ejpmr, 2022, 9(8), 371-375

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

A STUDY TO COMPARE THE EFFECTS OF MOTOR RELEARNING PROGRAM VERSUS ISOMETRIC STRENGTHENING EXERCISE PROGRAM IN IMPROVING UPPER LIMB FUNCTION FOLLOWING ACUTE HEMIPARETIC STROKE

Manjula S.*[1], Dr. P. Senthil Selvam[2] and S. Ashfak Abdul Kader[3]

[1]MPT, Asst. Prof., School of Physiotherapy, Vistas, Thalambur, Tamil Nadu- 600130, India.
[2]Phd, Prof., HOD, School of Physiotherapy, Vistas, Thalambur, Tamil Nadu- 600130, India.
[3]School of Physiotherapy, Vistas, Thalambur, Tamil Nadu- 600130, India.

***Corresponding Author: Manjula S.**

MPT, Asst. Prof., School of Physiotherapy, Vistas, Thalambur, Tamil Nadu- 600130, India.

Article Received on 29/05/2022 **Article Revised on 19/06/2022** **Article Accepted on 09/07/2022**

ABSTRACT

Aim: To compare the effects of motor relearning program Vs. isometric strengthening exercise program in improving upper limb function following acute hemiparetic stroke.

Objective:

- To assess the effects of motor relearning program on upper limb function in acute hemiparetic stroke patients.
- To assess the effects of isometric exercises on upper limb function in acute hemiparetic stroke patients.
- To compare the effects of motor relearning program with isometric exercises on upper limb function in acute hemiparetic stroke patients.

Research design:

- Study design: Comparative study
- Study type: experimental type
- Sampling method: simple random sampling
- Total Sample size: 20
- Group A: 10 motor relearning program
- Group B: 10 isometric strengthening exercise
- Duration: 6 weeks

Procedure: subjects were randomly allocated into two groups. Group A received motor relearning program and Group B received isometric strengthening exercise. Both the groups were trained for one hour / day for five days a week in a six week program. Pre-test and post-test measurements was done with the Fugl – Meyer assessment scale. **Result:** Result would reveal that the group A which received Motor relearning program showed significant improvement in comparison to group B that received isometric exercises. **Conclusion:** Thus it is concluded that the motor relearning program is more significant than isometric strengthening exercise program in improving upper limb functions following an acute hemiparetic stroke.

KEYWORDS: motor relearning program, isometric exercise, hemiparetic stroke, Haemorrhage, ischemia, Fugl-Meyer assessment.

INTRODUCTION

According to WHO, stroke is an acute onset of neurological deficient that occurs due to abnormalities in the cerebral circulation with resultant signs and symptoms that corresponds to involvement of focal area of brain lasting for more than 24 hours. It occurs when there is a decreased blood and oxygen supply to the brain followed by rupture/blockage in the blood vessels. The alteration in the flow of blood can cause a deprivation of nutrients to the brain tissue. Ischemic stroke account for about 80% of all strokes.

The common risk factors of stroke are unbalanced diet, inactivity, heavy alcohol use, tobacco use, family history, health history like high cholesterol level, high blood pressure, previous stroke or TIA, diabetes etc.

Prevalence of stroke in India was estimated 203 per 100,000 populations above 20 years, amounting to a total of 1 million cases. The male to female ratio is 1:7.around 12% of all stroke occurred in population 40 years. The estimation of stroke mortality was limited by the method of classification for cause of death in the country.

The most common neuralgic impairment caused by stroke is hemiparesis i.e. partial weakness. There will be a reduced ability to activate spinal motor neurons voluntarily. Around 80% of people with stroke experience acute hemiparesis. It results in diminished ability of purposeful movements in their affected extremity.

Only about 40% of such patients achieve full recovery. The remaining 60% of stroke survivors have persistent motor and non-motor impairments that significantly disrupts their ability to participate in home and community life.

