

Carly Fiest, BA^{1,2}, Jason Adams MD², Spencer Johnson, BA^{1,2} Eric Gong , BA^{1,2}, Maura Cosetti, MD^{2,3}, Jennifer Kelly, PT^{2,3}

¹Icahn School of Medicine at Mount Sinai, New York, NY, ²Department of Otolaryngology-Head & Neck Surgery, Mount Sinai, New York, NY, ³Ear Institute of the New York Eye and Ear Infirmary of Mount Sinai, New York, NY

Background

- Dizziness affects 15-20% of adults and can be extremely debilitating, impacting an individual's ability to work, socialize, and live independently.¹
- The Dizziness Handicap Inventory (DHI) is a validated instrument for evaluating global dizziness-related disability, as well as specific factors across the sub-domains of emotional, physical, and functional impairment, including precipitating factors and consequences of vestibular impairment.²
- This study investigates correlations between vestibular diagnosis and dizziness-related disability using overall DHI score and sub-domain analysis with the aim of helping clinicians tailor treatment.³

Methods

- A retrospective analysis of 457 adults referred for vestibular rehabilitation and evaluated by trained vestibular therapists in 2024 was performed
- Diagnoses included acoustic neuroma, benign paroxysmal positional vertigo (BPPV), central vestibular dysfunction, Meniere's disease, multisystem balance disorder, non-vestibular dizziness, unilateral peripheral dysfunction, and vestibular migraines.
- DHI scores, DHI sub-domain scores, and associated non-dizzy symptoms (brain fog, hearing loss, aural fullness, tinnitus, anxiety, depression) were recorded and underwent descriptive statistical tests, and t-tests.

Results

- Average age was 60.7 years (range 13-99) and 67% were female
- Race of the patients included White (38%), Asian (8%), Black or African American (7%), and other (47%)
- Total DHI scores of patients with vestibular migraines (48.35) were significantly higher than total scores of patients with BPPV (42.16, p value=0.04) and non-vestibular dizziness (27.29, p value= 0.025).
- Total DHI scores of central vestibular dysfunction (47.07) were significantly higher than total scores of patients with non-vestibular dizziness (27.29, p value= 0.047).
- Total DHI scores of multisystem vestibular dysfunction (46.85) were significantly higher than total scores of patients with non-vestibular dizziness (27.29, p value= 0.04).

Figure 1. Summary Statistics

	Acoustic Neuroma	BPPV	Central Vestibular Dysfunction	Meniere's Disease	Multisystem Balance Disorder	Non-vestibular Dizziness	Unilateral Peripheral Vestibular Dysfunction	Vestibular Migraines
N	8	176	28	15	52	14	72	92
Average Age	58.88	64.25	54.71	61.87	77.17	59.29	62.40	44.30
Total DHI	48.00	42.16	47.07	39.73	46.85	27.29	43.36	48.43
Physical Score	16.67	16.32	15.24	12.17	15.90	7.40	15.02	15.00
Emotional Score	18.00	11.33	15.05	14.17	13.66	9.80	13.27	13.49
Functional Score	21.33	15.47	16.29	13.50	17.61	9.80	14.87	15.71
Top 3 Associated Non-Dizzy Symptoms	hearing loss (75%)	motion intolerance (58%)	motion intolerance and headaches (54%)	hearing loss (93%)	hearing loss (65%)	tinnitus (57%)	motion intolerance (57%)	headaches (76%)
	tinnitus (63%)	tinnitus (38%)	visual distortion (46%)	motion intolerance (60%)	motion intolerance (52%)	motion intolerance (36%)	tinnitus (56%)	motion intolerance (62%)
	motion intolerance and aural fullness (38%)	hearing loss (37%)	tinnitus (43%)	tinnitus (53%)	headaches (40%)	anxiety (29%)	hearing loss (47%)	photophobia (60%)

Results (continued)

- The physical sub scores of non-vestibular dizziness (7.4) were significantly lower than patients with BPPV (16.31, p value=0.0082), central vestibular dysfunction (15.24, p value=0.020), multisystem balance disorder (15.90, p value=0.012), unilateral vestibular dysfunction (15.01, p value (0.021), and vestibular migraine (15, p value = 0.02)
- Disease specific sub-domain analysis found that patients with BPPV had a statistically significantly higher physical sub scores (16.32) compared to both emotional (11.40) and functional (15.47) sub scores (p values = 0.000001 and 0.000768 respectively)

Conclusion

- DHI sub-scores and associated symptoms provide a more comprehensive understanding of disease specific dizziness-related disability than the overall DHI score.
- Our data supports that there are significant differences in total DHI and physical domain scores across diseases. Furthermore, some diseases such as BPPV show significant differences among DHI domains.
- Patients with notably high levels of dizziness handicap, such as those with vestibular migraines, may benefit from multi-modality treatment, such as referral to address emotional aspects of disease burden.
- High functional and physical subdomain scores associated with BPPV suggest referral to vestibular rehabilitation may offer the most effective and targeted treatment for their disease-specific disability.
- Since dizziness is such an amorphous and varied symptom, our findings help doctors personalize treatment to address each patients' unique struggles with dizziness.

References

- Neuhauser HK. The epidemiology of dizziness and vertigo. *Handb Clin Neurol*. 2016;137:67-82. doi: 10.1016/B978-0-444-63437-5.00005-4. PMID: 27638063.
- Prell T, Wassermann A, Zipprich HM, Finn S, Axer H. Impact of Common Dizziness Associated Symptoms on Dizziness Handicap in Older Adults. *Front Neurol*. 2021 Dec 17;801499. doi: 10.3389/fneur.2021.801499. PMID: 34975741; PMCID: PMC8718649.
- Koppelaar-van Eijlden HM, Schermer TR, Bruintjes TD. Measurement Properties of the Dizziness Handicap Inventory: A Systematic Review. *Otol Neurotol*. 2022 Mar 1;43(3):e282-e297. doi: 10.1097/MAO.0000000000003448. PMID: 35147600.