, 42%(n=21) were 4-6 month and 28%(n=14) were 7-12 month.

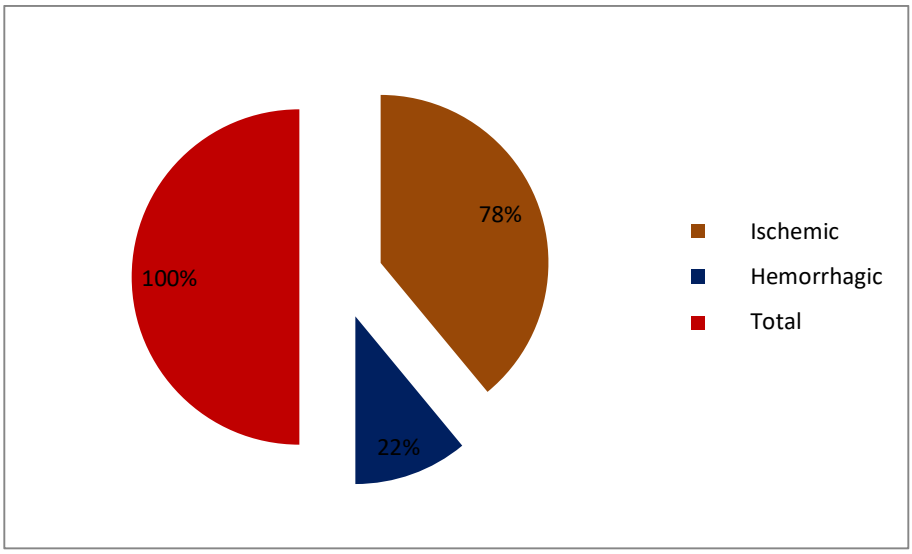
Figure 3: Duration of stroke of the participants



4.6 Type of stroke:

Among 50 participants in this study, ishchemic stroke patients are 78%(n=39) and hemorrhagic stroke patients are 22%(n=11).

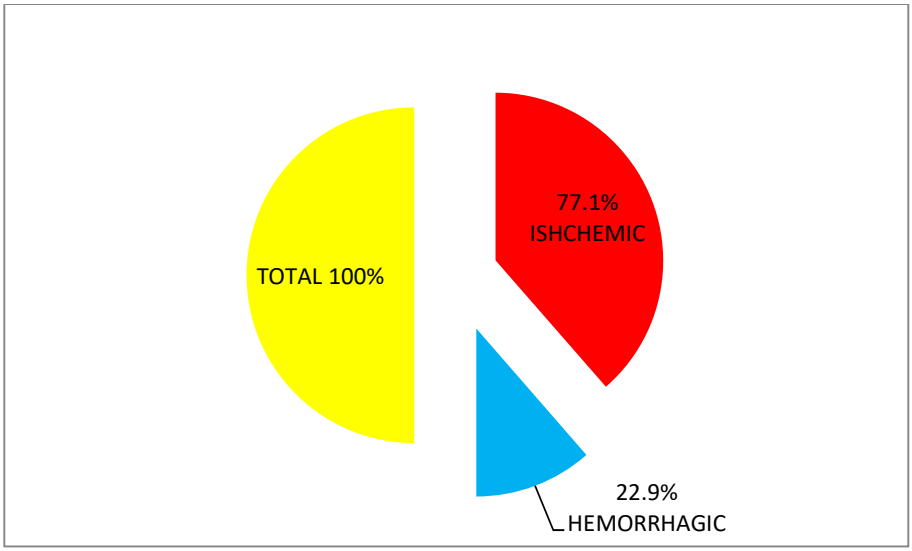
Figure 4: Type of stroke of the participant



4.7 Type of stroke of male:

Among 35 participants of male in this study, ishchemic stroke patients are 77.1%(n=27) and hemorrhagic stroke patients are 22.9%(n=8).