Hemiparesis stroke survivors may use altered movement strategies to perform functional arm and hand activities, which is considered compensatory. It shows that non-guided therapy may lead to the reinforcement of compensatory movements.

Stroke rehabilitation is a complex intervention, drawing on a huge range of therapy techniques. Currently there is an emphasis on functional / task specific training using intense practice of functional task along with behavioural shaping and environment enrichment. Motor learning strategies provide a common base for all functional training.

Stroke results in a reduction in muscle strength predominantly on the paretic side, with mild weakness on the ipsilateral non-paretic side when compared to healthy individuals. Changes in muscle strength depends on the location and volume of the brain injury, as well as the time from stroke. Individuals with stroke could undertake muscle strengthening without any increase in spasticity.

MOTOR RELEARNING PROGRAM

It was introduced by Roberta B. Shepherd and Janet H. Carr. It is a retraining of motor control based on understanding of normal movement and analysis of motor dysfunction. It emphasis on practice of specific activities, training of cognitive control over muscles and movement. MRP is a rehabilitation program which includes real life functional activities. It is based on three factors. They are,

- Elimination of unnecessary activities
- Feedback
- Practice

ISOMETRIC STRENGTHENING EXERCISE

Isometric exercise involves the contraction of muscles without any movement in the surrounding joints. Isometric exercises involve holding static positions for long periods of time. Isometric contractions occur when intra muscular tension increases but the muscle remains at a constant length.

Holding the muscle contraction allows the muscle tissue to fill with blood and create metabolic stress on the muscle. This can help improve strength and endurance. They are suitable for people with an injury or medical condition that restricts movement.

They are useful in enhancing stabilization, maintaining the position of the affected area, since muscles often contract isometrically to aid in stabilization. It helps to improve neuromuscular recruitment of the muscles being trained and shows gains in muscle recruitment.

AIM OF THE STUDY

- To compare the effects of motor relearning program vs. isometric strengthening exercise program in improving upper limb function following acute hemiparetic stroke.

OBJECTIVE OF THE STUDY

- To assess the effects of motor relearning program on upper limb function in acute hemiparetic stroke patients.
- To assess the effects of isometric exercises on upper limb function in acute hemiparetic stroke patients.
- To compare the effects of motor relearning program with isometric exercises on upper limb function in acute hemiparetic stroke patients.

RESEARCH DESIGN AND METHODOLOGY

An experimental study design was conducted with 20 patients within the age group of 35 to 75 years who fulfilled the inclusion and exclusion criteria.

INCLUSION CRITERIA

1. Patients with first onset of stroke
2. Hemiparetic stroke patients; both ischemic & haemorrhagic
3. Patients within the age group ranging from 35 to75 years
4. Both male & female
5. Patients in acute stage of stroke

EXCLUSION CRITERIA

1. Patients with Sensory impairment on upper limb.
2. Patient having cognitive and perceptual disorders.
3. Patients with associated musculoskeletal disorder
4. Patients with severe cardiac diseases

OUTCOME MEASURES & TOOLS

Fugl -Meyer assessment scale – it is the most widely used clinical assessment of post stroke upper extremity impairment. The test items are organized into five sequential recovery stages. A three point ordinal scale is used to measure impairments of volitional movement with the grades ranging from 0 to 2. This scale includes upper extremity function, balance, sensation, range of motion and pain.

TOOLS USED

- Glass
- Coin
- Comb

- Cap
- Table
- Reflex hammer
- Ball
- Paper

PROCEDURE

A written consent was taken from patients who fulfilled the inclusion criteria. 20 Subjects were randomly allocated to 2 groups.

