

Effect of Motor Relearning Programme Versus Bobath Approach On Functional Mobility In Hemiplegic Patients – A Randomized Clinical Trial.

Satwinder Singh MPT Student, Dr.Lalit Arora Associate Professor,
Dr.Reena Arora Lecturer,
Baba Farid University of Health Sciences, Faridkot, Punjab

Abstract

Aim of the study: The aim of the study was to conduct a randomized clinical trial to compare the effect of Motor Relearning Programme versus Bobath Approach on Functional Mobility in Hemiplegic Patients.

Methodology: 30 hemiplegic patients both male and female with recovery stage 2 were included in the study on the basis of inclusion and exclusion criteria. The patients were divided into two groups by random number table. Group A (n=15) received Motor Relearning Programme and Group B (n=15) received Bobath Approach. Treatment was given for 6 days/ week for 6 weeks. The outcomes were assessed with the help of Motor Assessment Scale (MAS), Barthel index (BI) and Functional Independence Measure (FIM).

Result: The result showed that there was significant improvement in BI, MAS and FIM in both the groups after 6 weeks of the treatment. But when compared between group A & B; group A showed significant improvement ($p < 0.001$) as compared to group B.

Conclusion: The study concluded that both groups, Group A who received Motor Relearning Programme and Group B who received Bobath approach are effective in improving functional mobility in hemiplegic patients. However, it is concluded that Motor Relearning Programme is more effective than the Bobath approach in reducing functional disability and improving functional mobility in hemiplegic patients.

Keywords: Bobath Approach; Functional Mobility; Hemiplegia; Motor Relearning Programme.

Date of Submission: 03-07-2022

Date of Acceptance: 17-07-2022

I. Introduction

Stroke is one of the leading causes of serious, long-term disability and WHO defined stroke as “rapidly developed clinical signs of focal disturbance of cerebral function, lasting more than 24 hr. or leading to death, with no apparent cause other than vascular origin”¹.

Paralysis is usually on the side of the body opposite to the side of the brain damaged. It may affect the face, an arm, a leg, or the entire side of the body. It causes weakness, problems with muscle control, and muscle stiffness. This one-sided paralysis is called Hemiplegia².

In 2001, it was estimated that cerebrovascular diseases (stroke) accounted for 5.5 million deaths worldwide, equivalent to 9.6 % of all death. Two-thirds of these deaths occurred in people living in developing countries and 40% of the subjects were aged less than 70 years³. Worldwide stroke prevalence in 2016 was 80.1 million, Out of those 41.1 million (38.0–44.3) was in women and 39.0 million (36.1–42.1) in men. In the United States, the prevalence of stroke is about 3% in adults 20 years or older, which accounts for ≈7 million strokes in the population⁴. In 2019, there were 12.2 million (95% UI 11.0–13.6) incident cases of stroke, 101 million (93.2–111) prevalent cases of stroke, 143 million (133–153) disability-adjusted life-years (DALYs) due to stroke, and 6.55 million (6.00–7.02) deaths from stroke⁵. According to the India stroke factsheet updated in 2012, the estimated age-adjusted prevalence rate for stroke ranges between 84-262/100,000 in rural and between 334-424/100,000 in urban areas⁶.

Stroke occurs when the blood flow in brain is cut off or altered. When there is any alteration in the blood flow occurs in brain, it can cause lack of oxygen to the brain cells and the brain cells begin to die. When the brain cells start to die this will lead the brain to lose its abilities such as memory, uncontrolled movements and sensory loss depending on the area affected⁷. Strokes are either occlusive (due to closure of a blood vessel) or haemorrhagic (due to bleeding from a vessel). Both types of strokes may occur at any age, including infancy, from many causes including cardiac disease, infection, trauma, neoplasm, vascular malformation and immunological disorders⁸.

Physiotherapy in the rehabilitation of stroke patients is represented by various approaches, e.g., Proprioceptive Neuromuscular Facilitation, Constraint Induced Movement Therapy, Brunnstrom technique, Bobath approach and the Motor Relearning Programme.

Bobath method developed in the 1940s by Dr. Karel and Berta Bobath (a neuropsychiatrist and a physical therapist) is a problem-solving approach to the assessment and treatment of individuals with disturbances of function, movement and postural control due to a lesion of the central nervous system^{9,10}. The goal of applying the Bobath concept is to promote motor learning for efficient motor control in various environments, thereby improving functioning¹¹.

