

Detecting Alzheimer's disease before symptoms arise

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Both of Andrew Kiselica's grandfathers developed dementia when he was in graduate school. As Kiselica was going through neuropsychology training in graduate school, he saw his mother's father become unable to

walk or speak due to severe dementia. The University of Missouri researcher said that personal experience has motivated his work to identify and prevent neurodegenerative diseases like Alzheimer's.

Now an assistant professor of health psychology, Kiselica recently finished a study that has resulted in procedures for defining the preclinical stages of Alzheimer's disease. Since there are no current treatments to reverse the course of Alzheimer's, this finding can help drug developers identify who could potentially benefit from a future Alzheimer's treatment before symptoms of cognitive decline start to arise.

"Most families have had this experience of watching someone who is vibrant and full of life essentially turn into someone they can barely recognize," said Kiselica, an assistant professor in the School of Health Professions. "I don't want people to have to go through that as their last phase of life. The experience with my grandparents has been the driving force behind my desire to study this disease."

Defined by cognitive changes that impact one's ability to complete basic activities in daily life, dementia is most commonly caused by Alzheimer's disease, a [brain](#) disorder where a buildup of amyloid plaque in the brain leads to memory loss and other cognitive issues.

By looking at datasets from the National Alzheimer's Coordinating Center, Kiselica examined more than 400 individuals who had been declared "cognitively normal," and particularly focused on 101 of these individuals who had a buildup of amyloid plaque in the brain that is associated with Alzheimer's disease.

After analyzing test results that provided data on their memory and attention, caregiver observations of signs of cognitive decline, and neurobehavioral symptoms like anxiety and depression, Kiselica found

that those with the amyloid plaque in their brain were more likely to show Alzheimer's-related symptoms compared to those without the amyloid plaque, as expected. More significantly, Kiselica found that 42% of those with the amyloid plaque showed no signs of cognitive decline at all.

"We have developed clear procedures for classifying individuals who are asymptomatic or symptomatic in the preclinical stages of Alzheimer's disease," Kiselica said. "This is important because if a drug to treat Alzheimer's is approved by the FDA down the road, the drug will likely be most effective on those with Alzheimer's-related changes in the brain but no outward signs of cognitive decline yet."

Kiselica added that if those with Alzheimer's-related brain pathology and outward signs of cognitive decline take a proposed Alzheimer's drug in the future, it is possible it will be ineffective because the disease will not be able to reverse course once symptoms start to show up. Therefore, his research can help the developers of future drugs designed to treat Alzheimer's disease or dementia know what type of people to include in their clinical trials.

"This is one of the first studies to demonstrate procedures for defining people in preclinical stages of Alzheimer's [disease](#) who do and do not show signs of cognitive and behavioral changes," Kiselica said. "I hope in some small way, my research can lead to improving quality of life for people suffering with [neurodegenerative diseases](#) like Alzheimer's."

"An initial empirical operationalization of the earliest stages of the Alzheimer's continuum" was recently published in *Alzheimer's Disease and Associated Disorders*.

More information: Andrew M. Kiselica et al, An Initial Empirical Operationalization of the Earliest Stages of the Alzheimer's Continuum,

Alzheimer Disease & Associated Disorders (2020). DOI: [10.1097/WAD.0000000000000408](https://doi.org/10.1097/WAD.0000000000000408)

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