

**A COMPARATIVE STUDY ON THE EFFECTIVENESS OF  
CONVENTIONAL PHYSIOTHERAPY VERSUS  
CONVENTIONAL PHYSIOTHERAPY ALONG WITH VIDEO  
GAME ADDED MOVEMENT PRACTICE TO IMPROVE HAND  
FUNCTION AMONG SUBACUTE STROKE SUBJECTS**

**A Dissertation Submitted to**

**THE TAMILNADU Dr. M.G.R. MEDICAL  
UNIVERSITYCHENNAI**

**In partial fulfilment of the requirementsfor the award of the  
MASTER OF PHYSIOTHERAPY**

**Degree Programme**

**Submitted by**

**Reg.No:271420202**



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The Dissertation entitled

**A COMPARATIVE STUDY ON THE EFFECTIVENESS OF  
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PRACTICE TO IMPROVE HAND FUNCTION AMONG SUBACUTE  
STROKE SUBJECTS.**

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**Prof.Dr.PRADEEPA M.P.T (Neurology),**

**MIAP.,Ph.D**

A Dissertation submitted to

**THE TAMILNADU Dr.M.G.R. MEDICAL UNIVERSITY**

**CHENNAI**

**Dissertation Evaluated on** \_\_\_\_\_

**Internal Examiner**

**External Examiner**

## **CERTIFICATE I**

This is to certify that the dissertation entitled “**A COMPARATIVE STUDY ON THE EFFECTIVENESS OF CONVENTIONAL PHYSIOTHERAPY VERSUS CONVENTIONAL PHYSIOTHERAPY ALONG WITH VIDEO GAME ADDED MOVEMENT PRACTICE TO IMPROVE HAND FUNCTION AMONG SUBACUTE STROKE SUBJECTS**” is a bonafide compiled work, carried out by **Register No: 271420202**, PPG College of Physiotherapy, Coimbatore-641035 in partial fulfilment for the award of degree in Master of Physiotherapy as per the doctrines of requirements for the degree from **THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI-32**. This work was guided and supervised by **Prof.DrPRADEEPA M.P.T(Neurology).,MIAP.,Ph.d**

**DATE:**

**PRINCIPAL**

**PLACE:**

## **CERTIFICATE II**

This is to certify that the dissertation entitled “**A COMPARATIVE STUDY ON THE EFFECTIVENESS OF CONVENTIONAL PHYSIOTHERAPY VERSUS CONVENTIONAL PHYSIOTHERAPY ALONG WITH VIDEO GAME ADDED MOVEMENT PRACTICE TO IMPROVE HAND FUNCTION AMONG SUBACUTE STROKE SUBJECTS**” is a bonafide compiled work, carried out by **Register No: 271420202**, PPG College of Physiotherapy, Coimbatore-641035 in partial fulfilment for the award of degree in Master of Physiotherapy as per the doctrines of requirements for the degree from **THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI-32** under my guidance and supervision.

**Prof.Dr.PRADEEPA**

**M.P.T (Neurology), MIAP.Ph.D.,**

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# **A COMPARATIVE STUDY ON EFFECTIVENESS OF CONVENTIONAL PHYSIOTHERAPY VERSUS CONVENTIONAL PHYSIOTHERAPY ALONG WITH VIDEO GAME ADDED MOVEMENT PRACTICE TO IMPROVE HAND FUNCTION AMONG SUBACUTE STROKE SUBJECTS**

## **ABSTRACT**

### **Introduction:-**

Recent neurorehabilitation concepts have emphasized environment . Newly developed activity-based intervention including video game therapy and conventional therapy provide evidence for the improvement of hand functioning.

### **Objective:-**

To Compare the effectiveness of video game therapy and conventional therapy on improving upper extremity hand functions for stroke Subjects.

### **Methodology:-**

15 Stroke Subjects were treated conventional therapy and 15 Subjects were treated with video game therapy added with conventional therapy, intervention last 4 weeks, Fulg meyer scale were used before & after intervention.

### **Results:-**

Results obtained from the outcome measure considered in this study suggest that both intervention were moderate effective on improve upper which hand function

## Conclusion:-

Video game added with conventional therapy provided as much benefit as the Experimental group. Thus subjects who, exposed to video game therapy recovered to the conventional therapy

## Key words:-

Subacute Stroke , conventional therapy, video game therapy.

# CHAPTER I

## 1.1 INTRODUCTION

Stroke is one of the commonest neurological emergencies. Stroke is the third most common cause of death in the developed world after cancer and ischemic heart disease and is responsible for a large proportion of physical disability becoming more frequent with increasing age. Stroke affects approximately 5,00,000 new victims each year with the estimated number of stroke survivors close to 3 million.

