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85 Predicting Conversion to Mild Cognitive Impairment in Parkinson's Disease: a Random Forest Machine Learning Model Based on Parkinson's Progression Markers Initiative Dataset.

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Objective: Mild cognitive impairment (MCI) is common in Parkinson's disease (PD). Recent scientific advances show that MCI in PD could also be impacted by neuropsychiatric symptoms (such as apathy, anxiety, depression), dopaminergic deficiency (more striatal denervation associated with MCI) and certain genotypes such as in APOE E4, MAPT H1 or SNCA C/C carriers. We used a python-based random forest machine-learning algorithm (scikit-learn) in order to evaluate the factors that are mostly involved in the MCI conversion over a 5-year follow-up period.

Participants and Methods: Baseline data of healthy individuals and participants with Parkinson's disease were extracted from the PPMI dataset. All participants also had the evaluations of their cognitive status, neuropsychiatric symptoms (hallucinations, anxiety, apathy, depression, sleepiness, impulse control disorders and rapid eye movement behaviors), dopaminergic uptake (DaT-Scan) and genetic status (APOE, MAPT and SNCA) at baseline and after 5 years. Baseline demographic (age, sex, education years) and clinical values (duration of disease, age of onset) were also included in the model. The algorithm defined (1) the most important variables in predicting MCI, (2) the threshold values to distinguish "converting" vs. "non-converting" subgroups.

Results: The algorithm showed that (1) age onset of disease, (2) dopaminergic uptake, (3)

age, (4) anxiety, and (5) years of education were the most important factors in predicting MCI over 5 years. Among the factors involved in predicting conversion to MCI, a lower number of years of education associated with lower dopaminergic uptake in the right putamen increased the risk of conversion. Individuals with more years of education are at higher risk of conversion if they have symptoms of depression, anxiety, and lower right striatal dopamine uptake. Other factors that were involved in increasing the risk, were the presence of sleepiness and the presence of rapid eye movement disorders. Interestingly, the genetic factors were of negligible importance and were not considered by the algorithm. Finally, the model showed an accuracy of classification of participants (converters vs. non-converters) of 92.53%.

Conclusions: Random forest algorithm shows that (1) depression and anxiety are probably important factors for MCI conversion; (2) years of education influences the conversion; (3) presence of sleepiness and rapid eye movement increases the risk of conversion to MCI. Since the algorithm considers the disease's age onset, but not the diagnosis of individuals, it would be necessary to generate a model for each group (Healthy on the one hand, Parkinson's on the other).

Categories: MCI (Mild Cognitive Impairment)

Keyword 1: mild cognitive impairment

Keyword 2: Parkinson's disease

Keyword 3: neuropsychiatry

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86 Dementia Caregiver Burden associated with COVID-19 quarantine: A South American Cohort Study

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Objective: The objective of this study is to explore the impact on the mental health of caregivers of people with dementia during the period of mandatory preventive social isolation

(ASPO) and to study which of these factors were predictors of caregiver overload.

Participants and Methods: During the first 3 months of the ASPO (June 2020 to September 2020). A sample of 112 caregivers (75.89% female; age 58.65 ± 14.30) of patients with dementia from a Memory Center answered, remotely (online or telephone) a survey with the following questionnaires: the Zarit Caregiver Overload Scale (ZBI), Weekly hourly load dedicated to the care of patients with dementia), the use of time in unpaid activities through an activity diary, provided by Argentine National Institute of Statistics and Census (INDEC), the Caregiver Activities Survey (CAS) and the Anxiety, Depression and Stress Scale (DASS-21). These questionnaires evaluate the conditions and characteristics of caregiving tasks and their impact on the caregiver in the context of ASPO. Additionally, it was recorded whether the person with dementia, the caregiver, or persons living with them had had COVID-19.

Results: Descriptively, a disparity in frequency was observed in the gender of caregivers of persons with dementia, i.e., caregiving is inequitably distributed between men (24.11%) and women (75.89%). This difference hinders direct comparison between men and women. A regularized L2 regression was performed for the identification of predictors of caregiver overload identifying the number of caregiving hours ($\beta=0.090$), DAS depression ($\beta=0.085$), DASS anxiety ($\beta=0.099$) DASS stress ($\beta=0.164$), fear of Covid (0.141) and lower patient cognitive performance according to MMSE ($\beta=-0.41$) and to lesser extent sex as the greatest contributors to patient overload. Additionally, a mediation analysis was performed in which the factors number of caregiving hours (CAS; $r=0.254$, $r=0.292$, $r=0.252$, $r=0.252$, $r=-0.37$), being a primary caregiver and fear of Covid-19 ($r=0.335$, $r=0.432$, $r=0.402$, $r=-0.496$) were found to be mediators of the effect between anxiety, depression, stress (DASS) and overload (ZBI).

Conclusions: Caregivers of patients with dementia have suffered sequelae such as anxiety, stress, depression, and overload (caregivers' burden) in the context of the COVID-19 virus spread and during mandatory preventive social isolation. Being a primary caregiver, dedicating more hours to caregiving, and fear of Covid-19 are factors that contribute significantly to caregiver burden and mediate between this burden and mood variables. Public

policies to support caregivers and information about the disease could modify these variables and reduce caregiver burden.

Categories: MCI (Mild Cognitive Impairment)

Keyword 1: cognitive course

Keyword 2: neurocognition

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87 Not Normal but not MCI: Course of Memory over time

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Objective: A diagnosis of mild cognitive impairment (MCI) requires memory complaint and objective memory impairment. However, some individuals report subjective memory complaints (SMC) despite having intact memory performance, while others demonstrate subtle impairment on memory testing but have no memory complaints; neither case would meet criteria for MCI. This study aimed to compare memory performances over time in individuals who do not meet traditional MCI criteria to those with normal cognition and those who converted to MCI.

Participants and Methods: Diagnoses for a longitudinal sample from the Texas Alzheimer's Research and Care Consortium were reviewed by a consensus panel of neuropsychologists and neurologists and reclassified at time of last visit. Diagnostic categories included SMC (i.e., memory complaint but no impairment on testing), objective cognitive impairment but no complaint (Impaired but not MCI), normal control (NC), MCI, and dementia. In this study, 827 participants were divided into 4 groups: 1) NC over 5 visits ($n=511$, 71% female; 42% Latinx/Hispanic), 2) baseline NC to amnesic MCI ($n=62$; 63% female; 57% Latinx/Hispanic), 3) SMC at last visit ($n=133$; 58% female; 70% Latinx/Hispanic), and 4) impaired but not MCI at last visit ($n=121$; 71% female; 60% Latinx/Hispanic). A memory composite (z-score) was created from the CERAD list-learning task (immediate, delayed, and recognition-discrimination) and Wechsler Memory Scale