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A Study on Efficacy of Bobath Technique and Motor Relearning Programme on Functional Activities in Hemiplegic Patients

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Abstract

Objective: To compare the efficacy of Motor Relearning Programme and Bobath technique with Motor Relearning Programme in improving functional activities among hemiplegic patients.

Design: Two group experimental studies designed with pre-test and post-test.

Background: The primary goal of stroke rehabilitation is functional enhancement by maximizing the independence, life style and dignity of the patient. A new development for stroke treatment in specialized and well organized manner generated by different neurological treatment approaches includes Bobath technique and Motor Relearning Programme. There has been less research explaining about the importance of Bobath technique for improvement in functional activities. Bobath technique with MRP still remains to be optimized and lacks the much needed standardization. In this study comparison of the efficacy of MRP and Bobath technique with MRP in improving functional activities among hemiplegic patients was done.

Method: Thirty subjects aged 40 to 55 years with stroke under Brunnstorm recovery stage II were selected under purposive sampling technique and assigned into two groups with 15 subjects each, one group received Motor Relearning Programme and the other group received Bobath technique with Motor Relearning Programme for a period of 4 weeks.

Outcome measure: The Functional Independence Measure scale was used to evaluate functional activities (ADL). Intervention values for self-care and transfer activities were measured before and after treatment.

Results: Statistical analysis done by using student 't' test and independent 't' test showed that there was significant improvement in subjects who received Bobath technique with Motor Relearning Programme.

Conclusion: Bobath technique with Motor Relearning Programme shows significant improvement in functional activities than Motor Relearning Programme.

Keywords: MRP-motor relearning program; FIM scale-Functional independence measure scale; ADL-activities of daily living

Introduction

Stroke is a disease of developed nations. Worldwide it is increasing along with modernization. Stroke is one of the leading causes of serious, long term disability. It is the acute severe manifestation of cerebro-vascular disease. WHO defined stroke as "rapidly developed clinical signs of focal disturbance of cerebral function, lasting more than 24 h or leading to death, with no apparent cause other than vascular origin" [1].

The disturbance of cerebral function is caused by 3 morphological abnormalities, i.e. stenosis, occlusion or rupture of the arteries. Dysfunction of the brain (neurological deficit) manifests itself by various neurological signs and symptoms that are related to the extent and site of the area involved and to the underlying causes. Warning signs of stroke can be numbness, sudden severe head ache, weakness or paralysis of face, arm and leg especially on one side of the body [2].

It has been noted that stroke incidence may vary considerably from country to country. The prevalence of stroke in India was estimated as 203 per 100,000 population above 20 years, amounting to a total of about 1 million cases [3]. Promoting Physical activity by enhancing self-efficacy may increase physical activity and self-efficacy for physical activity in hospitalized patients with mild ischemic stroke 29 [4].

If there is recovery from stroke it takes place in the first 3-6 months after the injury [5]. However, research has shown there can be recovery of useful motor function year's later. Forty percent of stroke patients are left with moderate functional impairments and 15% to 30% with severe disability. Effective rehabilitation interventions initiated early after stroke can enhance the recovery process and minimize functional disability.

The expected increase in stroke survivors potentially living with disabilities will place a burden on the survivors family, community and the health care system. New developments in stroke treatment included changes in stroke care and the necessity to concentrate this care in specialized and well organized manner. In terms of rehabilitation different approaches focus on the modification of impairment and improvement in function within everyday activities. A number of different physiotherapy approaches, e.g. Bobath approach, Motor Re-learning approach, Brunnstrom, Rood approach, Proprioceptive Neuromuscular Facilitation have been developed based on different ideas about how people recover after a stroke.

The Bobath approach is used by 90% of the physiotherapists in the UK [6], which is "a problem-solving approach to the assessment and treatment of individuals with disturbances of function, movement

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and tone" [7]. Motor Relearning Programme (MRP) which focuses on task-oriented stratergies. "MRP is a set of internal processes associated with practice experience leading to relatively permanent changes in the capability of skilled behaviour". Task-oriented therapy is important. It makes intuitive sense that the best way to relearn a given task is to train specifically for that task. MRP theory describes the ways in which motor patterns can be acquired and modified through learning [8].

Aim of the Study

The aim of the study is to find out the effectiveness of Motor Relearning Programme and Bobath technique with Motor Relearning Programme on functional activities in hemiplegic patients.

Objective of the Study

To study the effectiveness of Motor Relearning Programme in improving functional activities in hemiplegic patients.

To study the effectiveness of Bobath technique with Motor Relearning Programme in improving functional activities in hemiplegic patients.

To compare the effectiveness of Motor Relearning program and Bobath technique with Motor Relearning Programme in improving functional activities in hemiplegic patients.