In India, there is some evidence that stroke is particularly common in young people. Every year more than 15 million worldwide have a stroke. 5 million Die, 5 million recover and 5 million are disable. Mostly stroke occurs at the age of 65 it can also occur in much younger people too.

Stroke is one of the important causes of severe disability in the society. The effects include paralysis of a limb or one side of the body and disturbances of speech and vision and including impairments of sensory, motor, mental, perceptual functions. It caused by embolism or fat deposition in artery which causes narrowing of lumen of the artery which result stroke, If stroke symptoms completely disappears less than 24 hours. This is called a mini stroke (Transient ischemic attack).

Transient ischemic attack is a warning sign that the patient is in a high risk of stroke. If patient feels swallowing difficulty, a dietitian is recommended. If patient has problem in speech, a language or speech therapy is recommended. If has difficulty to walk or perform daily task, PHYSIOTHERAPIST can teach the exercise and home adaptation techniques.

Video game is common for individuals to experience loss of movements and strength after a stroke .difficulties with movement and muscle weakness can impact on the patients ability to use his/ her arm and hand. Video game training can be a fun and motivating way to improve arm and hand strength and motor functions . the video games use visual images that responds to movements made by patient while he/she is playing the game these visual Images provide the patient with immediate feedback about his/her body movements .the patient can then adjust or adapt his/her movements in response to this visual feedback ‘this visual feedback has been shown to help with motor learning and motor recovery following stroke.

The patient rehabilitation team will identify some video game exercise that will help him/her with the difficulties caused by the stroke. The patient can practice these video game exercise hospital and can continue to practice at home after he/she has been discharged from hospital..

Video game training in this model refers to the use of commercially available video game entertainment system for the treatment of stroke .after a stroke the patient can use the gaming system in different ways during rehabilitation the video game system included hand –held devices and pressure sensitive footpads that respond to the patients motion in real time. Video games have found the way into the clinical care of youth in most medical fields, in academic interest in the use in increasing in study. The popularity of video games among youth may qualify them as a useful tool in physiotherapy for children and adolescence. Limited literature on video games and mental health care and improving hand functions suggest that they can help any subjects become more cooperative and enthusiastic about physiotherapy.

Recent experience suggest that videogames may facilitate therapeutic relationships , compliment the physiotherapy assessment of young people by evaluating cognitive skills, and elaborate and clarify conflicts during the therapy process. Concerns about video game content, perceive effects on young people, and lack of familiarity with this medium may form a barrier in their use in therapy offices.

Further research of the benefits of video game use in physiotherapy including subjects characteristics that may moderate outcomes is needed finally, future collaborations between clinicians and video game developers may produce specific to be used in physiotherapy. The recent evidence indicates that intensive massed practice may be accessory to modify neural organization and effect recovery of motor skills in subjects following stroke.

Video game technology has the capability of creating an interactive, motivating environment in which practice intensity and feedback can be manipulated to create individualized treatments of retrain movement. Case description who were in the subacute phase following stroke participated in a two week training programme including dexterity tasks on real objects and video game therapy. The video game stimulation were targeted for range of motion, movement speed fractunation, and force production. The function was most impaired at the beginning of the intervention but showed improvement in the thumb and fingers in range of motion and speed of movement.

The outcome suggest that videogame therapy may be useful to augment rehabilitation of the upper limb in subjects in the sub acute phase following stroke.

## **TOOLS NEEDED FOR VIDEO GAMES**

- monitors
- head phones
- Joysticks

## **CONVENTIONAL THERAPY.**

The focus of conventional therapy is to compain restraint of the unaffected limb and intensive use of the affected limb. Types of restraints include a sling or triangular bandge, a splint, a sling combined with a resting hand splint, a half glove, and a mitt. Determination of the type of restraint used for therapy depends on the required level of safety vs. intensity of therapy. Some restraints restrict the wearer from using their hand and wrist; though allow use of their non-involved upper extremity for protection by extension of their arm in case of loss of balance or falls.

However, restraints that allow some use of the non-involved extremity will result in less intensive practice because the non-involved arm can still be used in complete tasks. Conventional therapy typically consists of placing a mitt on the unaffected hand or a sling or splint on the unaffected arm, forcing the use of the affected limb with the goal of promoting purposeful movements when performing functional tasks. The use of the affected limb is called shaping. Typically, conventional therapy involves restraining the unaffected arm in subjects with hemiparetic stoke or hemiparetic cerebral palsy

## **1.2 AIM OF THE STUDY**

The study was aimed to find out the effectiveness of conventional therapy versus videogame added with conventional therapy in improving the upper extremities hand function after stroke.