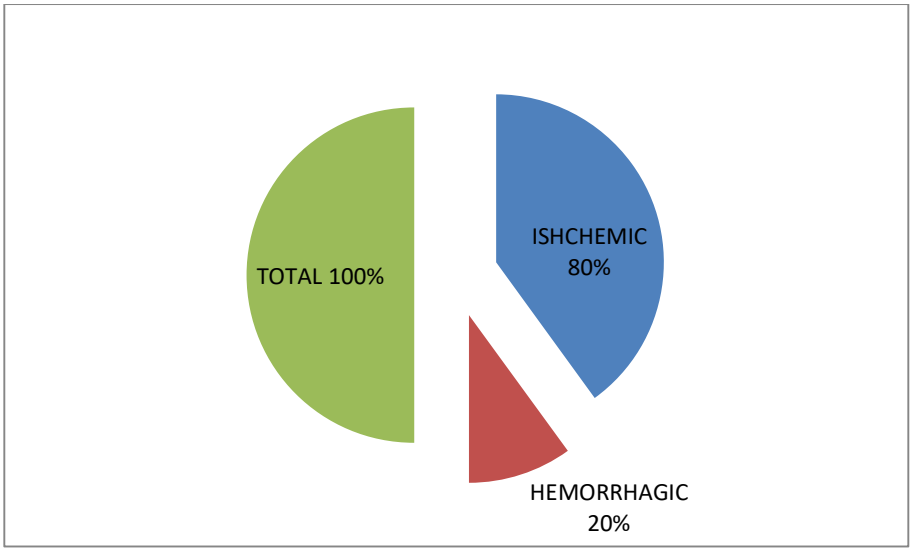
Figure 5: Type of stroke of male



4.8 Type of stroke of female:

Among 15 participants of female in this study, ishchemic stroke patients are 80%(n=12) and hemorrhagic stroke patients are 20%(n=3).

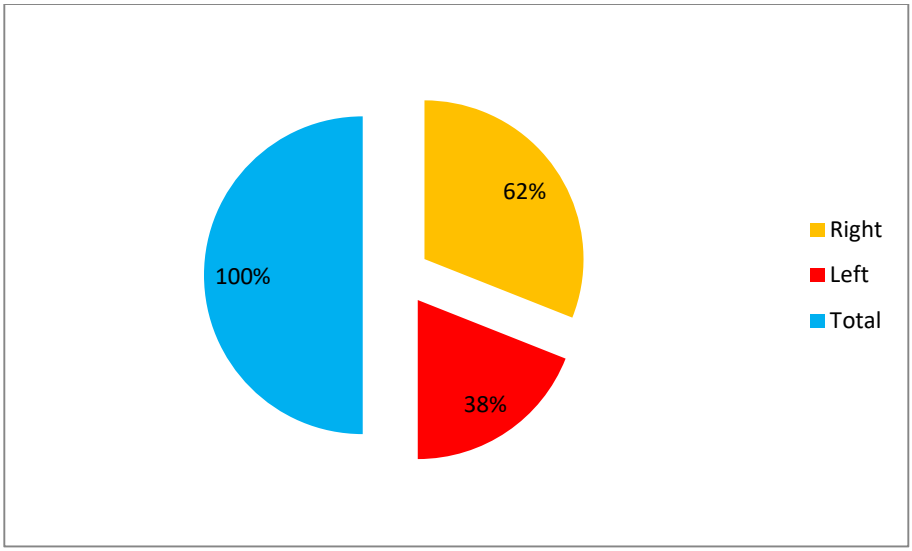
Figure 6: Type of stroke of female



4.9 Affected site:

About 50 peoples participate in this study. Among them 68%(n=34) are right side affected and 32%(n=16) are left side affected.

