RSNA Press Release

Blood Test Shows Obesity Speeds Alzheimer's Development

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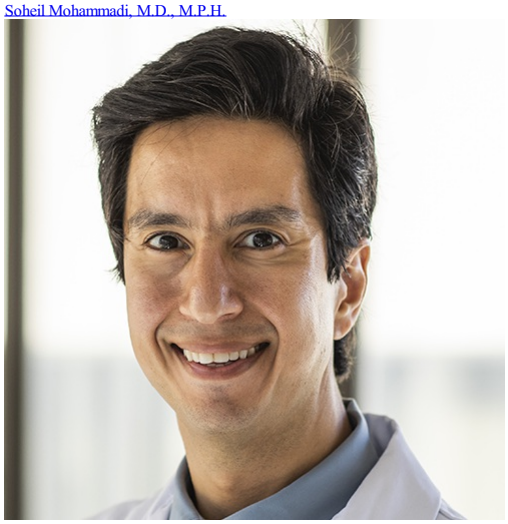
At A Glance

- Alzheimer's disease blood biomarker values increased up to 95% faster in individuals who were obese.
- Researchers accessed five-year data on 407 individuals, which included amyloid PET scans and blood samples.
- In the study, blood biomarker tests were more sensitive than PET scans in capturing obesity's impact on Alzheimer's pathology.

CHICAGO – Researchers have conducted the first study evaluating the impact of obesity on Alzheimer's disease blood biomarkers (BBMs). BBM values increased up to 95% faster in individuals with obesity than in non-obese individuals, according to a new study being presented today at the annual meeting of the Radiological Society of North America (RSNA).

Soheil Mohammadi, M.D., M.P.H.



Cyrus Raji, M.D., Ph.D.

"This is the first time we've shown the relationship between obesity and Alzheimer's disease as measured by blood biomarker tests," said Cyrus Raji, M.D., Ph.D., senior author of the study and a principal investigator in the Neuroimaging Labs Research Center at Mallinckrodt Institute of Radiology (MIR) at Washington University School of Medicine in St. Louis.

Researchers accessed five-year data on 407 participants from the Alzheimer's Disease Neuroimaging Initiative, which included amyloid positron emission tomography (PET) scans and blood samples. PET scans demonstrate the brain's amyloid burden, or the accumulation of beta-amyloid protein in the brain in the form of amyloid plaques, a central hallmark of Alzheimer's disease.

Plasma samples were tested for BBMs associated with Alzheimer's disease, including pTau217 levels (a biomarker used in the diagnosis and monitoring of Alzheimer's disease), neurofilament light chain (NfL)—a protein fragment released from damaged or dying neurons—and plasma GFAP—a protein expressed primarily in astrocytes (cells that support and protect neurons in the brain and spinal cord) using six leading commercial tests.

The researchers performed statistical analysis to assess the association between the BBMs and body mass index (BMI) and the three-way interaction between baseline obesity, time and BBMs. The researchers also validated the BBMs against the amyloid PET scans.

Analysis of the BBMs and PET scan data demonstrated that at baseline, BMI was associated with lower BBMs and reduced whole-brain amyloid burden.

"We believe the reduced BBMs in obese individuals was due to dilution from the higher blood volume," said study lead author Soheil Mohammadi, M.D., M.P.H., postdoctoral research associate at MIR. "In fact, by relying on the baseline measurements, you could be fooled into thinking that the people with obesity had a lower pathology of Alzheimer's disease. We need the longitudinal data to fully understand the how obesity impacts the development of Alzheimer's pathology."

A longitudinal study involves repeatedly collecting data from the same group over an extended period, tracking changes and trends over a period of time.

Over time, Alzheimer's disease BBMs and brain PET scans demonstrated an increased burden of Alzheimer's disease pathology in individuals with obesity compared with non-obese

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individuals. Comparatively, participants with obesity had a 29% to 95% faster rate of increase in plasma pTau217 ratio levels. Baseline obesity led to a 24% faster rate of increase in plasma NfL and a 3.7% faster rate of increase in amyloid accumulation.

Dr. Raji said their analysis demonstrated that the blood tests were more sensitive than the PET scans in capturing the impact of obesity on Alzheimer's pathology.

"The fact that we can track the predictive influence of obesity on rising blood biomarkers more sensitively than PET is what astonished me in this study," he said.

Dr. Mohammadi said the impact of obesity on trajectories of amyloid burden and corresponding changes in blood biomarkers for Alzheimer's is an important consideration for clinical practice.

"According to the 2024 report of the Lancet Commission, 14 modifiable risk factors total approximately 45%, or close to half, of the risk for Alzheimer's disease," he said. "If we can reduce any of those risk factors, we can significantly reduce Alzheimer's cases or lengthen the amount of time until the onset of the disease."

Dr. Raji believes longitudinal assessments with blood biomarkers with brain health imaging will become the norm for monitoring treatment paradigms with anti-amyloid drugs.

"This is such profound science to follow right now because we have drugs that can treat obesity quite powerfully, which means we could track the effect of weight loss drugs on Alzheimer's biomarkers in future studies," he said. "It's marvelous that we have these blood biomarkers to track the molecular pathology of Alzheimer's disease, and MRI scans to track additional evidence of brain degeneration and response to various treatments. This work is foundational for future studies and treatment trials."

Other co-authors are Farzaneh Rahmani, M.D., M.P.H., Mahsa Dolatshahi, M.D., M.P.H., and Suzanne E. Schindler, M.D., Ph.D.

Note: Copies of RSNA 2025 news releases and electronic images will be available online at *RSNA.org/press25*.