The Motor Relearning Programme (MRP) was developed by Janet H. Carr and Roberta Shepherd around 1982 in Australia¹². It is a task-oriented approach that improves motor control focusing on relearning of daily activities. This approach includes many aspects of Motor learning theory and provides practical guidelines for retraining functional skills (e.g., balanced sitting, sitting and standing, transfer skills, gait, etc.). The approach is based on four distinct steps: 1. Analysis of the task 2. Practice of the missing components 3. Practice of the task 4. Transference of learning¹³.

II. Materials and Methodology

The study was approved by the ethical committee of University College of Physiotherapy and Faculty of Physiotherapy, Baba Farid University of Health Sciences, Faridkot. 35 patients were screened, Out of those 5 were excluded (3 did not meet the inclusion criteria and 2 declined to participate). 30 patients were included in the study based on inclusion and exclusion criteria. Inclusion Criteria: 1. Patients with impaired functional mobility and dependent. 2. Both genders Male and Female. 3. Motor deficits in upper and lower limb functions. 4. Age group between 40-60 years. 5. Patients with unilateral side of the involvement. 6. Were able to understand command. Exclusion Criteria: 1. Patients having any medical condition that affects his/her performance. 2. Patients with complete recovery in terms of walking abilities. 3. Patients with altered sensorium.

Procedure: Patients were divided into two groups, Group A-MRP (n=15) and Group B-Bobath approach (n=15) based on randomization. Randomization was done by using random number generator with A-B-A-B method. They were evaluated for the functional mobility using Barthel Index (BI), Motor Assessment Scale (MAS), and Functional Independence Measure (FIM). The study was conducted at OPD of University College of Physiotherapy, Faridkot. All the patients were thoroughly explained about the procedure prior to participation in the study and the informed consent was taken. The patients were assessed at 0th week, at 3rd week and at the end of 6th week to see the efficacy of MRP versus Bobath on functional mobility in hemiplegic patients. Treatment was given for 1 hour/session, 6 days/week for 6 weeks.

➤ **Group A:** -Subjects of Group A received MRP for 1 hour/ day, 6 days/ week for 6 weeks.

MRP Includes^{14,15}

a) Oro facial Function:

- Practice of face expression
- Jaw movements & tongue movements

b) 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 carpometacarpal 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.

c) 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

d) **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 mid position 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 mid position. Therapist assists in shoulder forward flexion over affected side, one hand on elbow and other hand on wrist.

e) **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 mid position, repeat to other side.

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

f) **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. Therapist 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 therapist assists the movement.

g) **Walking:** Retrain normal movement pattern.

➤ **Group B:** -Subjects of Group B received Bobath approach for 1 hour/ day, 6 days/ week for 6 weeks.

Bobath Includes^{7,16}

- Minimize Spasticity by positioning of the patient, stretching of the affected limb.
- Handling techniques such as pushing, pulling, holding, lifting, carrying etc. to activate movement patterns that both decrease abnormal tone and co-ordination and reeducate normal movements.
- Mobilizing shoulder girdle to make painless elevation of the shoulder.
- Reflex Inhibiting patterns are the positions used to inhibit hyper tonicity of the muscles.
- Trunk Rotation Exercises to improve mobility of the trunk.
- Facilitation technique to reinforce weak movement patterns and to discourage overactive ones by the use of sensory stimulation (tactile cues through manual contacts, verbal directions etc.)
- Facilitation to get balance and righting reactions and support on the affected arm and hand, and mobile weight on the leg, should be obtained.
- Weight shifting exercises such as forward and backward shifting, sideway shift to improve physical support and postural control.
- Weight bearing exercises such as pelvis lift using hands with extended elbow, sit on edge of the couch with feet touching the floor to induce muscle strength.
- Adaptive techniques for ADL such as bed mobility, transfers and wheel chair management.
- Postural perturbations given in order to improve balance, reactive postural control, protective reactions & equilibrium.
- Avoidance of abnormal patterns of movement (such as combined movement of shoulder, circumduction of leg during walking) because it leads to functional disability.
- Gait training done from the beginning (until patient will be able to stand) without letting the patient use a stick, so that he/she develops a symmetrical walking pattern with weight bearing on the affected leg.

III. Data Analysis and Result

Data was analyzed by using SPSS version 20. Unpaired t- test and Repeated Anova test were used to determine the effectiveness of MRP versus Bobath approach on functional mobility in Hemiplegic patients.