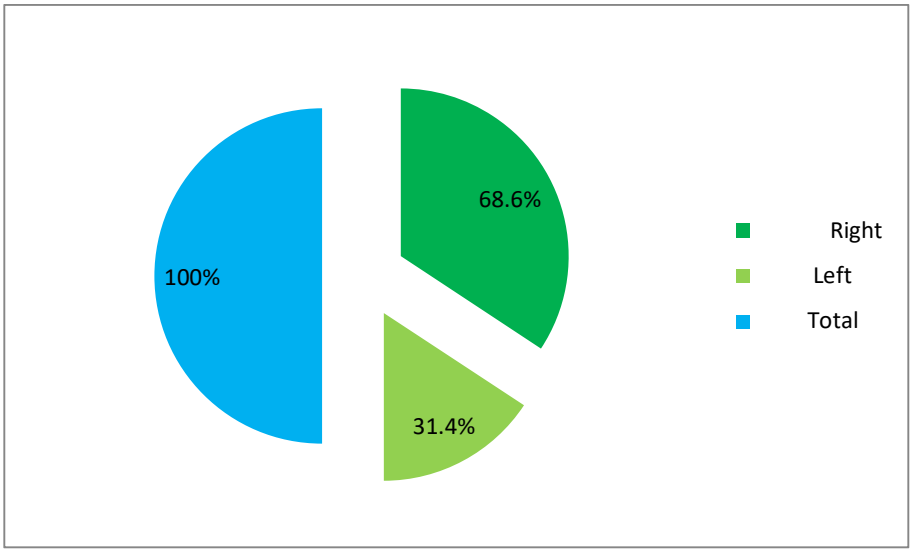
Figure 7: Affected side of the stroke patients



4.10 Affected site of male:

About 35 peoples participate of male in this study. Among them 68.6%(n=24) are right side affected and 31.4%(n=11) are left side affected.

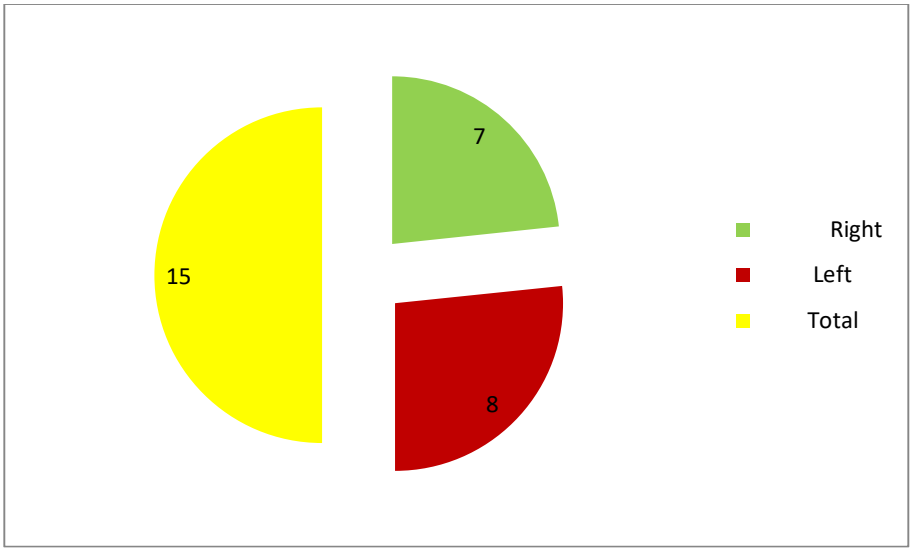
Figure 8: Affected side male



4.11Affected site of female:

About 15 peoples participate of female in this study. Among them 46.7%(n=7) are right side affected and 53.35%(n=8) are left side affected.

Figere 9: Affected site of female:



4.12 Static balance:

Among 50 participants in this syudy, all patients static balance is good.Static balance of participants are independent-100%(n=50)

Table 3: Static balance of the participants

Static balance	Number	%
Independent	50	100
Modified independent	0.00	0
Supervision	0.00	0
Need assistance	0.00	0

4.13 Dynamic balance:

Among 50 participants maximum participants dynamic balance is good.All patients dynamic balance are given below- independent-96%(n=48), modified independent-4%(n=2), supervision-0%, need assistance-0%.

