

Alzheimer's Disease and Education: What's the Correlation?

? Question:

Has there been a study to correlate Alzheimer's disease to a patient's education level and/or general intellectual activity?

Response:

Numerous studies have been done to address this question. There are two main factors: expression and prognosis of Alzheimer's disease (AD).

1. Expression of AD

Clinico-pathologic correlations, looking at autopsy levels of AD pathology, have shown that level of education affects the number of diffuse and neuritic plaques, but not the number of neurofibrillary tangles. Authors skeptical about this association feel it is more likely education provides a cognitive reserve, resulting in later clinical expression of AD symptoms, even though there may have been significant neuropathology present for some time.

Imaging studies have also associated larger brain volumes with a later AD presentation.

Premorbid level of education is thought to affect the "cognitive reserve", (although this concept is still under debate). Cognitive reserve reflects active compensation for AD pathology. It has been separated into level of education and occupation.

It seems level of education is more influential on disease expression—from a cognitive standpoint—than occupation.

Imaging studies have associated larger brain volumes with later AD presentation.

Frequent participation in cognitively stimulating activities is also associated with a decreased risk of incident AD (this is not the case for physical activity).

Furthermore, education has been shown to protect individuals from the cognitive impact of cerebral white matter hyperintensities (as seen on magnetic resonance imaging).

In contrast, people with Down syndrome are at increased risk of developing AD. While not all have the clinical manifestations of impaired cognition, these individuals have neuropathologic changes of AD after 35 years.

2. Rate of decline in AD

When AD pathology is severe, cognition reserve can no longer compensate.

In fact, it appears AD patients with a higher level of education (> 8 years) or occupation (high manager or professional) experience a more rapid deterioration in memory scores. Thus, in AD patients matched for clinical severity, those with higher education and occupation die sooner. [CME](#)

References available—contact *The Canadian Journal of CME* at cme@sta.ca.

Answered By:
Dr. Angela Juby,
Associate professor
division of geriatrics,
department of medicine,
University of Alberta,
Edmonton, Alberta