

Prevention (nonpharmacological) / Lifestyle factors (e.g., smoking, etc.)

Genetic risk, education and incidence of dementia

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Abstract

Background: There is evidence that educational attainment increases cognitive reserve, and may prevent or delay the development of dementia. However, the extent to which education offsets or interacts with genetic risk is unknown. We therefore investigated the relationship between education and genetic risk for dementia.

Method: In this cohort study, we used data from UK Biobank including adults aged 60 years and older of European ancestry without cognitive impairment or dementia at baseline. Participants joined the study between 2006 and 2010 and were followed until 2016 or 2017. Genetic risk was estimated using a polygenic score for dementia incorporating 249,273 single-nucleotide polymorphisms with low (lowest quintile), intermediate (quintiles 2 to 4), and high (highest quintile) categories. Education was categorized as low (no/other qualifications), intermediate (secondary/vocational qualifications), or high (college/university degree or other professional qualifications). The outcome was incident all-cause dementia, ascertained through hospital inpatient and death records.

Result: 196,383 individuals (mean [SD] age, 64.1 [2.9] years; 52.7% were women) were followed up for 1,545,433 person-years (median [interquartile range] follow-up, 8.0 [7.4-8.6] years). Overall, 41.5% had low education, 31.0% had intermediate education and 27.5% had high levels of education. 20.0% had high polygenic risk scores, 60.0% had intermediate risk scores, and 20.0% had low risk scores. Of the participants with high genetic risk, 1.2% developed dementia compared with 0.6% of the participants with low genetic risk (adjusted hazard ratio, 1.92 [95% CI, 1.64-2.24]). Of the participants with low education, 1.3% developed dementia compared with 0.7% of participants with high levels of education (adjusted hazard ratio, 1.51 [95% CI, 1.35-1.70]). Of the participants with a high genetic risk and low education, 1.5% developed dementia compared with 0.4% of participants with low genetic risk and high education (adjusted hazard ratio, 2.79 [95% CI, 2.12-3.68]). There was no significant interaction between genetic risk and education ($p = 0.108$).

Conclusion: Among older adults without cognitive impairment or dementia, high education was independently associated with lower dementia risk when accounting for genetic risk. Education may increase cognitive reserve even in those with a high genetic risk of dementia.