FC2: Differences in white matter hyperintensities in socioeconomically deprived groups: results of the population-based LIFE Adult Study

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Introduction: Previous studies have shown that people with low socioeconomic status have more white matter hyperintensities (WMH) when they get older. In this study, we wanted to analyze to what extent education and income explain differences in WMH. Further, we wanted to identify lifestyle risk factors that are associated with WMH among people with low and high education or income.

Methods: A total of n = 1,185 dementia-free participants aged 40–80 years from the population-based study of the Leipzig Research Centre for Civilization Diseases (LIFE) in Leipzig, Germany, were analyzed. Information was obtained in standardized interviews. WMH (including the derived Fazekas scores) were assessed using automated segmentation of high- resolution T1-weighted anatomical and fluid-attenuated inversion recovery (FLAIR) MRI.

Results: Income and WMH were significantly associated in univariate analyses but did not remain statistically significant after adjusting for age, gender, arterial hypertension, heart disease, and APOE e4 allele. Education was significantly associated with Fazekas scores but not with WMH and not after Bonferroni correction. After combining the lifestyle risk factors in a factor analysis, results from adjusted models indicated only statistically significant associations between higher distress and more WMH as well as between obesity and deeper WMH.

Discussion: Differences in WMH between individuals with low and high education or income may be the result form differences in risk factors. Further research needs to explore the potential pathways.

FC3: Differential diagnosis of Alzheimer's disease and mild cognitive impairment based on genotype, tongue cleft, eye movement, age and education analysis: a machine learning model

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Background: Alzheimer's disease, as a major disease that seriously jeopardizes the health and safety of human life, and its association with mild cognitive impairment (MCI) a clear diagnosis is essential for prevention and treatment. In clinical work, there are many patients who reject the option of Aβ-PET because of its expensive price and radiopacity. It is well known that the onset of Alzheimer's disease is closely related to ApoE genotype, age, and education, and the eye movements of patients with Alzheimer's disease also differ significantly from those of patients with mild cognitive impairment and the normal population. And we found in our clinic that many patients with Alzheimer's disease develop significant tongue fissures. Based on this, we developed a machine learning tool based on the combined analysis of genotype, tongue cracking, eye movements, age, and education to help patients definitively diagnose either MCI or Alzheimer's disease.

Methods: We recruited 22 patients with subjective cognitive decline, 11 with Alzheimer's disease and 11 with MCI, based on the results of neuropsychological scales assessed in the clinic (MMSE, MoCA, etc.) and the exclusion of other causes of dementia such as vascular dementia. We collected blood samples, tongue image and eye movement data and their basic information from the patients, and we measured and calculated the ratio of the longest tongue crack to the upper lingual segment where the crack was located. We built a new machine learning tool for diagnosing Alzheimer's disease and MCI based on the combined analysis of genotype, tongue cracking, eye movements, age and education using Rstudio software with support vector machines (SVM) and used Rstudio to fill in missing values due to random factors.

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