Table 4: Dynamic balance of the participants

Dynamic balance	Number	%
Independent	48	96
Modified independent	2	4
Supervision	0.00	0
Need assistance	0.00	0

4.14 Received physiotherapy session:

Among 50 participants in this study, 68% (n=34) participant received 10-20 physiotherapy session, 26% (n=13) participant received 21-35 physiotherapy session, and 6% (n=3) participant received 36-50 physiotherapy session

Table 5: Received physiotherapy session of the participants

Received physiotherapy session	Number	Percentage(%)
10-20	34	68
21-35	13	26
36-50	3	6
Total	50	100

4.15Gait parameters:

Among 50 participants 35 patients are male and 15 patients are female. Here, comparision between average normal human gait and post stroke gait parameters which received physiotherapy are given below.Here, all parameters (step length, stride length, speed and cadence) are decreased after stroke.

Table 6: Comparison between normal and post stroke gait

Selected gait parameters	Average normal gait parameters	Average post stroke gait parameters
Step length(m)	0.762(Hunter et al.,2004)	.3174
Stride length(m)	1.524(McCamley,2018)	.2401
Speed(m/s)	1.40(Fujiyama, T. and Tyler, N., 2004)	.2391
Cadence(step/min)	80-110(Tápanes López.,2018)	67.44

4.16 Camparision between male and female selected gait parameters after:

Here, 35 participants are male and 15 participants are female. Here male step length(0.3261m) is larger than female(0.9272m),male stride length(0.2411m) is larger than female(0.238m), male speed(.2257m/s) is less than female(.2703), female cadence(65.17 step/min) is more than male(72.73step/min).

Table 7: Difference between male and female average gait parameters

Selected gait parameters	Male	Female
Step length(m)	0.3261	0.2972
Stride length(m)	0.2411	0.238
Speed(m/s)	.2257	.2703
Cadence(step/min)	65.17	72.73

4.17 Mean difference between male and female gait parameters:

Table 8: Mean difference between male and female gait parameters

Gait parameters	Mean difference	P-value	Significance
Step length	.10476	.821	Not significant
Stride length	.04762	.493	Not significant
Speed	-.08571	.317	Not significant
Cadence	-.08571	.317	Not significant

Here, p-value is >.05. So the mean difference between male and female is not significant.

4.18 Association between age and gait parameters:

Table 9: Association between age and gait parameters

Variable	Gait parameters	Chi-square value ($\chi 2$)	P-value	Significance
Age	Step length	3.871	.144	Not significant
Age	Stride length	5.534	.019	Significant
Age	Speed	2.289	.130	Not significant
Age	Cadence	.806	.369	Not significant

Table no-8 showed chi-square test for age and gait parameters. The test showed that the results of step length (P=.144), stride length (P=.019), speed (P=.130) and cadence (P=.369).Only stride length is significant and all of them are not significant because the found P-values of these domains are more than 0.05. So, there is not a relationship between age and gait parameters.

4.19 Association between Gender and gait parameters:

Table 10: Association between Gender and gait parameters

Variable	Gait parameters	Chi-square value ($\chi 2$)	P-value	Significance
Gender	Step length	.420	.811	Not significant
Gender	Stride length	.113	.736	Not Significant
Gender	Speed	.344	.558	Not significant
Gender	Cadence	.344	.558	Not significant

Table no-9 showed chi-square test for gender and gait parameters. The test showed that the results of step length (P=.811), stride length (P=.736), speed (P= .558) and cadence (P=.558).All of them are not significant because the found P-values of these domains are more than 0.05. So, there is not a relationship between gender and gait parameters.

4.20 Association between Occupation and gait parameters:

Table 11: Association between Occupation and gait parameters

Variable	Gait parameters	Chi-square value ($\chi 2$)	P-value	Significance
Occupation	Step length	4.024	.855	Not significant
Occupation	Stride length	3.369	.498	Not Significant
Occupation	Speed	2.731	.604	Not significant
Occupation	Cadence	2.764	.598	Not significant

Table no-10 showed chi-square test for occupation and gait parameters. The test showed that the results of step length (P=.855), stride length (P=.498), speed (P=.604) and cadence (P=.598).All of them are not significant because the found P-values of these domains are more than 0.05. So, there is not a relationship between occupation and gait parameters.

