EFFECT OF HOME BASED TASK ORIENTED TRAINING ON THE LOWER EXTRIMITY FUNCTION IN CHRONIC STOKE.

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CERTIFICATE

This is to certify that the dissertation work entitled "**EFFECT OF HOME BASED TASK ORIENTED TRAINING ON THE LOWER EXTRIMITY FUNCTION IN HEMIPLEGIA"** was carried out by **GULNAAZ KAUR, REGISTRATION NO. 11110748,** department of physiotherapy, Lovely Professional University, towards partial fulfilment of requirements of master of physiotherapy (neurology) degree programme.

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This is to certify that Miss Gulnaaz kaur, Registration NO.11110748 has completed MPT dissertation work entitled "**EFFECT OF HOME BASED TASK ORIENTED TRAINING ON THE LOWER EXTRIMITY FUNCTION IN HEMIPLEGIA**" under my guidance and supervision. To the best of my knowledge, the present work is the result of her original investigation and study. The dissertation is fit for the submission and the partial fulfilment of the conditions for the award of MPT(Neurology).

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DECLARATION

I hereby declare that this dissertation titled "**EFFECT OF HOME BASED TASK ORIENTED TRAINING ON THE LOWER EXTRIMITY FUNCTION IN HEMIPLEGIA**" submitted for MPT degree is entirely my original work and all the ideas and references are duly acknowledged. I also declare that I have stick to the principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea, data, fact, source in my submission. I understand that any violation of the above will cause for the disciplinary action by the school and can evoke penal action from the sources which have thus not been properly cited or from proper permission has not been taken when needed. It does not contain any work of award of any other degree or diploma.

Dedicated to Almighty and My Parents

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" *Success is not final; failure is not fatal: It is the courage to continue that counts."*

ABSTRACT

EFFECT OF HOME BASED TASK ORIENTED TRAINING ON THE LOWER EXTRIMITY FUNCTION IN CHRONIC STOKE.

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Background: There have been many researches on task oriented training for the lower extremity function in the stroke subjects which have proven to improve the function of lower extremity. Home based exercises have not been evaluated by researchers that much for the chronic stroke patients. This study investigated the function of lower extremity on account of home based task oriented training in chronic stroke subjects.

Methods: This study is one group pre-test and post-test quasi experimental design in which with the convenience sampling 16 chronic stroke subjects were included. They all were given home based task oriented training for 2 times per day morning and evening, 6 days in a week and for total 4 weeks. Patients were supervised on alternative days and were assessed after every week. The outcome measures used are step test, 10 meter walk test and 5 times sit to stand test which were measured after every week. The data was analysed using repeated ANOVA test analyse the difference pre-test and post-test and within the weeks and unpaired T test for the comparison of paretic and nonparetic limb in step test.

Result and discussion: The results of this showed that home based task oriented training has improved the function of lower extremity in chronic stroke subjects which leads to improved locomotion of the patient which results to improved and independent activities of daily living.

Conclusion: Results indicates that home based task oriented training should be taught to chronic stroke patients as it improve the lower extremity function which leads to the higher level of quality of living in chronic stroke patients.

Key words: home based, task oriented training, lower extremity functions, step test, 10 meter walk test, 5 times sit to stand test.

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CHAPTER 1 –

INDRODUCTION

1.1 INTRODUCTION

Movement performed by humans are complex in nature, it requires involvement of multiple segments and forces to develop a movement. To produce movement two kinds of forces are required external and internal forces. External forces are push and pull that usually arises from outside the body for example gravitational force and this external force helps in restricting the movement or its initiation. Internal forces are the forces which arises within the body for example force generated by muscles and ligaments which usually initiates the movement but it can also counteract the external forces. Various kinds of forces are generated within the muscles and joints which interact with each other to produce a desired movement like distraction force, compression force, tensile force, torque which is a rotational force[1].

The production of force in the muscles is controlled by recruitment of motor unit and by regulation of firing rate of recruited motor units[2]. Nervous system plays an important role in control of movement as the movement are initiated by the smallest units called motor unit which consist of motor neuron, motor axon and a muscle fibre. Under the control of motor unit there can be few muscle fibres to large group of muscle fibres. The type of muscle fibre present, is according to the quality of the control required example- muscles of fingers, face and eyes are less in number and shorter muscle fibre whereas muscles of leg have large number and long muscle fibres in their motor unit[3]. The properties like metabolic, electrophysiological, anatomical, and mechanical of motor neuron and its muscle unit are synchronized in a manner that allows competent muscle contraction over a wide range of motor performance[4].

The interaction of both the systems musculoskeletal and neuromuscular system leads to a resultant motion which is required to accomplish the task. To produce normal action for a particular task a normal muscle synergy is required. Muscle synergy is also called motor synergy, neuromuscular synergy, or muscle mode. Muscle synergy is activation of the group of muscles to produce a particular movement[5]. Example for hip flexion a group of muscle is required to perform the task so these synergies are necessary for static and dynamic movement. Results from many studies determine that the action of muscle synergies can be correlated to functional outputs related to task performance[6].

These synergies are responsible for the normal daily living activities, which are explained as a set of activities essential for regular self-care. The activities are locomotion, bed transfers personal hygiene, dressing, and feeding. Locomotion means walking on the level, on gentle

slopes and down stairs. Locomotion is also an important activity for are daily living like for bathing, transportation, toileting, earning bread and butter. To perform these activities tasks normal walking is required this is possible due to normal functioning of musculoskeletal and nervous system[7]. In many neurological diseases such as cerebrovascular asault, traumatic brain injury, spinal cord injury, multiple sclerosis activities of daily living are affected due to the abnormal synergy pattern. This abnormality occurs because of abnormal recruitment of motor units[8].

Stroke is a major factor for this disability in India. The guesstimated adjusted occurrence rate of stroke in India ranges 84-262/100,000 in rural and 334-424/ 100,000 in urban areas[9]. Stroke is the global culprit of acquired adult disability. It includes motor and sensory impairment from which motor impairment cause mild to severe disability and leads to loss or limitation of mobility. Motor cortex, pre motor cortex, motor tracts or associated pathways in brain can be affected due to injury to the brain either by ischemic or haemorrhagic injury[10]. Although about 70% to 80% of adults who have pulled out themselves from stroke will recover the capability to walk for a few distances on plane surfaces, only 50% gain partial society ambulation and fewer than 20% have unrestricted ambulation in the society[11]. In stroke motor control of all the four or any of the four extremities is typically affected, showing a mixture of physical symptoms like hypertonia or hypotonia, muscular weakness, and impaired coordination. Muscles which are affected in stroke patients often show developing changes in their intrinsic mechanical properties, involving muscle contraction and adjustments in muscle internal structure, such as decreased muscle fibers, an increase of interstitial connective tissue, and changes in the visco elastic muscle[12].

Muscle weakness in the post stroke population occurs because of decreased size, firing rate, and atrophy of muscle fibres with increased fatigue, reduced and altered motor unit number and recruitment. A number of stroke researches have proved that weakness of muscles leads to scaling down of walking speed and the endurance to walk. The torques produced by the knee, hip, and plantar flexor muscles have been related with gait performance. Muscle weakness has been suggested as a significant forecaster of walking capability in chronic stroke individuals[13].The most often occurring impairment is in lower limb, resulting difficulty to balance and walking ability[14].

They have unsymmetrical outline of lateral movements and outsized excursions toward lateral side of the pelvis, on comparing to subjects who are healthy when they are walking at analogous

speeds. Furthermore, the accelerations are also not symmetrical and more prominent when weight bearing is on the side which is affected. These may signify complexity in balancing during gait and this is related to falls. They have deficits to shift weight on the affected leg and to have power over a push at the pelvis level, predominantly on the affected side. Due to which activities of daily living which require locomotion are impaired example sit to stand, walking on different surfaces, reaching activities, standing with narrow base of support, walking through hurdles[15].

To overcome these deficits many physiotherapy programs have been designed which may include Bobath, Brunnstrom, Roods, Proprioceptive neuromuscular facilitation approaches and strengthening exercises[16]. Patients in chronic stage usually stop there physiotherapy treatment due to many reasons like expenditure on transport, difficulty in daily transport, expensive physiotherapy charges and the emphasis is also on the acute stage patients with the lack of support in latter stages. This reveals the problems encountered by stroke patients including social isolation, reduction in mobility and life roles. Due to which there health or the improvement they have gained is reduced. Solution to this problem is self home exercises which can be supervised by their care giver.

Self home based exercises provide significance with numerous aspects of sustaining development and managing with setbacks after the stroke, it is a self management programme which motivates individuals with chronic stroke to take dynamic part in the management of their condition[17].To provide the optimal exercise programme to chronic stroke patients task oriented training can be used. Task oriented training has been developed from science of movement and motor learning skill literature in which it is defined as a therapy in which patients rehearse situation definite motor task and gain some kind of feedback. It focuses on the progress of performance in the functional task though aim-directed practice of task and repetition of task. The attention is on functional task not on the impairment. Neural plastic changes have been evident with this training where neural plasticity is ability of the brain to re-organize itself according the task given.

Animal studies have shown that task oriented training can restore the function by the utilisation of spared brain areas. Task oriented training is based on principals like task should be relevant to purpose, the practice of task should be randomly ordered, the training should be practiced with the help of repetitions, the aim of training should be reconstruction of complete task, and the training should be positively reinforced. The purpose of inclusion of task oriented training in the

study is that it uses bona fide world or everyday activities for the functional recovery thus it is easy for the patient to learn the task and perform the activities[18].

Various studies have been done in which task oriented training of lower limb has been proved beneficial for the patients who are in acute stage and there are very less studies for the chronic stroke. Various outcomes are used to evaluate the function of lower limb in stroke patients like 6 min walk test, timed up and go test, 10 meter walk test, 5 times sit to stand, gait parameters, berg balance scale, and leg muscle strength. These outcome measures are used to evaluate speed, balance, and strength of the lower limb. To measure activities of lower limb three main activities are required to measure walking, stepping up, and sit to stand[19].

