



EFFECTIVENESS OF SEMONT MANEUVER ALONG WITH VESTIBULAR REHABILITATION IN ADULT WITH BENIGN PAROXYSMAL POSITIONAL VERTIGO: RCT

Physiotherapy

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ABSTRACT

Background: BPPV is defined as an inner-ear disorder characterized by repeated episodes of positional vertigo. Vertigo and balance disorders are the most relevant factors among older adults and associated with immobility, decreased participation and ADL. In BPPV, SM is preferred, in which vestibular debris is shifted from the semilunar-canal by rapidly putting the patient in various positions. VR is an exercise-based therapy, which consists of various eye, head and body movements to stimulate the vestibular-system.

Objective: The purpose of the study was to find the effectiveness of SM in adult people to reduce symptoms, improve balance and QoL with BPPV. **Study design:** RCT

Methods: In 4-weeks interventional study, 30 participants with features of BPPV were studied. They were divided into 2 groups by simple random sampling; Group A: experimental group and Group B: control group. Pre and post-treatment data were collected and analyzed using SPSS 22.0. McNemar and Paired t-test were used to find out the significance of the treatment.

Results: A significant improvement was found in balance through the BBS and reduced symptoms through Dix-Hallpike test ($p < 0.05$) after treatment. A greater statistically significant difference was seen in Group A.

Conclusion: The study concluded that the combined effect of SM along with VR shows significant improvement in reducing symptoms of BPPV and improve the balance and QoL.

KEYWORDS

BPPV, SM, Vestibular Rehabilitation, Dix-Hallpike test, BBS.

Background:

Vertigo, dizziness and balance-disorders are the most relevant factors influencing the burden of disability among older adults^[1] and are associated with immobility, limitations in activities of daily living (ADL) and decreased participation.^[2] Dizziness is a non-specific term used by patients to describe several symptoms ranging from true vertigo, lightheadedness, disorientation or sense of imbalance.^[3] It is a frequent complaint with a reported prevalence of dizziness in approximately 30% of older adults, affecting more women (36%) than men (22%). Importantly, its prevalence rises with age.^[4]

Positional vertigo is defined as a spinning sensation produced by changes in head position relative to gravity. Benign paroxysmal positional vertigo (BPPV) is defined as a disorder of the inner-ear characterized by repeated episodes of positional-vertigo.^[5] BPPV is an inner-ear disorder in which changes to the position of the head, such as tipping the head backward, lead to sudden vertigo—a feeling that the room is spinning.^[5]

BPPV is the most common vertiginous-disorder in the community. The cardinal symptom is sudden vertigo induced by a change in head-position: turning over in bed, lying down in bed, looking up, stooping, or sudden change in head-position.

There is a wide spectrum of severity. Mild-symptoms are inconsistent positional-vertigo. Moderate symptoms are frequent positional attacks with disequilibrium. When severe, vertigo is provoked by most head-movements, giving an impression of continuous vertigo. The symptoms can last for days, weeks, months, years, or be recurrent over many years.^[6] BPPV occurs when tiny calcium particles-canaliths are dislodged from their normal location and collect in the inner-ear. The inner-ear sends signals to the brain about head and body movements relative to gravity. It helps to keep balance.^[7]

BPPV (Posterior Canal) is now recognized as the most common cause of vertigo in adults. It is estimated that 2.4% of people experience at least episode in their life.^[8]

The relationship between canal receptors and extra-ocular muscles. Each receptor is connected to ipsilateral and contralateral muscle. Posterior Canal BPPV (PC-BPPV) is diagnosed by the Dix-Hallpike test. The patient must experience vertigo.^[9]

The most common cause of dizziness is peripheral vestibular disease, including BPPV and vestibular neuronitis.^[10,11] In BPPV, Semont

Maneuver(SM) is preferred, in which vestibular debris is shifted from the semilunar-canal by rapidly putting the patient in various positions. The treatment has been proven to be safe and can easily be performed.^[12]

SM: The patient turned rapidly into the position that provokes vertigo and kept in that position for 4 minutes. Then patient is moved quickly to opposite position with normal ear down. After some time, patient asked to sit slowly in upright position.^[13]

Vestibular rehabilitation (VR) is an exercise-based therapy, which consists of various eye-head-body movements to stimulate the vestibular system. According to a recently updated Cochrane review, there is moderate-to-strong evidence that VR is a safe and effective treatment for peripheral vestibular disease.^[14]

According to previous study no evidence shows the effectiveness of SM with VR in adult people with BPPV. So, the aim and need of study were to find out the effectiveness of SM with VR in adult people with BPPV.

