



Clinical Gaps in Vestibular Evaluation and Rehabilitation Among Older Adults with Dementia and Audio-vestibular Impairment

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Hearing loss and dizziness were associated with poorer cognitive performance, yet fewer than half of patients received vestibular evaluation and only 12% completed vestibular rehabilitation, revealing a substantial gap in clinical care.

INTRODUCTION

Sensorineural hearing loss (SNHL) and vestibular dysfunction (VD) are associated with dementia, suggesting interactions among auditory, balance, and cognitive systems.

However, whether these sensory impairments independently or synergistically contribute to cognitive decline and fall risk remains unclear. VD is under-recognized and poorly documented in elderly adults, potentially leading to preventable falls.

We conducted a retrospective chart review among older adults with dementia to examine relationships between peripheral sensory impairment, cognitive function, and falls to characterize patterns of vestibular evaluation and treatment in this population.

METHODS

Study Design: A retrospective chart review with N = 319 older adults with clinical encounters prior to dementia diagnosis.

Variables:

- Cognition: Montreal Cognitive Assessment (MoCA) and Mini-Mental State Examination (MMSE)
- Hearing: Pure Tone Average (PTA)
- Dizziness symptoms
- Fall history
- Vestibular diagnoses
- Referral patterns (Vestibular Evaluation (VE)/Vestibular Rehabilitation Therapy (VRT))

Vestibular Assessments:

Oculomotor: Nystagmus, Head-Shaking Test, Vestibulo-Ocular reflex suppression, Ocular counter-roll

Balance/Gait: Romberg Test, Fukuda Stepping Test, Gait Analysis

Functional: Calorics, Ocular/Cervical Vestibular-Evoked Myogenic Potentials, Videonystagmography, Rotational Chair

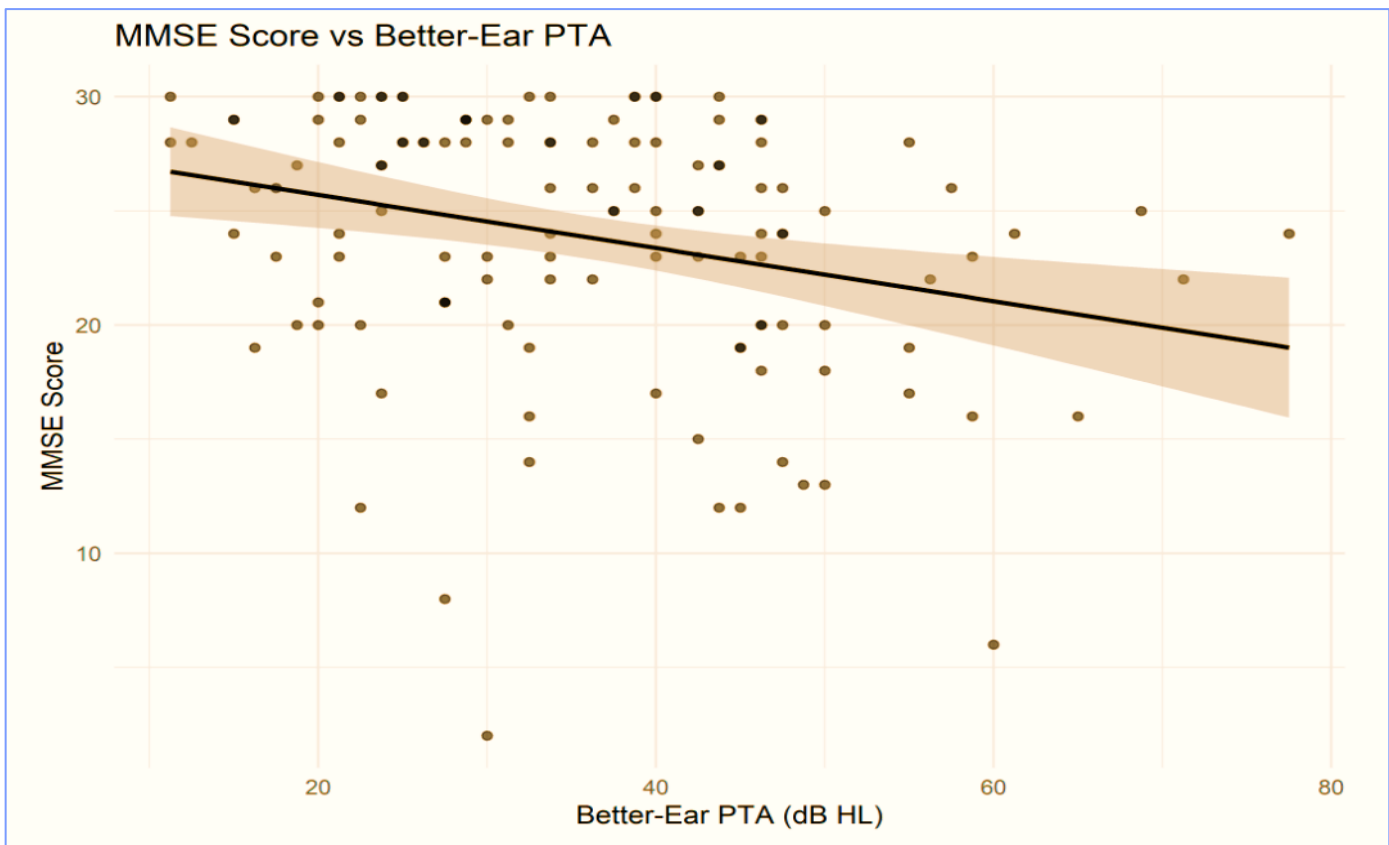
RESULTS

Vestibular Evaluation, Referral, and Rehabilitation Utilization (N = 319).

