

Original Article

A STUDY ON EFFECT OF PHYSICAL THERAPY INTERVENTION WITH AND WITHOUT VISUAL AND VERBAL CUES ON BALANCE TRAINING IN THE RECOVERY STAGE OF STROKE

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ABSTRACT

Objective: Stroke is a leading cause of mortality and disability worldwide. Balance impairment is a common issue among stroke survivors, leading to increased fall risk and decreased quality of life. Visual and verbal cues have shown the potential in improving balance in stroke patients. This study aimed to compare the effectiveness of conventional therapy alone versus conventional therapy combined with visual and verbal cues in balance training during stroke recovery.

Methods: Thirty participants with post-stroke hemiplegia were randomly assigned to either a control group or an experimental group. The control group received conventional physical therapy, while the experimental group received additional visual and verbal feedback. The Berg Balance Scale was used to assess balance on the 1st, 15th, and 30th days of the study.

Results: Both groups showed improvements in balance over the course of the study. On the 15th day, the experimental group had a significantly higher mean Berg Balance Scale score compared to the control group ($p = 0.001$). On the 30th day, the experimental group still had a higher mean score, although the difference was not statistically significant ($p = 0.048$).

Conclusion: The addition of visual and verbal cues to conventional therapy showed a greater effect on balance training during stroke recovery compared to conventional therapy alone. These findings support the potential benefits of incorporating visual and verbal feedback in stroke rehabilitation programs. Further research should explore the long-term effects and sustainability of this approach to optimize balance recovery in stroke survivors.

Keywords: Stroke recovery, Balance training, Visual cues, Verbal cues

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INTRODUCTION

Stroke is a major health concern worldwide, causing significant mortality and disability rates. Ischemic stroke, resulting from disrupted blood flow to the brain, is the most common type. Prompt assessment and management of acute stroke cases are crucial, as the potential for neurological recovery decreases with each passing minute. Implementing rehabilitation programs and adopting lifestyle changes can greatly improve outcomes and alleviate the global burden of stroke [1].

Several risk factors contribute to the occurrence of stroke, including advanced age, hypertension, diabetes, smoking, cardiovascular disease, atrial fibrillation, and left ventricular hypertrophy. Hypertension is particularly significant, as it is the most dominant risk factor for stroke, affecting 75% of stroke patients. Uncontrolled hypertension can lead to various types of strokes, such as lacunar infarcts affecting specific brain regions or hypertensive intracerebral haemorrhages [2].

Atherosclerosis, primarily in larger blood vessels, is a common cause of ischemic strokes. Stroke risk factors can also differ between genders, with factors like pregnancy, gestational diabetes, and hormone use being unique to women [3]. Men generally have a higher age-adjusted risk of stroke, while women experience higher mortality and disability rates. Balance impairment is a prevalent issue among stroke survivors, with around 83% experiencing this condition. Balance problems increase the risk of falls, leading to extended hospital stays, increased medical expenses, and decreased quality of life. Stroke survivors often rely heavily on visual cues for maintaining balance and stability [4].

The Berg Balance Scale (BBS) is an assessment tool used to evaluate functional balance, consisting of 14 tasks that assess both static and dynamic balance. Initially designed for the elderly population, the BBS has shown validity and reliability across various patient groups,

including stroke patients and those with neurological conditions. It has proven to be effective in predicting fall risk, outcomes, and length of stay in rehabilitation settings. Administering the BBS is relatively quick and requires inexpensive equipment. The scale assesses tasks of increasing difficulty, with scores ranging from 0 to 4, indicating the level of independence in performing each task. A higher score reflects better balance abilities [5].

MATERIALS AND METHODS

Sample size

A group of 30 individuals who had experienced post-stroke hemiplegia were chosen as participants for the study. Prior to their involvement, all patients were provided with information regarding the study and were required to provide signed consent forms for record-keeping purposes. Subsequently, the 30 participants were randomly assigned to two groups: a control group and an experimental group, with each group consisting of 15 patients.

Subjects

30 subjects (includes male and female subjects) Males-25, Females-5 of age group 30 to 85 y.

Study design

Experimental study

Source of data

OPD of Pacific medical college and Hospital.

Inclusive criteria

1. Recovery stage of stroke.
2. Unilateral hemiparesis as a result of stroke.

3. Sustain an unassisted standing position for a duration of one minute.
4. Capability to comprehend and comply with basic directions.
5. Individuals without any orthopaedic or neurological impairments.
6. Brunnstrom recovery stage of lower limb (stage5)

Exclusion criteria

1. Bilateral stroke.
2. Visual impairment.
3. Absence of active movements in paretic limb.
4. Medically unstable (uncontrolled hypertension).
5. Uncooperative patients in the hospital.
6. Perceptual, Cognitive and Comprehensive impairment.

Data collection

After completing the inclusion criteria, subjects were randomly assigned to either the control group or the experimental group.

The measurements were taken through Berg balance scale. On 1st day, 15th day and on 30th day as the study is for 30 d or 4 w.

