

The Impact of Age-Related Auditory Decline on Spatial Speech-in-Noise Processing

Shivani Dattani, Doris-Eva Bamiou, Nehzat Koohi
Affiliation: UCL Queen Square Institute of Neurology, Neuro-audiovestibular Lab & Ear Institute

BACKGROUND

- Presbycusis:** Common sensory deficit in older adults.
- Beyond hearing thresholds:** difficulties with speech-in-noise and spatial hearing.
- Central auditory decline:** contributes to communication problems.

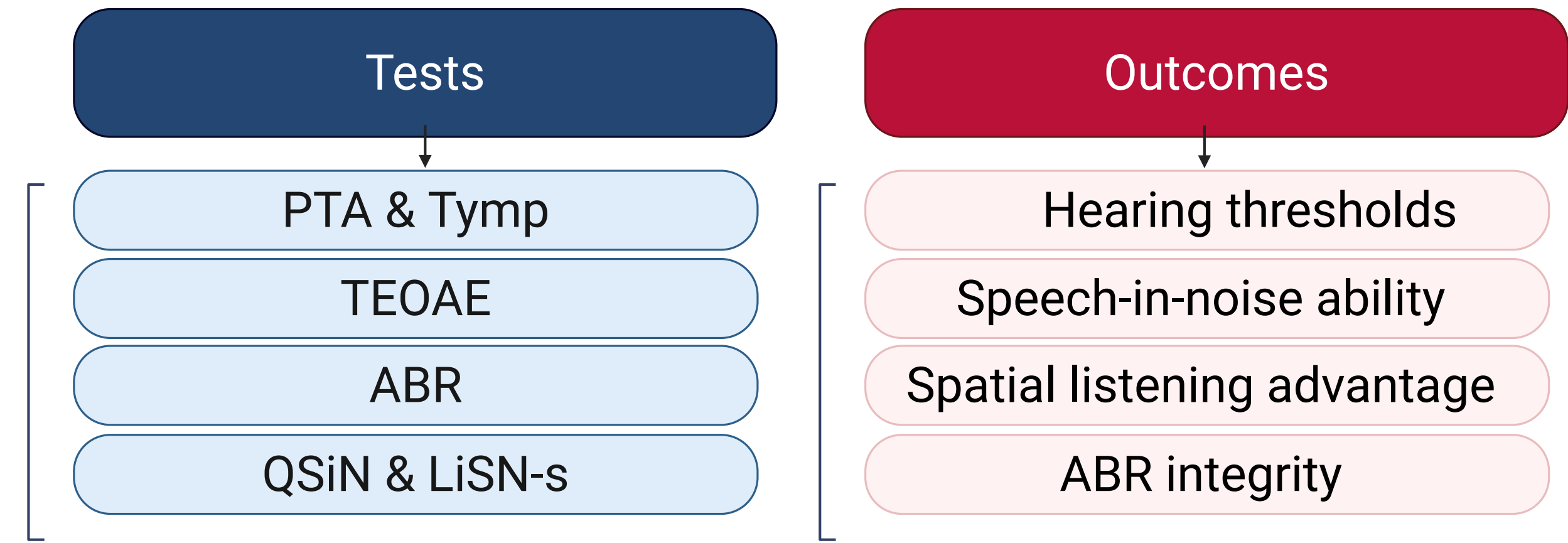
AIM: To examine the impact of ageing on spatial speech-in-noise perception.

METHODS

Design: Cross-sectional study.

Participants: n = 32, aged 60–89 (3 groups: 60–69, 70–79, 80–89).

Analysis: Descriptive stats + Welch’s ANOVA + Games–Howell post hoc.