Materials and Methodology

Study design

Two group experimental studies designed with pre-test and post-test.

Sampling technique

Purposive Sampling Technique.

Sample size

30 subjects.

Study method

Subjects were divided into Experimental group I and Experimental group II.

Experimental group I: 15 subjects were treated with motor relearning programme.

Experimental group II: 15 subjects were treated with Bobath technique and motor relearning programme.

Inclusion criteria

- Ischemic stroke.
- Territories-Anterior cerebral artery and middle cerebral artery
- Above one month post-stroke and within one year (Brunnstrom stage 2)
- Age group between 40 and 55 years
- Both Male and female
- Either right or left hemiplegic side.

Exclusion criteria

- Patient with deformities
- Bilateral involvement
- Shoulder hand syndrome
- Pathologies including both upper and lower limb
- Recent surgery of both upper limb and lower limb
- Post traumatic injury
- Unbearable pain
- Medical instability
- Territory-Posterior cerebral artery
- Unreliable patients

Study setting

Study was conducted at Ashwin Multi Specality Hospital-Coimbatore, Outpatient department - P.P.G College of physiotherapy, Vivekananda hospital – Salem, Community rehabilitation centre-Coimbatore.

Study duration

Study was conducted for a period of 5 months.

Parameter functional

Independence Measurement Scale. Items included self-care and transfer only.

Treatment Techniques

Motor relearning programme

Sitting up over the side of bed: (1) From supine position in bed: Flexing the affected leg while therapist stabilizes the foot and leg, turn to intact side. Therapist assists by lowering legs. Flexing head sideways while therapist assists into sitting.

(2) Mobility exercises perform in bed: Rolling and bridging

Balanced sitting: Sitting on a firm surface, hands in lap, feet and knees approximately 15 cm apart, feet on floor.

(1) **Head and trunk movements:** Turning head and trunk to look over shoulder, returning to midposition and repeating to other side. Looking up at the ceiling and returning to upright.

(2) **Reaching actions:** Reaching forward (flexing at the hips), sideways (both sides), backward, returning to midposition. Therapists assists in shoulder forward flexion over affected side, one hand on elbow and other hand on wrist.

Balanced standing: Standing on a firm surface, hands over side of body, feet apart, while therapist stabilizes affected side of knee.

(1) **Head and trunk movements:** Standing with feet apart, looking up at ceiling and returning to upright.

Standing with feet apart, turn head and body and look behind, return to midposition, repeat to other side.

(2) **Reaching actions:** Reaching forward, sideways (both sides), backward, returning to midposition. Therapists assists in shoulder forward flexion over affected side, one hand on elbow and other hand on wrist.

Standing up and sitting down: Sitting on a firm flat surface, no arm rests, feet flat on floor, no flexion within upper body throughout action.

(1) **Standing up:** Start with upper body vertical, feet placed backward. Patients swings upper body forward at the hips and stands up. Therapists stabilizes paretic foot and knee, one hand over trunk and other hand over knee, to prevent buckling.

(2) **Sitting down:** Patient flexes hip, knee and ankles to lower body mass toward the seat. While therapists assists the movement.

Upper limb function:

(1) **Reaching:** Forward (flexion at shoulder), sideways (abduction at shoulder) and backward (extension at shoulder).With shoulder girdle elevation, elbow extension and varying amount of shoulder external rotation done. Opening of hand aperture between thumb and fingers, extension of wrist, pronation and supination.

(2) **Grasping:** Extension of wrist and fingers. Abduction and conjunct rotation of the carpometacarpel joints of thumb and fifth finger. Closure of fingers and thumb around object (tumbler, rolled towel).

(3) **Holding:** Flexion and extension of wrist holding object (tumbler, rolled towel).

(4) **Manipulation and finger dexterity:** Flexion and extension of fingers. Flexion and conjunct rotation of the carpometacarpal joints of thumb and fifth finger. Independent finger flexion and extension.

Bobath technique

In sitting:

(1) Sitting on a firm flat surface, hands rests over bed, feet flat on floor, while therapist place one hand over elbow and other over the wrist Weight shifting to both sides done.

(ii) Clasping both hands forward, turning to sound side. While lifting the affected leg and crossing it over the sound side.

(iii) Clasping both hands forward, turning to affected side. While lifting the sound leg and crossing it over the affected side.

(iv) Sitting with crossed legs. The affected leg over the sound one. While both hand clasps and places over knee.

(v) Flexion and extension of knee. Therapist places one hand over foot other hand over knee.

From sitting to standing: Clasping both hands forward placing affected foot parallel with sound one. Therapist places one hand over sacrum and other hand over knee, and help them to raise up.

In standing: (i) Clasping both hands forward. Turning to both sides.