### **1.3 NEED FOR THE STUDY**

- Study is done to prove the effectiveness of video game therapy and video game therapy with conventional therapy in improving on upper extremities motor recovery after stroke
- To prove that video game therapy and conventional therapy is more effective
- So the research works studying effectiveness of video game therapy and video game therapy with conventional therapy in improving on upper extremities motor recovery exercise are significant in the field of stroke rehabilitation

### **1.4 OBJECTIVES OF THE STUDY**

To evaluate the effectiveness of video game therapy on improving upper extremity function in stroke subjects.

To evaluate the effectiveness of video game therapy added with conventional therapy on improve the upper extremity hand function in stroke subjects.

To compare the effectiveness of video game therapy with conventional therapy on improving upper extremity hand function in stroke subjects

### **1.5 HYPOTHESIS;**

**NULL HYPOTHESIS;** There was no statistical significant improvement in upper extremity stroke subjects when treated with conventional therapy than video game added with conventional therapy.

**ALTERNATIVE HYPOTHESIS;** There was statistically significant improvement in upper extremity stroke subjects when treated with video conventional therapy than video game added with conventional therapy.

## **1.6 OPERATIONAL DEFINITION ;**

**STROKE;** Stroke is caused by interruption of the brain, usually because of blood vessel bursts or is blocked by a clot. This cut of the supplies of oxygen and nutrients causing damage to brain tissue.

(WORLD HEALTH ORGANISATION)

**VIDEO GAME THERAPY;** Video game was defined as a game that employs electronics to create an interactive effectiveness of video used in therapy have remained sparse playing a video game induces structural brain changes a finding this proves that specific brain region can be trained by means of video games.

(T. ATILLA CERANOGLU)

**CONVENTIONAL THERAPY;** treatment that is widely accepted and used by most health care professional it is different from alternative or complementary treatment.

(M.N. LEVINE)



## **CHAPTER - II**

### **REVIEW OF LITERATURE**

- **DJ Gladstone., et al. (2002):** abstract measurement of recover after stroke is becoming increasingly important with the advent of new treatment options under investigations stroke rehabilitation research the Fugul Meyer scale was developed as the quantitative evaluative instrument for measuring stroke recovery, based on Twitchell and brunstrom concept of sequential stage of motor return in the stroke patients. The Fugel Meyer is a design, feasible and efficient clinical examination method that has been tested widely in the stroke population.
  
- **JV Basmajian, et. al (2004);** problems with upper limb hand functions and mobility are common after and stroke. But high repetition of task-oriented exercise can improve these sequelae .conventional therapy enables stimulated practice of functional tasks, wish moderate benefits on upper limb tasks over standard rehabilitation for people with stroke. Substituting some (or) all of a standard rehabilitation regimen with conventional therapy rehabilitation elicits in hand functions in stroke subjects.
  
- **LOUISE Ada., et al( 2006):**  
Conventional intervention were defined as intervention that involved attempts at repetitive ,effortful muscle contraction and included biofeed back , muscle re education , progressive resistance exercise and mental practice. Strength was measure of force or torque or ordinal measures such as manual muscle tests. spasticity was measured using the modified ash worth scale , a custom made scale , or the pendulum test activity was measured directly eg, 10 m walk test , or the box and block test, or with scale that measure depends such as the barthel index strengthening interventions increase strength improve

activity and do not increase spasticity these findings suggest that strengthening programmes should be part of rehabilitation after stroke .

- **Flynn,s et al( 2007)** feasibility of using the sony play station 2 gaming platform for an individual post stroke. one women with chronic stroke received 20 , 1 hour sessions over 4 to 5 weeks of video game therapy the intervention considered using the sony play station 2 eye toys to practiced target based upper extremity movement, motor planning dynamic sitting and standing balance ,and eye hand coordination. measures were taken at base line ,post treatment and 6 month follow up and included mobility measure by the dynamic gait index and timed up and go test , walking endurance , measured by 6 minute walk test spasticity measured by the modified Ashworth scale depression measured by the beck depression inventory . a clinically significant improvement was noted at post treatment and was maintained at follow up 6 month on the DIG and trends toward improvement were found on the BBS , MAL and BDI..
  
- **Yavuzer,.et al (2008)** 20 patient with subacute stroke were randomized to receive either video game training or sham video game training VGT involved using the sony play station 2 eye toys to improve the shoulder and elbow wrist movements for 30 minute sessions over 4 weeks .sham VGT involved watching the same game as the VR group without accompanying movements . both group also received 2.5 hours section conventional therapy per week for the 4 weeks of intervention .measures were taken at base line , 4weeks and 3 months follow up upper extremity recovery , measure by the brunstrom stage of recovery for the upper limb functional independent measured by the self care items of the functional independence measures , at post treatment and at follow up a significant between group difference was found for the FIM self cares in favour of VGT COMPARED TO SHAM VGT .no significant between group difference were found on the brunstrom stage of recovery.