4.21 Association between educational level and gait parameters:

Table 12: Association between educational level and gait parameters

Variable	Gait parameters	Chi-square value ($\chi 2$)	P-value	Significance
educational level	Step length	5.299	.506	Not significant
educational level	Stride length	6.656	.354	Not Significant
educational level	Speed	3.018	.807	Not significant
educational level	Cadence	5.299	.506	Not significant

Table no-11 showed chi-square test for educational level and gait parameters. The test showed that the results of step length (P= .506), stride length (P=.354), speed (P=.807) and cadence (P=.506).All of them are not significant because the found P-values of these domains are more than 0.05. So, there is not a relationship between educational level and gait parameters.

4.22 Association between duration of stroke and gait parameters

Table 13: Association between duration of stroke and gait parameters

Variable	Gait parameters	Chi-square value ($\chi 2$)	P-value	Significance
duration of stroke	Step length	2.356	.671	Not significant
duration of stroke	Stride length	2.381	.304	Not Significant
duration of stroke	Speed	2.063	.357	Not significant
duration of stroke	Cadence	3.081	.214	Not significant

Table no-12 showed chi-square test for duration of stroke and gait parameters. The test showed that the results of step length (P=.671), stride length (P= .304), speed (P=.357) and cadence (P=.214).All of them are not significant because the found P-values of these domains are more than 0.05. So, there is not a relationship between duration of stroke and gait parameters.

4.23 Association between type of stroke and gait parameters:

Table 14: Association between type of stroke and gait parameters

Variable	Gait parameters	Chi-square value ($\chi 2$)	P-value	Significance
type of stroke	Step length	1.395	.498	Not significant
type of stroke	Stride length	.272	.602	Not Significant
type of stroke	Speed	.035	.851	Not significant
type of stroke	Cadence	.825	.364	Not significant

Table no-13 showed chi-square test for type of stroke and gait parameters. The test showed that the results of step length (P=.498), stride length (P=.602), speed (P=.851) and cadence (P=.364).All of them are not significant because the found P-values of these domains are more than 0.05. So, there is not a relationship between type of stroke and gait parameters.

4.24 Association between affected side and gait parameters:

Table 15: Association between affected side and gait parameters

Variable	Gait parameters	Chi-square value ($\chi 2$)	P-value	Significance
affected side	Step length	2.533	.282	Not significant
affected side	Stride length	4.40	.036	Significant
affected side	Speed	.897	.344	Not significant
affected side	Cadence	.806	.369	Not significant

Table no-14 showed chi-square test for affected side and gait parameters. The test showed that the results of step length (P=.282), stride length (P=.036), speed (P= .344) and cadence (P=.369). Only stride length is significant and all of them are not significant because the found P-values of these domains are more than 0.05. So, there is not a relationship between affected side and gait parameters

4.25 Association between received physiotherapy session and gait parameters:

Table 16: Association between received physiotherapy session and gait parameters

Variable	Gait parameters	Chi-square value ($\chi 2$)	P-value	Significance
received physiotherapy session	Step length	25.658	.900	Not significant
received physiotherapy session	Stride length	18.741	.408	Not Significant
received physiotherapy session	Speed	13.872	.737	Not significant
received physiotherapy session	Cadence	19.601	.356	Not significant

Table no-15 showed chi-square test for received physiotherapy session and gait parameters. The test showed that the results of step length (P=.900), stride length (P=.408), speed (P=.737) and cadence (P=.356).All of them are not significant because the found P-values of these domains are more than 0.05. So, there is not a relationship between received physiotherapy session and gait parameters.

CHAPTER –V: DISCUSSION

5.1 Discussion

The study was conducted to evaluate selected parameters of gait among stroke patients. The main focus of this study was patient's selected gait parameters performance after get physiotherapy treatment. 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 20 to 70 years and a mean age of the participants was 48.58 with. The higher number of participants age was 70 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, where 70%participant was male and 30% 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, 24% participant were businessman, 26% were home maker(all are female), 44 % were employer, 2% were farmer, 2% were others profession.

In America, a study showed that 29% participant was none primary, secondary 37% and college-university 34% (Salbach et al., 2006). In the study 8% peoples illiterate,14% got primary education, 16% got secondary education, 22% participants completed S.S.C level, 24% participants completed H.S.C level, 12% were graduate and 4% were post graduate holder. In the study the duration of stroke, where 30% were 1-3 month, 42% were 4-6 month and 28% were 7-12 month.