(ii) Sitting and standing up.

For movements of arm: (i) Elevation of arms with clasped hands.

(ii) Moving clasped hands to face, while therapists hand prevents retraction of shoulder.

(iii) Moving clasped hands above head, while therapists hand prevents retraction of shoulder.

(iv) Bilateral shoulder flexion exercises.

(v) Sitting push-ups to full elbow extension.

Procedure

The subjects of both groups I and II were involved for pretest assessment by Functional independent measurement scale, only self-care and transfer activities were are taken. The subjects of group I were given MRP and group II were given Bobath and MRP techniques. Clinical applications to be assessed are upper limb function, sitting up over the side of bed, balanced sitting, standing up and down and balanced standing. For upper limb function analyze lack of shoulder forward flexion, excessive elbow flexion, internal rotation of shoulder and pronation of forearm, grasp-wrist extension, Metacarpophalangeal joint extension, thumb abduction and rotation. For Sitting up over the side of the bed analyze the poor lateral trunk movement, pulls with intact hand, hooks intact leg under affected leg, difficulty in flexion of hip and knee. For Standing up and Sitting down analyze weight through intact side, inability to shift centre of gravity sufficiently forward. For Balanced standing analyze ability to stand relatively still without using undue muscular activity, to move about in standing to perform a variety of tasks, Difficulty in hip and knee extension and wide base of support. After analyzing the above activities perform the techniques. At the end of fourth week, both groups were involved for posttest assessment by Functional independent measurement scale, only self-care and transfer activities are taken.

The treatment was designated as one hour therapy sessions daily on week days.

Results

Effectiveness of experimental group I

(Motor Relearning Programme) is determined by comparing the pretest and posttest values using paired 't' test; the calculated value is higher than the critical value. Since the calculated value is greater than the critical value, there exists a significant difference between the pretest and posttest values of Experimental group I.

When comparing the mean values of both, the posttest mean value 30.06 is greater than the pretest mean value 12.4 which confirms that there is a significant improvement in functional activities.

Effectiveness of experimental group II

(Bobath Technique with Motor Relearning Programme) is elicited by comparing the pretest and posttest values using paired 't' test, the calculated value is higher than the critical value. Since the calculated value is greater than the critical value, there exists a significant difference between the pre-test and post-test values of Experimental group II.

When comparing the mean values of both, the posttest mean value 36 is greater than the pretest mean value 12.53, which confirms that there is a significant improvement in functional activities.

Between groups, while comparing the posttest values of Experimental group I and Experimental group II using independent 't' test, the calculated value is higher than critical value, Since the alternate hypothesis is accepted, which shows that there exists a significant difference between the posttest values of two groups.

When comparing the mean values of both, the posttest mean value of Experimental group I 30.06 is greater than the posttest mean value of Experimental group II 36 which confirms that Experimental group II shows a significant improvement in functional activities than Experimental group I (Tables 1-4 and Figures 1-4).

Tests	Experimental groups	
Pretest mean value	Experimental Group I	Experimental Group II
	12.4	12.53
Independent 't' test	0.139	
P value and its significance	P value>0.05 and is insignificant	

Table 1: Shows analysis of pretest data of experimental group I and group II.

Tests	Experimental groups	
Posttest mean value	Experimental Group I	Experimental Group II
	30.06	36
Independent 't' test	2.701	
P value and its significance	P value<0.05 and is significant	

Table 2: Shows analysis of posttest data of experimental group I and group II.

Tests	Motor Relearning Programme	
Experimental Group I	Pre-test mean value	Post-test mean value
	12.4	30.06
Paired 't' test	15.91	
P value and its significance	P value<0.05 and is significant	

Table 3: Shows analysis of pretest and posttest data of experimental group I.

Tests	Bobath technique with Motor Relearning Programme	
Experimental group II	Pre-test mean value	Post-test mean value
	12.53	36
Paired 't' test	13.96	
P value and its significance	P value<0.05 and is significant	

Table 4: Shows analysis of pretest and posttest data of experimental group II.

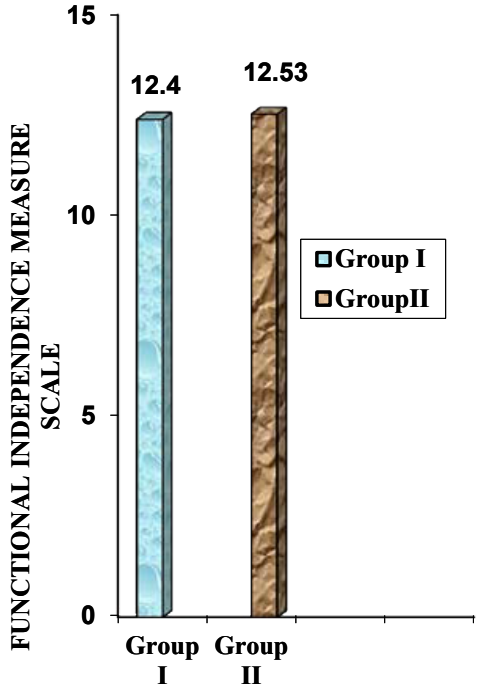

Figure 1: Shows pre-test values of experimental group I and experimental group II.