RESULTS

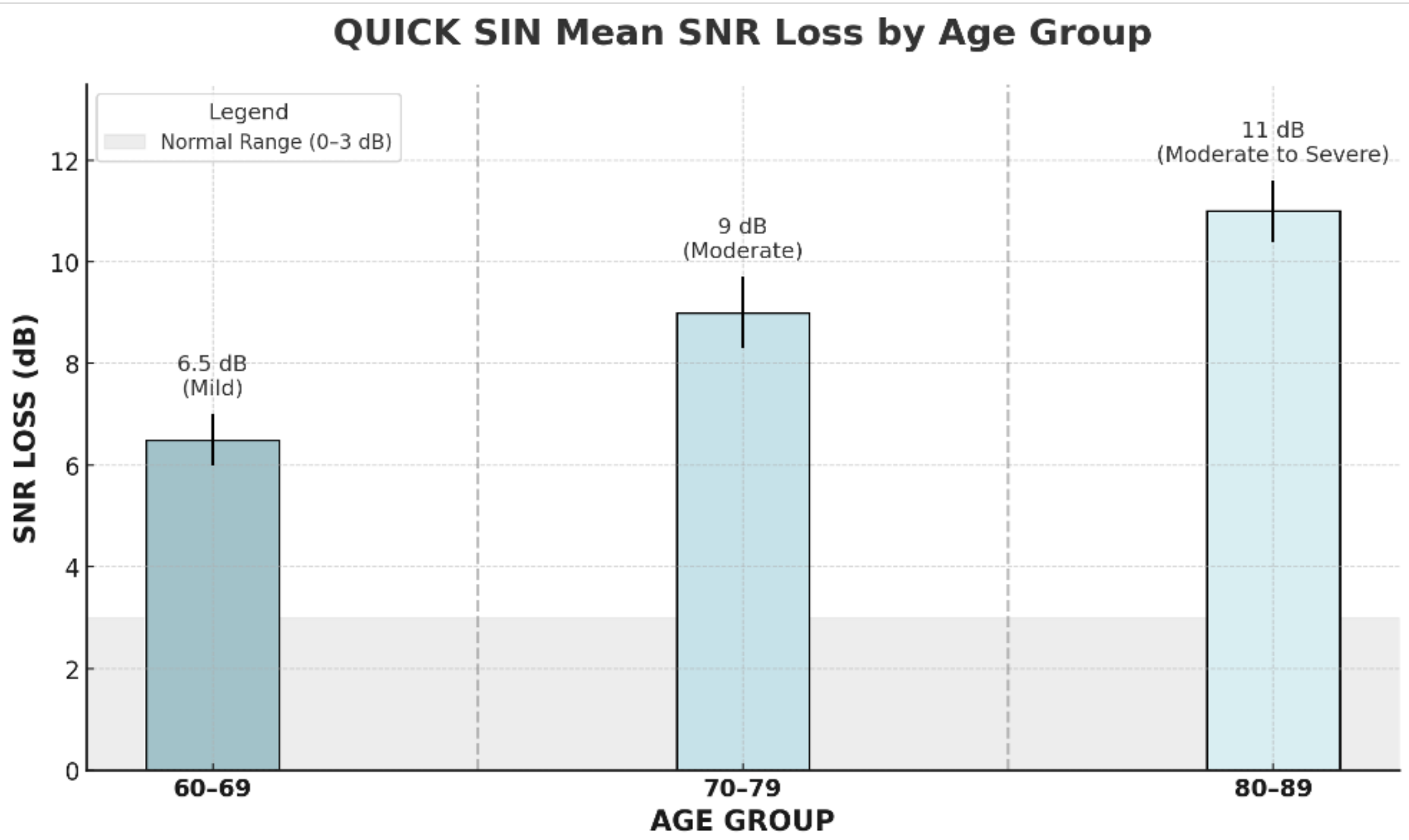


Figure 1. Mean QuickSIN SNR loss by age group. Older adults showed increasing difficulty understanding speech in noise, with all groups performing outside the normal range (0–3 dB).

