SHORT REPORT

Effects of Half-Somersault and Brandt-Daroff exercise on dizziness, fear of fall and quality of life in patients with posterior canal benign paroxysmal positional vertigo: A randomised control trial

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Abstract

The aim of this study was to compare the effects of Half-Somersault and Brandt-Daroff exercises on dizziness, fear of fall, and quality of life in patients with posterior canal benign paroxysmal positional vertigo (PC-BPPV). This study was conducted from July 2020 to November 2020. A total of 20 patients were enrolled in the study, through sealed envelope method, and assigned to two groups, A and B (10 in each). Vestibular activity and participation measure and Fall Efficacy Scale (FES) were used. The mean age of the patients was 36.70±11.58 years. There was a significant (p=0.05) difference between the Vestibular activities and participation measure (VAP) score at post intervention and Fall Efficacy Scale (FES) (p<0.05) between the groups. Within group analysis showed significant results (p=0.01). This study concluded that both manoeuvers are significantly effective in the treatment of PC-BPPV, but patients treated with Brandt-Daroff exercises reported more improvement in terms of quality of life and residual dizziness compared to the Half Somersault group.

Keywords: Benign paroxysmal positional vertigo, dizziness, vestibular rehabilitation.

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Introduction

Benign Paroxysmal Positional Vertigo (BPPV) is the vestibular disorder that usually occurs and is viewed as one of the utmost succeeding causes of dizziness.[1] Vertigo is basically initiation of movement that could be rocking, tilting, dropping or spinning movements.[2] The clinical conditions associated with BPPV are hearing loss, vertigo, tinnitus, gait disturbance and poor balance which eventually lead to postural changes accordingly expanding risk of falls and decreasing quality of life.[3] Typically, there are episodes of serious vertiginous giddiness which are set off by explicit head position, and generally continue for a moment. Among the most frequent disorders, vertigo and dizziness are the commonest to be observed by a physician.[4] As a matter of fact, this condition is associated with little spells of vertigo on moving the head, causing the person to feel dreaded with respect to head developments and, hence, limit their everyday life out of fear of increasing the risk of falls.[5]

There are different ways to treat PC-BPPV, including Epley's Manoeuver (Canal repositioning), Brandt-Daroff work out (Habituation work out), and Half-Somersault Manoeuvre (Head position activities) and literature confirms that these manoeuvres achieve the Central Nervous System (CNS) adaptation and compensation.[6]

A number of studies have been done on different manoeuvres, but no study is available to-date which compares these manoeuvres, i.e. Brandt-Daroff exercises and Half Somersault manoeuvre. So, the purpose of this study was to compare these techniques to find which one is more effective in treating PC-BPPV so that other risk factors could be minimised, which will ultimately improve the patient's quality of life.

Methods and Results

This was a single blind randomised control trail registered in Clinical Trials.gov identifier (NCT number): NCT04469309, and was conducted from July 2020 to November 2020. After approval from the ethics review committee of Riphah College of Rehabilitation Sciences, Islamabad, randomisation of the participants was done through sealed envelope method with non-probability convenient sampling technique. The study was carried out at the Physical Therapy Department of Hayatabad Medical Complex (HMC) and Irfan General Hospital (IGH) Peshawar. The sample size of the study was calculated using the Open-epi online sample size calculator,[7] which

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Table-1: Intergroup Analysis of VAP and FES with mean and standard deviation and p- value.

Variable	Group	Baseline		After Intervention	
		Mean (SD)	p-value	Mean (SD)	p-value
VAP	Group A	47.60 ±4.993	0.08	18.30±5.870	0.05
	Group B	43.90 ±3.957		24.10 ±6.919	
FES	Group A	42.10 ±3.542	0.23	22.90 ±1.370	0.01
	Group B	39.80±4.686		28.50 ±3.629	

VAP: Vestibular Activity Participation Questionnaire.
FES: Fall Efficacy Scale.

Table-2: Intra Groups Analysis of VAP and FES with Mean and Standard Deviation, Mean difference and p values.

Variable		Pre (Mean±SD)	Post (Mean±SD)	Mean difference (Mean±SD)	p-value
Group A	VAP	47.60 ±4.993	18.30 ±5.870	2.30 ±3.26	0.01
	FES	42.10 ±3.542	22.90 ±1.370	2.65 ±0.84	0.01
Group B	VAP	43.90±3.957	24.10 ±6.919	4.87±1.54	0.01
	FES	39.80±4.686	28.50 ±3.629	4.24 ±1.34	0.01

VAP: Vestibular Activity Participation questionnaire.
FES: Fall Efficacy Scale.

