Ethno-racial disparity among patients with Alzheimer’s disease in the US population: A real world study based on administrative claims and electronic health records data
Conflict Of Interest Statement

• The authors of this presentation have no conflicts of interest to disclose.

• We have made every effort to present unbiased information.

• Please feel free to reach out to us at the email address provided below with any questions or concerns.

  • Vikash.verma@optum.com
  • Abhishek.gaur@optum.com
  • Shailaja.daral@optum.com
Introduction – About the Speakers

Vikash Verma, Director Optum Lifesciences

- Vikash has more than 15 years of experience in forecasting, HEOR, managed market analytics, portfolio/data strategy, sales force excellence, and KOL management.
- Currently, he leads the Optum Life Sciences India team, comprising consultants, doctors, data scientists, and data engineers to support projects on healthcare commercial effectiveness and real-world insights solutions.
- Vikash has worked with companies like TCS, GSK Knowledge Centre (WNS), and Pharmarc. He received his BS degree in pharmaceutical science from Manipal College of Pharmaceutical Sciences, an MBA (marketing) from Manipal Institute of Management, and an Executive program in business analytics from IIM Calcutta. Currently is pursuing the Senior Executive Development CXO Programme - in Driving Growth from XLRI

Abhishek Gaur, Senior Manager Optum Lifesciences

- Abhishek has more than 12 years of experience in RWE Analytics, Payer/PBM Analytics, Marketing Analytics, Competitive Intelligence, Market Research
- He has prior work experience with companies like Novartis, GSK Knowledge Centre (WNS), Pfizer and TCS.
- Abhishek has more than 50+ abstract publications.
- He received his MBA in Pharmaceutical Marketing from National Institute of Pharmaceutical Education & Research, Punjab and B. Pharmacy from L. M. College of science & Technology.

Dr. Shailaja Daral, Senior Manager Optum Lifesciences

- Dr. Shailaja has 10+ years of experience in healthcare project management, strategy consulting, clinical and community studies, brand planning, and designing behavior change communication tools.
- She has prior work experience with consulting firms (Bain) and hospitals (Safdarjung Hospital). She has 17+ research publications in reputed international and national medical journals.
- Dr. Shailaja has completed her MBA from Indian School of Business; MD in Preventive Medicine from Delhi University, and Diplomate of National Board (DNB) in Family Medicine from National Board of Examinations.
- She also has multiple certifications in Clinical Research, Pharmacovigilance, Basic Health Economics.
The number of Americans with Alzheimer’s (AD) is growing at a very fast rate, and it is now the fifth leading cause of death for adults aged 65 and older.

**Epidemiology & Cost of care**

- **More than 5.8 million** people in the US suffer from AD. This number will grow due to the rapid aging population, estimating almost **14 million** affected individuals by 2050.

- **1 in 3** people >60 years dies with Alzheimer’s or another dementia. It kills more than breast cancer and prostate cancer combined.

- Currently, an estimated **$240 billion USD** is spent annually on people aged ≥65 years with dementia. This may rise to nearly **$1 trillion USD** by 2050.

- **Over 11 million** Americans provide unpaid care for people with Alzheimer’s estimated at over **$230 billion USD** annually.

- **Total Medicare cost for AD patients ≥65 years** is estimated to be **$25,213/ person**, about **3 times higher** than without AD ($7750).

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1. [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9198803/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9198803/)
2. [https://www.alz.org/alzheimers-dementia/facts-figures](https://www.alz.org/alzheimers-dementia/facts-figures)
The at-risk population in the USA is becoming increasingly racially and ethnically diverse. Lack of understanding of the ethno-racial disparities may lead to inadequate care management for racial minorities.

With increasing AD incident, racial disparities has also increased. Older African American & Hispanics are roughly 1.5 to 2 times as likely than whites to develop Alzheimer’s and related dementias.

Although these racial disparities are well documented, lack of knowledge on the underlying cause still exists owing to the lower participation of minority groups in clinical research.

Use of real-world data which links electronic health record with claims has opened a sea of opportunity to research to study and understand the cause of ethno-racial disparities.

Real world evidence from real world data can be used to study specific outcomes such as disparity in adherence, clinical outcome, comorbidities, health resource utilization etc.

This study aims to explore ethno-racial disparity in clinical benefits using brief cognitive instrument (the Mini-Mental State Examination [MMSE]) and adherence (proportion of days covered [PDC]) among Alzheimer’s disease (AD) patients.
In the reviewed literature, there are studies which analyzed adherence and discontinuation pattern of Alzheimer’s drug.

Natalia Olchanski et al., 2022

This study examined the adherence and discontinuation of two Alzheimer’s disease drug, cholinesterase inhibitors and memantine, by race and ethnicity. The data used for the analysis was the data from the 2000–2016 Health and Retirement Study linked with Medicare and Medicaid claims. The study showed lower adherence and frequent discontinuation of AD treatment among African American and Hispanic patients compared to Whites.

Limitation: The impact of poor adherence on clinical outcome has not been established.

Jakub Perwieniec et al, 2015

This study was a randomized, double-blind, placebo-controlled study and invested the effect of cholinesterase inhibitors discontinuation on patients with Alzheimer’s Disease on measurable results of neuropsychological testing. The study concluded that cholinesterase inhibitors discontinuation may have negative effects on cognition and neuropsychiatric test.

Limitation: The study was based on clinical trial and real-world scenario was not considered.

Sources:
1. Natalia Olchanski, Allan T. Daly, Yingying Zhu, Alzheimer’s disease medication use and adherence patterns by race and ethnicity
2. Jordana O'Regan, Krista L Lanctôt, Graham Mazereeuw, Cholinesterase inhibitor discontinuation in patients with Alzheimer’s disease: a meta-analysis of randomized controlled trials

Optum
A retrospective observational study was designed to compare clinical outcome (MMSE score) and adherence (PDC) among races.