Walking capacities are divided into short and long walking test where short walking test are to evaluate speed and long walking test are to evaluate walking endurance.10 meter walk test is a type of short walking test in subject needs to give brief or maximal effort which is associated with muscle strength but on the other hand 6 minute waking test is long walking test which is associated with endurance due to strain on cardiorespiratory system on the completion of test. To measure the strength 10 meter walk teat have good reliability and validity for the subjects with stroke[20].

For stepping activity and dynamic standing balance step test is used in subjects with stroke. In this test evaluator needs to count the number of times person is able to step up and step down from the stepper in 15 seconds. To perform this test there should be adequate strength of lower limb to stabilize the body in stance phase as the other leg is stepping. Step test has a good reliability and validity for subjects with stroke[21]. Sit to stand is a functional strength test usually done to measure the muscle performance where individual has to perform sit to stand for 5 times from the given surface as fast as possible and time is measured in which the task is complete. Sit to stand test also have good reliability and validity for the subjects with stroke[22].

1.2 NEED OF THE STUDY

Physiotherapy of stroke patients are long term and patients need to go for their treatment on the daily basis to the physiotherapy centre, and for chronic stroke patients it becomes very difficult to travel daily. It is very essential for the patient to perform exercise daily to improve their functional mobility. Many patient face difficulty in travelling because it is tiring and some people does not have that much funds to spend so the need of the study is to determine the effect of home exercises based on task oriented training as these exercises can be performed by patients easily because they mimic the activities which we generally perform for our daily living and the result of these exercises based on motor learning and neural plasticity of the brain.

1.3 SIGNIFICANCE OF STUDY

The patient will be benefitted by this study as the patient has to remain at home and can perform his exercises by himself as the patient gets less dependent on the therapist and become more dependent on him self to perform the task of daily living. The interventions which will be given are goal oriented which are easy to achieve.

1.4 AIMS AND OBJECTIVES OF THE STUDY

To determine effect of home exercises based on task oriented training on the lower limb function in stroke patients.

1.5 HYPOTHESIS

H_0 = There will be no significant effects of home based task oriented training on the lower limb function in chronic stroke.

H_A = There will be significant effect of home based task oriented training on the lower limb function in chronic stroke.

1.6 OPERATIONAL DEFINATION

TASK ORIENTED TRAINING: Task oriented training is defined as training where goal oriented task is performed repetitively which leads to neural plasticity. In this brain reorganizes itself according to the task which is based on motor skill learning.

SELF HOME BASED EXERCISES: These are the exercises which will be performed by patient at home. These exercises are taught and supervised by physiotherapist.

HEMIPARESIS: it is defined as the muscular weakness in one side of the body due to cerebrovascular assault.

ACTIVITIES OF DAILY LIVING: These are the activities which are performed by individuals to do the basic things of everyday example grooming, bathing, locomotion, eating and toileting.

CHAPTER 2 –
REVIEW OF LITERATURE

Ray-Yau Wang et al(2012); conducted this study to investigate the effect of rTMS in chronic stroke subjects on performing task-oriented training and measuring the cortical excitability and walking performance. 24 subjects were divided into experimental and control group by randomisation. Subjects in who were in experimental group were given task oriented training for 30 mins for 10 sessions over 2 weeks with 10 mintues of repetitive, where as in control group task oriented training for 30 mins for 10 sessions over 2 weeks with 10 mins of sham repetitive TMS was given. Outcome measures used are motor evoked potentials (MEP), lower limb Fuglmeyer scale, gait performance, were measured pre and post training. Thus concluded that rTMS enhances the task oriented training when given in chronic type of stroke by increasing the gait, spatial symmetry and corticomotor excitability symmetry[23].

Sze-Jia Hong et al(2012) conducted a cross sectional study, to establish the interrater and intrarater reliabilities, validity and cut off scores of step test distinguishing individuals with chronic stroke from subjects who are healthy and the convergent validity of step test. Total number of 30 subjects was added through convenience sampling. 15 subjects of chronic stroke and 15 subjects of healthy subjects older than 50 years were added. The outcome measures used are handheld dynamometer to measure bilateral lower limb strength; lower limb extremity coordination test; berg balance scale and 5 meter walk test. The result showed excellent intrarater reliability with ICC ranging from .981 to .995 and interrater reliability with ICC ranging from .996 to .999. Cut off score of 13 was found on paretic side when compared to the subjects who were healthy with sensitivity of 87% and specificity of 87% where as cut off score of 11 was found on nonparetic side when compared to subjects who were healthy with sensitivity of 100% and specificity of 67%. Thus concluded that step test is a reliable measuring tool.

Yiqin Mong et al (2010); carried out this cross sectional study to assess the intrarater, interrater, and test retest reliability of 5 times sit to stand. To see the correlation of this test with lower limb muscle strength and balance performance and cut off scores among three groups which include young subjects, healthy elder subjects and subjects with stroke. 36 subjects were added through convenience sampling. 12 healthy elderly patients subjects, 12 chronic stroke stroke patients and 12 young subjects. The outcome measures used are 5 times sit to stand test, handheld dynamometer, Berg Balance Scale and limit of stability using

posturography. The result shows an excellent interrater, intrarater and test retest reliability of 5 times sit to stand test. Significant association was found between muscle strength of affected and unaffected knee flexors of the stroke subjects and no significant relation was found between 5 times sit to stand test and berg balance scale and limit of stability in subjects with stroke. Cut off score of 12 seconds was found discriminate between healthy elder subjects and stroke subjects thus they concluded that 5 times sit to stand is reliable tool to measure knee muscle strength but not reliable in balance in stroke subjects.

Fiona Jones et al (2010); conducted this review to examine the effect of self-efficacy on rehabilitation results after stroke, and the proof to support self-management treatments which rely on on self-efficacy principals in case of stroke survivors. The studies which were i included were taken from various Databases and sources . The articles included were based on Primary research testing relationships between self-efficacy and rehabilitation outcomes including those measuring impairment, activity or participation in a stroke population and Research testing efficacy and effectiveness of self-management interventions designed specifically for a stoke population in which the principle theoretical framework is self-efficacy or a similar control cognition. 22 articles were included out of 104 articles which were searched. Thus this study concluded that there is a requirement of researches to be performed, to develop the test and interventions protocols which can support self-management skills and confidence to ensure continuous progress after stroke. This could help to reduce some of the negative penalties of stroke such as reduced quality of life and social separation.

Isobel J. Hubbard et al(2009); carried out this study to review the relevance of occupational based neurorehablitation in which many studies related to task oriented training has been discussed. They discussed the value of task oriented training, evidences of task oriented training in psychology of motor skill learning and neurosciences neural plastic changes in animals and humans and purposed five principals to apply the task oriented training the task should be randomly assigned, repetitive and involve mass practice, aim towards reconstruction of the whole task and reinforced with positive and timely feedback.

Vicki Stemmons Mercer et al (2009); conducted this study to establish relationship between step test score and measure the activity and participation of the stroke subjects during the first

six months after stroke. The study design used is prospective cohort study 33 subjects who were diagnosed with single and unilateral stroke were included. Subjects were tested once in each month from 1st to 6th month after stroke. In this study step test was regarded as an impairment stage measure whereas the outcome measures used are self specific gate speed, the medical outcome study for 36 item health survey, physical function index were used to evaluate the physical function. In this study 3 domains of the stroke impact were used to assess disability. The result of study was that step test scores were related with both physical functions measures. But the relation was well-built for self selected gate speed than physical function index. The limitation of the study is small sample size and lack of examiner's blinding with regard to demographic characteristics of subjects. They concluded that impairments in balanced and paretic lower extremity motor control, as measured by the step test, are related to physical function and disability during first six months post stroke.

Lotte Wevers et al (2009); aimed to systematically review RCT of task oriented circuit class training on the activities related to the gate in the individuals affected with stroke. Computer software was used to identify RCTs in which the experimental group was given task oriented circuit class training focusing on the lower extremity. Studies which were published up to 2008 (march) were included. Each study was assessed according to its methodological quality and the studies which were identified with same variables outcome were pooled together by calculating the summary effect sizes. 6 studies from 445 were screened in which 307 subjects were included. The meta analysis resulted significant uniform summary effect size in the favour of task oriented circuit class training for distance which can be walked, gate parameters, speed of walking and timed up and go test and there was a non significant summary effect sizes in the favour of task oriented circuit class training were found for the step test balance control. This study supported the use of task oriented circuit class training to improve the gate parameter and gate related activities in patients with chronic stroke.

Alex Pollock et al (2009); conducted this study to evaluate if there is a dissimilarity in the improvement of postural control and lower extremity function in individuals with stroke if physical therapy protocol is formed on the basis of orthopaedic or neuro physiological or motor learning principles, or on a combination of these treatment principles. Randomised and quasi-randomised controlled trials of physical therapy treatment approaches aimed at promoting the improvement of postural control and lower limb function in individuals with a

of stroke were included. Outcomes measures included measures of disability, motor impairment or participation. 21 studies were included in this review, 5 studies of which were comparisons. 8 studies compared a neuro physiological approach ; 8 studies compared a motor learning approach; and 8 studies compared a mixed approach. They concluded that mixed approach was considerably more effective than no treatment or sham control for improving functional ability in lower limb.