RSNA is an association of radiologists, radiation oncologists, medical physicists and related scientists promoting excellence in patient care and health care delivery through education, research and technologic innovation. The Society is based in Oak Brook, Illinois. (*RSNA.org*)

Editor's note: The data in these releases may differ from those in the published abstract and those presented at the meeting, as researchers continue to update their data right up until the meeting. To ensure you are using the most up-to-date information, please call the RSNA Newsroom at 1-312-791-6610.

For patient-friendly information on PET, visit *RadiologyInfo.org*.

Video (MP4):

Video. Cyrus Raji, M.D., Ph.D., and Soheil Mohammadi, M.D., M.P.H., discuss their research on the impact of obesity on Alzheimer's disease blood biomarkers and how blood biomarker values increased up to 95% faster in individuals with obesity than in non-obese individuals.
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Images (JPG, TIF):

Infographic

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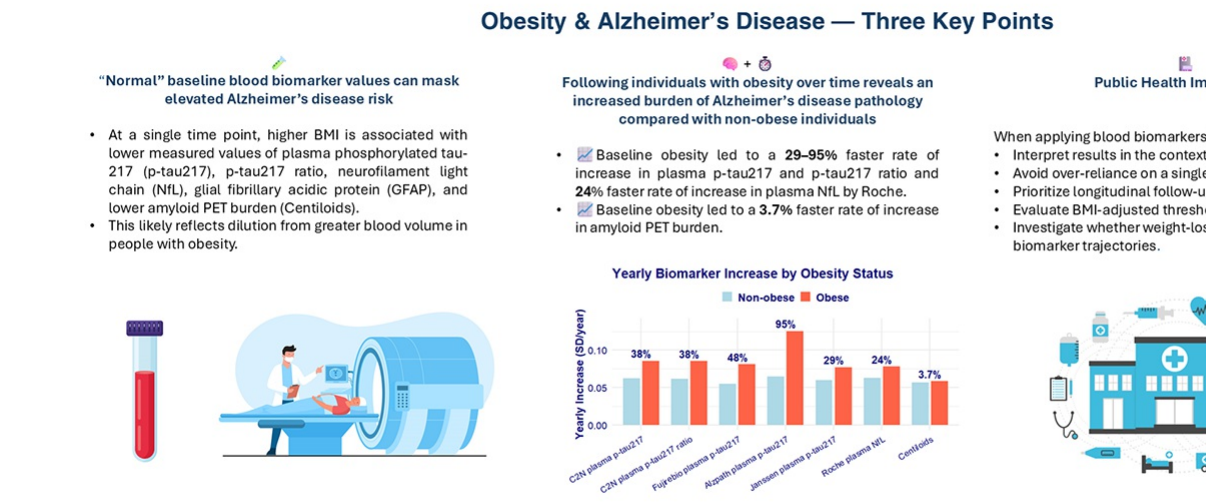

Figure 1. Obesity and Alzheimer's Disease – Three Key Points

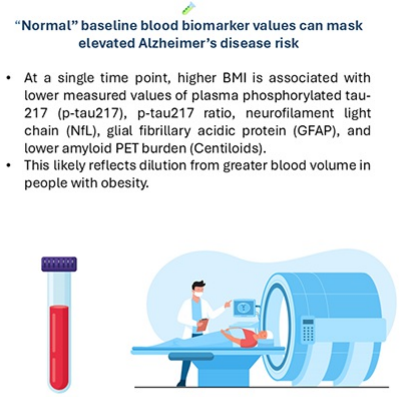

Figure 2. "Normal" baseline blood biomarker values can mask elevated Alzheimer's disease risk.

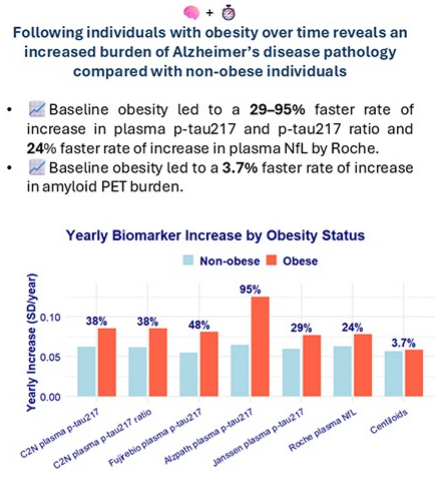

Figure 3. Yearly biomarkers increase by obesity status. Following individuals with obesity over time reveals an increased burden of Alzheimer's disease pathology compared with non-obese individuals.

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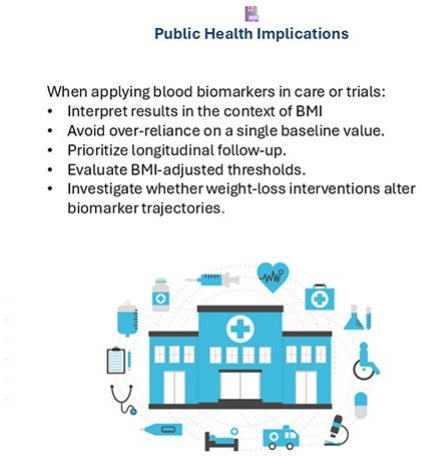

Figure 4. Public health implications.

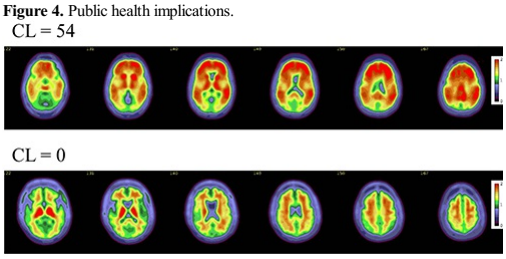

Figure 5. Axial color scales images of two brains show examples of an amyloid positive scan with a higher centiloid (CL) number and more red colors compared to a normal scan with normal background binding of the amyloid tracer signifying no amyloid plaques.

Resources:

Abstract

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