

**COMPARATIVE EFFECTS OF SEMONT LIBERATORY MANEUVER
VERSUS CAWTHORNE COOKSEY EXERCISES ON POSTERIOR CANAL
BENIGN PAROXYSMAL POSITIONAL VERTIGO
(BPPV)**

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ABSTRACT

Background: Benign paroxysmal positional vertigo refers to a vestibular disorder resulting from the shift of otoliths within inner ear that causes vertigo spells. Therapeutic procedures that entail purposeful movements and exercises are employed to cure symptoms; these include; Semont Liberatory Maneuver (SLM) and Cawthorne-Cooksey Exercise (CCE). The most common cause of vertigo is benign paroxysmal positional vertigo impacts between 20% and 40% of patients with peripheral vestibular disease affecting the PC.

Objective : To determine effect of Semont Liberatory Maneuver VS Cawthorne-Cooksey Exercise (CCE) in posterior canal BPPV vertigo

Methods: This was randomized control trial data collected from Allied Hospital and National hospital Faisalabad. Twenty-eight patients with BPPV participated. 2 intervention groups were formed Group A received SLM and group B undergone CCE in this study. The intervention was performed three times per week for 3 weeks. Liberatory maneuver depends on the theory of cupulolisthiasis. SPSS version 20 was utilized for the analysis of the data.

Results :Non-significant difference ($p=0.770$) was found between groups in visual analogue scale in pre-treatment with mean \pm SD of group A (73.504 ± 10.511) and group B (82.0363 ± 10.420) between the two groups. It was found that there existed non-significant difference ($p=0.211$) between groups in post treatment with mean \pm SD of group A (52.964 ± 15.593) and group B (35.1520 ± 8.79538). The statistical test did not discover sufficient evidence.

Conclusion :This study concludes that the results of the two therapy approaches do not differ statistically significantly. Although it is evident from the statistical analysis that the interventions individually are effective in the treatment and management of the symptoms of lightheadedness in the patients with PC BPPV but none of the intervention is better or more effective than the other.

Keywords: Vertigo; lightheadedness; Cupulolisthiasis; Semont Maneuver; CCE; BPPV

INTRODUCTION

Lightheadedness in patients may include vertigo, which is the false perception of movement in one's environment or oneself. Among the most common kinds of vertigo is BPPV. Benign means that "this is not so critical". You are not in risk. Paroxysmal is defined as that it starts abruptly, continues for a short period and comes and goes. The word position means that you activate vertigo with some posterity and through head movement. Benign paroxysmal positional vertigo (BPPV) is the condition of inner-ear, which is a very frequent reason of giddiness, a very definite type of unsteadiness, which produces the sensation that your surrounding is in a circular motion (1). The term BPPV is also characterized by alteration in head position in relation to gravity. BPPV including the posterior semicircular canal can be identified on the basis of nystagmus buildup in an ascendant and torsional way (2). One disorder that has only vestibular symptoms is BPPV, which is characterized by attacks of acute vertigo of short duration that occur when head is held in particular position gets changed (3, 4).

As per World health organization (WHO) the quantity of people 60 years or more will be 37% by 2050 in many of the agricultural nations. In the last ten years, it has been estimated that 50% of people have BPPV (BPPV), and that 85% of people with inner ear defects have vertigo and balance problems. The prevalence of Harmless Paroxysmal Positional Lightheadedness is 2.4% everywhere.(5)The short spinning sensations that characterize BPPV are typically resulting from a change in the head's orientation with respect to gravity (2)Significant functional impairment is linked to BPPV (BPPV), which is characterized with a change in head position relative to gravity. Although some people may have prolonged symptoms and be severely incapacitated, therapeutic maneuvers can relieve their symptoms (6) Physical examination of symptoms such as vertigo, head movement dizziness, and the Dix-Hallpike positioning test are used to diagnose BPPV. For the diagnosis and prognosis of posterior canal BPPV, the Dix-Hallpike positioning test is helpful. DHI aids in BPPV screening, and one of its components assesses the quality of life for BPPV patients based on a number of criteria. (7) While most patients experience spontaneous resolution of BPPV within weeks or months, repositioning techniques and vestibular rehabilitation (VR) exercises are believed to be safe and effective treatments. (8)