The study revealed that, 78% participants were ischemic and 22% 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 62% patient were right sided hemiplegic and 38% participant were left sided hemiplegic.

The study revealed that 68% participant received 10-20 physiotherapy session, 26% participant received 21-35 physiotherapy session, 6% participant received 36-50 physiotherapy session. 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).

The study revealed that Average normal gait parameters was step length(0.3261m) stride length(0.2411m) speed(.2257m/s) cadence(65.17step/min) and post stroke gait parameters was step length(.3174m) stride length(.2401m) speed(.2391.m/s) cadence(67.44step/min).This is a comparision between normal and stroke gait parameters.

The study found that, average gait parameters of stroke patients are stride length(.75m),speed (33.05m/min),cadence (87.11 step/min), gait cycle (1.42sec).This is the average gait parameters after stroke on that study(Matthew et al.,1997).

5.2 Limitations of the study:

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.
- As the study was conducted at Centre for the Rehabilitation of the paralyzed (CRP) which may not represent the whole country.

CHAPTER –VI: CONCLUSION AND RECOMMENDATION

CONCLUSION

The study concludes that maximum (50%) number of the participants were attended in this study.In this study we excluded the average selected gait parameters of stroke patients such as step length, stride length, speed and cadence.Caparision of normal and after stroke gait parameters are excluded. Male and female gait parameters are different. Maximum participant's (68%) received 10-20 physiotherapy treatment session. In the world, stroke is considered as the 3rd 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.

RECOMMENDATION:

The aim of this study was to explore selected parameters of gait of stroke patients. The result that the researcher found from the study has fulfilled the aim of this research project. The researcher recommended the following things-

1. Should take more samples for generating the result and make more valid and reliable.

2.Sample should collect from different hospital, clinic, institute and organization in different district of Bangladesh to generalize the result.

3.This study can also accomplish with other individual functional problems.

4. To find out an effective and efficient result in generalized form, other measurement scale should be used in consideration.

5. 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

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

Ref.

Date: 22/10/2018

CRP-BHPI/IRB/10/18/1259

To,
Md. Sohag Miah,
B.Sc. in Physiotherapy,
Session: 2013-2014, Student ID:112130214
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: Approval of the thesis proposal **"Selected gait parameters of stroke patients who attended at neurology unit of physiotherapy department, CRP"** by ethics committee.

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

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

The purpose of the study is to determine find out the selected gait parameters of stroke patients. The study involves use of a self structured questionnaire to find out the selected gait parameters of stroke patients that may take 15 to 20 minutes to answer, the members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 10 AM on 24th January, 2018 at BHPI.

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

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

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

Date: 21.07.2018

To,

Head of the Physiotherapy Department

Centre for the Rehabilitation of the Paralysed (CRP)

CRP-Chapain Savar, Dhaka- 1343

Through Head, Department of physiotherapy, BHPI

Subject: Prayer for seeking permission to collect data conduct a research project.

Sir,

With due respect and humble submission I am Sohag miah a student of 4th Professional B.Sc in Physiotherapy at Bangladesh Health Professions Institute (BHPI). In 4th year we have to do a research project for the partial fulfillment of the requirement for the degree of B.Sc in physiotherapy. My Research Project title is, "Parameters of gait of stroke patients at CRP". It is a cross sectional study. I have chosen Physiotherapy neurology department to collect required data. Now I am looking for your kind approval to start data collection. I would like to assure that anything of my research project will not harmful for the participants and department as well.

So, I therefore pray and hope that you would be kind enough to grant me the permission for data collection and oblige thereby.

