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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