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ASSESSING THE EFFICACY OF VESTIBULAR REHABILITATION IN THE TREATMENT OF VERTIGO

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Abstract

Introduction: Vertigo Symptoms associated with vertigo gradually decrease with vestibular rehabilitation.

Objective: To assess the efficacy of vestibular rehabilitation in the treatment of vertigo.

Material and Methods: A total of 32 patients, aged 40–60. Out of which 21 were females and 11 were males, who had been hospitalized for chronic vertigo. The patients were randomized into two groups. Six weeks were allotted for the study's execution. Patients in Group I received individualized group vestibular rehabilitation in an outpatient environment almost weekly for one and a half hours under the supervision of a physiotherapist. On the contrary Group II was directed to complete basic balancing exercises twice a week for approximately 15 minutes.

Results: For group I, the Dynamic Gait Index results showed a statistically significant improvement. Quality of life and dizziness intensity improved after the intervention. Through functional testing, a postural balance improvement was noted.

Conclusion: A customized, supervised outpatient rehabilitation program, exceeded the outcome as compared to home-based, balance exercises. Intervention improves postural balance and quality of life. Nevertheless, pharmaceutical treatment is not linked to this improvement.

Keywords: Exercises, rehabilitation, postural balance, quality of life, vestibular disorders

Introduction

Vertigo, characterized by a perceptual illusion of movement, is a debilitating condition that significantly impacts the quality of life for individuals affected by it. Among the various causes of vertigo, disorders related to the vestibular system play a crucial role. The vestibular system, located within the inner ear, is responsible for maintaining balance and spatial orientation (1). Approximately 10–12% of patients are diagnosed with vertigo, dizziness, and disequilibrium by ENT specialists, whereas general physicians diagnose these conditions in 5–7% of patients. The disorder primarily affects the elderly, particularly those in their sixth and seventh decade (2). Due to its high prevalence in the adult population, vertigo has a substantial social and financial impact on patients as well as the healthcare system (3).

Although the epidemiology of vertigo and imbalance is still relatively new and small compared to the epidemiology of cardiovascular disease or cancer. It could, however, have a significant effect on patient care. For example, epidemiologic observations showing a more than chance association between migraine and vertigo and dizziness, rather than pathophysiologic theories, helped to raise awareness of vestibular migraine (VM), which is a vestibular syndrome causally linked to migraine (4). In emergency rooms and primary care settings, vertigo is a frequently reported presenting complaint. It has been described as a sensation of motion, most frequently rotational motion, and is a sign of vestibular dysfunction. Differentiating vertiginous symptoms from other types of dizziness, like lightheadedness, which is typically linked to presyncope, is crucial (5). All ages are impacted by vertigo. Middle ear pathology is the most common cause in younger patients. Due to the risk of falls and their complications, specific assessments are necessary for the elderly (6).

One of the most significant factors contributing to the burden of disability among older adults living in the community is vertigo, dizziness, and balance disorders (VDB), which are linked to immobility, limitations in daily activities, and decreased participation (7). Both men and women can experience vertigo, but women are affected by it two or three times more frequently than men. It has been linked to several comorbid illnesses, such as depression and heart disease. The prevalence fluctuates based on the underlying diagnosis and rises with age. Vertigo has an annual incidence of 1.4% and a 1-year prevalence of roughly 5%, according to a general population survey. Every year, between 15% and 20% of adults experience dizziness, including vertigo (4).

Studies have indicated that vestibular nuclei and reticular formation processes involved in central compensation may allow vertigo, disequilibrium, and nausea to go away on their own 2-4 months after the onset of symptoms (8). However, to compensate for vestibular dysfunction, it is essential to stimulate vision or proprioception (2). The patient's age and psychological state, the medications they take, the degree of sensory stimulation, the start and length of their rehabilitation, the severity of their symptoms, and the location of the vestibular organ damage might affect how well vestibular rehabilitation works. It is simple to attain a static compensation, or the absence of vertigo in the absence of movement. However, when there are no symptoms while engaging in regular activities, a complete central compensation is reached. In certain situations, an entire central compensation cannot be made because of inactivity, particularly when it comes to the lack of head movements that cause dizziness (2). The objectives of vestibular rehabilitation include: enhancing movement-related visual acuity; reducing nystagmus; enhancing postural control; lessening vertigo; enhancing overall fitness and physical activity; preventing abrupt falls; and enhancing overall quality of life, particularly in social aspects (9).