Group 1- Motor relearning program

Group 2- isometric strengthening exercise

GROUP 1:

PATIENT POSITION

- Sitting with arm on table.
- Knee in 90° and feet placed on the ground.
- Affected hand is placed on the table.
- Unaffected hand

STEPS

- Stretching of long finger flexors, forearm pronators and shoulder internal and external rotators.
- Lifting and lowering a glass which held by the palm and the fingers.
- Lifting glass from table by radial deviation at wrist, forearm in mid prone position.
- Slide the glass that is placed in dorsal and volar aspect of the wrist to facilitate wrist flexion and extension.
- Tapping table top with all fingers.
- Hold & release the glass repeatedly to facilitate palmar abduction and thumb rotation.
- Opposition of thumb and digits.
- Holding a cup filled with water, transfer to other hand and place it on target.
- Pick up the glass and bring it towards the body and again place on the table.
- Slide glass backward and forward to touch the target by extending & flexing the elbow.
- Shoulder placed at 90º flexion, reaching and pointing within controllable range above 90º, gradually increasing range in forward and sideways direction.
- Reaching forward, sideways and backwards to pick up an object and transport it to another place.
- Scooping the coin from the table & transfer it to other hand. Repeat it again with opposition of other digits.
- With forearm supported on the lap shoulder shrugging.
- Lifting hands to comb the hair.
- Put the cap on the head & take it off.

Exercises was given for 1 hour /day for 5 days a week for 6 weeks.

GROUP 2

PATIENT POSITION

- Supine lying

Isometric strengthening exercises consist of

• shoulder flexion and extension
• shoulder abduction and adduction
• shoulder external and internal rotation
• elbow flexion and extension
• Wrist flexion and extension

Exercises were given as 3 sets of 8-12 repetitions, 5 days/ week for 6 weeks

DATA ANALYSIS AND INTERPRETATION

FUGL-MEYER ASSESSMENT SCALE

Table 1.1: Motor Relearning Program.

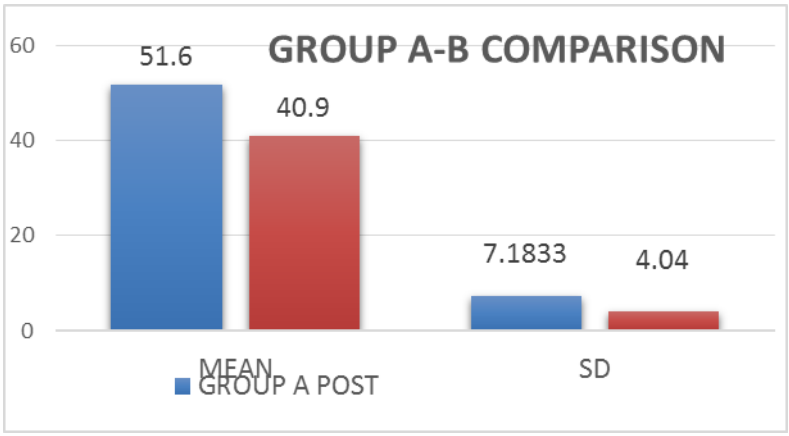
GROUP A	MEAN	STANDARD DEVIATION	P VALUE	T VALUE
PRE TEST	30.2	6.4944	P < 0.0001	6.988
POST TEST	51.6	7.1833		

Table 2.1: Isometric Strengthening Exercise.

GROUP B	MEAN	STANDARD DEVIATION	P VALUE	T VALUE
PRE TEST	29.8	3.8239	P<0.0001	6.310
POST TEST	40.9	4.0400		

Table 3.1: Comparison of Group-A and Group-B.

	SAMPLE SIZE	MEAN		SD		T VALUE	P VALUE
		PRE TEST	POST TEST	PRE TEST	POST TEST		
GROUP A	10	30.2	51.6	6.4944	7.1833	6.988	P<0.0001
GROUP B	10	29.8	40.9	3.8239	4.0400	6.310	P<0.0001



RESULT

The post-test mean value of group-A is 51.6 and the post-test mean value of group-B is 40.9. The standard deviation of group-A & group-B are 7.1833 and 4.0400. When comparing the mean and standard deviation values of both the groups, group-A shows higher rate of improvements in the post tests. Thus, motor relearning program is proved to be more effective than isometric strength training in improving the upper limb function of acute hemiparetic stroke patients.