Variable	n (%)
Vestibular Testing	
No	181 (56.7)
Yes	138 (43.3)
Vestibular Referral	
No	230 (72.1)
Yes	89 (27.9)
Vestibular Rehabilitation (VRT) Attendance	
Not Referred / Not Applicable	234 (73.4)
Referred but Did Not Attend	46 (14.4)
Attended VRT	39 (12.2)

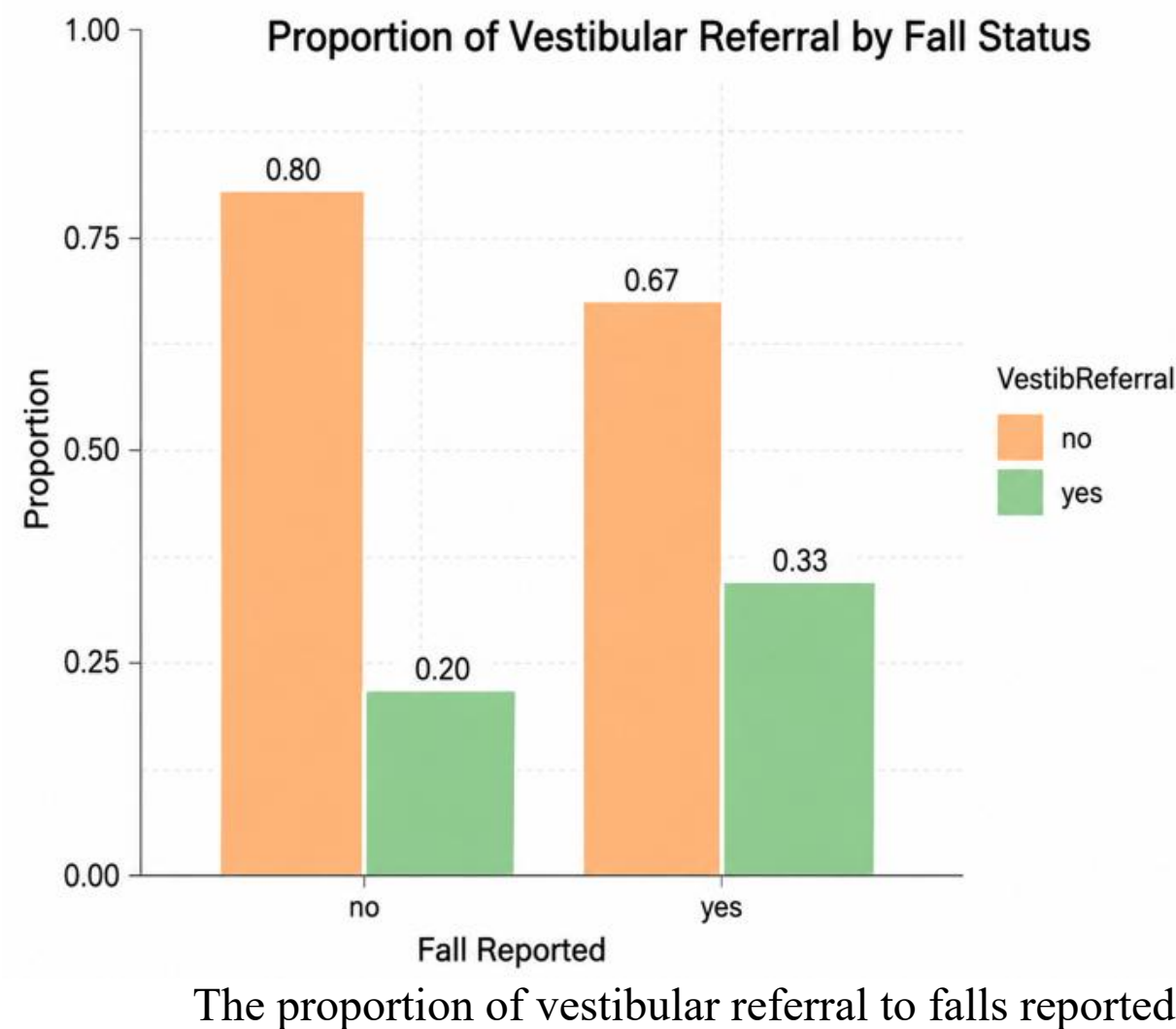
Vestibular Testing, Referral, and Rehabilitation distribution within our cohort.

Correlation Between Pure-Tone Average and MMSE Performance.



Greater hearing loss was significantly associated with lower cognitive screening scores.

Falls Influence Vestibular Referral Patterns.



Takeaways

- PTA and MMSE scores were moderately negatively correlated ($r = -0.28$, $p = 0.001$), with each 1 dB increase in PTA associated with a 0.12-point decrease in MMSE score ($p = 0.003$).
- Following a linear mixed model, higher PTA ($\beta = -0.15$, $p = 0.003$) and self-reported dizziness ($\beta = -3.40$, $p = 0.011$) were linked to lower MoCA scores.
- Falls were significantly associated with referrals for VE/VRT ($p = 0.0018$) but not VE ($p = 0.57$) or VRT ($p = 0.63$).

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CONCLUSIONS

Hearing loss and vestibular dysfunction, but not fall frequency, are independently associated with cognitive performance in older adults with dementia. Despite high fall rates and documented sensory impairments, fewer than half received VE and only 12% completed VRT. Addressing this treatment gap will require integrated screening algorithms and enhanced provider education to improve diagnostic accuracy and referral pathways.

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