Many repositioning techniques, such as the "Semont liberatory manoeuvre," are useful in treating the majority of patients. These techniques "free" or move otolith debris or crystal

from the cupula or associated canal to the sac of utricula. Because the manoeuvres are safe, patients who experience recurring BPPV attacks or who do not respond to the initial therapy may benefit from repeating the application in consecutive sessions. (9) Posterior canal BPPV is treated using Cawthorne-Cooksey exercises, which involve head, eyes, and balance movements. They lessen the occurrence of vertigo by helping to stabilise the brain in reaction to altered movement sensations brought on by the migration of otoconia, or calcium carbonate deposits, from the posterior semicircular canal. (10) Participants with posterior canal benign paroxysmal positional vertigo showed a statistically significant increase in balance confidence and a reduction in the degree of dizziness after performing the Cawthorne-Cooksey exercise, according to Divya S et al. (11)

MATERIALS AND METHODS

The study design was randomized clinical trial where population was selected from physiotherapy department of Allied Hospital Faisalabad and National hospital Faisalabad. Study ran from march 2024 to july 2024. Convenience sampling was used

Study sample of 28 was taken after calculation from EpiTool

Input Data			
Confidence Interval (2-sided)	95%		
Power	80%		
Ratio of sample size (Group 2/Group 1)	1		
	Group 1	Group 2	Difference*
Mean	68	76	-8
Standard deviation	5.01	9.35	
Variance	25.1001	87.4225	
Sample size of Group 1	14		
Sample size of Group 2	14		
Total sample size	28		

Figure 3.1 Sample size calculation

Female 25-45 years ,Acute cases of BPPV ,Participants physically capable of undergoing the Semont Maneuver, Positive DHT were included .Patients with active vertigo complaints ,Patients with progressive vascular pathology ,Patients having neck fragility or neck instability ,Patients who had some brainstem or cerebellar signs and Patients suffering from cognitive and perceptual issues were excluded.Lightheadedness in patients with PC BPPV with VAS for vertigo Emotional, functional and physical stability of patients with PC BPPV Improvement in the QOL of sufferers with PC BPPV with DHI used as assessment tools.2 groups were made Group A received the semont liberatory maneuver Group B received cawthorne cooksey exercises intervention 3 times per week for 3 weeks. Data was analyzed through SPSS 20. Descriptive Statistics show the frequency distribution of tables, bar and pie charts was use for summarize the groups measurements which was measured over time.

RESULTS

Table 1 Mean ±SD of Age of the Patients

	Treatment Groups				Total	
	Group A		Group B		N	Mean ±SD
	N	Mean ±SD	N	Mean ±SD		
Age of Patient	16	36.3125±7.462	17	34.2941±5.860	33	35.2727±6.658

shows mean and SD of age of students in group A (36.3125±7.4620) and in group B (34.2941±5.860) with the total of (35.2727±6.658).