The purpose of the study was to find out the effectiveness of SM to reduce symptoms, improve balance, and ADL of life in adult with BPPV.

Two Hypothesis were formulated: [H₀] There is no significant effect of SM along with VR to reduce symptoms, improve balance & QoL in adults with BPPV. [H₁] There is significant effect of SM along with VR to reduce the symptoms, improve balance & QoL in adults with BPPV.

METHODOLOGY:

METHOD

Study-design: Randomized Controlled Trial

Study-technique: Simple Random Sampling (lottery-method)

Sample size: 30 participants

Study-setting: Nootan College of Physiotherapy

Study-duration: 6 Months (September 21-February 22).

SELECTION CRITERIA

INCLUSION CRITERIA

- PC-BPPV
- Age : 25-45 years
- Gender: Male-Female both
- Person with impaired balance & co-ordination
- Participants who were taking pharmacological-treatment for

- BPPV
- Unilateral involvement

EXCLUSION CRITERIA

- Dizziness due to hypoglycaemia, Migraine or side-effect of medication
- Any neurological conditions
- Mental-retardation
- Obesity
- Meniere's disease(currently)
- Panic-disorder
- Postural-hypotension
- Cervicogenic-vertigo
- Vertebrobasilar-insufficiency
- Labyrinthitis.

The pre-evaluation included detailed assessment and functional scale of the participants. The balance was assessed by BBS and symptom(dizziness) by Dix-Hallpike test.

Treatment: Treatment was given in experimental group. In SM, the first participant was in high sitting position at the edge of the plinth. The therapist standing in front of patient.

The therapist grasps the head of the patient and turn 45° to the unaffected-side. Then quickly lie-down on affected-side. Stay there for 30 seconds.(Figure 1) Don't change the direction of head. Keep it at a 45° angle and lie for 30 seconds. And look at the floor. Slowly return to sitting and wait a few minutes. Repeat these moves for unaffected-side. Along with SM therapist will perform VR.VR includes Cawthorne-Cooksey Exercises. It can perform various positions: sitting-standing-while moving.

Post-intervention evaluation was done. Each participant was evaluated before the First session and after the last session.

All statistical analysis was done using SPSS 22.0 software for windows. Descriptive analysis was obtained by mean & standard deviation. Intergroup comparison between Group A & B of pre & post-treatment of BBS and Dix-Hallpike were done using an unpaired t-test. Intragroup comparison of pre & post-treatment scores of BBS and Dix-Hallpike within Group-A and B were done using paired t-test.



Figure 1: Semont Maneuver (by therapist)

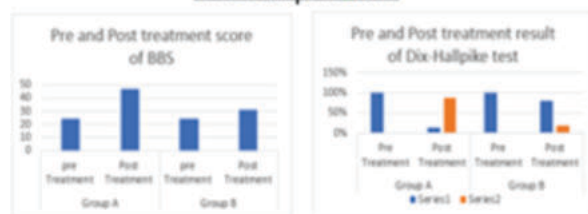
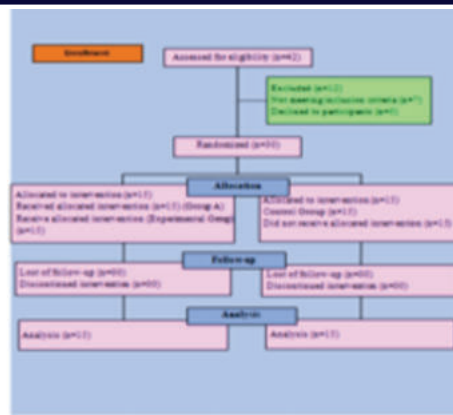
Treatment Protocol

- 1st Week: SM and VR 4/day for 4 days.
- 2nd Week: SM and VR 3/day for 4 days.
- 3rd Week: SM and VR 2/day for 3 days.
- 4th Week: SM and VR 2/day for 2 days(self).