Recommended & forwarded for approval.
Millat Hossain
21/07/2018

Muhammad Millat Hossain
Assistant Professor
Project & Course Coordinator
Dept. of Rehabilitation Science
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Yours faithfully

Md. Sohag Miah

Sohag Miah

Roll no: 19

Session: 2013-2014

Student of 4th year B.Sc in physiotherapy

Department of Physiotherapy

22.07.18
Prof. Md. Obaidul Haque
Head, Department of Physiotherapy
Bangladesh Health Professions Institute (BHPI)
CRP, Savar, Dhaka-1343

Approved

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

CONSENT FORM

Assalamu-alaikum,

I am Sohag Miah, Student 4th Professional year B.Sc in Physiotherapy at Bangladesh Health Professions Institute (BHPI), CRP. I shall have to conduct a research and it is a part of my academic activity. My research title is "Parameters of gait of stroke patients at CRP". Through this research I will find out Parameters of gait of stroke patients.

.

To fulfill my research project, I need to collect data. So you can be a respected participant of my research and I would like to request you as a subject of my study. I want to meet with you,during your physiotherapy treatment. I am assuring you that this conversation will not harmful your daily activity.

I would like to inform you that this is a purely academic study and will not be used for any other purposes. 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 at any time of the experiment. You also have the right not to answer a particular question that you don't like.

If you have any query about the study or right as a participant, you may contact with me or my Muhammad Millat HossainAssistant Professor, Dept. of Rehabilitation Science, CRP, Savar, Dhaka-1343, Bangladesh.
Do you have any questions before I start?

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

☐ Yes ☐o

Signature of the participant ..... Date .....

Signature of the data collector ..... Date .....

Signature of the witness ..... Date .....

সম্মতিপত্র

আসসালামু আলাইকুম,

আমি মোঃ সোহাগ মিয়া, বাংলাদেশ হেলথ প্রফেশন্স ইনস্টিটিউট (বি.এইচ.পি.আই), সি.আর.পি এর বি.এস.সি ইন ফিজিওথেরাপী কোর্সের ৪র্থ বর্ষের শিক্ষার্থী। আমার প্রাতিষ্ঠানিক কাজের অংশ হিসেবে আমাকে একটি গবেষণা করতে হবে। আমার গবেষণার বিষয় হলো, "স্ট্রোক রোগীদের হাটার প্যারামিটার"। এই গবেষণার মাধ্যমে আমি খুঁজে বের করব স্ট্রোক রোগীদের হাটার প্যারামিটার। গবেষণাটি সম্পাদনের জন্য, আমার তথ্য সংগ্রহ করা প্রয়োজন হবে। এজন্য, আপনি আমার গবেষণার একজন সম্মানিত অংশগ্রহনকারী হতে পারেন। তাই আমি আপনাকে অনুরধ করছি আমার গবেষণায় একজন অংশগ্রহনকারী হতে। আমি নিশ্চিত করছি যে, এই আলোচনা আপনার দৈনন্দিন কাজকর্মকে কোন ধরনের ক্ষতিকর প্রভাব ফেলবে না। আমি আপনাকে অবগত করছি যে, এটি একটি সম্পূর্ণ প্রাতিষ্ঠানিক গবেষণা এবং এটি অন্য কোনো উদ্দেশ্যে ব্যবহৃত হবে না। আমি আপনাকে আরো নিশ্চিত করছি যে, আপনার প্রদত্ত সকল তথ্য [illegible] হবে। আপনার অংশগ্রহন হবে ইচ্ছাকৃত। এই গবেষণা থেকে আপনি যে কোনো মুহূর্তে সম্মতি [illegible]

আপনার যদি এই গবেষণা সম্পর্কে এবং অংশগ্রহণকারী হিসেবে আপনার অধিকার সম্পর্কে কোনো জিজ্ঞাসা থাকে তবে আপনি আমার সাথে অথবা আমার পর্যবেক্ষক মোহাম্মাদ মিল্লাত হোসাইন (সহকারী অধ্যাপক, মাস্টারস ইন রিহ্যাব সাইন্স, বিএইচপিআই),সি আর পি, সাভার, ঢাকা-১৩৪৩, বাংলাদেশ এর সাথে যোগাযোগ করতে পারবেন।

উপাত্ত সংগ্রহের পূর্বে আপনার কি কোনো প্রশ্ন আছে?

আমি কি আপনার সাক্ষাৎকার গ্রহনের সম্মতি পেতে পারি?