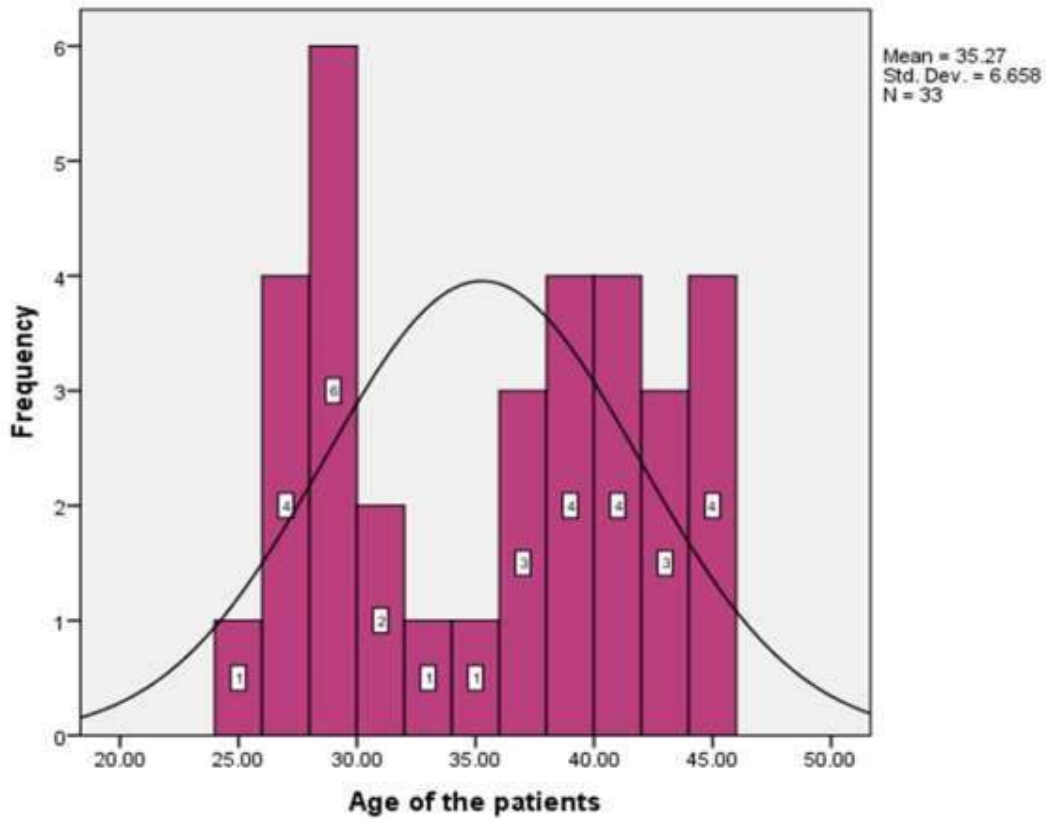


Figure 1: Histogram of age of the students show N=33 with mean 35.27 and SD

6.658.

Table 2: Between groups comparison of VAS at Pre and Post treatment

Outcome	Treatment Groups						P value
	Group A			Group B			
	N	Mean	SD	N	Mean	SD	
VAS – Pre Treatment	16	73.5047	10.51108	17	82.0363	10.42040	0.693
VAS – Post Treatment	14	52.9642	15.59397	14	35.1520	8.79538	0.211

Independent sample t test was applied for between groups comparison for VAS. There was non-significant difference ($p=0.770$) among groups in visual analogue scale in pretreatment with mean \pm SD of group A (73.504 ± 10.511) and group B (82.0363 ± 10.420) among both the groups. Non-significant difference was found ($p=0.211$) among the groups in post treatment with mean \pm SD of group A (52.964 ± 15.593), group B (35.1520 ± 8.79538).

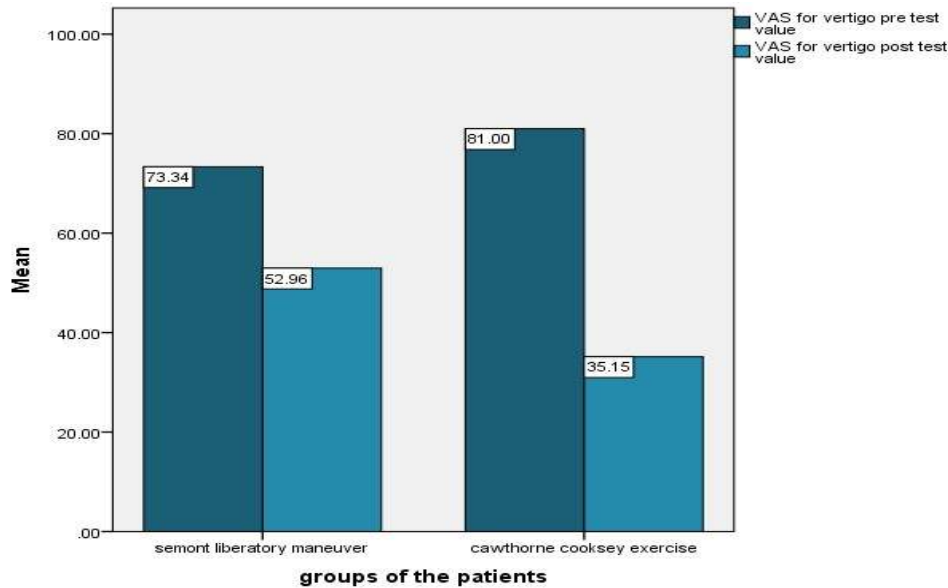


Figure 3: Bar Chart show difference between both groups at pre and post assessment of Visual Analogue scale (VAS) for vertigo

