



Multisensory Difficulties And Cognitive Impairment

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BACKGROUND

The 2024 Lancet Commission on Dementia Prevention, Intervention, and Care report identified hearing and vision loss as key modifiable risk factors for dementia. (1) Dual sensory impairment is common with advancing age.

Emerging evidence suggests that individuals with multisensory impairment experience worse cognitive outcomes (2, 3); findings across studies have been heterogeneous and often limited by study design and outcome ascertainment.

METHODS

The study comprised 5,567 Mayo Clinic Study of Aging (MCSA) participants (aged 50 years or older) who underwent a comprehensive cognitive evaluation, assessing memory, language, executive/attention, and visuospatial cognitive domains. MCSA is a population-based cohort study of cognitive aging and impairment. (4)

Visual and hearing difficulties were based on the informant's response to whether the participant had significant visual or hearing difficulties that interfered with daily activities. (5)

Logistic and linear regression models were run to model outcomes of mild cognitive impairment (MCI) and cognitive z-scores, respectively, adjusting for age, sex, and education. We assessed the risk of MCI and dementia outcomes using Cox proportional-hazards models utilizing age as the time scale.

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OBJECTIVE

To investigate the association of co-occurring hearing and visual difficulties with cognitive impairment in the population-based Mayo Clinic Study of Aging.