[Diagram showing steps: Optum Market Clarity data -> Query -> Dataset and tables -> Data Cleaning -> Patient Population -> Prescription/Claims data -> Clinical outcome/E.H.R data -> Mean proportion of days covered (PDC) by race -> Mean difference in MMSE score by race -> Explore disparity based on mean PDC and mean MMSE score]
Design of retrospective observational study

**Baseline Period**
- 12-month period preceding the index date

**Index Period**
- First possible index date: 07/01/2016
- Last possible index date: 01/01/2017
- January 1, 2017 – December 31, 2019

**Follow-up Period**
- 15-month period following the index date
- 03/31/2021

**Data Sources**
- Optum’s de-identified Market clarity database which links EHR with claims data

**Index Period**
- January 1, 2017 – December 31, 2019

**Inclusion Criteria**
- Patients aged ≥41 years who had continuous 12-months pre- and 15-months post-index eligibility along with at least 2 AD outpatient diagnoses on two different dates at least 30 days apart or 1 AD inpatient diagnosis were considered for the analysis.
- Identified AD patients Patient with MMSE results in both at the index and at 12-month follow up time point

**Exclusion Criteria**
- Patients with AD or dementia diagnosis in the baseline/pre-index period

**Index Event**
- First occurrence of AD diagnosis

**ICD-10 codes**
- G30 for AD identification

**Study Outcome**
- Change in MMSE score from at index to at 12 month follow-up time point, MMSE score difference White vs other race/ethnicity at 12-month
- Secondary adherence (PDC) from index to 12-month

**Statistical Analysis**
- Descriptive analysis, Propensity score matching on age, gender, region, and insurance to compare the disparity in clinical outcomes AT 12-month
Demographic distribution of AD patients with cognitive measures included in the study

Total Incident AD Patient count: **29,044**
Patient with cognitive impairment test (MMSE) in both baseline and follow up period: **866**

*Due to the lack of cognitive measure in EHR data, the relatively small patient cohort was available for the analysis: Maserejian N, Krzywy H, Eaton S, Galvin J E; Cognitive measures lacking in EHR prior to dementia or Alzheimer’s disease diagnosis; The journal of Alzheimer & Dementia; https://doi.org/10.1002/alz.12280
Lower value of Mini Mental State Examination (MMSE) scores at 12 months post follow up in racial minorities suggest faster cognitive decline

### Clinical Outcome

#### Change in MMSE Score from Index to 12-months Follow-up

<table>
<thead>
<tr>
<th>Race /Ethnicity</th>
<th>n</th>
<th>MMSE score at Index</th>
<th>MMSE score at 12-month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean (SD)</td>
<td>Median (IQR)</td>
</tr>
<tr>
<td>Overall</td>
<td>866</td>
<td>18.9 (7.1)</td>
<td>20.0 (15.0-24.0)</td>
</tr>
<tr>
<td>Whites</td>
<td>749</td>
<td>19.2 (7.1)</td>
<td>20.0 (15.0-24.0)</td>
</tr>
<tr>
<td>African American</td>
<td>59</td>
<td>17.2 (6.6)</td>
<td>18.0 (13.0-23.0)</td>
</tr>
<tr>
<td>Hispanics</td>
<td>27</td>
<td>14.6 (7.3)</td>
<td>16.0 (8.0-26.0)</td>
</tr>
<tr>
<td>Asians</td>
<td>11</td>
<td>19.9 (3.9)</td>
<td>19.0 (17.0-26.0)</td>
</tr>
</tbody>
</table>

#### Mean MMSE score at 12 months follow up*

<table>
<thead>
<tr>
<th>Race /Ethnicity</th>
<th>n</th>
<th>MMSE score Mean (SD)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>53</td>
<td>16.1 (7.7)</td>
<td>0.0104</td>
</tr>
<tr>
<td>Whites</td>
<td>53</td>
<td>20.0 (7.7)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race /Ethnicity</th>
<th>n</th>
<th>MMSE score Mean (SD)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanics</td>
<td>26</td>
<td>14.0 (7.4)</td>
<td>0.0087</td>
</tr>
<tr>
<td>Whites</td>
<td>26</td>
<td>19.3 (8.2)</td>
<td></td>
</tr>
</tbody>
</table>

*After applying PSM on age, gender, insurance, and region
We have observed lower AD drug utilization in African American and Hispanics compared to Whites. Mean 12-month PDC also was lower in the racial minorities group however, it was statistically non-significant.

**Overall Mean PDC & and Statistical significance**

<table>
<thead>
<tr>
<th>Race /Ethnicity</th>
<th>n</th>
<th>Mean PDC</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>31</td>
<td>59.9%</td>
<td>0.4764</td>
</tr>
<tr>
<td>Whites</td>
<td>38</td>
<td>64.6%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race /Ethnicity</th>
<th>n</th>
<th>Mean PDC</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanics</td>
<td>12</td>
<td>49.8%</td>
<td>0.0811</td>
</tr>
<tr>
<td>Whites</td>
<td>19</td>
<td>67.4%</td>
<td></td>
</tr>
</tbody>
</table>
Limitation

Possibility to generalize the results by having more patient sample and more cognitive tests

Extensive missing cognitive data and differences in the availability of cognitive measures by race, age, and socioeconomic factors hinder patient care and limit utility of EHR for Alzheimer’s research, the analysis was performed on a limited sample.

Other Factors of Inferior Clinical Outcomes

This study only evaluated the effect of adherence to AD medication on clinical outcome. Factors such as genetic predisposition, other biological indicators, and impact of comorbidities were not considered.