Table 3 Between groups comparison of DHI at Pre and Post treatment

Outcome	Treatment Groups						P value
	Group A			Group B			
	N	Mean	SD	N	Mean	SD	
DHI pre-test values	16	70.4226	12.66750	17	73.0649	10.14612	0.511

DHI values	post-test	14	42.5121	9.29357	14	24.3613	7.97031	0.819
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Independent sample t test was applied for between groups comparison. There was nonsignificant difference (p=0.511) between groups in group A SLM in pretreatment with mean \pm SD of group A (70.4226 \pm 12.66750), group B (73.0649 \pm 10.14612). Nonsignificant difference was found (p=0.819) between groups in post treatment with mean \pm SD of group A (42.5121 \pm 9.29357), group B (24.3613 \pm 7.97031).

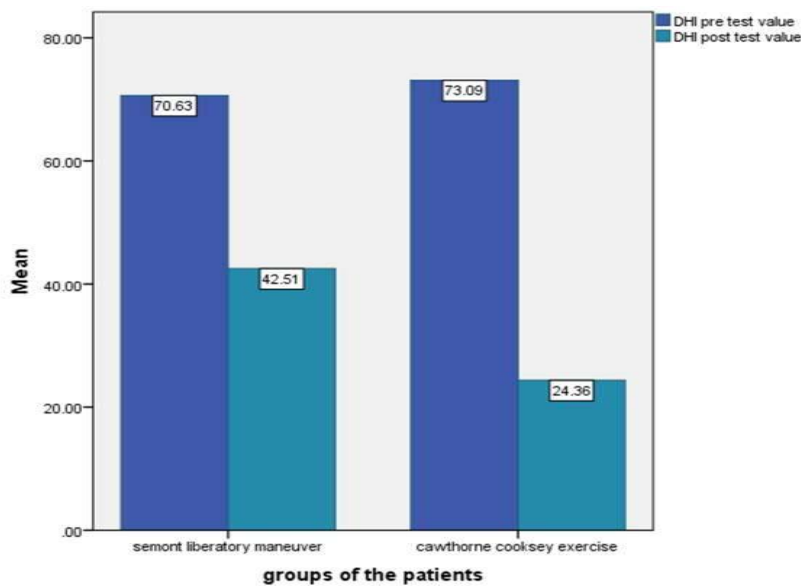


Figure 4 Bar Chart Bar Chart show difference between both groups at pre and post assessment of Dizziness Handicap Inventory (12) for vertigo.

Table :4. Paired Samples Statistics for VAS

	Mean	N	Std. Deviation	Std. Error Mean
VAS for vertigo pre-test value	73.3413	14	7.22421	1.93075
VAS for vertigo posttest value	52.9642	14	15.59397	4.16766

Paired sample t test was applied for within group difference. The paired sample statistics indicated the values of mean pre-test as 73.3413, standard deviation of 7.22421 while the standard error mean came out to be 1.93075. On the contrary, posttest reading of the VAS indicated the values of mean as 52.964 standard deviation of 15.59397 while the standard error mean came out to be 4.16766.

Table 5: Paired Samples Test for VAS

	Mean	Std. Deviation	Std. Error Mean	Sig.(2-tailed)
VAS for vertigo pre-test value - VAS for vertigo post-test value	20.37708	12.00706	3.20902	.000025

Paired t test is applied to find the mean difference within two groups. The values of mean came out to be 20.37708, standard deviation 12.00706, standard error mean 3.20902 and the significance p value within two groups was ($p = <0.00025$).

Table 6: Paired Samples Statistics for DHI

	Mean	N	Std. Deviation	Std. Error Mean
DHI pre-test value	73.0896	14	9.55667	2.55413
DHI post-test value	24.3613	14	7.97031	2.13015

Paired sample t test was applied for within group difference. The paired sample statistics of DHI indicated the values of mean pre-test as 73.0896, standard deviation of 9.55667 while the standard error mean came out to be 2.55413. On the contrary, post-test reading of the DHI indicated the values of mean as 24.3613 standard deviation of 7.97031 while the standard error mean came out to be 2.13015.