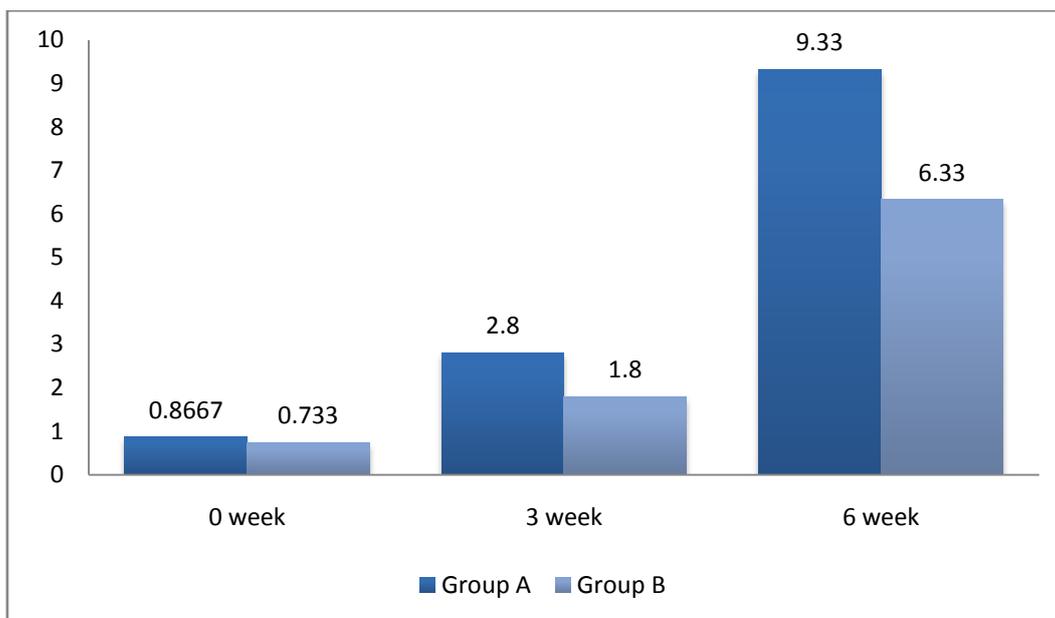


Fig 1.1: Comparison at 0th week, 3rd week and 6th week score measurements of Barthel Index between Group A and Group B

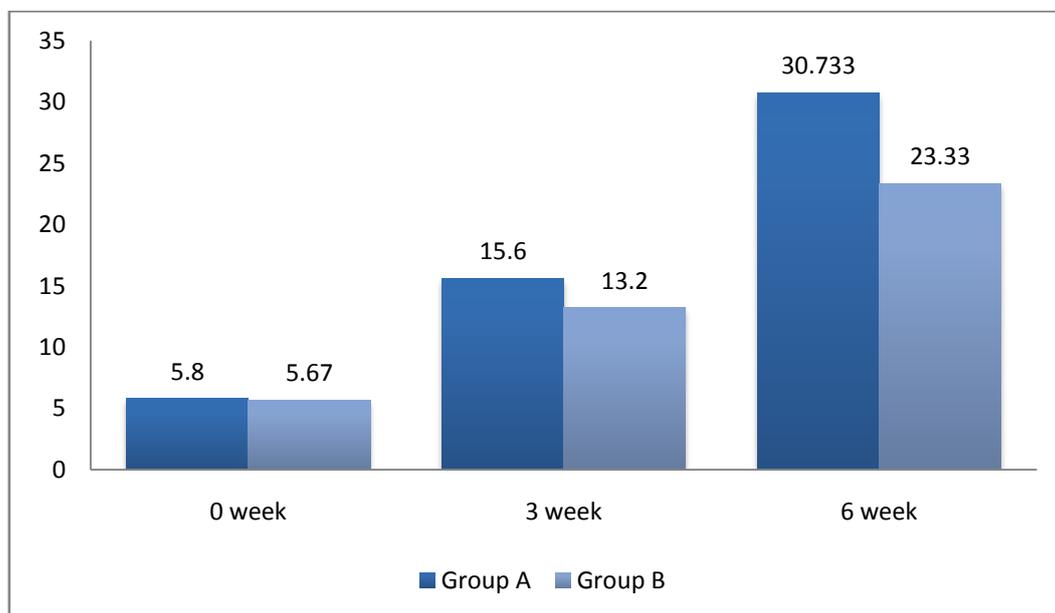


Fig 1.2: Comparison at 0th week, 3rd week and 6th week score measurements of Motor Assessment Scale between Group A and Group B

