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Vestibular Rehabilitation Therapy and Its Effect on Positional Tolerance among Employees with Vestibular Symptoms

Karl Isiah Stanley Samar and Fortunato R. Caillo*

University of Perpetual Help System Manila, Philippines

Abstract

Vestibular symptoms are one of the most commonly complained impairments. This includes motion sensitivity which accounts for positional tolerance — the capacity to maintain and alter head and body postures without the feeling of symptoms of dizziness, nausea, or even vomiting. On the other hand, Vestibular Rehabilitation Therapy (VRT) is an approach to treat vestibular dysfunction and improve functional outcomes for patients with vestibular disorders. This study used a single-group pre-test, posttest experimental design to determine how effective VRT is in improving positional tolerance among UPHSM school employees. A total of 9 employees were screened with Dix Hallpike and were tested with Motion sensitivity test (MST). Four participants showed positive vestibular symptoms. Participants were then given VRT on a course of 4 weeks and were tested after the treatment period. There was no significant difference between the pre-test and post-test of MST scores; consequently, a large effect size of Cohen's d=1.58 was achieved confirming that the VRT treatment showed clinically meaningful change in the participants' positional tolerance. Ultimately, evidence from this study suggests that a structured four-week VRT program holds considerable promise as an effective treatment for improving positional tolerance among school employees with vestibular symptoms hence, improving their quality of life.

Keywords: VRT; MST; Vestibular Symptoms; School Employees

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Correspondence:

Karl Isiah Stanley Samar, University of Perpetual Help System Manila, Philippines, Tel: (+632) 8731-8199; E-mail: pt.manila@uphsl.edu.ph

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Introduction

Vestibular symptoms such as dizziness, vertigo, lack of balance, nausea, and sensitivity to motion are some of the most common complaints of patients who suffer from vestibular dysfunction and cause significant consequences to patients in their housework and occupational duties. Epidemiological studies show that most adults experience dizziness or vertigo at some point in life, and vestibular symptoms nearly affect 20-30% of the general population with multifactorial etiologies that can lead to decreased quality of life, increased risk of falls, and more serious conditions such as anxiety and activity avoidance. (Motawea et al., 2023) Many individuals with vestibular problems struggle to change positions without aggravating the symptoms. In a workplace setting, activities like standing up from a seated position, looking up or down, bending, and even turning the head become difficult, which are integral to many occupations. These result in avoiding aggravating movements unconsciously, which limits their capabilities to reach a good job performance and functional independence. While most vestibular research focuses on bridging the gap to balance, gait, and dizziness severity, fewer studies target positional tolerance as the primary functional outcome, yet it directly maps onto workplace tasks that require positional transitions and frequent head movements. In relation, Vestibular Rehabilitation Therapy (VRT) is an evidence-based, exercise-driven approach designed to treat vestibular dysfunction and improve functional outcomes for individuals. A high-quality clinical practice guideline from the Academy of Neurologic Physical Therapy/APTA [4] concludes there is strong evidence supporting the use of VRT for vestibular hypofunction, with recommended elements including gaze-stabilization exercises, balance and postural control training, and individualized progression based on patient response. These interventions clinically reduce dizziness, improve gaze and postural stability, and increase overall function. It was also further confirmed by 2023 systematic reviews and meta-analyses that reported moderate-certainty evidence supporting the effectiveness of VRT in improving gait and balance problems among stroke patients. These findings showed the effect of VRTs in broader applicability beyond the usual vestibular disorders and demonstrated their capacity to influence the postural

control mechanism. This growing body of evidence provides a strong rationale for the present study to bridge the existing gap in the literature between VRT and positional tolerance, particularly among school employees experiencing vestibular symptoms [4]. The Motion Sensitivity Test, also called the Motion Sensitivity Quotient, is a useful clinical tool that the study will use to assess dizziness brought on by sudden alterations in a person's position. MST is widely used to measure motion-provoked symptoms and track the progress of vestibular dysfunction rehabilitation.