Table 7: Paired Samples Test for DHI

	Mean	Std. Deviation	Std. Error Mean	Sig. 2tailed
DHI pre-test value - DHI post-test value	48.72837	10.30566	2.75430	.0000

Paired t test is applied to find the mean difference within two groups for DHI. The values of mean came out to be 48.72837, standard deviation 10.30566, standard error mean 2.75430 and the significance p value within two groups was ($p = <0.0000$).

DISCUSSION

It was found that there existed nonsignificant difference ($p=0.211$) between groups in post treatment with mean \pm SD of group A (52.964 ± 15.593) and group B (35.1520 ± 8.79538) on VAS scale these results were accordance to Sheetal, Sonu Punia et al. study showed improvement visual analogue scale after Semont Liberatory Maneuver (9) The statistical test did not discover sufficient evidence to infer that there is real difference in the population from which the samples were taken if non-significant difference was found between two clusters. From a practical standpoint, this implies that any apparent distinction between the groups can be the result of chance or random fluctuation instead than a true, systematic difference. There were non-significant differences ($p=0.511$) between groups in group A (SLM) in pretreatment with mean \pm SD of group A (70.4226 ± 12.66750), group B (73.0649 ± 10.14612). There were non-significant differences ($p=0.819$) between groups in post treatment with mean \pm SD of group A (42.5121 ± 9.29357) and group B (24.3613 ± 7.97031) these results were contrast to study Zou et al. study (13)

This study was aiming at analyzing the efficacy of the CCE with the SLM in the treatment of BPPV. The results of our research did not give a significant difference between the two treatment groups, indicating that the two therapies may have comparable efficacy in treating BPPV symptoms. The fact that there was no discernible difference between the SLM and the CCE suggests that neither intervention was more effective than the other at easing BPPV symptoms in the participants in our research. The difference in improvement rates between the two groups might probably be attributable to arbitrary chance rather than a real difference in treatment efficacy, according to the observed p-value (e.g., $p = 0.511$). Healthcare professionals may prescribe a treatment strategy that puts the comfort and convenience of the patient first, given the non-significant difference. For patients who need treatment right away, the Semont Maneuver, which only requires one session, may be a better option these results were accordance to Roy study (14) On the other hand, individuals who are accustomed to self-managed, continuous therapy may benefit more from the CCE, which call for regular practice. Although it is shown from the literature, that therapeutic maneuvers treat the symptoms of

BPPV than sham or no treatment. Several inferences can be made when substantial outcomes are observed in within-group comparisons of the CCE and the SLM for BPPV. SLM: Notable outcomes show that the technique successfully lessens or does away with BPPV symptoms in the group receiving this care these findings were accordance to Roberts, et al. Study (15) Improvements in balance and functional status, together with a decrease in the frequency, length, and intensity of vertigo episodes, can all be indicators of this. CCE: Notable results imply that the exercises assist patients with become used to activities that usually cause lightheadedness, which lessens symptoms and enhances vestibular function in general. Prominent outcomes within cohorts bolster the ongoing implementation and advocacy of these interventions by medical practitioners. It encourages their integration into BPPV patients' routine treatment by offering evidence based support for their effectiveness.(16, 17) The SLM and CCE have been shown to be beneficial in lowering BPPV symptoms,(18) promoting balance, and increasing patients' quality of life, as evidenced by significant findings in within-group comparisons these results were compatible to Corna et al. study (19) The output of this study validates the application of these interventions in clinical settings and emphasize their significance for vestibular rehabilitation. Within group analysis of the SLM and CCE show the significance of 0.0000 and 0.00025 respectively. Which indicate positive results are seen within both groups these results were accordance to Eleftheriadou et al.study (20) On the contrary, no statistically significant results are observed between the two groups. Therefore, we accept Null hypothesis and reject Alternate hypothesis.

CONCLUSION

This study concludes that the results of the two therapy approaches do not differ statistically significantly. Although it is evident from the statistical analysis that the interventions individually are effective in the treatment and management of the symptoms of lightheadedness in the patients with PC BPPV but none of the intervention is better or more effective than the other. Thus, any of the intervention with proper handling and by the use of right technique can be performed on the patients of PCBPPV for the management of vertigo.

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