☐ হ্যাঁ ☐ না

অংশগ্রহণকারীর স্বাক্ষর.....তারিখ.....

তথ্যসংগ্রহকারীর স্বাক্ষর.....তারিখ.....

স্বাক্ষীর স্বাক্ষর.....তারিখ.....

English questionnaire

1.**Personal details:** **ID no:**

1.1.Name of the patient:

1.2.Age:

1.3.sex:

1.4.Occupation:

1.5.Educational level:

Illiterate	1
Primary	2
secondary	3
S.S.C	4
H.S.C	5
Graduate	6
Post Graduate	7

1.6.Address:

Village/house no:

Post office:

Thana:

District:

1.7.Contact number:

1.8.Date of interview:

2.**Condition related information**:

2.1.Length of incident of stroke:

2.2.Type of stroke:

Ischemic	1
Hemorrhagic	2

2.3.Affected side:

Right	1
Left	2

2.4.Static balance:

Independent	1
Modified independent	2
Supervision	3
Need assistance	4

2.5.Dynamic balance:

Independent	1
Modified independent	2
Supervision	3
Need assistance	4

2.6.Type of weight bearing:

Symmetrical	1	Asymmetrical	2

2.7.Received physiotherapy session\time?:

PARAMETERS MEASUREMENT

Measurement of step length:

Distance from sound **heel to** affected **heel**	
So, step length	

Measurement of stride length:

Stride length=total step/total distance=

Total step	**Total distance(m)**	**Stride length(ts/td)**

Measurement of speed:

Speed=distance/time=

Speed	

Measurement of cadence(number of steps in 1 min):

Number of steps	**Time (/min)**

বাংলা প্রস্নাবালি

- ব্যক্তিগত বিবরনীঃ

১।রোগীর নামঃ

২।বয়সঃ

৩।পেশাঃ

৪।শিক্ষাগত যোগ্যতাঃ

লেখাপড়া করে্ন নাই	১
প্রাথমিক বিদ্যালয়	২
উচ্চ বিদ্যালয়	৩
এস.এস. সি.	৪
এইচ.এস. সি.	৫
স্নাতক	৬
পোস্ট গ্রাজুেয়ট	৭

৫।ঠিকানাঃ

গ্রাম/বাড়ি নুম্বেরঃ

ডাকঘরঃ

থানাঃ

জেলাঃ

৬।ফোন নাম্বারঃ

৭।সাক্ষাতকারের তারিখঃ

- রোগ সম্পর্কিত তথ্যঃ

১।স্ট্রোক কবে হয়েছেঃ

২।কোন ধরণের স্ট্রোকঃ

ইস্কেমিক	১
হেমোরেজ	২

৩।আক্রান্ত অংশঃ

ডান	১
বাম	২

৪।স্থির ভারসাম্যঃ

আত্মনির্ভরশীল	১
প্রায় আত্মনির্ভরশীল	২
রক্ষণাবেক্ষণ করতে হয়	৩
সহযোগিতা লাগে	৪

৫।গতিশীল ভারসাম্যঃ

আত্মনির্ভরশীল	১
প্রায় আত্মনির্ভরশীল	২
রক্ষণাবেক্ষণ করতে হয়	৩
সহযোগিতা লাগে	৪

৬।কিভাবে শরিরের ভার বহন করেঃ

উভয় পাশে সমান	১
যেকোন এক পাশে	২

৭।কত সেশান ফিজিওথেরাপি নিয়েছেঃ

হাটার প্যারামিটার মাপা

ধাপের ধরঘ্য নির্ণয়ঃ

ভাল পা থেকে আক্রান্ত পায়ের দূরত্ব	
অতএব ধাপের ধৈরঘ্য	

ধীরঘ ধরঘ্য নির্ণয়ঃ

মোট ধাপ	মোট দুরত্ত(মিটার)	ধীরঘ ধরঘ্য

গতি নির্ণয়ঃ

গতি(দুরত্ত/সময়)	

ক্যাডেঞ্জ নির্ণয়ঃ

ধাপের সংখ্যা	সময়(/মিনিট)