Yea–Ru Yang et al (2007); conducted single blind RCT to examine the effectiveness of dual task based exercise program on walking abilities in subjects with chronic stroke. 25 subjects were included, who were at limited society ambulatory. Subjects were randomised into experimental group (n=13) and control (n=12). Subjects in the experimental group were given ball exercise program for 4 weeks whereas control group were not given any rehabilitation exercises. The main outcome measures used are performance of gate was measured under single task that is walking with tray carrying task. The gate parameters which were included are walking speed, temporal symmetry index, cadence while walking, stride length, and stride time. When compared to the control group the experimental group showed significant improvement in all the gate measures but did not show improvement in temporal symmetry index under both task conditions. They concluded the dual task based exercise program is feasible and beneficial for improving gate with chronic stroke[25].

S. Beck et al (2007); conducted study to identify sites and mechanism of long term plasticity following the lower limb muscle training in task specific training. Comparison of two different training interventions where 27 healthy subjects were divided in to 2 groups, group A performing ballistic ankle strength or training postural stability training were compared to non training group. To test the exercise training motor evoked potentials produced by repetitive transcranial magnetic stimulation were recorded during rest and at the time of exercise training. The results showed changes of motor evoked potentials parameters in both the training groups which reflects cortical motor plasticity but there was no changes in control group[26].

Shamay S.M.Ng et al (2007); conducted this study to examine whether combining trans cutaneous electrical nerve stimulation with task related training improves the functional ability of lower extremity in individuals with chronic stroke. 88 patients with stroke were randomly divided into four groups, in group one only TENS was given, in second group TENS plus task related training, in third group placebo TENS with task related training and in fourth group there was no treatment given. The outcome measures used are composite spasticity scale, peak torque value produced during highest isometric voluntary contraction of dorsiflexors and plantarflexor, and velocity in gate recored at baseline, after second and fourth weeks of treatment. The result of the study showed that TENS combined with task related training showed considerably greater improvement in dorsiflexion torque at follow up and in planatarflexion torque at second week and follow up and there was earlier and greater reduction of plantarflexor spasticity and there was significant great improvement in velocity of gate[27].

Katherine J Sullivan et al (2007) conducted this study to determine walking capability when the stroke subjects are provided with combined task specific and lower extremity strength training. 80 subjects were included who were capable of walking from 4 months to 5 years after one sided stroke The exercise program consist of body weight supported treadmill training, limb loaded resistive leg cycling, Lower Extremity muscle specific progressive resistive exercise, and upper-extremity ergometry. The subjects after the baseline measurement were randomly assigned to a paired combined exercise program. The exercise pairs were: BWSTT/UE-EX, CYCLE/UE-EX, BWSTT/CYCLE, and BWSTT/LE-EX. Exercise sessions were 4 times per week for 6 weeks which formed total of 24 sessions. Outcomes were self-selected walking speed, fast walking speed, and 6 minute walk distance measured pre and post intervention and with 6 month follow-up. The BWSTT/UE-EX group had considerably greater walking speed when compared with the CYCLE/UE-EX group; but both groups improved in distance walked. All BWSTT groups increased walking speed and distance whether BWSTT was combined with lower extremity strength training or not.

Jean-Francois Bayouk (2006); carried out this study to compare sensory input on postural stability which is altered or unaltered during task oriented training exercises in the subjects with stroke. 16 subjects at least 6 month post stroke were randomly assigned to experimental and control group. In experimental group exercises were performed where conditions of

vision and surface manipulation but in control group exercises were performed under normal conditions which were carried out for 8 weeks in which task oriented exercises were given. Pre and post assessment involved the measurement of centre of posture and sit to stand with four sensory conditions 1) open eyes, surface is normal; (2) open eyes, surface is soft. (3) closed eyes, surface is normal; and (4) closed eyes, surface is soft and 10 meter walk test. They concluded that a task oriented exercise program, combined with manipulation of sensory input, is more effective at improving the standing balance of stroke subjects than the conventional program.

Yea-Ru Yang et al (2006); conducted this experimental study to evaluate chronic stroke subjects by giving task oriented resistance strength training for lower limb function and strength. A single blinded, RCT in which 48 subjects were divided into two groups experimental group (n=24) and control group (n=24).The subjects in experimental group received task oriented progressive resistance strength training for 4 weeks whereas in control group no rehabilitation was given. The main outcome measures used are muscle strength of lower extremity, velocity in gait, cadence in gait, stride length in gait, 6 minute walk test, step test, and timed up and go test. The experimental group showed considerable progress in all the selected measures of functional performance except the step test thus they concluded that task oriented progressive resistance strength training program improves the lower limb muscle strength in subjects with chronic stroke[28].

Nancy. M et al (2005); conducted this study to evaluate the efficacy of task oriented walking intervention in improving the balance self efficacy in stroke. It is a secondary analysis of two centre, observer blinded, randomized, control trail. In which 91 subjects with the residual walking deficit within 1 year of a first stroke were included. Task oriented interventions targeting the walking and upper limb function were provided 3 times a week for 6 weeks which were measured by using activities specific balance confidence scale, six minute walk test, 5-m walk, berg balance scale, and timed up and go test, which are measured at baseline and post intervention. As a result there was marked improvement walking then upper limb. The walking interventions showed greater change in balance self efficacy than the upper limb interventions.

Eva De Bujanda et al (2003) conducted cross sectional study to examine the relationship between impairments of the affected limb, ambulation capacities and kinematic inconsistentsy

in the frontal plane during walking. 10 subjects with chronic hemiparesis were included. Frontal plane kinematics of the shoulder girdle and hip were assessed throughout treadmill walking in a gait lab using a video graphic system to find the lateral displacement and lateral accelerations. Foot-switches were used to determined the percentages of time used up in single stance. Index of asymmetry for the lateral accelerations and single stance were also calculated. Clinical tests were used to measure the subject's motor and functional characteristics. Findings demonstrated associations between physical impairments, ambulation capacities and the frontal kinematics in the subjects with chronic stroke.

Stefano Paolucci et al(2003); carried out this case control study to assess the specific influence of stroke etiology on rehabilitation effects. 270 patients with single stroke that were enrolled in uniform subgroups on the basis of stroke severity, age, sex, basal disability, onset of stroke were included. Stroke subjects were different in only terms of stroke origin that is haemorrhagic and ischaemic. Comparison of subjects was done on the basis of time of stay in the hospital, efficiency and effectiveness of interventions and the proportion of low and high responder stroke subjects. When they compared haemorrhagic with ischaemic subjects, patients with haemorrhagic stroke subjects showed appreciably higher Canadian neurological scale, barthal index and rivermead mobility index scores at the discharge. Thus provides evidence of better functional progrosis in stroke survivors with haemorrhagic stroke[29].

Philippe Rossier et al (2000); carried out this study to determine the reliability and validity of four mobility measures in patients who are neurologically affected and are in rehabilitation process. In this study 46 patients with neurological impairments, who were capable of walking 10 meter with or without assisted device were selected from inpatient and outpatient centres. Patients were evaluated two times with the time period of 7 days. The main outcome measures used are rivermead mobility index standard version and version with 4 levels of answer, 10 meter walk test, and 2 minute walk test. These measures showed significant intercorrelation, suggesting that all were valid measures.

Catherine M. Dean et al (2000); conducted this study to evaluate the performance of chronic stroke subjects when given ambulation related tasks exercises in which its immediate and retention effects were evaluated. It is a randomized controlled trail pilot study with two months follow up. 12 subjects of chronic stroke were added through convenience sampling and these subjects were randomly divided into experimental and control group. The

experimental and control group both took part in exercise classes for 3 times in a week for total of 4 weeks. The experimental group was focused on strengthening of affected lower limb and practicing functional tasks involving the lower extremity, while the control group performed upper-limb tasks exercises. The outcome measures used are speed and endurance of walking, peak vertical ground reaction force all the way through the affected foot during the step test and sit-to stand test. The experimental group showed significant immediate and retained improvement when compared with the control group[30].

Pamela Duncan et al (1998); carried out this pilot study to develop the home based balance, strength and endurance protocol and to determine capability of stroke participants to recruit and retain and also to evaluate the effects of the exercise program. 20 patients who were minimally and moderately affected by stroke and who were 30 to 90 days post stroke were divided into experimental and control group with the randomization. Experimental group received home based exercise program for 8 week, 3 times per week and was supervised by therapist where as control group was given the standard care as prescribed by the physicians of patient. They assessed the patient by fugl-meyer scale, barthel index, the Lawton scale of instrumental ADL, and medical outcomes study-36 health status measurement. Assessment of balance and gait included 10 meter walk test, 6 minute walk test, and berg balance scale. Jebsen test was used to measure the hand function. The result of this study showed improvement in the measures of neurological impairment and lower extremity function. Effects of the exercises based dexterity and functional health status for the upper limb function were equivocal[31].

CHAPTER 3 –

MATERIALS AND METHOD

3.1 STUDY DESIGN- one group pre test post test design – quasi experimental design.

3.2 STUDY SETTING- Home based

3.3 POPULATION AND SAMPLING

- **SAMPLING METHOD -** Convenient sampling
- **SAMPLE SIZE** - 16

3.4 CRITERIA:

- **Inclusion criteria** – Subjects should meet these criteria to be included in the study.
- Age group 45- 65 years
- Stroke more than 6 months.
- Patient is able to walk 6 meters.
- Ischemic and haemorrhagic stroke.
- Both male and female.
- Patient should understand verbal commands.
- Left and right hemiplegia.
- **Exclusion criteria–**subjects with following criteria should be excluded.
- Unstable medical condition.
- Patient with cognitive impairment.
- Patients who were unable to perform the exercise protocol due any other medical condition.

3.5 PARAMETRES –

- Step test
- 10 meter walk test.
- 5 times sit to stand test.

3.6 INSTRUMENTS AND TOOLS

- Stepper
- Chairs of different heights
- Inch tape.

3.7 PROCEDURE:

Subjects with age 45 – 65 year old of both the genders will be recruited with the use of neurological evaluation and with the help inclusion and exclusion criteria they will be included and excluded. The functional activities of the subject will be measured with step test, 10 meter walk test and sit to stand test after which they will be given 4 week task oriented training program which will performed for 2 times per day and 6 days per week in they will be supervised on the alternative days whether they are performing exercises or not and will be assessed once in the week. Total of 6 exercises will be given which may include further modifications.

