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Short Communication

# Is Hearing Impairment by Audiometry as Much a Cognitive Score as Cognitive Domain Batteries?

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## ABSTRACT

This article is about hearing acuity in a memory clinic. This memory clinic is typical of almost all clinics in that background noise is low and there are no alarms or signals from monitors as in emergency departments. We performed pure tone audiometry with the Siemen's hear check Screener (Siemens AG, Munich) at three intensities and two frequencies (1000 and 3000 Htz). We analysed the best ear for hearing acuity.

**Keywords:** Pure tone audiometry; Hearing; Dementia; Delirium

## DESCRIPTION

This article [1] is about hearing acuity in a memory clinic. This memory clinic is typical of almost all clinics in that background noise is low and there are no alarms or signals from monitors as in emergency departments. We performed pure tone audiometry with the Siemen's Hear Check Screener (Siemens AG, Munich) at three intensities and two frequencies (1000 and 3000 Htz). We analysed the best ear for hearing acuity. The best possible score is 6/6 tones and the worst is 0/6. Hearing loss was trichotomized severe as acuity 0/6-2/6, intermediate as 3/6 to 5/6 and normal as 6/6. Global cognition was assessed by two tests: Mini-Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA). Cognitive domains were assessed using multiple tests for attention, executive function, language, memory, and visual-spatial function. Each domain had an average of four tests. We recruited 124 subjects whose median age was 82. The 31 subjects with severe hearing loss were on average 4 years older than the intermediate hearing group and 11.4 years older than those with normal hearing. The severe group also had twice the frequency of low instrumental activities of daily living (Nottingham IADL<6/22), twice the prevalence of dementia as the intermediate group and four-fold more dementia than the normal group. Portable amplifiers with headphones were used on 66%, 15% and 0% of the three groups. We used Bonferroni adjustment of P values from P<0.05 to P<0.0014. Best hearing acuity was highly correlated with 13 of 36 scores including 11 of 31 (35%) cognitive measures. Yet cognitive domains scores were better correlated with other cognitive domains than were hearing acuity scores. We compared our results to ten other studies [2-12]. We did not use Z scores to combine cognitive tests but this was similar to other studies: none of the ten studies used Z scores to combine cognitive tests.

One weakness of the study is that portable amplifiers were not used in 100% of the severely impaired group. Another weakness was the convenience sample from a single centre. A strength of the study is exclusion of delirium by the Delirium Index. Strength is the Bonferroni adjustment of P values for multiple comparisons. An additional strength is use of open-access cognitive tests which can be used by all clinicians and not just registered psychologists.

In conclusion, this article supports portable pure tone audiometry in older outpatients with cognitive complaints.

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