Exploring the Relationship Between Bilingualism and Alzheimer's Disease: A Narrative Literature Review

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Abstract

Protective Effects

Cognitive Reserve

Cognitive Profile

Delayed Symptoms

Introduction

- Alzheimer's Disease (AD) is an age-related neurocognitive disorder that causes impairment in the brain network and cognitive decline.[1]
- AD typically affects the elderly population and disproportionately impacts lower- and middle-income communities.[1, 2]
- A study showed that all dementia conditions cost global societies $818 million in 2015.[2]
- Bilingualism has been reported to be a positive environmental factor with better cognitive outcomes while aging.[3]
- A study conducted in Wales found that bilingualism improved cognitive function and thinking indicating its potential as a protective factor against neurocognitive conditions.[4]

Our review aims to analyze the potential impact of bilingualism as a protective factor against the onset and progression of Alzheimer's disease

Methodology

- A thorough literature search was conducted on the PubMed database.
- **Search Strategy + Keywords Utilized:** "bilingual" OR "bilingualism" AND "Alzheimer's"
- Time period of articles was set to from 2015-2025.
- Only English-written articles were considered.
- Excluded articles did not pertain to the topic of focus.

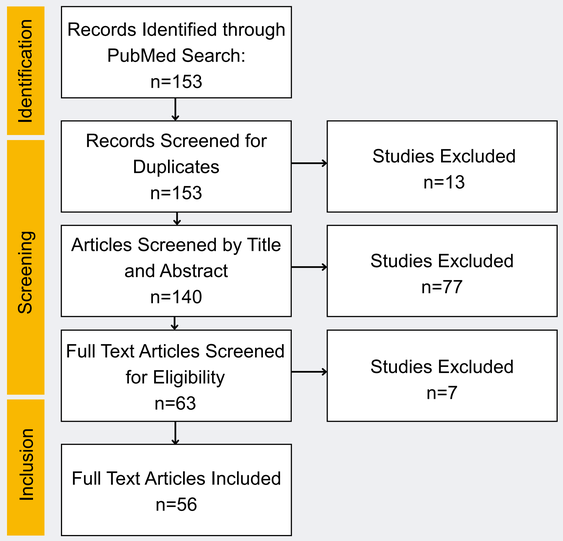

Figure 1: PRISMA diagram demonstrating search strategy results.

Results

Theme	Number of Articles
Cognitive Profile	25
Delayed Symptoms	24
Cognitive Reserve	16
Protective Effects	20

Figure 2: Instances of thematic elements within included studies as a result of a thematic analysis.

Discussion

Cognitive Profile
- Bilingual individuals were found to have a superior baseline cognitive performance.
- Bilingualism enhances frontal executive reserve by inducing significant grey and white matter changes.
- Cognitive profiles in the elderly population are slightly more functional in bilingual patients.

Delayed Symptoms
- Symptoms in bilinguals became prevalent at a later stage of disease.
- Bilingual individuals presented with clinical AD features on average 4 years later than monolinguals.
- Diagnosis on average occurred 2 years later than the monolingual population.

Cognitive Reserve
- Bilingualism improves cognitive reserve by its positive impacts on executive and visual-spatial functioning.
- Second language use is associated with neural reserve through enhanced brain connectivity.

Protective Effects
- Bilingualism is associated with increased gray and white matter densities which may have protective effects against dementia.
- Bilingualism may have protective effects against cognitive decline.

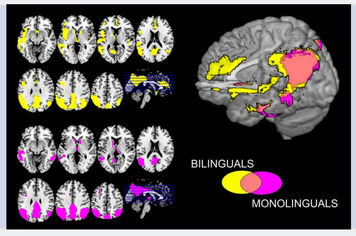

Figure 3: Neurological differences between bilinguals and monolinguals.[1]

Conclusion

Bilingualism is associated with delayed onset of Alzheimer's disease symptoms, enhanced baseline cognitive performance, and neuroprotective structural changes, suggesting its role as a protective factor against age-related cognitive decline.

- Future research should focus on identifying and validating preventative factors including bilingualism for Alzheimer's disease to develop more effective interventions.
- Governments should evaluate the public health potential of promoting bilingual education to develop neural pathways to bolster population-level cognitive reserve.

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