

Reliability of audiometric assessment in adults with cognitive impairment

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Hearing loss has been identified as a potential risk factor for the development of dementia in older adults. Studies reporting this relationship have typically compared pure tone thresholds or self-report measures of hearing abilities to measures of dementia severity or scores on cognitive tests (e.g. Digit Symbol Substitution task). One concern with these studies, however, is that they often fail to report whether participants could successfully complete the audiogram as a measure of hearing. For example, in a recent review, Bott et al (2019) noted a severe lack of information regarding the success/failure of audiometric testing in adults with dementia and reported that in the studies reviewed as few as 30% of adults with mild or worse dementia successfully completed pure tone audiometry. In order to determine the effects of cognitive impairment on the reliability of audiometric testing, we assessed the test-retest reliability of a comprehensive audiometric evaluation protocol in groups of older adults with normal cognitive function and dementia. All participants completed two identical test sessions, one to two weeks apart, which included otoscopy, assessment of hearing handicap, tympanometry, distortion product otoacoustic emissions, acoustic reflex thresholds, pure tone air and bone conduction thresholds, speech recognition thresholds, and a test of speech perception in noise. Because of the concerns of participant fatigue in these tests, the order of the protocol was prioritized to establish hearing abilities across the speech frequencies (500-4000 Hz) for each ear to evaluate the feasibility of protocol length. Participants ranged in age from 62-87 years. Audiometric data revealed all participants had at least a mild mid-to-high frequency hearing loss. Preliminary data suggest individuals with very mild dementia had slightly poorer thresholds (better ear pure tone average $M=44$ dB HL, $SD=18$) than those without dementia diagnoses ($M=29$ dB HL, $SD=12$), however, generalization is cautioned, and data collection is ongoing. Preliminary analyses reveal high test-retest reliability for all measures ($r \geq 0.75$). Testing was completed within the allotted time for individuals with normal cognitive function and very mild dementia. Findings from this study will provide critical information regarding the reliability of hearing evaluations and evidence for modifying standard audiologic assessment in the growing population of older adults with cognitive impairment. Support provided by NIH R01DC014281-04S1 and T32AG000030.

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