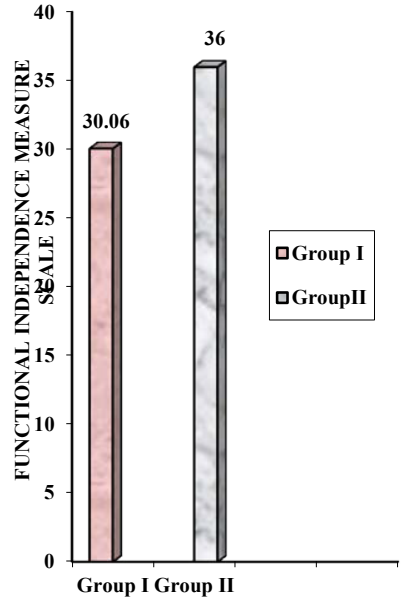

Figure 2: Shows post-test values of experimental group I and experimental group II.

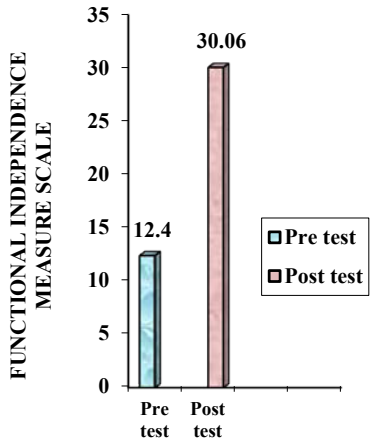

Figure 3: Shows pre-test and post-test values of experimental group I.

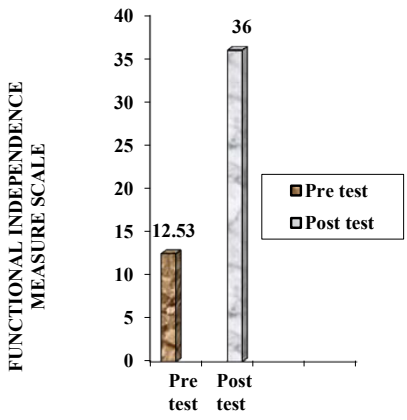

Figure 4: Shows pre-test and post-test values of experimental group II.

Discussion

The results of this study reveal that patients in experimental group II, which includes Bobath technique with Motor relearning programme showed better functional recovery in terms of self-care and transfer than those who were in experimental group I, which includes Motor relearning programme alone.

Using FIM scale as disability level measurement helps to predict patient's life satisfaction. The FIM, a new tool for rehabilitation of post stroke patients [9]. The FIM measurements, self-care and transfer capacity in the before and after treatment, improving the quality of life of patients and to continue to lay the Foundation for rehabilitation.

This study aimed to find out the effectiveness of Motor Relearning Programme and Bobath technique with Motor Relearning Programme on functional activities in hemiplegic patients. Improving functional activities like eating, grooming, and bathing, dressing upper and lower, toileting and to make patient independent was the primary focus of treatment.

Both groups show improvement in the functional activities. But when combination of bobath technique and MRP given the group shows fast recovery than giving MRP alone.

People with brain injury have deficits in motor programs, motor memory which largely impaired their final performances [10].

Based on the concept that pathologic movement patterns (limb synergies and primitive reflexes) must not be used for training because continuous use of the pathologic pathways may make it too readily available to use at expense of the normal pathways.

The goal of NDT is to normalize tone, to inhibit primitive patterns of movement, and to facilitate automatic, voluntary reactions and subsequent normal movement patterns [11].

Therefore when Bobath technique and MRP were given in combination, the fast recovery enables the patient to score more in FIM scale.

Conclusion

Experimental group I was treated with MRP and Experimental group II was treated with Bobath technique with MRP for a period of 4 weeks. Pre-test and Post-test scores are noted and analysis was done using independent 't' test which favored the alternate hypothesis.

The intra group analysis was done and results were analyzed using paired 't' test, which favored the alternate hypothesis. Statistical analysis shows there is significant improvement in ADL in hemiplegic patients in group II (Bobath technique with MRP) than in group I (MRP). It can be concluded that combination of Bobath with MRP were found to have fast recovery in improving functional activities of stroke patients than giving MRP alone.

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