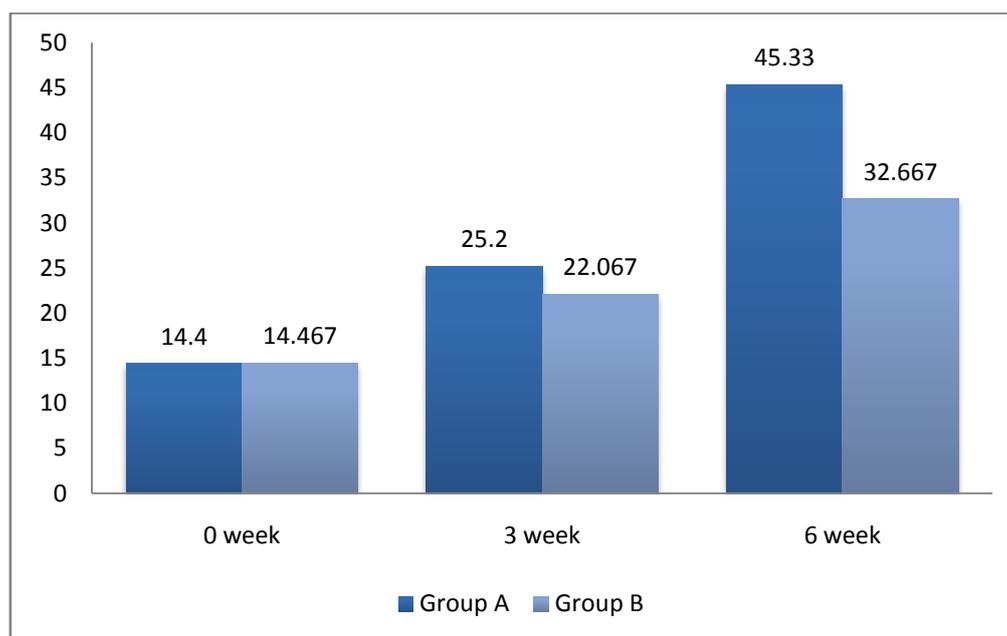


Fig 1.3: comparison at 0th week, 3rd week and 6th week score measurements of Functional Independence Measure between Group A and Group B.

Result: The result showed that there was significant improvement in BI, MAS and FIM in both the groups after 6 weeks of the treatment. But when compared between group A & B; group A showed significant improvement in BI, MAS and FIM ($p < 0.001$) as compared to group B.

IV. Discussion

This study emphasizes the use of physical therapy in Hemiplegia and present study was conducted to determine the effect of Motor Relearning Programme versus Bobath approach on functional mobility in Hemiplegic patients. Improving functional activities like eating, grooming, and bathing, dressing upper and lower, toileting, mobility and to make patient independent was the primary focus of treatment. Between group comparison indicated that both the groups Group A and B showed significant improvement in Functional Mobility measured by BI, MAS and FIM. Group A who received Motor Relearning Programme showed greater improvement measured by BI, MAS and FIM than group B who received Bobath approach.

The results of the present study are in accordance with Krutulyte G et al. (2003)¹⁷ on the effectiveness of physical therapy methods (Bobath and Motor Relearning Program) in rehabilitation of stroke patients. They concluded that physiotherapy with task-oriented strategies represented by MRP is preferable to physiotherapy with facilitation/inhibition strategies, such as the Bobath Programme in the rehabilitation of patients with stroke ($p < 0.05$). Rainy Bhuyan and Sanjiv Kumar (2018)¹⁸ carried out a randomized controlled trial showing comparison of Bobath Approach and MRP for Improvement in Gait Parameters in Patients with Stroke. The study concluded that Bobath approach and MRP are effective in improving gait in chronic stroke patients. However, MRP produced more statistically significant improvement in the outcome measures compared to Bobath approach.

In MRP, patient learned bed mobility, transfer & ambulation earlier than subjects treated with Bobath group. This is because of specificity of activity & continuous practice of those activities. During this training, subjects were given opportunity to analyze themselves the missing component & to think & plan for what can be done to correct it. This task specific training helped them to have better motor planning & motor relearning. It may cause the specific recruitment of the motor units specifically required for the task.

V. Conclusion

This study concluded that both groups, Group A who received Motor Relearning Programme and Group B who received Bobath approach are effective in improving functional mobility in hemiplegic patients. However, it is concluded that Motor Relearning Programme is more effective than the Bobath approach in reducing functional disability and improving functional mobility in hemiplegic patients after the 6 weeks of treatment.

Conflict of Interest: There is no conflict of interest.