- **Joo., et al (2009)** A feasibility study using interactive commercial off the shelf computer gaming in upper limb rehabilitation in patient after stroke. 20 patients with sub acute stroke and upper limb weakness received 30 minute sessions of video game training over 2 weeks .The intervention involved using the Nintendo video gaming system boxing , bowling , tennis , golf , baseball games to improve upper limb function measured were taken at baseline and post treatment at 2 week statistically significant pre to post treatment improvements were found for the motricity index.
- **Video Game Based Therapy Helps Stroke Patient Recover Study Society For Neuroscience et al 2010** repeated exercise even in a video games environment helped stroke patients improve arm and hand functions according to a new human study of an interactive video game based therapy may be beneficial for functional recovery after stroke patient Adamovich said further more our data imply that this recovery may be particularly due to increased functional connections between different brain regions.
- **K.J. Sullivan( 2011) :** psychometric properties and administration of the wrist/ hand sub scales of the Fugel Meyer assessment in minimally impaired upper extremity hemiparesis in stroke. There is a need for time efficient, valid measures of distal faradic upper extremity.
- **Aimee P.,et al – (2011) :** Conventional therapy has gained considerable popularity as a treatment technique for upper extremity rehabilitation among patients with mild to moderate stroke. While substantial evidence has emerged to support its applicability, issues remain unanswered regarding the best and most practical approach.
- **T simone dorsch (2011) :** The new video game training strategy for patients with stroke purpose to support of hand function while retraining on a videogame therapy. This project compare the effect of videogame therapy with conventional therapy.

- **Leon et al – (2012) :** Video game therapy aim to create a visual, auditory and sometimes tactile and olfactory environment that appears real and enable the human used to become immersed in the interactive experience. Some authors have reviewed studies on stroke an video game therapy and conventional therapy, Sinder et al carried out a literature review observing the results of video game therapy and conventional therapy for stroke, the research was performed with no time limitation and importance of motor learning and the advance of technology in the use of video task and home based conventional therapy in rehabilitation programs for stroke patients.
  
- **G senal (2012) :** A supervised videogame therapy programme is an effective means to improve exercise performance in patients with intermittent cludication with continued improvement over the eight weeks of training. In contrast eight weeks of strength training was less effective than twelve weeks of supervised videogame therapy.
  
- **Palman et al –( 2013) :** The effacing of different therapeutic techniques on upper limb stroke patients, to improve health related quality of life in stroke patient. Their study reported six articles addressing the effect of constraint-induced movement therapy which all were analyzed too in this bachelor their four of them were considered to be effective in increasing patient's quality of life among which three were randomized controlled trials using reliable and accurate measure.
  
- **Pranale., (2014) :** The video game therapy exposure can be done any where in the world if given the necessary tools going along with the idea of unavailable transpiration and proximity there are many individuals who recover therapy but due to forms of mobilizations they cannot physicaly be more to where the therapy is conducted.

- **Gert Kcoukkel, PHD et al – (2015):** Conventional therapy was developed to overcome upper limb impairment after stroke and is the most investigated intervention for treating stroke patients in the previous decades. This review describes the current evidence regarding original conventional therapy and modified various of Constraint Induced Movement Therapy. Meta analysis showed strong evidence favoring both types of self induced movement therapy in terms of motor functions, arm, hand activities and self reported arm hand functioning in daily life.

## **CHAPTER III**

### **MATERIALS AND METHODOLOGY**

#### **3.1 STUDY DESIGN:**

The study was a comparative study design

#### **3.2 STUDY SETTING**

The study was conducted at Devendra College of Physiotherapy, and Rock Hospital, Tirunelveli under the supervision of concerned authority.

#### **3.3 SAMPLE SIZE:**

Sample consisted of 30 stroke subject who were satisfying the inclusion criteria and referred to the physiotherapy department.

#### **3.4 SAMPLING TECHNIQUE:**

Population of 30 stroke subjects were selected by using convenient sampling technique and they were randomly assigned into control and experimental groups by using lot method.