- Standing – quiet standing
  Reaching activities
  Narrow standing
  Tandem standing
  Heel off
- Sit to stand – chairs used to perform are of different heights.
- Walking – stand up and go exercise and sideways walking.
- Stepping on stepper – sideways and forward
- Walk on different surfaces
- Kicking while sitting

Each exercise will be repeated 10 times as the care giver will be educated with all the exercise and a record book will be provided to record if the patient is performing exercises or not.

3.8 STATISTICAL TOOL

1) Repeated ANOVA

Analysis was done using repeated ANOVA to the significance difference between the weeks and pre-post readings.

Step 1: Calculate (SS_T):

$$SS_T = {}^{S}\text{grand}^{(N-2)}$$

Step 2: Calculate the residual sum within participants (SS_R):

$$SS_R = (\sum X_I - \overline{X}_i)^2$$

$$SS_R = S^2 (n - 1)$$

Step 3: Calculate the Model Sum of Squares (SS_M):

$$SS_M = \sum n_i(\bar{x}_i - \bar{x}\text{grand})^2$$

Step 4: Calculate the Residual Sum of Squares (SS_R):

$$SS_R = SS_W - SS_M$$

$$df_r = df_w - df_m$$

Step 5: Calculate the Mean Squares:

$$MS_R = \frac{ss_m}{df}$$

$$MS_R = \frac{SS_R}{df_R}$$

Step 6: Calculate The F-Ratio:

$$F \text{ Ratio} = \frac{MS_R}{MS_S}$$

2) Unpaired T test

To test the null hypothesis that the two population means, µ1 and µ2, are equal:

1. Calculate the diff erence between the two sample means, $\bar{x}_1$ - $\bar{x}_2$.

2. Calculate the pooled standard deviation:

$$s_p = \sqrt{(n-1)s_2^2(n_2 - 1)s_2^2/n_1 + n_2 - 2}$$

3. Calculate the standard error of the diff erence between the means:

$$SE = (x_1 - x_2) = s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$$

4. Calculate the T-statistic, which is given by

$$T = \frac{x_1 - x_2}{SE\ (x_1 - x_2)}$$

Under the null hypothesis, this statistic follows a t-distribution with $n_1 + n_2$ $^{-2}$ degrees of freedom.

5. Use tables of the t-distribution to compare your value for T to the $tn_1 + n_2^{-2}$ distribution. This will give the p-value for the unpaired t-test.

Chapter 4

STATISTICAL ANALYSIS AND RESULTS

AGE	MALE	FEMALE
MEAN AGE	54.5	58.8
TYPE OF SROKE		
ISCHAEMIC	31.3%	12.5%
HAEMORRAGIC	31.3%	25%
SIDE OF HEMIPARESIS		

Table 1 Demographic distribution of subjects

LEFT HEMIPAERESIS	37.5%	31.3%
RIGHT HEMIPARESIS	25%	6.25%
SAMPLE SIZE		
TOTAL NUMBER OF SUBJECTS	10	6
PERCENTAGE	62.5%	37.5%
RATIO	MALE : FEMALE 5 : 3	

Table 2: Repeated ANOVA and Turkey's method for pair wise comparison of step test in paretic extremity.

Repeated ANOVA	STEP TEST(PARIETIC)				
	PRE	WEEK1	WEEK2	WEEK 3	WEEK 4
Mean	1.88	3.06	4.25	6.13	7.50
S.D.	0.619	0.772	1.000	1.025	0.730
Median	2	3	4	6	7.5
Number	16	16	16	16	16
Maximum	3	4	6	8	9
Minimum	1	1	2	4	6
DF1	4				
DF2	60				
F Test	186.58				
P value	2.525				
Table Value	<0.001				

Result	Significant			
Tukey's method for Pairwise comparison Mean Difference & Result>	PRE			
WEEK1	1.18	WEEK1		
WEEK2	2.38Sig	1.19Sig	WEEK2	
WEEK 3	4.25Sig	3.06Sig	1.88Sig	WEEK 3
WEEK 4	5.63Sig	4.44Sig	3.25Sig	1.38Sig

There was statistically significant difference in step test (paretic extremity)on performing the home based task oriented training for 4 weeks pre-test and post-test, F value = 186.58, p value = 2.525. Additionally in all the weeks also it showed the improvement.

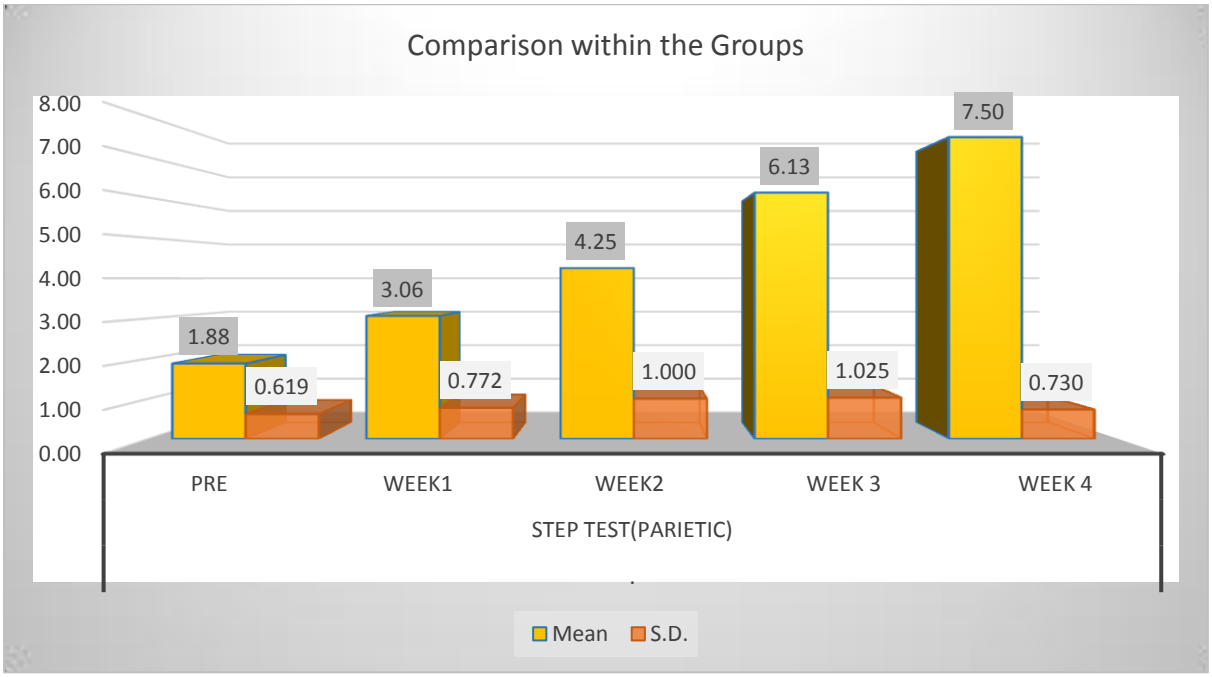

Figure 1 comparison of step test with pre-test and post-test and within the weeks.

Table 3. Repeated ANOVA and Turkey's method for pair wise comparison of step test for non paretic extremity

Repeated ANOVA	STEP TEST(NON PARIETIC)				
	PRE	WEEK1	WEEK2	WEEK 3	WEEK 4
Mean	2.50	3.81	5.25	6.88	8.75
S.D.	0.816	0.834	0.856	1.088	0.683
Median	2	4	5	7	9
Number	16	16	16	16	16
Maximum	4	5	7	8	10
Minimum	1	2	4	5	8
DF1	4				
DF2	60				
F Test	315.81				
P value	2.525				

Table Value	<0.001				
Result	Significant				
Tukey's method for Pairwise comparison		PRE			
Mean Difference & Result>	WEEK1	1.31Sig	WEEK1		
	WEEK2	2.75Sig	1.44Sig	WEEK2	
Unpaired	STEP TEST				
	WEEK 3	4.38Sig	3.06Sig	1.63Sig	WEEK 3
	WEEK 4	6.25Sig	4.94Sig	3.5Sig	1.88Sig

There was statistically significant difference in step test (non paretic extremity)on performing the home based task oriented training for 4 weeks pre-test and post-test, F value = 315.81, p value = 2.525. Additionally in all the weeks also it showed the improvement.