RESULTS:

Total 42 participants were selected. Among them 7 Participants didn't met the inclusion-criteria and 5 participants decline to participate in the study due to their personal reason. So, 30 participants with BPPV were selected.[Diagram 1]

The result found in this study disclosed that after 4 weeks treatment-program. A significant improvement was found in balance through BBS and reduced symptoms through Dix-Hallpike test ($p < 0.05$) post-treatment. A greater statistically significant difference was seen in Group A as compared to Group B.



Graph 1: Pre and Post treatment score of BBS Graph 2: Pre and Post treatment result of Dix-Hallpike test

Table 1: Demographic Data

Demographic details		Group A	Group B
Age	Mean	37.27±6.041	34.27±5.444
	SD		
Gender	Male	40%	40%
	Female	60%	60%
Affected Side	Right	46.70%	60%
	Left	53.30%	40%

Table 2: Pre and Post treatment score of BBS

Outcome	Group A				Group B			
	pre Treatment mean±SD	Post Treatment mean±SD	t-value	p-value	pre Treatment mean±SD	Post Treatment mean±SD	t-value	p-value
BBS	24.13±5.743	46.85±0.057	-25.702	0	24.67±3.994	31.13±4.24	-14.17	0

Table 3: Pre and Post treatment result of Dix-Hallpike test

Outcome		Group A		Group B	
		Pre Treatment	Post Treatment	Pre Treatment	Post Treatment
Dix-Hallpike test	Positive	100%	13%	100%	80%
	Negative	0%	86.70%	0%	20%

DISCUSSION:

BPPV is the most common form of dizziness and becomes more prevalent with age. It most commonly occurs after a head-trauma, infections, chemical changes in the body. BPPV is a dysfunction of the inner-ear. In BPPV the canaliths are out of place and in the posterior-canal of vestibular organ, they may try to reposition them with the SM. The aim of SM is used to reposition the calcium-crystals in vestibular system.

David S. Haynes et al. concluded that the SM provides relief of vertigo in patients with positional vertigo, even in patients without objective nystagmus. In this study, the effectiveness of SM in the patient with BPPV was described. Improvement was seen in 91% of patients with objective BPPV SM on average.[15]

From the available and accessible literature, there was no single study on the effectiveness of SM along with VR in adult with BPPV in any published literature.

This study was conducted on 30 participants with mean age of 37.27 ± 6.041 (mean ± SD). The participants were divided into two groups, Group A-who received SM with VR and Group B who receive VR for 4 weeks. In this study, BBS and Dix-Hallpike test were used as outcome measure.

The results obtained in this study state that, after 4 weeks of treatment

program, among two groups, Group-A, who received the SM along with VR, whereas in Group-B, who received VR. The result showed significant changes in outcome in pre and post-treatment stages. Though, a significant improvement was found after 4 weeks of treatment in Group A which shows greater improvement in BBS and Dix-Hallpike test (p -value < 0.05).

Hence, the alternative hypothesis[H1] is failed to reject.

The above-exposed statement suggests that the combined treatment of SM with VR is the more effective management of participants with BPPV for reducing symptoms and improving the balance, function and QoL.

- LIMITATIONS of this study were small sample size, participants involve only with acute BPPV and this study was conducted with adults.
- RECOMMENDATIONS of this study are the study can be done with long-term follow-up, with large sample size and with other outcomes and gender prevalence.

CONCLUSION:

The study concluded that with the combined effect of SM along with VR, experimental group shows statistically more significant improvement in reducing symptoms of BPPV and improve the balance and QoL than the control group.

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