#### **STUDY DURATION:**

Total duration of the study was four months. Data collected in a period of 2 months. (Intervention for 8 weeks)

#### **VARIABLES:**

Independent Variables:

- Video game therapy
- Conventional therapy

Dependent Variables:

- Fugl Meyer test

## **VALIDITY AND RELIABILITY OF THE TOOL USED MATERIALS:**

- Fugl-Meyer Assessment Scale
- Home based materials
- Phone tablet type of monitor

### **3.7 SELECTION CRITERIA:**

#### **Inclusion criteria:**

- Age: 35 to 45 years old were included.
- Sex: both males and females were included.
- Ischemic or hemorrhagic stroke (does not have to be a first time stroke); were included.
- Mild and moderate upper limb impairment were included.
- At least 6 month post stroke were included.
- Able to move the joints (proximal and distal) as defined by physical examination were included.

#### **Exclusion Criteria:**

- Being medically unstable were excluded
  - Severe cognitive or communication deficits were excluded
  - Virtual impairments were excluded
  - Severe balance deficits limiting sitting safely independently were excluded
  - Shoulder pain were excluded
  - Previous upper limb impairment limiting potential recovery were excluded
  - Individuals with ataxia or any other cerebellar symptom were excluded
  - Orthopedic alterations or pain syndrome of the upper limb were excluded
  - Peripheral nerve damage affecting the upper extremities were excluded
- Individuals whose virtual or hearing impairment does not allow were excluded.
- Possibility of interaction with the system were excluded.

### **3.8 PROCEDURE**

The study was designed as pre, post-test comparative-control group study design. 30 patients with stroke satisfying inclusion criteria were selected by convenient sampling method. These patients were randomly assigned to control and experimental group by using lot method 15 each.

The control group A received

conventional physical therapy treatment including active and passive movements to upper limbs, passive stretching, strengthening exercises. Experimental group received video game added with addition to conventional physical therapy treatment.

Pre-test evaluation was done on the first day before commencing the treatment program. Post-test evaluation was done, on the last day, after sixteen weeks treatment program. Outcomes were measured using Fugl-Meyer Assessment Scale and



## **TECHNIQUE.**

The patients were assessed and after satisfying inclusion criteria patients are divided random A into 2 groups of 15 each.

Group A – Control group

Group B – Experimental group

Group A received standard conventional physiotherapy treatment for 45 minutes. Group B received video game therapy for 30 minutes in addition to conventional therapy treatment for 15 minutes.

### **Conventional Physiotherapy**

The conventional treatment was given for 4 weeks, single session daily, outcomes were measured on the first and last day of treatment, the conventional treatment were,

- i. Passive movements to upper limb
- ii. Passive stretching

Biceps, Triceps and forearm muscles each stretch should be 5 times during session of exercises it should be help upto 20 seconds. .

- iii. Strengthening exercise

Hand griping exercise

Hand therapy ball exercise

#### **Video game added therapy:**

Video game therapy received by experimental group patients in the experimental group the starting position of each patients was chair sitting position with shoulder flexion and adduction elbow 90<sup>0</sup> flexion, the forearm are rest on the table. The hands and waist crossing the chest. The feet parallel and the trunk erect.

The subject is asked to sit with comfortable and trunk and lower extremities being fully upright position as possible. The subject is then asked to slowly performing the video game therapy, moves the fingers and thumb performing hand movements finger flexion extension and abduction adduction and grasping movements repeatedly under the supervision of the physical therapy. The subject was given rest for 2 to 3 minutes. If needed the video game therapy was given for 30 minutes. Single set per day, three days per week for 4 weeks.

The outcomes were measured using Fugl-Meyer scale.

### **Video game therapy**

#### Humming bird hunt

This simulation depicts a hummingbird as it moves through an environment filled with trees, flowers, and a river. Water and birds provide a pleasant, encouraging environment in which to practice repeated hand movements. The game provides practice in the integration of reach, hand shaping, and grasp and finger movements using a pincer grip to catch and release the bird while it is perched on different objects located on different levels and sections of the workspace. The flight path of the bird is programmed into three different levels: low, medium, and high, allowing for progression in the range of motion required to successfully transport the hand, catch the bird, adjust the target position as well as the size, and the precision required for the successful grasp and release of the finger movements.

## CHAPTER IV

### DATA ANALYSIS AND RESULTS

**Table 1**

Statistical analyses of pre and post fugl meyer test score of control group.( Paired test)

#### 1. WITHIN GROUP ANALYSIS OF GROUP A

#### STATISTICAL ANALYSIS OF PRE AND POST VALUES OF FUGL MEYER TEST SCORE OF CONTROL GROUP

Test	Mean	Standard deviation	T value	P value
Pre	3.25	0.46	5.31	
Post	3.60	0.48		

**Table 1**

Significant at  $< 0.01$  level

In the statistical analysis of pre and post FUGL-MEYER ASSESSMENT SCALE scores of control group, the mean value of pre test data was 3.25 and that the post-test data was 3.60 t value obtained was 5.31 which is statistically significant at  $< 0.01$  level. The post-test were significantly different from the pre- test scores.