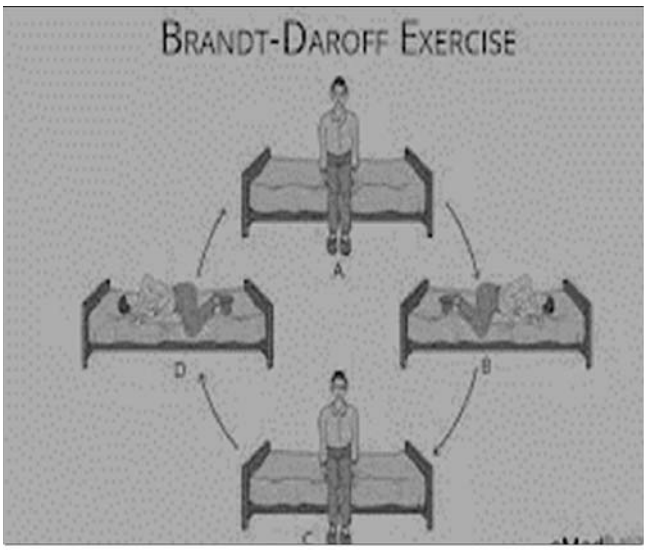

Figure-1:

was 32 (16 in each group) but due to Covid-19 only 20 patients could be taken. The mean and standard deviation of Vestibular Activity and participation measure was taken from previous literature with confidence interval 95% and power 80. Written informed consent was obtained from each participant prior to data collection. The flow of participants is shown in Figure-3. Patients with PC-BPPV (diagnosed with Dix-Hallpike manoeuvre), age 25 to 50 years, and Dizziness Handicap Inventory score 36-42 (moderate handicap) were part of this study. Patients presenting with cupulolithiasis,

Figure-2:

bilateral BPPV, or nystagmus of any other direction or stemming from other peripheral or central vestibular disorders were excluded. Tools used in the study were Fall Efficacy Scale (FES) and Vestibular Activities and Participation Measure (VAP). The Fall Efficacy Scale is used to assess a person's fear of falling while engaged in various activities. The scoring scale is from 16-64 points.[8] Vestibular Activities and Participation Measure (VAP) is a self-report inventory that has 34-items and is used for evaluation of the effects of dizziness and/or balance problems on their ability to perform activity and participation tasks.[9] After recruitment of the participants, all participants were randomly divided into two groups, i.e. Group A and Group B by sealed envelope method. Pre-intervention assessment was made for both the groups. VAP and FES were assessed at baseline. The participants of Group A used Brandt-Daroff exercise, while Group B participants did Half Somersault manoeuvre. A therapist helped the patients to do the exercise and then the patients were guided for home exercise, i.e. Brandt-Daroff exercise for group A and Half Somersault for group B. Brandt Daroff exercise was performed on a couch or bed where the patient can fully lie down in a horizontal position (Figure-1). The patients were instructed to lie on their left side with the nose pointed 45° upward (head turned toward the right); wait for 20 seconds; sit upright, keeping the head turned to the right; wait for 20 seconds; lie on the right side with the nose pointed 45° downward (head remains turned toward the right); wait 20 seconds; remain on the right side but turn the nose to 45° above the horizontal (head now turned toward the left); wait for 20 seconds; sit upright, keeping the head turned to the left; wait for 20 seconds; lie on the left side with the nose pointed 45° downward (head remains turned toward the left); wait for 20 seconds (10 minutes total). The Somersault position is assumed, with the chin tucked as far as

