

# Why do more women have Alzheimer's than men? It's not just from living longer

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Middle-aged women are more likely than men to have changes in the brain related to Alzheimer's disease, as detected by imaging, even when there are no differences in thinking and memory. This may be associated with hormonal changes due to menopause, specifically the loss of estrogen, according to a study published in the June 24, 2020, online

issue of *Neurology*, the medical journal of the American Academy of Neurology.

"About two-thirds of people living with Alzheimer's are [women](#), and the general thinking has been it's because women tend to live longer," said study author Lisa Mosconi, Ph.D., of Weill Cornell Medicine, New York, N.Y. "Our findings suggest that hormonal factors may predict who will have changes in the [brain](#). Our results show changes in brain imaging features, or biomarkers in the brain, suggesting menopausal status may be the best predictor of Alzheimer's related brain changes in women."

The study involved 85 women and 36 men with an average age of 52 who had no cognitive impairment. The men and women had similar scores on thinking and memory tests and measures such as [blood pressure](#) and family history of Alzheimer's.

Participants had [positron emission tomography](#) (PET) scans to see if they had amyloid-beta plaques in the brain, a biomarker associated with Alzheimer's disease. They also had detailed brain [magnetic resonance](#) imaging scans (MRI).

Researchers compared the women and men in four key areas of brain health to assess their risk of having Alzheimer's biomarkers: the volumes of both gray and white matter in the brain, levels of amyloid-beta plaques, and the rate at which the brain metabolizes glucose, an indication of brain activity.

The women scored worse on all four of those measures. On average, the women had 30% more beta amyloid plaques in the brain, and 22% lower glucose metabolism than the men did. When measuring average gray matter volume, the women had 0.73 cubic centimeters ( $\text{cc}/\text{cm}^3$ ) compared to men who had  $0.8 \text{ cm}^3$ , a difference of 11%. For average

white matter volume, the women had 0.74 cm<sup>3</sup> compared to men who had 0.82 cm<sup>3</sup>, a difference of 11%.

"Our findings suggest that middle-aged women may be more at risk for the disease, perhaps because of lower levels of the hormone estrogen during and after menopause," Mosconi said. "While all sex hormones are likely involved, our findings suggest that declines in estrogen are involved in the Alzheimer's biomarker abnormalities in women we observed. The pattern of gray matter loss in particular shows anatomical overlap with the brain estrogen network."

Mosconi said one limitation of the study is that only healthy, middle-aged people without severe brain or cardiovascular disease participated. Larger studies that follow up with participants over a period of time are needed.

Provided by American Academy of Neurology

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