MST is a reliable outcome measure for assessing positional tolerance due to its proven clinical relevance and sensitivity to positional changes. Despite numerous research evidence supporting VRT in clinical and post-injury populations, there is a lack of information and a notable gap regarding its application among working-adult, non-clinical occupational groups, such as school employees. School staff regularly perform actions that may provoke vestibular symptoms, such as turning their heads, bending to pick up materials, walking to corridors and between rooms, and navigating stairs, which contribute to functional limitations if unmanaged. Studying VRTs and their effect on positional tolerance in a school setting addresses occupational health concerns and develops accessible on-site therapeutic services for educational institutions. Taken together, the epidemiological burden of vestibular symptoms and the central role of positional tolerance in maintaining occupational performance and the substantial body of evidence supporting VRT's ability to improve balance and dizziness provide a rationale for this study. The present research, "Vestibular Rehabilitation Therapy and Its Effect on Positional Tolerance Among School Employees with Vestibular Symptoms: A Study at University of Perpetual Help System Manila," tested whether a structured 4-week VRT program enhances positional tolerance (measured by MST) in UPHSM employees who report vestibular symptoms. Moreover, the researchers intended to bridge clinical vestibular rehabilitation and workplace health interventions in an educational setting by focusing on this understudied group.

Methods

In this study, the researchers used a single-group pretest, posttest experimental design to evaluate how effective VRT is in improving positional tolerance among school employees with vestibular symptoms at UPHSM. This design works well for the study because all participants will receive the same intervention. This setup allows the researchers to measure changes in positional tolerance before and after the VRT program. Purposive sampling was used to acquire participants for the study. School employees reporting symptoms such as dizziness, vertigo, positional imbalance, and motion sensitivity will first undergo a Dix-Hallpike Test to screen the employees for vestibular dysfunction or positionally triggered symptoms. Employees who will demonstrate positive for the assessment will then proceed to undergo the baseline MST which will establish initial tolerance levels of the participants. Availability of participants was considered as treatment procedures occurred during work hours on workdays. After the initial evaluation, all eligible participants took part in a four-week structured VRT program tailored to the needs of daily and workplace activities. Once they finish, participants complete the post-test MST assessment again to measure any changes or improvements. Since this study has only one intervention group, randomization and blinding are not needed. All participants followed the same assessment protocol, with no comparisons between different treatment groups. The study maintained its internal validity by having the licensed PT consistently administer the same standardized VRT procedures and control the scheduling of assessments. The single-group pretest, posttest approach allowed the researchers a direct evaluation of changes linked to VRT. This supported a reliable observation of its effectiveness in improving positional tolerance among school employees with vestibular symptoms.

Results and Discussion

This discusses, examines, and interprets the data gathered in the study entitled Vestibular Rehabilitation Therapy and Its Effect on Employees' Positional Tolerance: A Basis for Intervention. The primary intent of the study was to determine whether a structured four-week Vestibular Rehabilitation Therapy (VRT) program substantially enhances the positional tolerance of school employees at the University of Perpetual Help System Manila (UPHSM) exhibiting vestibular symptoms, as evaluated by the Motion Sensitivity Test (MST). The first section presents the participants' demographics and past medical records. The second and third sections show the participants' MST scores before and after the intervention, respectively. The fourth section shows how the pre-test and post-test results compare using a paired sample t-test. After each table, there is a thorough analysis and explanation of the results. The chapter concludes with a discussion that contextualizes the results of the study's theoretical framework and the existing body of literature.

Table 1, presents the demographic profile and clinical characteristics of the four school employees with vestibular symptoms who participated in the study. Despite targeting approximately 15-30 participants for the study, only a total of 10 participants were screened initially, and yet only four school employees were qualified to participate based on the inclusion criteria. The participants were relatively young adults, with ages ranging from 22 to 28 years old. In terms of sex distribution, the group was predominantly female (three out of four participants), with only one male respondent. This suggests that, within this small sample, vestibular-related complaints were more commonly reported among female employees, although no generalization can be made due to the limited number of participants.

With respect to location, the participants came from different areas within Metro Manila, including Sampaloc, Quezon City, and Navotas. Two participants resided in Sampaloc, while the others came from neighboring cities, indicating that the sample reflects a modest geographic spread within an urban setting. Despite these differences in

Table 1: Demographic Characteristics of School Employees with Vestibular Symptoms.

Code	Age	Sex	Location	Clinical Symptoms & Vision History	Vestibular Test Results (DHT)
P-01	28	Male	Sampaloc, Manila	Severe Headache (8–9/10), Wearing corrective glasses	Positive (F+)
P-02	22	Female	Quezon City	Dizziness, Vertical Nystagmus	Positive (+)
P-03	25	Female	Navotas	Left-sided Migraine, Dizziness, Astigmatism	Equivocal/Positive Left (+?)
P-04	23	Female	Sampaloc, Manila	History of dizziness and headache, Nausea	Positive (F+)

Table 2: Participants' Baseline Motion Sensitivity Test (MST) Scores Prior to the Implementation of the VRT Program.