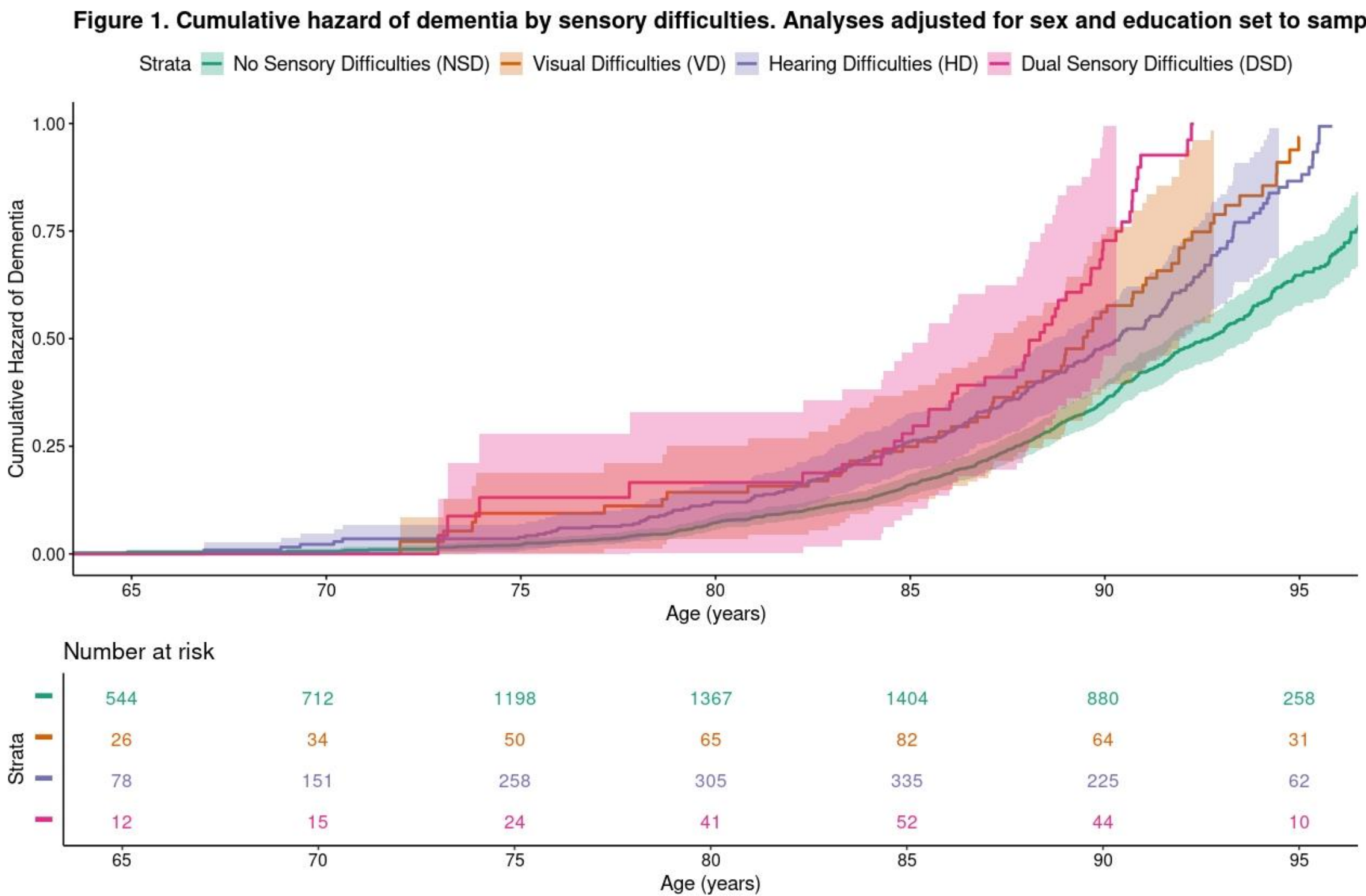


Table 1. Participants' Characteristics by Sensory Impairment Status at Study Baseline

Characteristics ^a	MSD (N=155)	HD (N=982)	VD (N=259)	NSD (N=4171)
Age at baseline	79.4 (7.8)	76.2 (8.8)	77.1 (9.6)	72.5 (9.7)
Male sex	103 (66.5)	712 (72.5)	104 (40.2)	1978 (47.4)
Education, years	13.7 (2.9)	14.2 (2.9)	13.9 (2.6)	14.5 (2.8)
APOE ε4 positive	36 (25.2)	243 (27.2)	58 (24.3)	1045 (27.6)
Global cognitive z-score	-1.1 (1.2)	-0.7 (1.1)	-0.9 (1.5)	-0.3 (1.2)
CU	115 (74.2)	800 (81.5)	206 (79.5)	3774 (90.5)
MCI	40 (25.8)	182 (18.5)	53 (20.5)	397 (9.5)
Incident MCI	34 (29.6)	186 (23.3)	54 (26.2)	676 (17.9)
Follow-up yrs (MCI) ^b	3.9 (4.0)	5.2 (4.8)	4.6 (4.5)	5.6 (4.9)
Incident dementia	28 (18.1)	80 (8.1)	25 (9.7)	199 (4.8)
Follow-up yrs (dementia) ^c	4.2 (4.2)	5.3 (4.8)	4.8 (4.4)	5.9 (5.0)
Spouse informant	103 (66.5)	717 (73.0)	137 (52.9)	2687 (64.4)
Other informant	52 (33.5)	265 (27.0)	122 (47.1)	1483 (35.6)

^a (mean ± SD) or n (%); CU: cognitively unimpaired; MCI: mild cognitive impairment; DSD: Multisensory Difficulties; HD: Hearing Difficulties; VD: Visual Difficulties; NSD: No Sensory Difficulties. ^b Years to MCI or last follow-up; ^c Years to dementia or last follow-up

RESULTS

- Sensory difficulties were associated with higher odds of MCI and lower global cognitive z-scores
- Sensory difficulties were associated with increased risk of incident MCI and dementia.

TABLE 2: Associations between sensory difficulties and cognitive outcomes.

Outcome	MSD	HD	VD
CROSS-SECTIONAL ANALYSIS AT STUDY BASELINE			
	OR (95% CI) ^a	OR (95% CI)	OR (95% CI)
MCI	1.97 (1.33, 2.91)	1.60 (1.30, 1.96)	1.80 (1.29, 2.51)
LONGITUDINAL ANALYSIS			
	HR (95% CI) ^b	HR (95% CI)	HR (95% CI)
MCI	1.50 (1.06, 2.13)	1.15 (0.97, 1.36)	1.35 (1.02, 1.78)
Dementia	2.00 (1.51, 2.65)	1.39 (1.19, 1.62)	1.53 (1.19, 1.96)

DSD: Multisensory Difficulties; HD: Hearing Difficulties; VD: Visual Difficulties. OR: Odds ratio; CI: confidence interval; HR: hazards ratio. ^a OR (95%) retained from logistic regression models adjusted for age, sex, education.; ^b HR (95% CI) retained from Cox proportional hazards models adjusted for sex and years of education, with age as the time scale.

CONCLUSIONS

Participants with dual sensory deprivation exhibited the greatest odds for MCI and the highest MCI and dementia risks.

Study findings emphasize the importance of early identification of individuals with sensory impairments, particularly those with combined deficits, as a group that warrants heightened vigilance for cognitive impairment screening and the timely implementation of early care interventions.

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