**STATISTICAL ANALYSIS OF PRE AND POST VALUES OF FUGL MEYER TEST SCORE OF EXPERIMENTAL GROUP**

<b>Test</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>T value</b>	<b>P value</b>
Pre	2.89	0.43	0.302	
Post	1.97	0.36		

**Table 1.1**

Significant at < 0.01 level

In the statistical analysis of pre and post scores of FUGL-MEYER ASSESSMENT SCALE experimental group, the mean value of pre test data was 2.89 and that the post-test data was 1.97 t value obtained was 0.302 which is statistically significant at <0.01 level. The post-test were significantly different from the pre- test scores.

**Table II**

**STATISTICAL ANALYSIS FUGL MEYER TEST SCORE OF BETWEEN GROUP**

<b>TEST</b>	<b>GROUP</b>	<b>MEAN</b>	<b>Std, DEVIATION</b>	<b>T VALUE</b>	<b>P VALUE</b>
PRE	Group A	3.25	0.46	5.31	
	Group B	2.89	0.43		
POST	Group A	3.60	0.48	0.302	
	Group B	1.97	0.36		

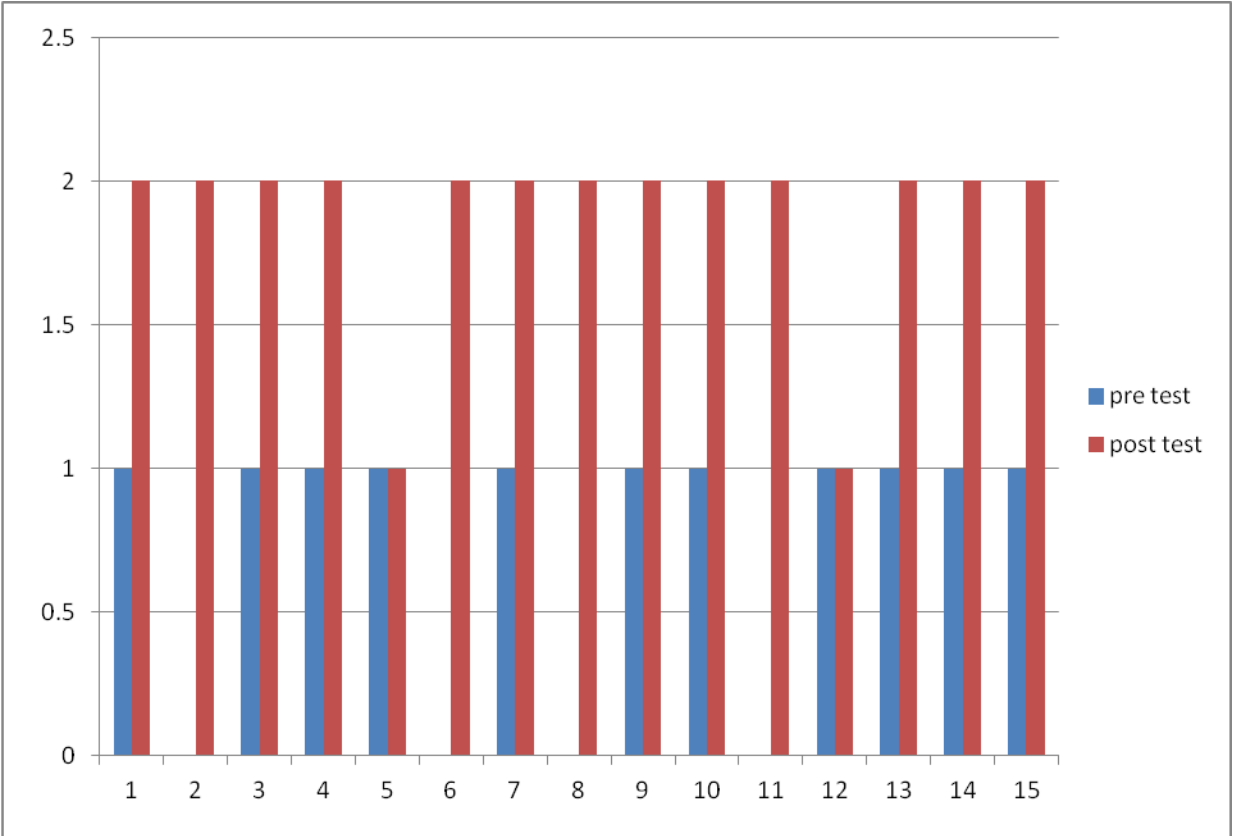
**Table 2**

Significant at < 0.01 level

In the statistical analysis of pre and post FUGL-MEYER ASSESSMENT SCALE scores of control group, the mean value of pre test data was 3.25 and that the post-test data was 3.60 t value obtained was 5.31 which is statistically significant at <0.01 level. The post-test were significantly different from the pre- test scores.