Implementation Period	M	SD	Interpretation
Pre-Test	27.50	3.00	Moderate Motion Sensitivity

Note: M = Mean; SD = Standard Deviation; 0 – 10 = Mild Motion Sensitivity, 11 – 30 = Moderate Motion Sensitivity, and 31 – 100 = Severe Motion Sensitivity

Table 3: Participants' Motion Sensitivity Test (MST) Scores After Completing the 4-Week VRT Program.

Implementation Period	M	SD	Interpretation
Post-Test	11.50	7.94	Moderate Motion Sensitivity

Note: M = Mean; SD = Standard Deviation; 0 – 10 = Mild Motion Sensitivity, 11 – 30 = Moderate Motion Sensitivity, and 31 – 100 = Severe Motion Sensitivity

residence, all participants shared a common experience of vestibular-related symptoms that may affect their daily functioning and work performance. The reported clinical symptoms varied but showed clear patterns associated with vestibular dysfunction. Common complaints included dizziness, headache, nausea, and migraine, with one participant reporting severe headache intensity (8–9/10). Visual concerns were also noted, such as the use of corrective glasses and astigmatism, which may contribute to or exacerbate balance and spatial orientation issues. These overlapping symptoms highlight the multifactorial nature of vestibular problems, where both sensory and neurological factors interact. Results of the Dix-Hallpike Test (DHT), a standard assessment for vestibular dysfunction, revealed that most participants had positive findings. Two participants showed a strong positive response (F+), one had a clear positive result (+), and one yielded an equivocal but likely positive result on the left side (+?). These findings confirm the presence of vestibular involvement among all participants, providing a clinical basis for the implementation of VRT. These findings show that the participants share consistent signs of vestibular dysfunction despite differences in age, sex, and location. The presence of dizziness, headache, and positive DHT results points to impaired balance mechanisms that can interfere with positional tolerance. This strengthens the need for targeted intervention. In this case, the data justify the use of a structured VRT program, as the participants demonstrate clear clinical indicators that may respond to rehabilitation.

Table 2, presents the baseline Motion Sensitivity Test (MST) scores of the participants prior to the implementation of the Vestibular Rehabilitation Therapy (VRT) program. The results show a mean score of 27.50 with a standard deviation of 3.00. This indicates that, on average, the participants experienced moderate motion sensitivity before undergoing the intervention. The relatively low standard deviation suggests that the scores were closely clustered around the mean, reflecting a consistent level of motion sensitivity among the participants at baseline. A mean score of 27.50 falls near the upper limit of the moderate range (11–30), which implies that the participants were experiencing noticeable discomfort during movement and positional changes. This level of sensitivity may interfere with daily activities, particularly those involving head and body movements such as bending, turning, or transitioning between positions. The consistency of the scores further indicates that all participants shared a comparable degree of difficulty in tolerating motion, strengthening the reliability of the baseline assessment. These findings show that prior to the VRT program, the participants already exhibited a uniform and clinically relevant level of motion sensitivity. The moderate classification, coupled with scores approaching the severe threshold, suggests that intervention is necessary to prevent further functional limitations. This baseline condition provides a strong foundation for evaluating the effectiveness of the VRT program, as any reduction in MST scores after the intervention can be more confidently attributed to the therapeutic approach rather than variability in initial symptom severity.

Table 3, presents the Motion Sensitivity Test (MST) scores of the participants after completing the 4-week Vestibular Rehabilitation Therapy (VRT) program. The results show a mean score of 11.50 with a standard deviation of 7.94, which is still classified under moderate motion sensitivity. However, the mean is positioned at the lower boundary of the moderate range, very close to the mild category (0–10), indicating a substantial reduction in motion sensitivity following the intervention. The relatively higher standard deviation compared to the pre-test suggests increased variability in post-test scores. This means that while some participants showed marked improvement, others experienced more modest changes. Such variation may be influenced by individual differences in symptom severity, adaptation to the exercises, or consistency in performing the VRT program. Even so, the overall downward shift in the mean score reflects a general trend of improvement in positional tolerance among the participants. Despite remaining within the moderate classification, the decrease from a higher baseline mean to a near-mild level is clinically meaningful. It suggests that the participants were better able to tolerate movements and experienced fewer or less intense symptoms during positional changes after undergoing VRT. This improvement points to enhanced vestibular adaptation and functional stability. These findings show that the VRT program led to a reduction in motion sensitivity, even if the overall classification did not fully shift to mild for the group as a whole. The proximity of the mean score to the mild range, along with the observed variability, suggests that the intervention was effective but may require longer duration or individualized adjustments to achieve more consistent outcomes across all participants.

