

Healthy vascular fat during menopause may stave off dementia later in life

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A new study published in *Alzheimer's & Dementia* is further evidence that the menopause transition is a particularly important time for women and their doctors to pay attention to heart health, in turn protecting their

brain health.

"It is shocking to know that two-thirds of Americans with Alzheimer's disease are women," said Meiyuzhen (Chimey) Qi, first author and Ph.D. candidate in epidemiology at Pitt Public Health. "The most common modifiable risk factor for dementia is cardiovascular disease, and interestingly, a woman's risk for [cardiovascular disease](#) increases after menopause. So the next logical step was to see if there was a link between [cardiovascular risk factors](#) related to the [menopause transition](#)—such as the type of cardiovascular fat a woman has—and her cognitive function later in life."

To explore the hunch, the team turned to the long-running Study of Women's Health Across the Nation (SWAN) and its ancillary study, SWAN Cardiovascular Fat. SWAN followed a diverse group of midlife women through the menopause transition. At an average age of 51, 531 participants had scans used to learn about the fat around their hearts and vessels. They were then followed for 16 years, receiving multiple cognitive tests along the way.

Cardiovascular fat consists of three main types: epicardial adipose tissue (EAT) located inside the sac surrounding the heart, paracardial adipose tissue (PAT) located outside that sac, and thoracic perivascular adipose tissue (PVAT), which surrounds the longest part of the body's largest artery leading away from the heart. EAT and PAT are usually [lower-quality](#) "white" fat that the body stores, while thoracic PVAT may be higher-quality "brown" fat that the body readily converts to energy. The team used density of fat in the scans as an indicator of fat quality.

In this study, the researchers assessed how the quantity and quality of cardiovascular fat during midlife are related to cognitive function as women age. Quantity was measured as volume of fat, whereas quality was determined based on the density of fat. A greater volume of thoracic

PVAT during midlife was related to stronger long-term memory later in life, while higher density of thoracic PVAT—likely reflecting lower quality [white fat](#)—was linked to worsening working memory.

"This is an association. We cannot say with any certainty that higher- or lower-quality cardiovascular fat causes Alzheimer's disease—but it is a tantalizing clue that makes sense," said senior author Dr. Samar El Khoudary, professor of epidemiology at Pitt Public Health. "Of the different types of heart fat, PVAT is located the closest to brain circulation and brown fat is linked to better whole-body metabolism and lower markers for inflammation."

During the menopause transition, women usually experience vascular or fat tissue inflammation, which may manifest as thoracic PVAT with higher density, meaning it is of lower quality. Previous studies have found that vascular inflammation promotes plaque formation, and inflamed fat tissue has abnormal secretion of cell signaling molecules, which predispose people to cognitive decline.

The SWAN Cardiovascular Fat ancillary study was limited to white and Black women, so the researchers stressed that more study will be needed to see if the findings extend to women of other races and ethnicities or to men. Further research is also needed to determine whether the type of cardiovascular fat actually causes cognitive decline or if efforts to modify the quality of cardiovascular fat—such as taking anti-inflammatory medications—can stave off dementia.

"That said, I believe our study is more evidence that taking care of your heart helps take care of your brain and that menopause is a particularly sensitive time for heart as well as brain health," El Khoudary said. "So staying active and regularly doing cardiovascular exercises that get your heart pumping, as well as eating a healthy diet and keeping up with doctor's appointments, are all especially important at midlife. Protecting

your heart during the menopausal transition may be protecting your brain in the future."

More information: Meiyuzhen Qi et al, The quantity and quality of cardiovascular fat at mid-life and future cognitive performance among women: The SWAN cardiovascular fat ancillary study, *Alzheimer's & Dementia* (2023). [DOI: 10.1002/alz.13133](https://doi.org/10.1002/alz.13133)

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