TRENDS IN SUBJECTIVE MEMORY AND FUNCTIONAL LIMITATIONS IN THE UNITED STATES: A MATCHED CASE-CONTROL NHANES ANALYSIS

Myrlene Sanon Aigbogun, MPH

Robert Stellhorn,¹ Holly Krasa,¹ Dusan Kostic²

¹Health Outcomes Otsuka Pharmaceutical Development & Commercialization, Inc., Princeton, NJ

Funding for this research was provided by Otsuka Pharmaceutical Development & Commercialization, Inc.
Background

Dementia/Alzheimer's Disease
- Dementia affects almost 50 million people worldwide
- Alzheimer's disease (AD) is the most prevalent form of dementia, affecting approximately 5.4 million Americans in 2016

Individual Reports
- Many individuals report subjective memory and functional complaints many years prior to the development of dementia and Alzheimer’s disease
- In 2012, a national survey estimated that in the United States 18.7% of noninstitutionalized individuals report limitations in mental or functional abilities.

Evidence Gaps
- Despite high and increasing numbers, published data on epidemiology, health care costs and real world reports on care are scarce

References:
Objective

• This study evaluated the prevalence rate of cognitive and functional limitations as reported by individuals.

• Specifically, the National Health and Nutrition Examination Survey (NHANES) was used to examine:
  • Prevalence rate of cognitive and functional limitations
  • Rates of healthcare resource utilization among cases versus matched controls
Cross-sectional survey designed to assess the health and nutritional status of adults and children in the United States

Unique in that it combines interviews and physical examinations

Major program of the National Center for Health Statistics (NCHS)

Survey examines a nationally representative sample of about 5,000 persons each year

NHANES interview includes demographic, socioeconomic, dietary, and health-related questions; the examination component consists of medical, dental, and physiological measurements, as well as laboratory tests administered by highly trained medical personnel
Methods: Sample Selection

Survey respondents from 1999-2012

Aged 65 years or older

Completed both Interview and Medical examination
## Methods: Sample Identification

<table>
<thead>
<tr>
<th>Sample</th>
<th>Definition</th>
<th>Survey related item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case</td>
<td>Cognitive Limitation</td>
<td>“Are you limited in any way because of difficulty remembering or because you experience periods of confusion?”*</td>
</tr>
</tbody>
</table>
|        | Functional Limitation | 3 functional domains  
|        |                    | - Activities of daily living (eating/dressing)  
|        |                    | - Instrumental activities of daily living (managing money, chores, preparing meals)  
|        |                    | - Social interactions (social activities, meetings, parties, visiting friends) |
| Control| • No positive responses to cognitive or functional limitation survey questions  
|        | • For each case with a limitation (cognitive/functional), using propensity scores 1 control participant was matched to a case based on age ±1 year, gender, race, education, individual comorbidity, and survey year |

*Previous using this question to evaluate cognitive limitations- Hajjar et al. Racial Disparity in Cognitive and Functional Disability in Hypertension and All-Cause Mortality. Am J Hypertens. 2015 Jul 1. pii: hpv084
Methods: Statistical Analyses

• Data analyzed using SAS and accounted for the nonrandom cluster sample design in calculating variance estimates

• Nationally representative estimates of the civilian, noninstitutionalized U.S. population were estimated using sample weights developed by the CDC

• Study measures include-
  • Patient Demographics
  • Concomitant Medications
  • Anti-dementia Treatment
  • Health Status
  • Healthcare Resource Utilization
Results: Patient Characteristics

- 9,029 participants were available across the 1999-2012 surveys
- 2,096 cases (23%) identified and 2,096 matched controls
- Mean age 75 years and 64% female for cases and controls

- Among cases with functional limitations-
  - 25.2% of cases reported worsening health status over one year compared to 13.1% of controls (p < 0.0001)

- Activities of daily living (i.e., eating, dressing)
- Instrumental activities of daily living (i.e., Managing money difficulty)
- Social interaction and activities (i.e., Attending social event difficulty)
Results: Prevalence (%) of self-reported concomitant medications by group, 1999-2012

- Higher utilization of co-medications reported in cases vs controls, including antidepressants (22% vs 11%), hypnotics (13% vs 8%), opioids (12% vs 4%), and antipsychotics (3.5% vs 0.6%)
Results: Prevalence of anti-dementia treatment by group, 1999-2012

- Higher utilization of anti-dementia treatment in cases versus controls
- Rate of cholinesterase inhibitors and memantine use increasing over time

Prevalence of anti-dementia use, by group
Results: Healthcare resource utilization

• Analyses showed significantly more (28.4% cases vs 18.2% controls) experienced overnight hospitalization in the last year (p<0.0001)
• Seeing a mental health specialist was also significantly higher in cases versus controls, 8.2% vs 2.5%, respectively, (p <0.0001)
Summary

- Survey findings provide an overview of the extent of memory & functional impairment in the US population over 65 years
- Higher rates of co-medications observed for cases versus matched controls along with greater use of healthcare resources
- Self-reported information is subject to recall bias and even more relevant in a population with memory complaints; notably self-reported health status is a common method to assess disability and also a predictor of morbidity and mortality\(^5,6\)
- While surveys are subject to recall bias, this study provides comparative data on the burden associated with memory and functional limitations
- These nationally-representative frequency data provide a tremendous resource for future epidemiologic studies in public health in the United States