Table 4, presents the comparison between the pre-test and post-test Motion Sensitivity Test (MST) scores of the participants following the implementation of the Vestibular Rehabilitation Therapy (VRT) program. The results show a mean difference (MD) of 16.00, indicating that, on average, participants' MST scores decreased by 16 points after the intervention. This sizable reduction suggests an improvement in motion sensitivity and positional tolerance. The computed t-value of 3.17 with 3 degrees of freedom yielded a p-value of 0.051. Since this value is slightly higher than the 0.05 level of significance, the null hypothesis was not rejected, leading to the conclusion that the differences between pre-test and post-test scores are not statistically significant. This means that the observed improvement cannot be confidently attributed to the VRT program alone, given the small sample size and variability in responses. However, the effect size, as measured by Cohen's d = 1.58, is considered large. This indicates that the magnitude of change between the pre-test and post-test scores

Table 4: Comparison Between Pre-Test and Post-Test MST Scores of Participants Following the Implementation of the VRT Program.

Comparison	MD	t	df	p	d	Decision (Null Hypothesis)	Significance
Pre-Test vs. Post-Test	16	3.17	3	0.051	1.58	Failed to Reject	Not Significant

Note: MD = Mean Difference; t = t-test value; df = degrees of freedom; p = probability value; d = Cohen's d (effect size). Statistically significant when $p < 0.05$.

is substantial in practical terms. A large effect size suggests that the intervention had a strong impact on participants, even if the result did not reach conventional levels of statistical significance. The discrepancy between the p-value and effect size may be due to the limited number of participants, which reduces the statistical power of the test. These findings show that while the statistical test did not confirm a significant difference, the actual improvement in MST scores is notable and meaningful. The large reduction in scores and strong effect size point to the potential effectiveness of the VRT program in enhancing positional tolerance. This implies that with a larger sample size or longer intervention period, the results might reach statistical significance, reinforcing the value of VRT as a basis for intervention among employees with vestibular symptoms.

Conclusions and Recommendations

Based on the findings presented and summarized above, the following conclusions are drawn. First, with respect to the demographic characteristics of the participants, the study established that vestibular symptoms are not exclusively confined to older or clinically diagnosed populations. Young adult school employees, predominantly female and residing in urban settings, demonstrated clinically confirmed vestibular involvement as evidenced by positive DHT results. This profile underscores the importance of proactive vestibular screening and intervention programs within non-clinical occupational settings such as educational institutions. Second, concerning the baseline MST scores, the participants presented with moderate motion sensitivity prior to the intervention, with scores clustering near the upper limit of the moderate range. These findings confirm that untreated vestibular symptoms in a workplace population can reach a level of severity that meaningfully compromises occupational function and positional tolerance. Third, regarding the post-intervention MST scores, a marked reduction in motion sensitivity was observed after the four-week VRT program. The post-test mean of 11.50—situated near the boundary between moderate and mild classification—indicates that the VRT program was associated with substantial clinical improvement in the participants' ability to tolerate positional changes. This improvement carries direct implications for occupational performance, as greater positional tolerance enables employees to perform work-related activities involving head movements and postural transitions with reduced symptomatic disruption. Fourth, concerning the comparison between pre-test and post-test MST scores, while the difference did not achieve statistical significance at the conventional alpha level of 0.05 ($p = 0.051$), the large effect size (Cohen's $d = 1.58$) confirms that the VRT program produced a clinically meaningful change in the participants' positional tolerance. The marginal non-significance is most appropriately attributed to the limited sample size, which reduced the test's statistical power. The overall pattern of results strongly implies that the null hypothesis may have been erroneously retained due to insufficient sample size rather than a true absence of effect. In broader terms, the evidence from this study suggests that a structured four-week VRT program holds considerable promise as an effective intervention for improving positional tolerance among school employees with vestibular symptoms. Based on these findings, it is recommended to consider the MST as a reliable and sensitive outcome measure for assessing positional tolerance in employees presenting with vestibular symptoms for future practitioners. School administrators and occupational health officers at educational institutions are encouraged to consider the integration of vestibular symptom screening into regular employee health assessments. Lastly, small sample size is the primary methodological limitation of this study, which constrains its statistical power; it is recommended to at least achieve 30 or more participants to observe clinical significance of the treatment.