References

- [1]. Kannabiran B, Cathrine S, Nagarani R, Senthil R.K, Sahayarah S.M. A Study on Efficacy of Bobath Technique and Motor Relearning Programme on Functional Activities in Hemiplegic Patients. *International Journal of Neurorehabilitation*. 2016; 3(6):1-5.
- [2]. Kanase SB. A study on Effect of Motor Relearning Programme and Conventional Training on Functional Mobility in Post Stroke Patients. *Indian Journal of Public Health Research & Development*. 5.2020; 11(5).496-501.
- [3]. Truelsen T, Begg S, Mathers C. Cerebrovascular Disease. *The Global Burden of Disease*. 2000; 1-67.
- [4]. Saini V, Guada L, Yavagal DR. Global Epidemiology of Stroke and Access to Acute Ischemic Stroke Interventions. *Neurology* 2021; 97:S6-S16.
- [5]. GBD 2019 Stroke Collaborators. Global, regional, and national burden of stroke and its risk factors, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet Neurology*. 2021;20(10):795-820. [https://doi.org/10.1016/S1474-4422\(21\)00252-0](https://doi.org/10.1016/S1474-4422(21)00252-0).
- [6]. Pandian JD, Sudhan P. Stroke epidemiology and stroke care services in India. *J Stroke*. 2013; 15(3):128-134.
- [7]. Annethattil A, Paul J, Sebastian J. Combined Effect of Bobath Technique and Motor Relearning Program Over Its Individual Effects to Improve Upper Limb Functions in Stroke Patients. *International Journal of Medical and Exercise*. 2017; 3(4).435-42.
- [8]. Thiagaraja T. “To Compare the Effectiveness Of Motor Relearning Programme in Improving Patient Quality of Life and Activity Daily Living for Hemiplegic Stroke Patients”. 2020 April; 3(4).6-15.
- [9]. Zanon MA, Porfirio GJM, Riera R, Martimbianco ALC. Neurodevelopmental treatment approaches for children with cerebral palsy. *Cochrane Database of Systematic Reviews* 2015, Issue 11.1-23.
- [10]. Bhalerao G, Kulkarni V. Comparison of Motor Relearning Program and Bobath Approach in acute stroke rehabilitation. *Indian journal of orthopedic and rehabilitation*. 2011 Jan; 1(1).79-88.
- [11]. Graham JV, Eustace C, Brock K, Swain E, Carruthers SI. The Bobath Concept in Contemporary Clinical Practice. *Top Stroke Rehabil* 2009; 16(1):57–68.
- [12]. Mufidah N, Wahyudi R, Hasinuddin M. The Differences between Motor Relearning Programme and Bobath Method on Standing Balance in Stroke Patients. *Journal of Global Pharma Technology*. 2020; Vol. 12(01).415-419
- [13]. Singha Ranjeet. Motor Relearning Program versus Proprioceptive Neuromuscular Facilitation Technique for Improving Basic Mobility in Chronic Stroke Patients-A Comparative Study. *International Journal of Physiotherapy and Research*. 2017; 5(6). 2490-2500.
- [14]. Carr, Janet H, and Roberta B. Shepherd. *A Motor Relearning Programme for Stroke*. Rockville, Md: Aspen Systems Corporation. 1983: 67-71.
- [15]. Carr JH, Shepherd RB. Introduction, standing up and sitting down, walking. Carr JH, Shepherd RB. *A Motor Relearning Programme for stroke*. Butterworth – Heinemann Physiotherapy 2nd Edition; 1987 (Standing up and sitting down, p.100-111), (walking, p.123-147).
- [16]. Bobath B. *Adult hemiplegia. Evaluation and treatment*. 3rd Ed. Oxford: Heinemann Medical. 1990.
- [17]. Krutulyte G, Kimtyas A, Krisciunas A. The effectiveness of physical therapy methods (Bobath and motor relearning program) in rehabilitation of stroke patients. *Medicina (Kaunas)*. 2003; 39(9): 889-95.
- [18]. Bhuyan R, Kumar S. Comparison of Bobath approach and Motor relearning program for improvement in gait parameters in patients with stroke-randomized clinical trial. *International Journal of Scientific Research*. 2018; 7(1).22-25.
- [19]. A Randomized clinical Trial to study the effectiveness of Mirror Therapy in Improving Hand Function of Stroke Patients. *International Journal of Health Sciences and Research* June 2015, Vol.5(6):360-365
- [20]. Efficacy of Trunk Rehabilitation and Balance Training On Trunk Control, Balance and Gait In Post Stroke Hemiplegic Patients: A Randomized Controlled Trial. *International Organization of Scientific Research – JNHS* 2014, 3(3):27-31

Satwinder Singh, et. al. “Effect of Motor Relearning Programme Versus Bobath Approach On Functional Mobility In Hemiplegic Patients – A Randomized Clinical Trial.” *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 21(07), 2022, pp. 01-06.