RESULTS

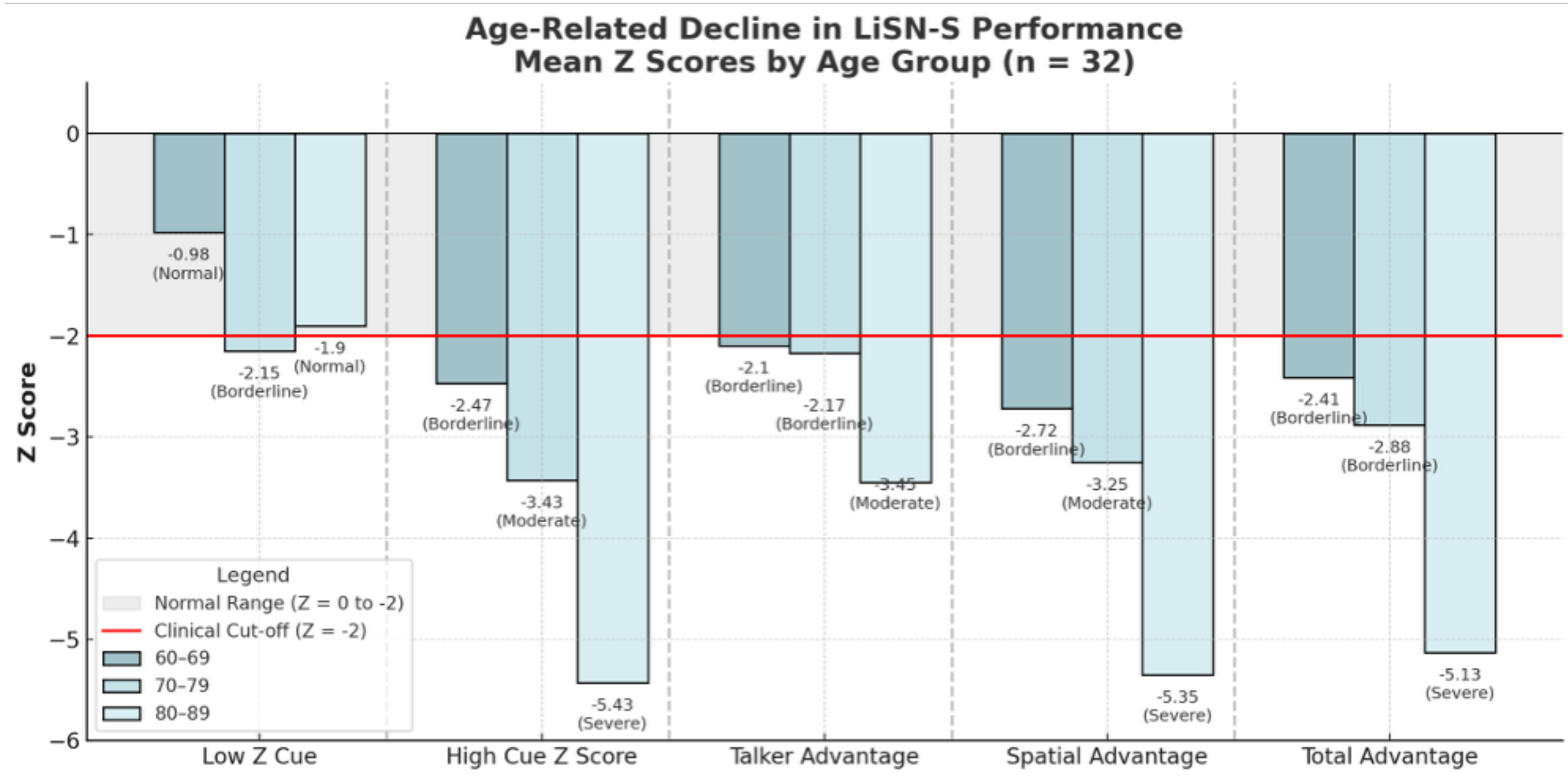


Figure 2. Mean LiSN-S Z scores across age groups show a decline in performance with age, with many falling below the clinical cut-off (Z = -2).