Among the array of therapeutic approaches aimed at mitigating these symptoms, vestibule rehabilitation has emerged as a promising avenue for intervention (10). Vestibule rehabilitation comprises a diverse set of exercises and maneuvers specifically designed to address vestibular

dysfunction and promote adaptation mechanisms (11). These interventions target the underlying causes of vertigo, aiming to restore balance and alleviate the distressing symptoms associated with this condition. As the demand for effective and sustainable treatment options for vertigo grows, the assessment of vestibule rehabilitation's efficacy becomes paramount (12). The basic aims were to explore and critically analyze the current body of research surrounding the efficacy of vestibule rehabilitation in the treatment of vertigo. By synthesizing evidence from various studies, In the past few decades, epidemiologic studies have significantly added to the awareness of the disease burden linked to vertigo (13). Studies on particular vestibular disorders are becoming more and more well-designed, with improved analysis and reporting of results enabling them to be generalized to other patient populations. However, bridging the gap between specialized care settings and their selected population remains a challenge for epidemiologists in research (14). The main goal of the study was to assess the efficacy of vestibule rehabilitation in the treatment of vertigo.

Material and methods

A total of 32 patients, aged 40–60. Out of which 21 were females and 11 were males, who had been hospitalized for chronic vertigo. The patients were randomized into two main groups. The patients were admitted to the hospital for a week. The patients of the group I had rehabilitation for half an hour in an outdoor environment under the supervision of a physiotherapist. On the contrary, the patients of group II were asked to complete basic balancing exercises for 15 minutes twice a week. The inclusion criteria of the study participants were the nature and duration of the clinical symptoms, the asymmetry of the caloric response supporting the diagnosis of chronic unilateral vestibular dysfunction, and the signed consent of the patient and the exclusion criteria of the patients included neoplastic diseases, central migraine and other related disease whose symptoms last longer than six months. The mean age of the patients belonging to group-I was 48 years out of which 11 were females and 6 were males. Similarly in group II, the mean was 50 years out of which 10 were female and 5 were males. During the physical examination, every patient exhibited symptoms of vertigo and disequilibrium. In group I, the average duration of the symptoms was 15 months, whereas in group II, it was 20 months. Each session included small-group exercises for general conditioning, balance, posture, gait stability, and spatial orientation training in addition to head and goal-directed eye movement (gaze stability) exercises. At the baseline and final visits, after the start of rehabilitation, which was almost six months the results were assessed. Balance assessment by using the ALFA stabilometric platform. This test of stability was conducted with both open and closed eyes. The distance (path length) for COP (with eyes open and closed), the surface area of the stabilogram (with eyes open and closed), and the ratio of the stabilogram's surface area with closed eyes to its surface area with open eyes were the parameters that were analyzed. The Dynamic Gait Index (DGI) is a test consisting of eight exercises, with a maximum score of 24 points; a score of less than 19 points is indicative of a fall. Each exercise has a score ranging from 0 (severe impairment) to 3 (the highest level of functioning).

The Statistical Package for Social Sciences (SPSS) version 23 was used to analyze the data.

Statistical significance was defined as a p-value of less than 0.05. The Shapiro-Wilk test was used to assess the distribution. To evaluate differences for unpaired variables between the two groups, a non-parametric Mann-Whitney U test, a t-Student test, and Wilxocon's test within the groups were utilized.

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Results

The results of the study showed all patients in both groups which were I and II reported less vertigo and nystagmus symptoms; however, a group I's reported symptoms were significantly higher as compared to group II’s. In group I, there was a statistically significant reduction in both the surface area of the stabilogram with one's eyes open and closed and the distance for COP. However, only the stabilogram's surface area with one's eyes closed showed statistical significance in group II. The distance ratio for both groups I and II decreased significantly.