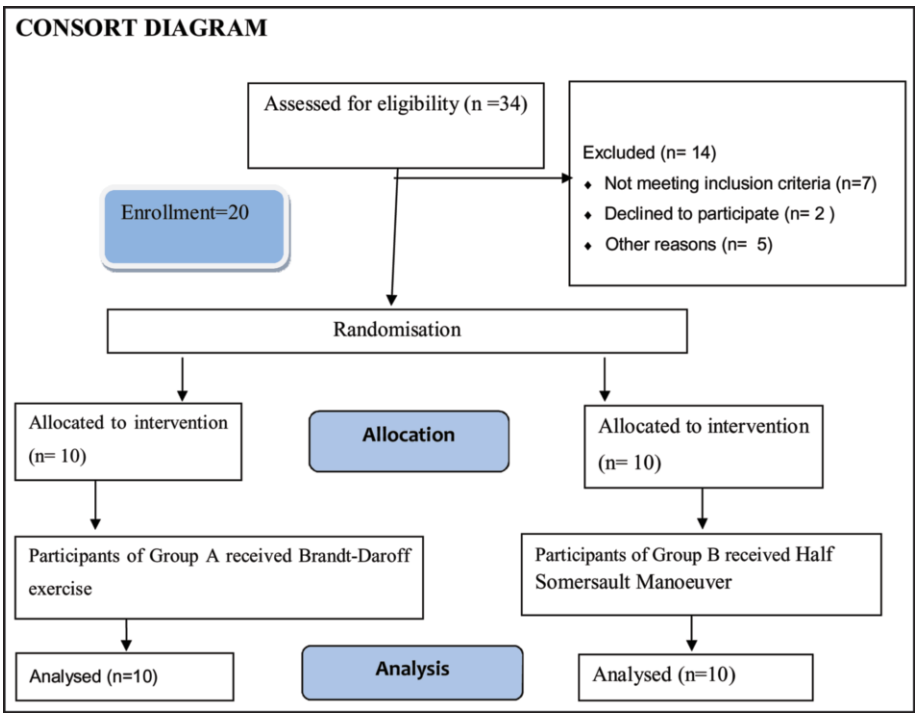

Figure-3: Consolidated Standards for Reporting of Trials (CONSORT) diagram.

possible toward the knee. After that, the head is turned about 45° toward the right shoulder, to face the right elbow. Then, maintaining the head at 45°, the head is raised to the back/shoulder level. Eventually, maintaining the head at 45°, the head is raised to the full upright position. After each position change, any dizziness is allowed to subside before moving on to the next position; if there is no dizziness, the position should be held for 15 seconds (Figure-2). To make sure that the experimental group correctly performed the HSM, they had to do it at the hospital first under the supervision of the main investigator. The total of 8 sessions were held (twice a day, 2 days a week, for 2 weeks).[10] First assessment was at baseline, and the second assessment was done after two weeks. SPSS version 22 was used for data analysis. Shapiro-Wilk test was used to assess the normality of data. Parametric tests were applied. For inter group analysis independent sample t-test was used, while for intra group analysis paired sample t-test was used.

The mean age of the participants in group A was 34.10±14.32 years and in group B it was 29.30±7.93 years, with mean age of each group being 36.70±11.58 years. In group A, there were 8 (80%) male participants and 2 (20%) females. In group B, 6 (60%) participants were males and 4 (40%) were female. Inter group analysis noted that group A showed greater improvement as compared to Group B after intervention on VAP scale (p=0.05) and FES(p=0.001), as shown in Table-1. For intra group analysis Paired T test was applied and both groups showed significant improvement post intervention (p=0.001) as shown in Table-2.

Discussion

The results of the study suggested that in inter group analysis the FES scale showed significant (p<0.05) results, while the results of VAP scale was non-significant (p>0.05). Whereas in within the group analysis the results were equally significant (p<0.05) for both the scales. The results of the study revealed that both the treatments were equally effective. These results are supported by a study on comparing efficacy of "Epley's Manoeuver and Half Somersault Exercise with Brandt-Daroff exercise" in patients with Posterior Canal BPPV.[11] The results of the study suggested that the Half Somersault Exercise with Brandt-exercise programme might be the treatment of choice for the therapist in reducing self-perceived handicap in patients with pc- BPPV as its results were highly significant.[12] Research carried on the comparison of "Half Somersault versus Epley Manoeuvre for Benign Positional Vertigo indicated that both exercises are effective when used as a home-base exercise for patients, though "Epley manoeuvre" was not as effective as Half Somersault. Another study on comparing effects of Epley, Semont Manoeuvres and Brandt-Daroff Exercise on Quality of Life in Patients with PC-BPPV" reported that there was significant alteration in pre/post VAP scores. This reveals that all three methods had positive effect on the quality of life in patients with Posterior Canal BPPV.[13] Whereas in the current study, the Brandt-Daroff Exercise group showed more improvement on the VAP and FES scale. However, the subjects reported more dizziness during the Half Somersault than during the Brandt-Daroff Exercise, and this difference was also statistically significant. The following limitations need to be considered: full vestibular testing including vHIT (video head impulse test) & VEMP (Vestibular evoked myogenic potential) to explore possible cryptogenic vestibular comorbidities should be done. Moreover, a study should be done to assess the long-term or retention effects. It is suggested that in future studies to assess the effects of these

manoeuvres in elderly patients should be conducted.

Conclusion

This study concluded that both manoeuvres are significantly effective in the treatment of posterior canal BPPV, but patients treated with Brandt-Daroff exercises reported more improvement in terms of quality of life and residual dizziness as compared to Half Somersault group.

Disclaimer: This study was a part of MS thesis project.

Conflict of Interest: None.

Source of Funding: None.

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