Relative risk of Dementia and its sub-types with baseline Visual Impairment (VI) and other confounding comorbidities

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Introduction

- VI has been linked with cognitive decline in older individuals and considered to be a potential risk factor for dementia. VI limits social engagement and puts additional burden on the cognitive system to interpret and respond to visual information
- A proportion of VI is preventable, and investigating longitudinal impact of VI on dementia may help to identify an important factor for the prevention of dementia

Objective

- Our objective is to investigate the temporal relationship between baseline VI and dementia and its subtypes

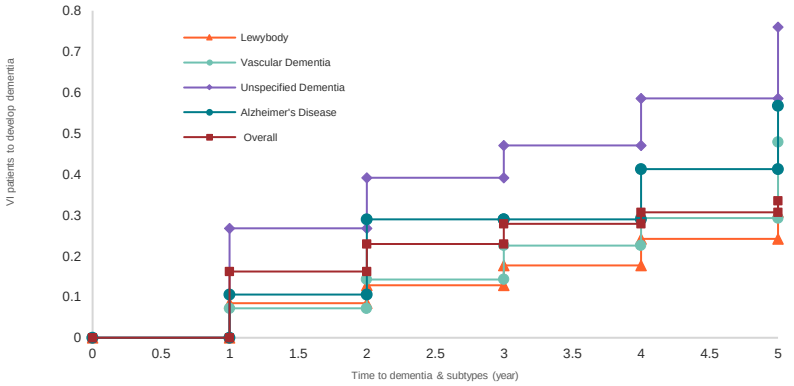
Methodology

- Optum's de-identified Market Clarity database which links EHR data with Claims data, was used to identify patients aged >60, who were diagnosed with VI from 1st Jan 2010 to 31st Dec 2015
- Patients with >=1 inpatient or >=2 outpatient claims, >=2 clinical notes and continuous eligibility of 12 months pre and 60 months post-index period were considered
- Potential confounding variables such as Coronary heart disease (CHD), Stroke, Hearing loss, Hypertension, Diabetes, Myocardial Infraction, Thinking & cognitive impairment, mood & neuropsychological disorder were extracted using 'Sign & Symptoms' component of clinical notes
- Kaplan-Meier & cox proportional hazards regression analysis were applied to indicate change in the proportion of patients with incident dementia, stratified based on VI at baseline for the entire period and to evaluate the impact of baseline VI on subsequent dementia. Log rank test was used to establish significance of survival curve.
- Models were adjusted for potential confounding variables, including demographics, clinical comorbidities and clinical signs & symptoms
- Further investigation was carried out for dementia subtypes such as Alzheimer disease (AD), Vascular dementia (VaDem), Unspecified Dementia and Lewybody

Results

- Of the 3,991 patients included in the analysis, 60% were female, 57%, were aged below 75 years. 83% patients were self-identified as Caucasians and 10% as African American, 21% reported Dementia development within the observation period

Fig.1- Time to event (development of Dementia & subtypes) analysis based on visual impairment



- Survival function showed increasing probability of developing Dementia with time. Risk of unspecified dem, AD and VaDem were much higher than other dementia types **[Fig.1]**

Fig.2- Gini Index of confounding variables

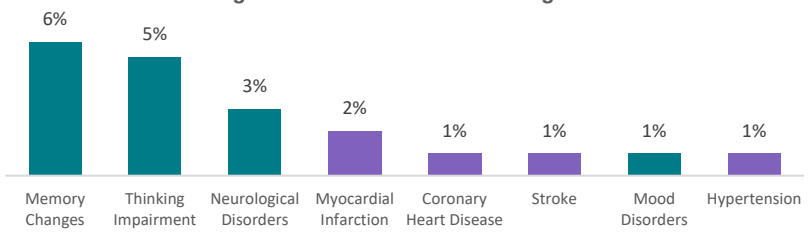
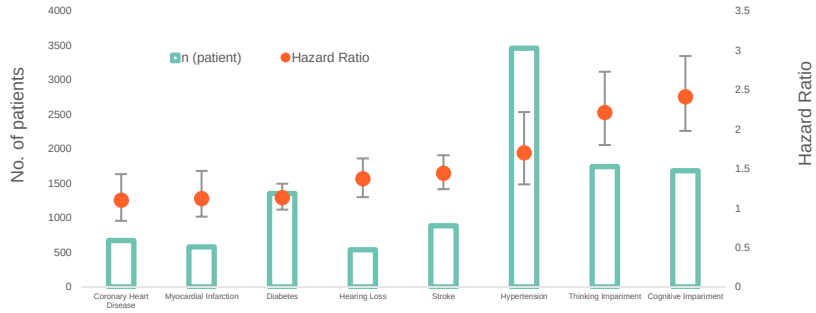


Fig.3- Hazard ratio of covariates with confidence Interval



- Cox proportional hazard model showed higher relative risk for cognitive impairment (2.41), thinking impairment (2.21), hypertension (1.7) followed by Stroke (1.44) among all confounding variables. Gini index was also found to be higher for cognitive impairment followed by thinking impairment **[Fig.2,3]**
- Survival forest model signified (P<0.05) at each node, patient pool with those with VI at baseline and dementia were more likely to be older, female and have signs of impaired memory function & diminishing thinking ability along with comorbidities like hypertension, stroke, hearing loss and others

Conclusion

- VI in the older population is associated with greater likelihood of dementia. Associations are likely multifactorial and could be more explained with variable interaction effect in the path from VI to dementia. Risk of developing dementia is higher for patient having more than one comorbidity and with signs and symptom of cognitive impairment.
- These findings suggest the need for early identification of older adults with VI to prevent the risk of Dementia development.

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