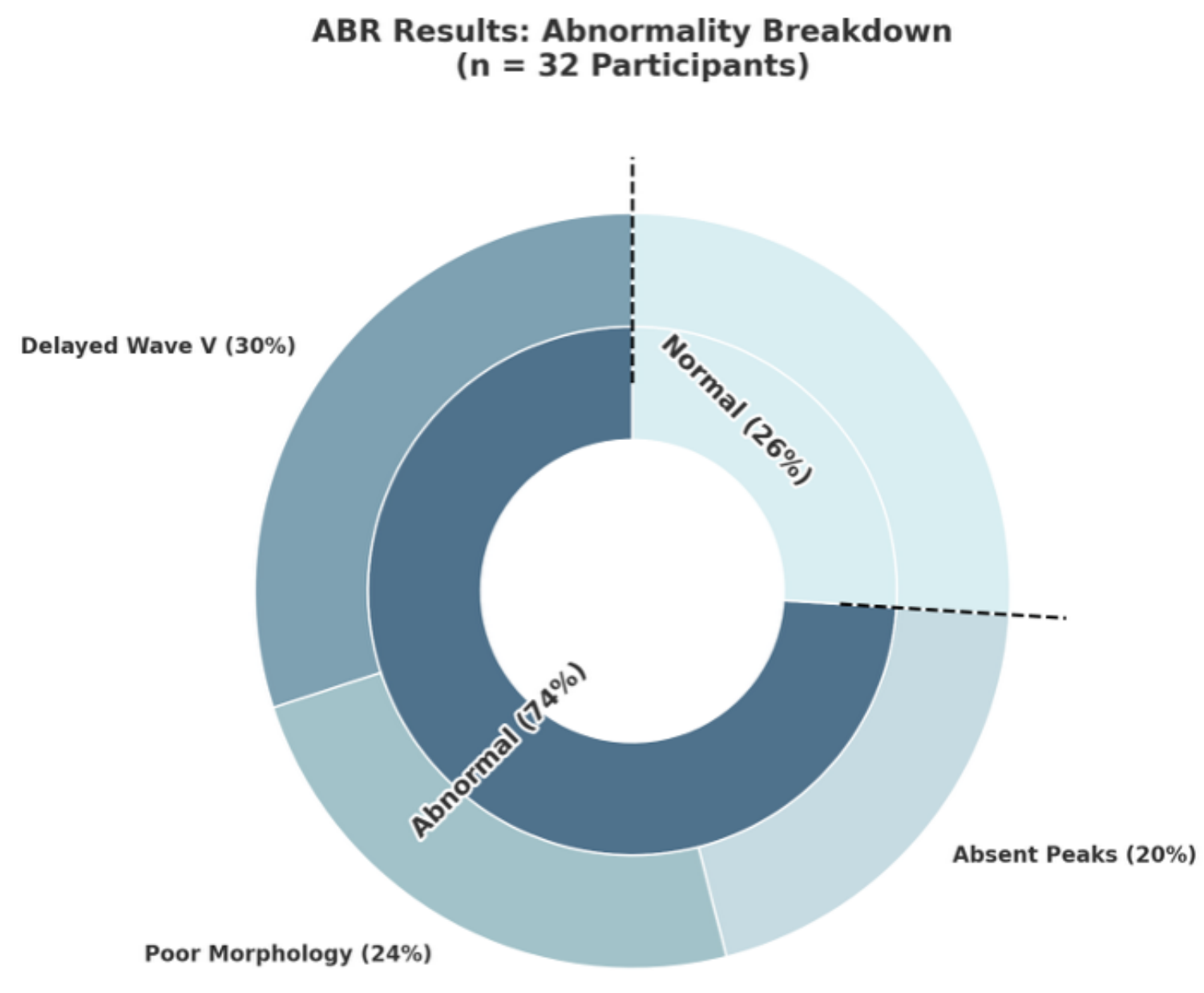


Figure 3. ABR results showing 74% of participants with abnormalities. Inner ring indicates normal vs. abnormal responses; outer ring details abnormality types.

CONCLUSIONS

- Ageing affects both **peripheral and central auditory function**.
- Spatial processing deficits** emerge in the 60s and worsen with age.
- PTA alone is insufficient** → speech-in-noise tests (QuickSIN, LiSN-S) and ABR give complementary insights.
- LiSN-S** is sensitive for detecting central auditory decline.
- ABR abnormalities** support subcortical timing deficits in older adults.
- Clinical practice should combine **audiometry + speech-in-noise + ABR**.
- Rehabilitation must extend beyond amplification: **auditory training + advanced hearing technologies**.

REFERENCES

Cameron & Dillon (2007) – Development of LiSN-S; Pichora-Fuller et al. (2017) – FUEL framework; Anderson et al. (2013) – ABR & speech-in-noise; NICE (2024) – Hearing loss prevalence.

Acknowledgment: We sincerely thank all the participants for their time and valuable contributions. We also extend our gratitude to the UCL Dementia Research Centre for their support in participant recruitment.