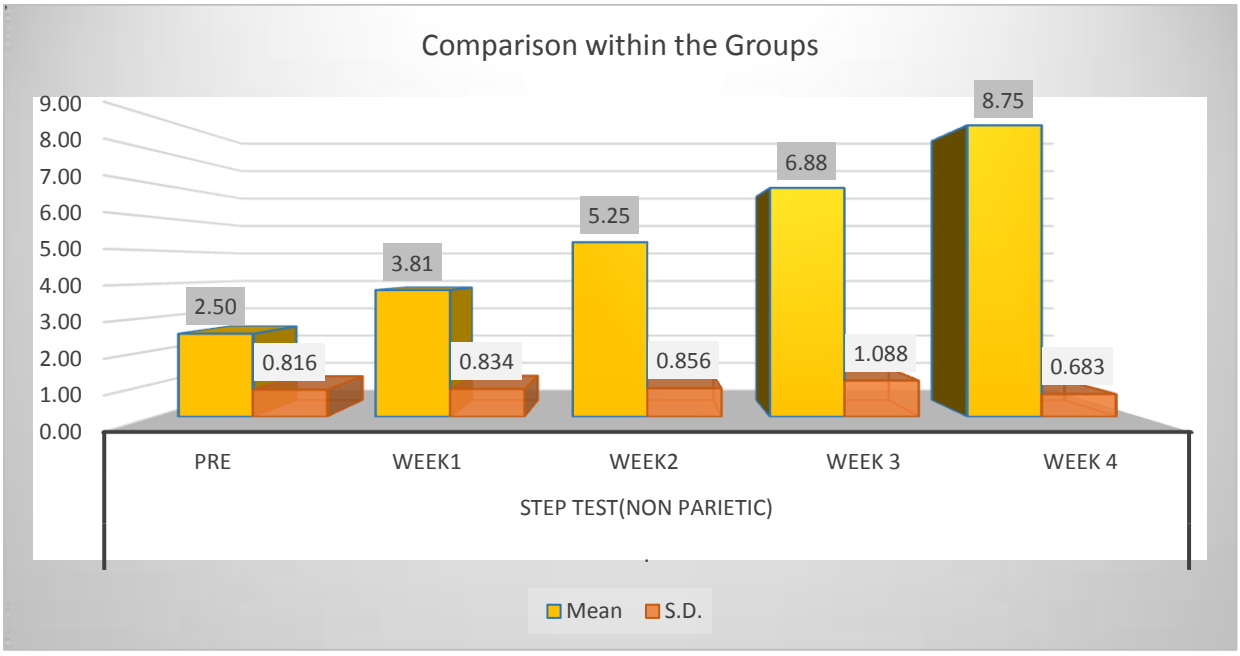

Figure 2 comparison of step test for non paretic extremity pre-test and post-test and within the weeks.

	PRE		WEEK1		WEEK2		WEEK 3		WEEK 4	
	PARIETIC	NON PARIETIC	PARIETIC	NON PARIETIC	PARIETIC	NON PARIETIC	PARIETIC	NON PARIETIC	PARIETIC	NON PARIETIC
Mean	1.88	2.50	3.06	3.81	4.25	5.25	6.13	6.88	7.50	8.75
S.D.	0.619	0.816	0.772	0.834	1.000	0.856	1.025	1.088	0.730	0.683
Mean Difference	-0.63		-0.75		-1.00		-0.75		-1.25	
Number	16	16	16	16	16	16	16	16	16	16
Maximum	3	4	4	5	6	7	8	8	9	10
Minimum	1	1	1	2	2	4	4	5	6	8
Range	2	3	3	3	4	3	4	3	3	2
Unpaired T Test	2.440		2.640		3.038		2.007		5.000	
P value	0.0208		0.0130		0.0049		0.0538		0.0000	
Table Value at 0.05	2.04		2.04		2.04		2.04		2.04	
Result	Significant		Significant		Significant		Not-Significant		Significant	

Table 4 Unpaired T test to compare the step test between paretic and non paretic extremity

An independent-samples t-test was conducted to compare paretic and non paretic extremity in step test. There was a significant difference in the scores for paretic and non paretic extremity in all the weeks except week 3 there was no significant difference between paretic and non paretic extremity in week 3.

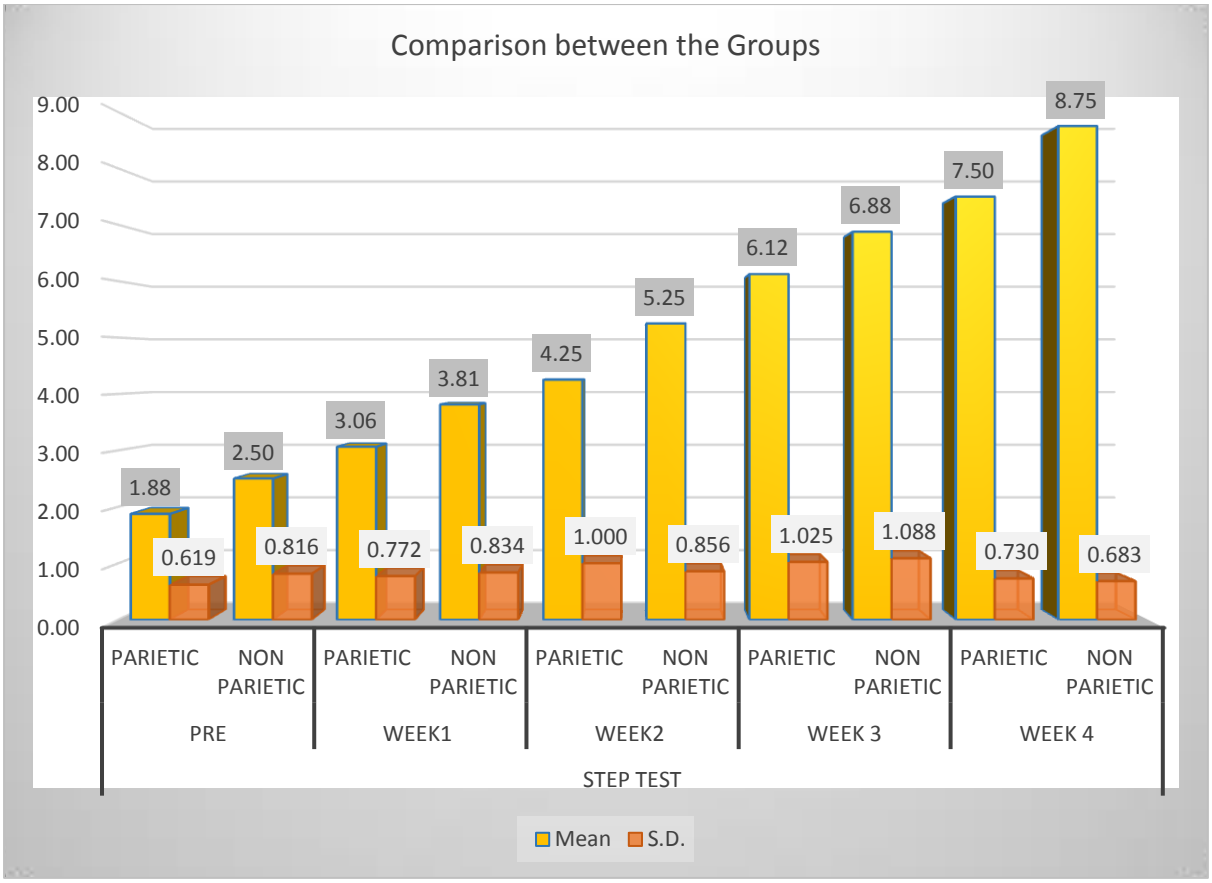

Figure 3 Comparison between paretic and non paretic extremity on performing step test within the week.

Table 5 Repeated ANOVA and Turkey's method for pair wise comparison of 10 meter walk test (in seconds)

Repeated ANOVA	10 METER WALK TEST				
	PRE	WEEK1	WEEK2	WEEK 3	WEEK 4
Mean	37.63	32.56	27.25	20.88	15.00
S.D.	3.828	4.016	3.606	2.473	2.280
Median	38.5	33	27	21	14.5
Number	16	16	16	16	16
Maximum	44	40	34	25	19
Minimum	32	26	22	17	12
DF1	4				
DF2	60				
F Test	450.78				
P value	2.525				
Table Value	<0.001				
Result	Significant				
Tukey's method for Pairwise comparison Mean Difference & Result>	PRE				
WEEK1	5.06Sig	WEEK1			
WEEK2	10.38Sig	5.31Sig	WEEK2		
WEEK 3	16.75Sig	11.69Sig	6.38Sig	WEEK 3	
WEEK 4	22.63Sig	17.56Sig	12.25Sig	5.88NSig	

There was statistically significant difference in 10 meter walk test (in seconds) on performing the home based task oriented training for 4 weeks pre-test and post-test, F value = 450.78, p value = 2.525. Additionally in all the weeks also it showed the improvement.

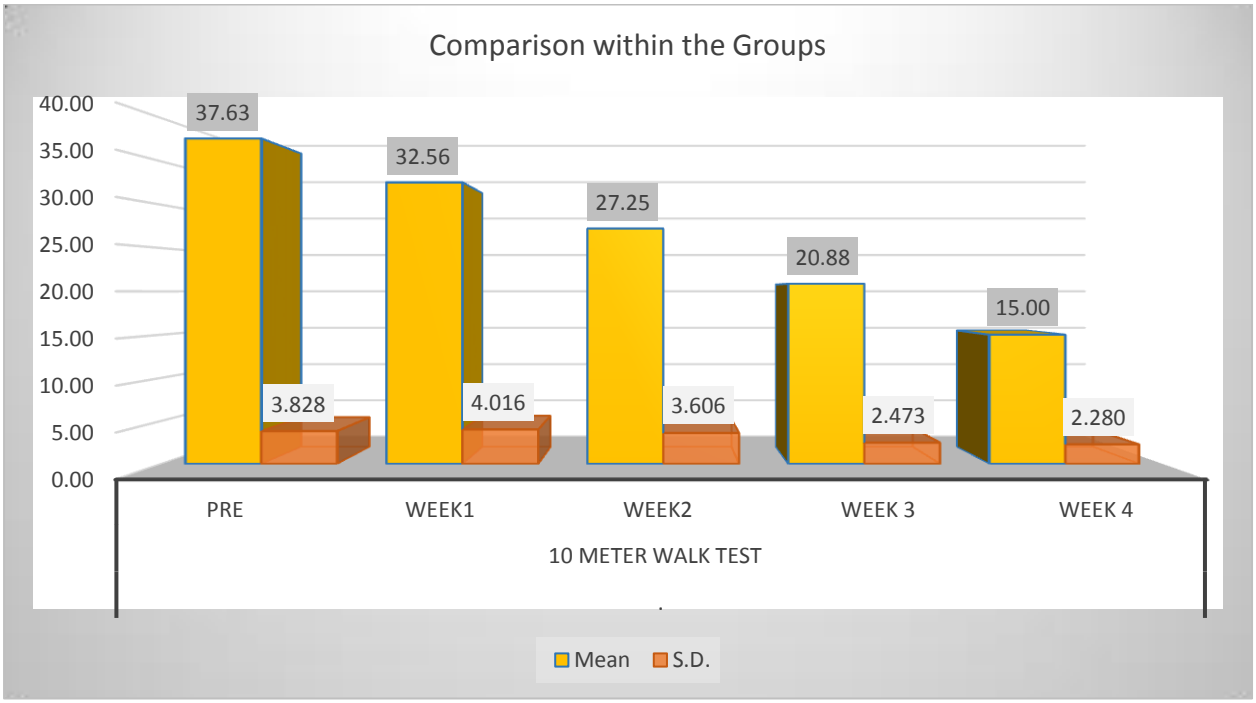

Figure 4 comparison between pre-test and post-test and within the weeks for 10 meter walk test

