Gender Differences in Use of Cerebrospinal Fluid Biomarker Test And Positron Emission Tomography For Diagnosing Mild Cognitive Impairment, Alzheimer's Disease, And Other Dementias In The Real World Setting

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Key Findings

- Our study of a nationally representative cohort of Medicare Fee-For-Service beneficiaries suggests that women are less likely than men to receive cerebrospinal fluid biomarker and positron emission tomography tests for confirming diagnoses of mild cognitive impairment, Alzheimer's disease, or other dementias.
- These findings highlight a gender disparity in the diagnostic evaluation of AD and related dementias. Further research is warranted to understand the underlying causes of this difference and its potential impact on patient outcomes.
- Our study also indicates an overall low utilization of confirmatory tools for AD diagnosis. Substantial improvements are needed in the adoption of diagnostic tests—particularly CSF biomarkers and PET—which will be essential to support the appropriate use of emerging disease-modifying therapies.

Background

- About 2/3 of Americans diagnosed with Alzheimer's disease (AD) or other dementias are women.
- Cerebrospinal fluid (CSF) biomarkers and Amyloid-β positron emission tomography (PET) imaging are now established tools in the diagnostic workup of patients with Alzheimer's disease (AD).[1]
- However, it is unknown whether use of these confirmatory tools for AD differed by gender.

Objective

- To compare the gender differences in use of CSF biomarkers and PET imaging for the diagnosis of AD or other dementias.

Methods

- For this retrospective, observational study, we used the Centers for Medicare & Medicaid (CMS) Research Identifiable Files (RIFs) for 100% of Medicare beneficiaries enrolled in the fee-for-service (FFS) program from years 2015-2020.
- The study included Medicare FFS beneficiaries ≥ 67 years old and newly diagnosed with MCI, AD, or other dementias between 2017 and 2020.
- The study index date was the first disease diagnosis date.
- Current Procedural Terminology (CPT)/Healthcare Common Procedure Coding System (HCPCS) Codes were used to identify the use of CSF and PET including the Amyloid-β PET.
- Chi-square analyses were conducted to compare the unadjusted gender differences in the use of CSF and PET during the 1 year prior to or on their first MCI, AD, or other dementia diagnosis (the baseline period).
- Firth's penalized logistic regression analyses were performed to adjust for baseline sociodemographic and clinical factors such as age, race/ethnicity, physician specialties, counties of residence, social determinants of health, and comorbidities.

Acknowledgements

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References

1. Leuzy A, Bollack A, Pellegrino D, et al Alzheimers Dement. 2025 Mar;21(3):e14528.

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Results

Study attrition

- Of the total 412,468 patients (46,253 MCI, 115,788 AD, and 250,427 other dementias) included in the final study sample, 251,812 (61.1%) were female (**Figure 1**).

Patient demographics and clinical characteristics by gender

- Compared to men, a higher percentage of women were 85 years and older, black, Medicare-Medicaid dual eligibles, and had problems related to care provider dependency (p<0.001) (**Figure 2**).
- In contrast, women exhibited a lower comorbidity burden, as indicated by their CCI scores and the prevalence of most comorbidities, than men (p<0.001).
- Overall, 2.2% of the study population received a CSF test and 0.7% had a PET test during the 1 year during the 1 year before their AD, MCI, or other dementia diagnosis.
- By gender, women had lower utilizations of CSF (1.9% vs. 2.6%) and PET (0.6% vs. 1.0%) than men (all p<0.001) .

Gender differences in CSF and PET diagnostic tests

- Adjusting for factors such as age, race/ethnicity, county of residence, physician specialty, and comorbidities, women had lower odds of using CSF [Odds Ratio (95% confidence interval): 0.95 (0.91-0.99), p=0.02] and PET (0.82 (0.77–0.89), p<0.0001] tests (**Figure 3**).

Figure 1. Study attrition criteria

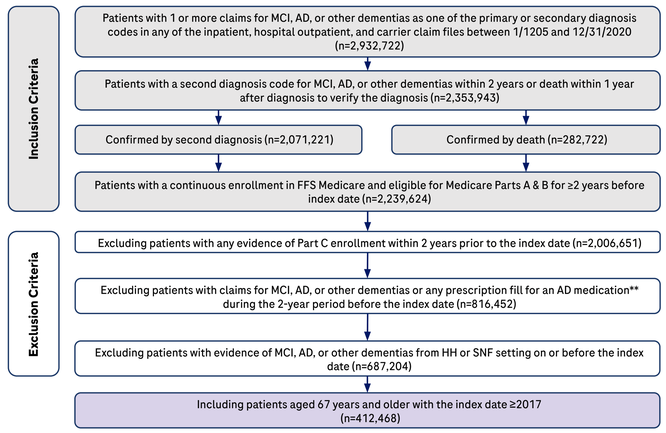

Figure 2. Patient demographics and clinical characteristics by gender

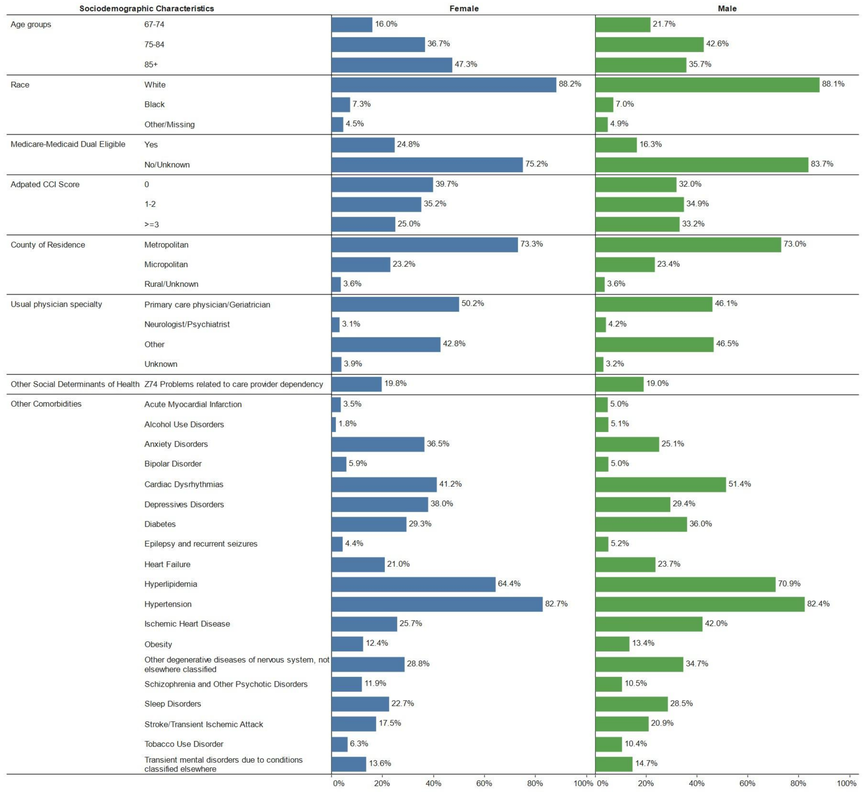

Figure 3. Unadjusted and Adjusted Gender differences in CSF and PET diagnostic tests