Significant at < 0.01 level

In the statistical analysis of pre and post scores of FUGL-MEYER ASSESSMENT SCALE experimental group, the mean value of pre test data was 2.89 and that the post-test data was 1.97 t value obtained was 0.302 which is statistically significant at <0.01 level. The post-test were significantly different from the pre- test scores



**Graphical changes of fugal meyer scale**

## CHAPTER V

### DISCUSSION

Corresponding to the aims and objectives, the results of the present study was:

Video game therapy with conventional therapy when given along with conventional physiotherapy showed statistically more effective in improving upper extremities motor recovery after stroke. The studies showed the benefits of the use of Video game therapy with conventional therapy in stroke patients improve the hand functions. However, there are few studies about improve the hand function with the use of Video game therapy with conventional therapy the long term benefits of stroke patients. The published studies need to be better designed with use of Video game therapy with conventional therapy for stroke patients can be better than traditional rehabilitation interventions.

Flynn, Palma, et al. says that feasibility of using the Sony PlayStation 2 gaming platform for an individual post stroke. One woman with chronic stroke received 20, 1-hour sessions over 4 to 5 weeks of video game therapy. The intervention considered using the Sony PlayStation 2 Eye Toy to practice target-based upper extremity movement, motor planning, dynamic sitting and standing balance, and eye-hand coordination. Measures were taken at baseline, post-treatment and 6-month follow-up and included mobility measure by the Dynamic Gait Index and Timed Up and Go test, walking endurance, measured by 6-minute walk test, spasticity measured by the Modified Ashworth Scale, depression measured by the Beck Depression Inventory. A clinically significant improvement was noted at post-treatment and was maintained at follow-up 6-month on the DIG and trends toward improvement were found on the BBS, MAL and BDI.

Video Game Based Therapy Helps Stroke Patient Recover Study Society For Neuroscience et al. says that repeated exercise even in a video games environment helped stroke patients improve arm and hand functions according to a new human study of an interactive video game based therapy may be beneficial for functional recovery after stroke patient. Adamovich said further more our data imply that this recovery may be particularly due to increased functional connections

between different brain regions. The video therapy with conventional therapy when given along with conventional physiotherapy showed statistically more effective in improving upper extremities hand functions after stroke.



## **CHAPTER VI**

### **SUMMARY AND CONCLUSION**

#### **SUMMARY:**

The study was conducted to investigate the effectiveness of video game therapy with conventional therapy to improving hand functions in subacute stroke patients along with conventional physiotherapy.

The study proves effectiveness of video game therapy with conventional therapy is more effective than the conventional physical therapy alone in improving hand functions in subacute stroke patients. This helps the patient improve their quality of life by improving hand functions of upper limb.

Hence taking into account of the positive results of the study it can be concluded that the video game therapy was effective treatment in improving hand functions with subacute stroke patients.

#### **CONCLUSION :**

The study concludes that effectiveness of video game therapy added with conventional therapy along in improving hand functions in subacute stroke subjects.

## **CHAPTER- VII**

### **LIMITATIONS AND SUGGESTIONS**

- The study was done within a short duration, so the study can be done for a longer duration for more valid result.
- The study was done with a smaller sample; hence further studies can be conducted with larger samples.
- The study can be analysed with other scales
- Similar study can be done with other forms of STROKE Patients.

#### **SUGGESTION OF FURTHER STUDY**

- Further study can be conducted with more sample size.
- Further studies can be done in other different type of STROKE and with various severities of STROKE.
- Further studies are recommended with a longer duration of treatment program
- Long term follow up is needed to evaluate the differences in the condition of the patients from the current status.
- Further study is needed to systematically determine the most efficacious protocol for the patient.
- Further study is suggested with more specific STROKE conditions.
- Randomized studies are needed to establish whether Exercise effect of virtual reality and home based self induced movement therapy improves upper motor functions in stroke patient.

## CHAPTER - VIII

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## CHAPTER - IX

### ANNEXURE - I

**TITLE:** A COMPARATIVE STUDY ON THE EFFECTIVENESS CONVENTIONAL PHYSIOTHERAPY VERSUS CONVENTIONAL PHYSIOTHERAPY ALONG WITH VIDEOGAME ADDED MOVEMENT PRACTICE TO IMPROVE HAND FUNCTION AMONG SUBACUTE STROKE SUBJECTS.