Table 6 Repeated ANOVA and Turkey's method for pair wise comparison of 5 times sit to stand test

Repeated ANOVA	5 TIMES SIT TO STAND TEST				
	PRE	WEEK1	WEEK2	WEEK 3	WEEK 4
Mean	38.56	34.25	28.94	24.56	19.44
S.D.	3.723	3.606	4.328	4.980	2.828
Median	38	34	28	22.5	19
Number	16	16	16	16	16
Maximum	46	42	38	36	28
Minimum	33	30	24	18	16
DF1	4				
DF2	60				
F Test	152.53				
P value	2.525				
Table Value	<0.001				
Result	Significant				
Tukey's method for Pairwise comparison					

Mean Difference & Result>

	PRE	WEEK1	WEEK2	WEEK 3
WEEK1	4.31Sig			
WEEK2	9.63Sig	5.31Sig		
WEEK 3	14Sig	9.69Sig	4.38Sig	
WEEK 4	19.13Sig	14.81Sig	9.5NSig	5.13Sig

There was statistically significant difference in 5 times sit to stand test (in seconds) on performing the home based task oriented training for 4 weeks pre-test and post-test, F value = 152.53, p value = 2.525. Additionally in all the weeks also it showed the improvement.

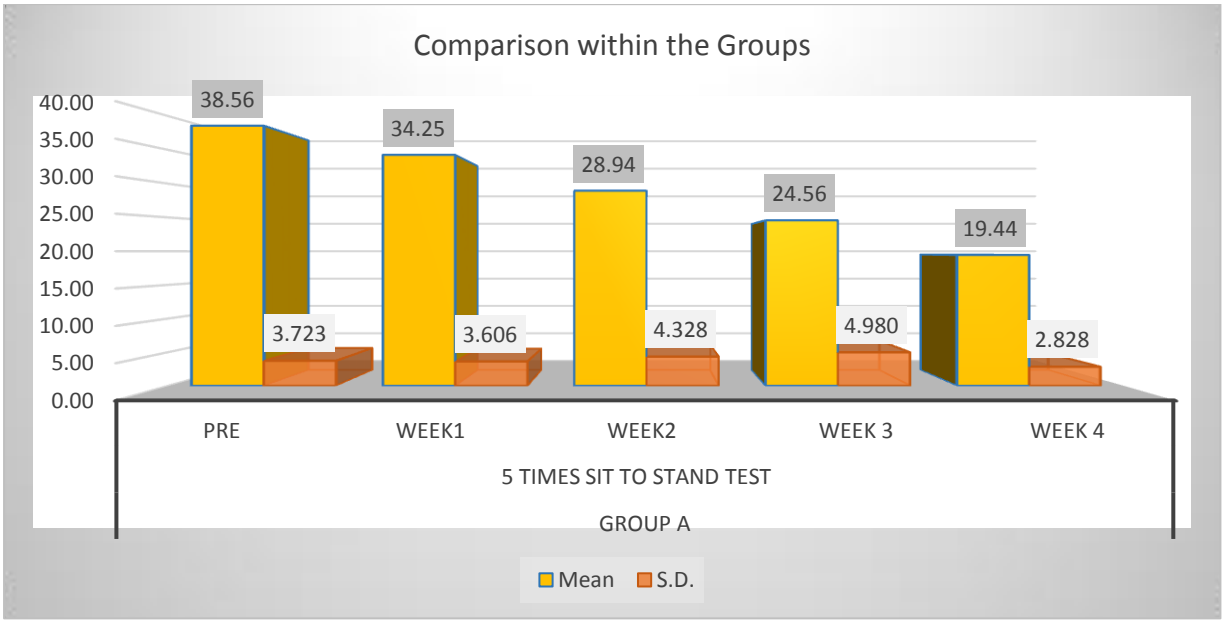

Figure 5 Comparison of 5 times sit to stand test, between pre-test and post-test and within the weeks

RESULT

PARTICIPANTS

Table no. 1 determines the demographic distribution of subjects that were included. In this study total number of 16 subjects with chronic stroke who met the inclusion criteria participated. Out of 16 subjects there were 10 males and 6 females, the ratio male vs female was 5:3. The mean age for males was 54.5 years and females were 58.8 years. There were 9 haemorrhagic stroke subjects out of which 6 subjects were affected with left hemiparesis and 3 subjects were affected with right hemiparesis. There were 7 ischemic stroke subjects out of which 4 subjects were affected with left hemiparesis and 3 subjects were affected with right hemiparesis.

Step test (Paretic side)

The result of step test are shown in table no. 2, by the use of repeated ANOVA test the difference between pre and post readings and difference within the weeks of the step test were calculated. For the paretic side lower limb within the week the mean value and standard deviation of pre test is 1.88 $\pm$ 0.619, week 1 is 3.06 $\pm$ 0.772, week 2 is 4.24 $\pm$ 1.000, week 3 is 6.13 $\pm$ 1.025 and week 4 is 7.50 $\pm$ 0.730 with F value 186.58 and p value 2.525. Pre-test and post-test showed a significant improvement as the difference between their mean values was 5.63 which showed improved stepping activity. It showed a significant difference within the weeks, in pre test and week 1 the difference is 1.18, in week 1 and week 2 the difference is 1.19, in week 2 and week 3 the difference is 1.88, and in week 3 and week 4 the difference is 1.38 which shows improvement of stepping activity in all the weeks.

Step test (Non paretic side)

The results of step test non paretic extremity are shown in table no. 3, by the use of repeated ANOVA test the difference between pre-test and post-test readings and difference within the weeks of the step test were calculated. For the paretic side lower limb Within the week the mean value and standard deviation of pre test is 12.50 $\pm$ 0.816, week 1 is 3.81 $\pm$ 0.834, week 2 is 5.25 $\pm$ 0.856, week 3 is 6.88 $\pm$ 1.088 and week 4 is 8.75 $\pm$ 0.683 with the F value = 315.81 and p value = 2.525. Pre-test and post- test readings was compared where the difference between there mean values was 6.25 which shows a significant improvement in the non paretic lower limb of chronic stroke patients. Additionally it showed a significant difference within the weeks, in pre test and week 1 the difference is 1.31, in week 1 and week

2 the difference is 1.44, in week 2 and week 3 the difference is 1.63, and in week 3 and week 4 the difference is 1.88 which shows improvement of stepping activity in all the weeks

Comparison of paretic and non paretic lower limb in step test (table no.4)

By using unpaired T test a comparison between both the limbs paretic and non paretic was done. The mean and standard deviation of paretic (P) and non paretic (NP) lower limb for step test are; for pre test are P = 1.88 ± 0.619 and NP = 2.50 ± 0.816, for week 1are P = 3.06 ± 0.0772 and NP = 3.81 ± 0.834, for week 3 are P = 6.13 ± 1.025 and NP = 6.88 ± 1.088 and for week 4 are P = 7.50 ± 0.730 and NP = 8.75 ± 0.683. When compared paretic and non paretic lower limb in pre test, week 1, week 2 and week 3 showed improvement in the non paretic side than paretic but week 3 there was no significant difference in paretic and non paretic lower limb.

10 Meter Walk Test

The results of 10 meter walk test are shown in table no. 5, by the use of repeated ANOVA test the difference between the pre-test and post-test and difference between within the weeks were calculated for 10 meter walk test (in seconds). The mean and standard deviation for pre test is 37.63 ± 3.828, week 1 is 32.56 ± 4.016, week 2 is 27.25 ± 3.606, week 3 is 20.88 ± 2.473 and week 4 (post test) is 15.00 ± 2.280 with F value = 450.78 and P value = 2.525. Comparison of pre-test and post-test shows a significant improvement. The difference between pre and post is 22.63 which is a marked improvement in 10 meter walk test in chronic stroke subjects. It also indicated a significant difference in weeks the difference between pre test and week 1 is 5.06, week 1 and week 2 is 5.31, week 2 and week 3 is 6.38, and week 3 and week 4 is 5.88 thus shows significant improvement throughout the week.

5 times sit to stand test (table no. 6)

The results of 5 times sit to stand are shown in table no. 6, by the use repeated ANOVA test the difference between the pre-test and post-test and between within the weeks was calculated for 5 times sit to stand (in seconds). The mean and standard deviation for pre test is 38.56 ± 3.723, week 1 is 34.25 ± 3.606, week 2 is 28.94 ± 4.328, week 3 is 24.56 ± 4.980 and week 4 (post test) is 19.44 ± 2.828 with F value = 152.53 and P value = 2.525. Comparison of pre test and post test shows a significant improvement. The difference between pre and post is 19.13 which is a marked improvement in 5 times sit to stand test in chronic stroke subjects. It also indicated a significant difference within the weeks the

difference between pre test and week 1 is 4.31, week 1 and week 2 is 5.31, week 2 and week 3 is 4.38, and week 3 and week 4 is 5.13 thus shows significant improvement throughout the week.