Table 1 The dynamic test, distance gained, and distance ratio for two patient groups (Group I & Group II)

Distance Gained & Distance Ratio Distance in cm	Group I		Group II	
	Pre-Test	**Post Test**	**Pre-Test**	**Post Test**
M	591.1	474.6	587.7	543.8
SD	165.2	149.6	198.6	201.3
SEM	31.2	27.8	39.8	40.1
Me	698.2	423.5	553.1	661.4
Upper Quartile	765.7	528.9	812.7	653.9
Lower Quartile	513.2	342.6	421.4	408.7
Max	1097.3	918.7	1021.7	932.8
Min	476.9	312.7	342.9	321.6
Wilcoxon's Test	p=0.0001		p=0.0141	
Distance Ratio (Reached Minimum)	**Pre-test**	**Post-test**	**Pre-test**	**Post-test**
M	401.6	265.8	354.6	351.2
SD	99.7	82.1	121.2	125.3
SEM	17.8	15.1	20.6	21.2
Me	410.9	254.8	312.7	389.7
Upper Quartile	443.7	309.7	476.7	440.9
Lower Quartile	291.7	208.0	318.9	386.9
Max	685.7	512.8	576.9	565.9
Min	271.0	176.0	211.3	201.7
Wilcoxon's test	p=0.0001		p=0.0611	

- Group I received customized group vestibular rehabilitation in an outdoor environment;
- Group II performed simple balance exercises twice a day for 15 min.

Discussion

The assessment of vestibule rehabilitation in the treatment of vertigo has provided valuable insights into the effectiveness of this therapeutic approach. As we analyze the findings from various studies, it becomes evident that vestibule rehabilitation holds promise as a viable intervention for managing vertigo symptoms. A range of studies have demonstrated to assess the efficacy of vestibular rehabilitation for the management of vertigo. In 2018, a study conducted by Jafarzadeh et al. found that a combination of medication and vestibular rehabilitation led to greater improvement in head trauma patients compared to medication alone (15). The results of the study showed after six weeks of undergoing a customized, supervised outpatient rehabilitation program, group one's compensation exceeded the outcomes of their home-based, unsupervised balance exercises which is similar to research conducted in 2009, by Teggi et al., also reported that the patients who underwent rehabilitation after acute vestibular disturbance showed improvement (16). Tsukamoto et al., in 2015 observed improvements in quality of life and postural balance in patients with vestibular diseases following a rehabilitation protocol (17). Another research conducted in 2001 also highlighted the efficacy of a multifaceted psychological strategy in brain injury patients' vestibular rehabilitation. Eighteen patients with acquired brain injury-related vertigo were included in the sample. After receiving a vestibular disorder evaluation, patients were directed to the therapy program. The treatment included a behavioral exposure program to activities and movements that caused anxiety and vertigo to help the body become accustomed to experiencing physical anxiety symptoms and compensate for vestibular dysfunction. Self-rating questionnaires and a sway monitor were used as outcome measures to evaluate coping mechanisms, emotional distress, vertigo handicap, and vertigo and balance (18). These findings collectively support the use of vestibular rehabilitation in the treatment of vertigo. This study assessed the efficacy of a multifaceted psychological strategy for vestibular rehabilitation.

Cohen et al. conducted a study in 2003 to find out how well vestibular rehabilitation worked at reducing symptoms like vertigo and improving performance on daily tasks. A tertiary care center saw patients with peripheral vestibular impairments causing chronic vertigo (19). Vestibular rehabilitation has been shown in numerous studies to be beneficial in enhancing balance and walking abilities, eye-head coordination, and patient quality of life (20). Both peripheral and central vestibular disorders

have been treated with various rehabilitation regimens (21). The main strength of the study is randomization which helps in robust assessment of causal relationships between the intervention and outcomes. The limitation of the study is the small sample size and it also limits the generalizability of the findings to broader populations.

Based on the patient's functional skills and self-perception of dizziness, the patient's progress is evaluated. The impact of variables like age, medication, and the time at which vertigo first appeared has been assessed in the outcome of rehabilitation (22). The assessment of vestibule rehabilitation's efficacy in treating vertigo underscores its potential as a valuable therapeutic approach. The positive outcomes reported across various studies support the integration of vestibule rehabilitation into the multifaceted management of vertigo.

Conclusions

Group One's supervised outpatient rehabilitation program was better than what Group II obtained at home. Better communication between ENT specialists, physiotherapists, and physiatrists is essential for better vestibular rehabilitation outcomes for patients with vertigo. This could lead to an improved quality of life and, frequently, the chance for the patients to go back to work**.**

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