

RESEARCH ARTICLE OPEN ACCESS

Is Work-Related Hearing Loss Associated With Dementia? Evidence From a High-Risk Population

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Received: 14 April 2025 | **Revised:** 15 September 2025 | **Accepted:** 17 September 2025

Funding: This study was supported by a cooperative agreement (DE-FC01-06EH06004) with the U.S. Department of Energy to a consortium led by CPWR—The Center for Construction Research and Training.

Keywords: dementia | hearing loss | occupation

ABSTRACT

Background: Age-related hearing loss is associated with increased dementia risk. We examined the association between hearing loss and dementia in a population at high risk for hearing loss from occupational noise exposures.

Methods: We conducted cross-sectional and longitudinal analyses using logistic regression and interval-censored Cox models using data from the Building Trades National Medical Screening Program (BTMed), from inception in 1996 through March 2024. Hearing loss was defined as a speech-frequency pure-tone average ≥ 20 decibels (dB) in the better ear and categorized as mild (20–34 dB), moderate (35–49 dB), moderately severe (50–64 dB), or severe to complete (≥ 65 dB). Dementia was defined using criteria from medical history, physical exams, and medication data across all medical screening examinations.

Results: The study included 44,000 exams in 24,958 BTMed participants; 54.6% had hearing loss. Hearing loss was strongly associated with dementia prevalence (211 cases, $p < 0.001$), with prevalence increasing by severity. Cross-sectional analysis found a significant association between hearing loss ≥ 20 dB and dementia (adjusted odds ratio = 1.88, 95% confidence interval (CI) = 1.15–3.07). In longitudinal analysis, a Cox model adjusted for confounders estimated a hazard ratio of 1.60 (95% CI = 0.99–2.59, p -trend = 0.0928) for incident dementia.

Discussion: Cross-sectional results support an association between occupational hearing loss and dementia, consistent in direction with findings for age-related hearing loss; longitudinal estimates were not significant but were directionally similar. If confirmed in other high-risk cohorts with repeated audiometry, these findings underscore the potential for hearing conservation and hearing loss rehabilitation in dementia prevention.

1 | Introduction

Hearing loss is a common condition, impacting an estimated 73 million or 22.2% of the United States population as of 2019 [1]. Hearing loss has been linked to multiple negative social, physical, and cognitive health outcomes [2]. While

disabling hearing loss has been defined by the World Health Organization (WHO) as hearing loss > 35 decibels (dB) in the better hearing ear, 20 dB is used as the threshold to define hearing loss that may be mild. Hearing loss may be mild, moderate, moderately severe, or profound, using the WHO classification [3].

Institution at which the work was performed: CPWR—The Center for Construction Research and Training.

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