Result shows improvement in all outcome measure – step test the no. of steps taken by the subject in 15 seconds increased from the pre test to post test, the time taken in 10 meter walk test to complete the task decreased from pre test to post test and in 5 times sit to stand test the time taken to complete the task also reduced from pre test to post test.

Additional in all the weeks also subjects showed improvement in all the outcome measures and in comparison of paretic and non paretic in the step test, non paretic showed improvement in all the weeks excluding week 3.

CHAPTER 5

DISCUSSION AND CONCLUTION

Discussion

This is a pre and post test quasi experimental study to examine the effectiveness of home based task oriented training on the lower extremity in chronic stroke patients. We found that task oriented training improves the lower extremity function when given as home exercises with the supervision on alternative days. More importantly it improves the lower extremity strength and functional performance. Lower extremity strength gain is associated with gain in functional test like step test, 10 meter walk test and 5 times sit to stand test.

Home based exercises are important for the patients who had suffered stroke and are in the chronic stage of stroke, as the patients experience physical deconditioning and leads to sedentary lifestyle which results in decreased quality of life, physical functioning, depression and difficulty in ADL's most of the patients have left the rehabilitation program and they are dependent on the others[32]. Task oriented training is the training which can be learned by patients easily and is associated with activities of daily living. It has been found that strengthening of the muscles can be accomplished by the task oriented training, more importantly task oriented training can improve the lower extremity strength and its functional program[28].

In this study home based task oriented training was given for 2 sessions for every day and 6 times a week where after 6 days 1 day was given as a relaxation day to all the patients. All the patients successfully completed the study. In the exercise program patient were given functional activities like sit to stand, standing with narrow base of support, standing with wide base of support, tandom standing, and reaching activities in standing and walking and adding different surfaces to it and kicking the ball. Basically repetition of these task resulted in improved muscle strength and transfer of the task to the real life. Previous studies also show improvement in muscle strength and transfer of task but no study is done to see the effect of task oriented training for lower limb when they are done on the basis of self home exercises which were supervised on alternative days and were assessed after each week to note the improvement in the functional activity of subjects with chronic stroke. A date and time chart was given to all the patients to mark the day and time at which they have done exercise and that is kept as a record and a feedback to the patient that he has done exercise and all the patient marked the chart and recorded the time and date of exercises.

The functional activity tests were performed to evaluate the task oriented training. Step test was done to evaluate the stepping activity and the lower limb strength. With the help of data analysis the difference between the pre test and post test showed marked improvement with significant difference of the mean values is 5.63 for the paretic side and 6.25 for non paretic side. There was

also improvement within the weeks and when both sides of lower extremity, paretic and non paretic were compared non paretic showed more improvement then the paretic side only in week 3 it was not significant result. The 10 meter walk test also showed marked improvement as the time taken to complete the task decreases from the pre to post test thus there is significant difference of mean values is 22.63 between the pre and post test. There was improvement within the weeks with the 10 meter walk test and then 5 times sit to stand test was performed which also showed significant improvement in pre and the post test as the time taken to perform the task reduced with the difference of mean values is 19.13 in between the pre and post test with improvement within the weeks.

The improvement in these outcome measures shows the improvement in the lower extremity function. Improvement of the step test indicates improved lower extremity muscle strength, coordination, walking speed and balance. The time reduction taken to cover the given distance shows improvement in the 10 meter walk test which indicates better ambulation ability which results to higher level of quality of life as the patient can walk with increased speed and can perform is activities of daily living easily like transportation, toileting, bathing, taking small things at home like a glass of water. Improvement of 5 times sit to stand test shows improved sit to stand activity of the patient as it is part of daily living activities, lower limb strength, and balance with weight shifting to the paretic limb while standing up and sitting down.

Thus this study shows improved lower extremity function when compared to the pre and post test readings of the task oriented training as self home exercises in subjects with chronic stroke.

Limitations –

1. The study encountered some of the limitations as there should have been video graphy for the step test to count the number of steps,
2. The evaluation of lower limb muscle strength should have been done with the use of handheld dynamometer and,
3. Computerized gait analysis could have been used in the study.

Future scope – The population of stroke patients is increasing day by day we need to conduct more researches in the field of self exercises as the patients are dependent on their loved ones and go through increased level of depression. Due to which their independence of doing their daily activities is restricted which can be overcome by formulating the self exercise programs. This study is the one group pre test and post test – quasi experimental study in future we can perform a randomized control trail in acute, sub acute, and chronic stroke subjects. In future researches there

should be addition of self efficacy questionnaire with depression evaluation which will help in evaluation of that how much do patients perform the exercises by themselves and the if there is any improvement in the level of depression. There can also be addition of tele-cominication with rehabilitation as the therapist will supervise the patient through tele-communication or use of video calling can be included.

Conclusion – most of the chronic stroke patients usually stop there rehabilitation program due to travelling or there is no one to bring them to rehabilitation centre due which they are unable to perform the exercises by their own which results in reduced muscle strength which leads to reduced activities of daily living and increased dependence. To improve the strength and function of lower extremity in chronic stroke patients home based task oriented training is given.Thus this study concluded that home based task oriented training improves the lower extremity function which improved the functional activity of stroke subjects which makes them more independent and the level of depression also decreases.

CHAPTER 5 –

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Chapter no.6

APPENDEX

INFORMED CONSENT

PERSONAL DETAILS:

Name:

Address:

Phone No:

Email Address:

Date of Birth:

Occupation:

Please carefully read and sign this form.

1. I understand that it is important that I give the most accurate health history and information to my physiotherapist so that any planned treatments and therapies are in by best interest.
2. I understand that my physiotherapist will discuss any assessment and treatment plans with me before they are administered.
3. I understand that information given by me will be kept confidential and private during the study.
4. I understand the importance and method of assessment and treatment used in the study as discussed with my physiotherapist.
5. I understand the risk of physiotherapy treatment can include but it is not limited to an exacerbation of symptoms, strains, sprains allergic reactions, electrical shocks and burns
6. I understand the consequences of not receiving treatment can include but is not limited to a continued exacerbation of symptoms or no improvement of symptoms.
7. I understand that I can discuss my interest or disinterest in the treatments with my physiotherapist.
8. I have read and understand the contents of this form. I hear by grant permission to my physiotherapist to perform the assessment and treatments that may that may be necessary to treat my condition or injury.
9. I understand that my physiotherapist will also provide further details regarding the benefits, risks,

consequences, and availability of alternative and adjunctive therapies specific to my symptoms during the course of the assessment and treatment.

10. I also understand that I can withdraw consent to any component of the assessment or treatment at any time.

DATE: _____ PATIENT SIGNATURE:

Patient form:

NAME:

AGE:

GENDER:

ADDRESS:

OCCUPAPATION:

PHONE NO:

HANDEDNESS:

CHIEF COMPLAINTS:

HISTORY OF PRESENT ILLNESS:

PAST MEDICAL HISTORY:

PERSONAL HISTORY:

OCCUPATIONAL HISTORY:

FAMILY HISTORY:

SOCIOECNOMIC HISTORY:

PAIN HISTORY

SIDE:

SITE:

ONSET:

DURATION:

TYPE:

AGGERAVATING FACTORS:

RELIEVING FACTORS:

SEVERITY OF PAIN: VAS/NPRS

VITAL SIGNS

TEMPERATURE

BLOOD PRESSURE

HEART RATE

RESPIRATORY RATE

OBJECTIVE EXAMINATION

BUILT

POSTURE

ATTITUDE OF LIMBS

MUSCLE WASTING

PATTEREN OF MOVEMENT

PRESSURE SORE

OEDEMA

TROPICAL CHANGES

DEFORMITY

GAIT

WOUNDS

INVOLUNTARY MOVEMENTS

MODE OF VENTILATION

TYPE OF REPIRATION

PATTERN OF RESPIRATION

EXTERNAL APPLIANCES

ON PALPATION

WARMTH

TENDERNESS

TONE

OEDEMA

ON EXAMINATION

(1) HIGHER FUNCTIONS

HIGHER MENTAL FUNCTIONS

1) LEVEL OF CONCIOUSNESS
2) ORIENTATION
3) MEMORY
4) ATTENTION
5) COMMUNICATION AND SPEECH

HIGHER CORTICAL FUNCTIONS

1) COGNITION
2) PERCEPTION

(2) CRANIAL NERVES

(3) SENSORY SYSTEM

LOCATION	UPPER EXTREMITY		LOWER EXTREMITY		TRUNK	COMMENTS
SENSATION	RT	LT	RT	LT		
SUPERFICIAL						
PAIN						
TEMPERATURE						
LIGHT TOUCH						
PRESSURE						
DEEP						
MOVEMENT SENSE						
POSITION SENSE						
CORTICAL						
TACTILE LOCALISATIOM						
TWO POINT DISCRIMINATION						
STEREOGNOSIS						
BAROGNOSIS						
GRAPHISTHESIA						
RECOGNITION OF TEXTURE						
DOUBLE SIMULTANEOUS STIMULATION						

(4) MUSCLE TONE

GRADING OF MUSCLE TONE

1. COMMON CLINICAL RATING SCALE (CCSR)

GRADE	DESCRIPSION
0	No Response(flaccidity)
1+	Decreased Response
2+	Normal Response
3+	Exaggerated Response (mild to moderate hypertonia)
4+	Sustained Response (severe hypertonia)

2. MODIFIED ASHWORTH SCALE (MAS)

GRADE	DESCRIPTION
0	No increase in muscle tone
1	Slight increase in muscle muscle tone manifested by a catch and release or by minimal resistance at the end of ROM when the affected part is moved in flex or extention
1+	Slight increase in muscle tone manifested by catch followed by minimalresist throughout the remainder (less than half) of the ROM
2	More marked increase in muscle tone through most ROM, but affected part is easily moved
3	Considerable increase in muscle tone, passive movement is difficult
4	Affected part is rigid