DISCUSSION

A comparative study has been done between motor relearning program and isometric strengthening exercise program in improving the upper limb functions of a hemiparetic stroke patients. The study was conducted for six weeks. The patients were been selected according to the inclusion and exclusion criteria.

The pre-test values of both the groups were taken at the starting of each week. The post-test values of both the groups were taken at the end of each week. The exercises were given based on the exercise protocol. The prognosis of the subjects were noted and analyzed at each week. At the end of sixth week, the mean values and standard deviation values were calculated. The p-value and t-value were evaluated. The comparison between both the groups has been done to check the effectiveness. The mean values and standard deviation values shows that group-A that received motor relearning program exhibited significant results when comparing to group-B that received isometric strength training. Hence, the motor relearning program is proved to be more significant than isometric strengthening exercise program in improving the upper limb function of an acute hemiparetic stroke patients.

CONCLUSION

The result had shown that both the motor relearning program (Group A) and isometric strengthening exercise program (Group B) that received 6 weeks of therapy had improved significantly on post values within the group. Based on the outcome measure, this study has been concluded that the motor relearning program (Group A) gives much more significant improvements than the isometric strengthening exercise program (Group B). Hence, the alternate hypothesis has been accepted.

REFERENCES

1. GUAN Min et al. effects of motor relearning program on motor function recovery of patients with hemiplegia after acute stroke, 2017.
2. Suresh Kumar et al. Incidence and prevalence of stroke in India: A systemic review". 2017.
3. Puneeth rihani et al. The effectiveness of motor relearning program and mirror therapy on hand functions in patients with stroke, 2015.
4. Bindu Menon et al. a hospital based study on awareness of stroke from south India. (2014)
5. Ashish Sharma et al. the prevalence of triggering factors in acute stroke: Hospital based observational cross sectional study, 2015.
6. Yogesh l. jadhav et al. risk factors and clinical profile of stroke in young adults, 2015.
7. Tapas Kumar Banerjee et al. (gives an overview of stroke disorder in India as derived through studies for the past fifty years, 2016.
8. Ikram Ullah et al. the effectiveness of motor relearning program along with electrical stimulation for improving upper limb function in patients with sub-acute stroke, 2020.
9. Amer Ghrouz et al. the effect of motor relearning program on balance, mobility and performance of activities of daily living among post stroke patients, 2022.
10. Liping Chem MM et al. Motor relearning program versus Bobath approach for prevention of post stroke apathy, 2018.
11. Camilia Beiring et al. the reliability, validity and responsiveness of the Fugl-Meyer assessment of the upper extremity, 2016.
12. A. Melendez-Calderon et al. Isometric movement training for post stroke rehabilitation of arm function, 2017.
13. Julius P. A. Dewald et al. suggested that upper limb dis coordination in hemiparetic stroke may largely represent a manifestation of additional neural constraints on motor outflow, 2015.
14. Shafqatullah Jan et al. Comparing the effects of motor relearning program versus mirror therapy for

improving upper limb motor functions in stroke patients, 2019.
15. Elizabeth J. Woytowicz et al the levels of upper extremity movement impairment by applying a cluster analysis to the Fugl-Meyer assessment, 2017.
16. Lei Yu et al. Remote quantitative Fugl-Meyer assessment framework for stroke patients based on wearable sensor networks, 2016.
17. Fredric M Ivey et al. Strength training for skeletal muscle endurance after stroke, 2017.
18. Felipe Jose Aldar et al investigating the influence of strength training on quality of life in ischemic stroke, 2016.
19. Patricia Graef et al. "Effects of functional and analytical strength training on upper extremity activity after stroke, 2016.
20. Paulo Bazile da Silva et al. Strength training associated with task-oriented training to enhance upper limb motor function in elderly patients with mild impairment after stroke, 2015.