

Association Between Years of Education and Amyloid Burden in Patients With Subjective Cognitive Decline, MCI, and Alzheimer Disease

Merle Hönig, Daniele Altomare, Camilla Caprioglio, Lyduine Collij, Frederik Barkhof, Bart Van Berckel, Philip Scheltens, Gill Farrar, Mark R. Battle, Hendrik Theis, Kathrin Giehl, Gerard N. Bischof, , Valentina Garibotto, José Luis L. Molinuevo, Oriol Grau-Rivera, Julien Delrieu, Pierre Payoux, Jean Francois Demonet, Agneta K. Nordberg, Irina Savitcheva, Zuzana Walker, Paul Edison, Andrew W. Stephens, MD, Rossella Gismondi, Frank Jessen, Christopher J. Buckley, Juan Domingo Gispert, Giovanni B. Frisoni, and Alexander Drzezga, for the AMYPAD Consortium

Abstract:

Objectives: Higher-educated patients with Alzheimer disease (AD) can harbor greater neuropathologic burden than those with less education despite similar symptom severity. In this study, we assessed whether this observation is also present in potential preclinical AD stages, namely in individuals with subjective cognitive decline and clinical features increasing AD likelihood (SCD+).

Methods: Amyloid-PET information ([¹⁸F]Flutemetamol or [¹⁸F]Florbetaben) of individuals with SCD+, mild cognitive impairment (MCI), and AD were retrieved from the AMYPAD-DPMS cohort, a multicenter randomized controlled study. Group classification was based on the recommendations by the SCD-I and NIA-AA working groups. Amyloid PET images were acquired within 8 months after initial screening and processed with AMYPYPE. Amyloid load was based on global Centiloid (CL) values. Educational level was indexed by formal schooling and subsequent higher education in years. Using linear regression analysis, the main effect of education on CL values was tested across the entire cohort, followed by the assessment of an education-by-diagnostic-group interaction (covariates: age, sex, and recruiting memory clinic). To account for influences of non-AD pathology and comorbidities concerning the tested amyloid-education association, we compared white matter hyperintensity (WMH) severity, cardiovascular events, depression, and anxiety history between lower-educated and higher-educated groups within each diagnostic category using the Fisher exact test or χ^2 test. Education groups were defined using a median split on education (Md = 13 years) in a subsample of the initial cohort, for whom this information was available.

Results: Across the cohort of 212 individuals with SCD+ (M(Age) = 69.17 years, F 42.45%), 258 individuals with MCI (M(Age) = 72.93, F 43.80%), and 195 individuals with dementia (M(Age) = 74.07, F 48.72%), no main effect of education ($\beta = 0.52$, 95% CI -0.30 to 1.58), but a significant education-by-group interaction on CL values, was found ($p = 0.024$) using linear regression modeling. This interaction was driven by a negative association of education and CL values in the SCD+ group ($\beta = -0.11$, 95% CI -4.85 to -0.21) and a positive association in the MCI group ($\beta = 0.15$, 95% CI 0.79-5.22). No education-dependent differences in terms of WMH severity and comorbidities were found in the subsample (100 cases with SCD+, 97 cases with MCI, 72 cases with dementia).

Discussion: Education may represent a factor oppositely modulating subjective awareness in preclinical stages and objective severity of ongoing neuropathologic processes in clinical stages.

Published online: 20 February 2024 in [Neurology](#)

<https://doi.org/10.1212/WNL.000000000208053>

Download the PDF [here](#).