DOCUMENTATION OF MUSCLE TONE

PART	MUSCLES	RIGHT	LEFT	PART	MUSCLES	RIGHT	LEFT
SHOULDER	FLEXORS			HIP	FLEXORS		
	EXTENSORS				EXTENSORS		
	ABDUTORS				ABDUTORS		
	INTERNAL ROTATORS				INTERNAL ROTATORS		
	EXTERNAL ROTATORS				EXTERNAL ROTATORS		
ELBOW	FLEXORS			KNEE	FLEXORS		
	EXTENSORS				EXTENSORS		
FOREARM	PRONATOR			ANKLE	DORSIFLEXOR		
	SUPINATOR				PLANTARFLEXOR		
WRIST	FLEXOR						
	EXTENSOR						

(5) MUSCLE POWER GRADING

GRADE	DANIELS AND WORTHINGHAM SCALE
5	Full available ROM against gravity, strong manual resistance
5-	Full available ROM against gravity, nearly strong manual resistance
4	Full available ROM against the gravity, moderate manual resistance
4-	Full available ROM against the gravity, nearly moderate manual resistance
3+	Full available ROM against the gravity, slight moderate manual resistance
3	Full available ROM against the gravity, no resistance
3-	At least 50% ROM against the gravity, no resistance
2+	Full available ROM, gravity minimized, slight manual resistance
2	Full available ROM, gravity minimized, no resistance
2-	At least 50% ROM, gravity eliminated, no resistance
1+	Minimal observable motion (less than 50 % of ROM) gravity minimized, No resistance
1	No observable motion, palpable muscle contraction, no response
0	No observable or palpable muscle contraction

Documentation of muscle power

PART	MUSCLES	RIGHT	LEFT	PART	MUSCLES	RIGHT	LEFT
SHOULDER	FLEXORS			HIP	FLEXORS		
	EXTENSORS				EXTENSORS		
	ABDUTORS				ABDUTORS		
	INTERNAL ROTATORS				INTERNAL ROTATORS		
	EXTERNAL ROTATORS				EXTERNAL ROTATORS		
ELBOW	FLEXORS			KNEE	FLEXORS		
	EXTENSORS				EXTENSORS		
FOREARM	PRONATOR			ANKLE	DORSIFLEXOR		
	SUPINATOR				PLANTARFLEXOR		
WRIST	FLEXOR						
	EXTENSOR						

(6) MUSCLE GIRTH

AREA	RIGHT	LEFT
ARM		
FOREARM		
THIGH		
CALF		

ARM – 10 cm above olecranon

FOREARM – 10 cm below olecranon

THIGH – 18 cm above patella

CALF – 10 cm below tibial tuberosity

(7) RANGE OF MOTION

JOINT	MUSCLES	RIGHT	LEFT	JOINT	MUSCLES	RIGHT	LEFT
SHOULDER	FLEXORS			HIP	FLEXORS		
	EXTENSORS				EXTENSORS		
	ABDUTORS				ABDUTORS		
	INTERNAL ROTATORS				INTERNAL ROTATORS		
	EXTERNAL ROTATORS				EXTERNAL ROTATORS		
ELBOW	FLEXORS			KNEE	FLEXORS		
	EXTENSORS				EXTENSORS		
FOREARM	PRONATOR			ANKLE	DORSIFLEXOR		
	SUPINATOR				PLANTARFLEXOR		
WRIST	FLEXOR						
	EXTENSOR						

(8) REFLEXES

DEEP (JERKS)	RIGHT	LEFT	WEXLER GRADING	
BICEPS			GRADE	DESCRIPTION
BRACHIORADIALIS			0	ABSENT
TRICEPS			1+	HYPOREFLEXIA
KNEE			2+	NORMAL
ANKLE			3+	HYPERREFLEXIA
SUFERFICIAL			4+	ABNORMAL
ABDOMINAL			5+	ABNORMAL
PLANTAR				

(9) COORDINATION TEST

NON EQUILIBRIUM TEST	RIGHT	LEFT	COMMENTS
UPPER LIMB			
FINGER TO NOSE			
FINGER TO FINGER			
PRONATION AND SUPINATION OF ELBOW			
LOWER LIMB			
HEEL ON SHIN			
TOE TO EXAMINER FINGER			
TAPPING FOOT			
EQUILIBRIUM TEST	RIGHT	LEFT	COMMENTS
STATIC			
STANDING WITH NORROW BASE OF SUPPORT			
TANDOM STANDING			
STANDING LATERAL TRUNK FLEXION			
DYNAMIC			
WALKING SIDEWAYS			
MARCH IN PLACE			
WALKING BACKWARDS			

GRADING OF EQUILIBRIUM AND NON EQUILIBRIUM TEST	
GRADE	DESCRIPTION
5	NORMAL PERFORMANCE
4	MILD IMPAIRMENTN
3	MODERATE IMPAIRMENT
2	SEVERE IMPAIREMENT
1	ACTIVITY IMPOSSIBLE

(10) BALANCE

BALANCE GRADING (FUNCTION BALANCE SCALE)

GRADE	DESCRIPTION	Remarks
NORMAL	STATIC – patient is able to maintain steady balance without support	
	DYNAMIC – accepts maximal challenge and can shift weight in all directions	
GOOD	STATIC - patient is able to maintain balance without support	
	DYNAMIC – accepts moderate challenge ; able to maintain balance while picking objects from floor	
FAIR	STATIC - patient is able to maintain balance with handhold	
	DYNAMIC – accepts minimal challenge, able to maintain balance	

(11)GAIT

STEP LENGTH:

STRIDE LENGTH:

CADENCE:

BIOMECHANICAL DEVIATION:

ANKLE:

KNEE:

HIP:

PELVIS:

TRUNK:

(12) DIAGNOSIS

ANATOMICAL DIAGNOSIS:

ETIOLOGICAL DIAGNOSIS:

PATHOLOGICAL DIAGNOSIS:

FUNCTIONAL DIAGNOSIS:

OUTCOME MEASURES

Step Test

Instrument - Stepper of 7.5cm height and stop watch

Procedure – the patient is asked to step up and step down the stepper as fast as possible in 15 seconds and the number of steps completed is recorded by counting manually. The test was done for both limbs paretic and non paretic and it was performed after every week to evaluate the lower extremity function.

10 Meter Walk Test

Instrument – inch tape and stop watch

Procedure – 10 meter walkway is marked with the help of inch tape and in this walkway a point at 2 meters and 8 meters is marked. Patient is asked to walk as fast as he can and we start measuring the time taken at the 2 meter point and will stop the stop watch at 8 meter point. 3 trails are done and a mean value is taken.

5 times sit to stand test

Instrument- chair and stop watch

Procedure- a chair is placed in the room and then patient is asked to sit and stand from chair for 5 times as fast as possible and we will note the time taken to perform this task.

MASTER CHART

Sr. No.	Code	Group	GENDER	AGE	TYPE OF STROKE	POST STROKE	SIDE OF PARESIS
1	A1	1	M	52	H	7	L
2	A2	1	F	65	H	8	L
3	A3	1	M	45	H	6	L
4	A4	1	F	65	I	9	L
5	A5	1	M	58	I	10	L
6	A6	1	M	54	H	11	R
7	A7	1	M	62	I	7	L
8	A8	1	F	53	H	8	R
9	A9	1	M	53	H	9	L
10	A10	1	M	65	I	8	R
11	A11	1	M	49	H	14	L
12	A12	1	F	59	H	16	L
13	A13	1	M	54	I	8	R
14	A14	1	F	55	I	9	L
15	A15	1	M	53	I	10	R
16	A16	1	F	65	H	13	L
Mean A						9.563	

STEP TEST(PARIETIC)					STEP TEST(NON PARIETIC)				
PRE	WEEK1	WEEK2	WEEK 3	WEEK 4	PRE	WEEK1	WEEK2	WEEK3	WEEK4
2	3	3	5	7	2	4	6	6	8
2	3	4	6	8	2	4	5	7	9
3	3	4	6	7	3	3	4	5	8
1	3	4	7	8	2	4	5	6	9
2	3	5	6	8	2	3	5	8	9
1	1	2	4	6	1	2	4	5	8
2	3	5	5	7	2	4	5	7	10
3	4	6	7	8	4	5	7	8	10
2	3	5	7	7	4	5	6	8	9
2	4	4	5	7	2	3	4	6	8
2	4	5	6	8	2	4	5	7	9
1	2	4	8	9	3	4	6	8	9
2	3	3	6	8	2	3	5	7	8
1	3	5	7	7	3	4	6	8	9
2	3	4	6	7	3	5	6	8	8
2	4	5	7	8	3	4	5	6	9
1.875	3.0625	4.25	6.125	7.5	2.5	3.8125	5.25	6.875	8.75

10 METER WALK TEST					5 TIMES SIT TO STAND TEST				
PRE	WEEK1	WEEK2	WEEK3	WEEK4	PRE	WEEK1	WEEK2	WEEK3	WEEK4
38	32	27	22	14	34	30	28	25	19
33	28	26	20	13	39	34	27	22	21
36	32	29	22	16	36	30	25	21	19
39	31	24	19	15	38	34	30	28	22
44	40	32	25	19	40	32	28	22	18
40	37	34	23	15	44	40	38	36	28
39	34	24	19	13	38	31	24	21	19
33	29	26	17	14	37	34	32	29	17
32	26	22	18	13	46	42	38	34	20
41	36	30	25	19	34	30	28	24	21
37	34	29	22	15	38	35	26	20	17
43	35	27	20	16	44	38	25	23	18
41	37	32	22	19	41	36	27	22	16
39	34	28	23	14	37	36	33	26	20
32	27	22	18	13	38	35	29	22	19
35	29	24	19	12	33	31	25	18	17
37.625	32.5625	27.25	20.875	15	38.5625	34.25	28.9375	24.5625	19.4375