References

1. ATA G, Şakul A. A, Kılıç G & Çelikyurt C. Comparison of the efficacy of vestibular rehabilitation and pharmacological treatment in benign paroxysmal positional vertigo. Indian Journal of Otolaryngology and Head & Neck Surgery, 2023, 75(S1), 483–490. https://doi.org/10.1007/s12070-023-03598-4
2. Fu M, Zhang L, Zhao X, Lv Z & Tang P. Association between screen time and self-reported balance disorders in middle-aged and older adults: National health and nutrition examination survey. Aging Clinical and Experimental Research, 2024, 36(1). https://doi.org/10.1007/s40520-024-02778-8
3. Gupta D & Solanki B. Epley's manoeuvre: A single line treatment for posterior semicircular canal benign paroxysmal positional vertigo. Indian Journal of Otolaryngology and Head & Neck Surgery, 2021, 74(S3), 3877–3882. https://doi.org/10.1007/s12070-021-02695-6
4. Hall C. D, Herdman S. J, Whitney S. L, et al. Vestibular rehabilitation for peripheral vestibular hypofunction: An updated clinical practice guideline from the Academy of Neurologic Physical Therapy of the American Physical Therapy Association. Journal of Neurologic Physical Therapy, 2021, 46(2), 118–177. https://doi.org/10.1097/npt.0000000000000382
5. Han B. I. Simplified vestibular rehabilitation therapy. 2021. https://doi.org/10.1007/978-981-15-9869-2
6. Han B. I. Vestibular rehabilitation in central dizziness. In Simplified vestibular rehabilitation therapy. 2021. (pp. 17–20). https://doi.org/10.1007/978-981-15-9869-2_2
7. Karatas M. Central vertigo and dizziness. The Neurologist, 2008, 14(6), 355–364. https://doi.org/10.1097/nrl.0b013e31817533a3
8. Kerber K. A. Dizziness in primary care. Primary Care: Clinics in Office Practice, 2024, 51(2), 195–209. https://doi.org/10.1016/j.pop.2023.12.001
9. Meng L, Liang Q, Yuan J, et al. Vestibular rehabilitation therapy on balance and gait in patients after stroke: A systematic review and meta-analysis. BMC Medicine, 2023, 21(1). https://doi.org/10.1186/s12916-023-03029-9
10. Ritz H. Evaluating patients with vertigo. JAAPA, 2023, 36(6), 1–6. https://doi.org/10.1097/01.jaa.0000918772.20883.9e
11. Sachdeva K & Sao T. The clinical response time of Epley maneuvers for treatment of BPPV: A hospital based study. Indian Journal of Otolaryngology and Head & Neck Surgery, 2020, 72(4), 503–507. https://doi.org/10.1007/s12070-020-02038-x
12. Saki N, Bayat A, Nikakhlagh S & Mirmomeni G. Vestibular rehabilitation therapy in combination with transcranial direct current stimulation (tDCS) for treatment of chronic vestibular dysfunction in the elderly: A double-blind randomized controlled trial. Brazilian Journal of Otorhinolaryngology, 2022, 88(5), 758–766. https://doi.org/10.1016/j.bjorl.2020.11.004
13. Se To P. L, Singh D. K & Whitney S. L. Effects of customized vestibular rehabilitation plus canalith repositioning maneuver on gait and balance in adults with benign paroxysmal positional vertigo: A randomized controlled trial. Journal of Vestibular Research, 2022, 32(1), 79–86. https://doi.org/10.3233/ves-190731
14. Shaphe M. A, et al. Effectiveness of Epley–canalith repositioning procedure versus vestibular rehabilitation therapy in diabetic patients with posterior benign paroxysmal positional vertigo: A randomized trial. Life, 2023, 13(5), 1169. https://doi.org/10.3390/life13051169
15. Shirley Ryan AbilityLab. Dix–Hallpike maneuver. 2013. https://www.sralab.org/rehabilitation-measures/dix-hallpike-maneuver
16. Yetiser S & Salturk Z. A review of the efficacy of therapeutic maneuvers in posterior canal benign paroxysmal positional vertigo. Clinical Medicine & Research, 2022, 20(3), 153–163. https://doi.org/10.3121/cmr.2022.1686