**INVESTIGATOR:** M. Kavitha

**CO-INVESTIGATOR:** PROF.DR.PRADEEPA

#### **PURPOSE OF THE STUDY:**

I \_\_\_\_\_ have been informed that this study will help clinicians and therapists to find out the effectiveness of video game therapy added with conventional physiotherapy on improving upper limb hand functions.

#### **PROCEDURE:**

I \_\_\_\_\_ understand that my subject will undergo experiment with Ms. M. kavitha and Dr.PRADEEPA under the direct supervision of the physiotherapist.I am aware that I have to follow therapist's instruction as has been told to me.

#### **RISK AND DISCOMFORT:**

I \_\_\_\_\_ understand that there are no potential risks associated with this procedure,and understand that Ms. M. kavitha and Dr. PRADEEPA will company my child during this procedure.There are no known hazards associated with this procedure.

**CONFIDENTIALITY:**

I \_\_\_\_\_ understand that the medical information produced by this study will be confidential. If the data are used for publication in the medical literature or for teaching purpose, no names will be used. Photographs, audio and video tapes will be used without identity for publication and presentation .

**PHOTOGRAPHY CONSENT:**

Ms. M. kavitha and D Dr. PRADEEPA have explained me that photography of my subject are required in order to illustrate various aspects of the study for thesis and other articles, and at the presentation or conference by giving my consent I \_\_\_\_\_ authorize Ms. M. Kavitha and Dr. PRADEEPA to use any of my subject taken in printed format, in slides for presentation.

**REQUEST FOR MORE INFORMATION:**

I \_\_\_\_\_ understand that I may ask any questions about the study at any time and that Ms. M. Kavitha and Dr. PRADEEPA are ready to clear my doubts at any time and I need a copy of this consent form for my personal and careful reading.

**REFUSAL OR WITHDRAWAL OF PARTICIPATION :**

I \_\_\_\_\_ understand that participation is voluntary and I may withdraw consent and discontinue his /her participation at any time with proper explanation and reason.

**INJURY STATEMENT**

I \_\_\_\_\_ understand the diagnosis/treatment procedure, under the guidance of my therapist, is likely to cause any/no injury . In such case medical attention will be provided , but no compensation will be provided . I understand my agreement to participate my in this study and I am not waiving any legal rights. Ms. M. Kavitha and Dr. PRADEEPA have explained me the purpose of the study, the study procedure and possible risk that my subject may experience.

I have read and I have understood this concern to participate as a subject in this study.

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-  
SUBJECT DATE  
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--  
WITNESS TO SIGNATURE DATE

We Ms. M. Kavitha and Dr. PRADEEPA have explained the purpose of the research, the procedure required and the possible risks and benefits, to the best of our ability.

**INVESTIGATORS**

DATE

1. Ms. M. KAVITHA

Dr. PRADEEPA



## **ANNEXURE - II**

### **APPENDIX**

Name:

Age:

Sex:

Occupation:

#### **SUBJECTIVE EXAMINATION:**

Chief complaints:

Past Medical History:

Bp:

Sugar:

#### **OBJECTIVE EXAMINATION:**

Body Built:

Deformity:

Gait:

Mobility Gait:

#### **ON EXAMINATION:**

##### **1. Higher Mental Function**

Memory

Attention

Emotional Response

Vision

##### **2. Speech Communication**

##### **3. Sensory Function**

##### **4. Motor Function**

Muscle Tone

Reflex

Muscle Power

Examination of Voluntary Movement Control

Synergy Pattern

Involuntary Movement

Tremor

Coordination

Balance

5. Examination of Gait

Hand Function

Type of Grip

Grip Strength

6. problem List

## **ANNEXURE - III**

### **Fugle meyer scale**

*Scoring* (Maximum possible score = 2):

- (0) – Function cannot be performed
- (1) – A pencil interposed between the thumb pad and the pad of the index finger can be kept in place, but not against a slight tug
- (2) – Pencil is held firmly against a tug
- (2) – Paper is held firmly against a tug

### **The Fugl-Meyer Assessment Scale Test requires:**

1. Tennis ball
2. A small spherical shaped container
3. A tool to administer reflex tests
4. Enough space is needed for a patient to move around freely
5. If possible, space should be a quiet, private room with few distractions

## MASTER CHART

### FMS MASTER CHART OF GROUP A AND GROUP B

PRE	POST	PRE	POST
1	2	1	2
1	2	0	2
1	2	1	2
1	1	1	2
0	1	1	1
1	1	0	2
1	2	1	2
1	1	0	2
0	2	1	2
1	1	1	2
0	1	0	2
1	1	1	1
0	1	1	2
0	2	1	2
1	1	1	2