Group I: Control Group of 15 has received only conventional physical therapy for 4 w.

Group II: Experimental group of 15 has received conventional physical therapy and additional of visual and verbal feedback for 4 w.

Procedure

Conventional physical therapy for stroke patients focuses on enhancing muscle strength, range of motion, balance, and mobility. The therapy includes alignment training, re-educating balance and coordination through various exercises. Strategies to improve balance involve exploring stability in different directions and learning to position the center of gravity within the base of support. Symmetrical weight-bearing and activities that shift weight onto the affected side are emphasized. Postural perturbation and voluntary movements are used to stimulate normal balance synergies. Functional activities with destabilizing influences, dual-task training, and varied sensory conditions are incorporated. Computerized force-plate systems and biofeedback help enhance balance and stability. Safety education and active problem-solving skills are emphasized. The intervention includes stretching, strengthening, weight-bearing, and balance exercises, as well as functional activities. Visual training using mirrors and a vertical stripe on the patient's shirt is also employed. Physical therapy sessions are provided four days a week for four weeks, while visual training is conducted twice a week for four weeks. Pacific Medical University, Institute's ethical approval obtained dated 29/08/2022, PMU/PMCH/IEC/2022/239. All participants completed the information and consent form at recruitment.

RESULTS

On Day-15 the mean value of 47.2667 with SD of 2.49189 in Group I and the Mean value of 50.6000 with SD of 1.63881 with the "t" value 4.329000 and ($p=0.001$), which was statistically found very highly significant (table 1).

Table 1: Shows the inter group comparison of berg balance scale for Group I and Group II on Day 15

Group	N	Mean	Std. deviation	t
Group-I	15	47.2667	2.49189	4.32900
Group-II	15	50.6000	1.63881	p = 0.001 vhs

The difference of 30TH day of Group I with the mean value of 7.0667 with SD 1.46306 and Group II with mean value of 8.1333 with SD 1.45911 with "t" value 2.23000 and ($p=.048$) which was statistically found to be significant (table 2).

Table 2: Comparison of berg balance scale for group I and Group II on day30

Group	N	Mean	Std. deviation	t
Group-I	15	7.0667	1.46306	2.23000
Group-II	15	8.1333	1.45911	p = 0.048 ns

DISCUSSION

This study aimed to compare the effectiveness of conventional therapy alone versus conventional therapy combined with visual and verbal cues in balance training during the recovery stage of stroke [6]. The study included 30 patients who were randomly assigned to two groups. Both groups were assessed using the Berg balance scale, with a maximum score of 56. The results showed improvements in both groups, but the group receiving conventional therapy with visual and verbal cues (Group II) showed a greater effect on balance training than the group receiving conventional therapy alone (Group I) [7].

Group I showed progressive improvements in the Berg balance scale score, starting from an initial mean value of 43.600 and reaching 47.2667 on the 15th day, further progressing to 50.6667 on the 30th day [8]. Group II also demonstrated progressive improvements, starting from an initial mean value score of 45.0667 and reaching 50.6000 on the 15th day, further progressing to 53.2000 on the 30th day. Group II had higher Berg balance scale scores on the 30th day compared to Group I, indicating that the addition of visual and verbal cues to conventional therapy had a positive impact on balance [9].

Several other studies support the findings of this study. Research by Geiger *et al.* (2001), L. Hollands *et al.* (2013), S. Jandaghi *et al.* (2016), and Shreya Upadhyay and Neha Verma (2022) have shown the benefits of visual feedback training on balance improvement

after stroke. Nicole K Rendos *et al.* (2021) found that incorporating personalized verbal feedback during gait training could improve learning and specific gait parameters in individuals with stroke [10]. T. B. Janzen Koshimori *et al.* (2022) emphasized the role of rhythm and music-based interventions in motor rehabilitation, suggesting their potential in promoting neural plasticity and restoring motor functioning. Madhurjya Krishna Debnath and Milan Anand (2022) concluded that a combination of visual feedback, verbal feedback, and conventional physiotherapy training is effective in improving function and reducing the risk of complications in stroke patients. Dorcas BC Gandhi *et al.* (2020) highlighted the effectiveness of mirror therapy in stroke rehabilitation, and Lisa Blum and Nicole Korner-Bitensky (2008) supported the use of the Berg balance scale as an appropriate assessment tool for balance in stroke patients [11]. The findings of these studies align with the current study, providing additional support for the use of visual and verbal cues in balance training during stroke recovery.

CONCLUSION

The study demonstrated that both the control group (Group I) receiving conventional therapy alone and the experimental group (Group II) receiving conventional therapy along with visual and verbal cues showed positive effects on balance training in stroke recovery. However, the group receiving conventional therapy with visual and verbal cues displayed greater effectiveness compared to

conventional therapy alone. The results support the research hypothesis and reject the null hypothesis, indicating that incorporating visual and verbal cues in balance training during stroke recovery is indeed more effective than conventional therapy alone.

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Nil

AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

CONFLICT OF INTERESTS

Declared none

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