

# Hidden Fat Threatens Your Brain's Future Health

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## STORY AT-A-GLANCE

- › Higher levels of visceral and subcutaneous fat are linked to reduced brain volume in critical regions like the hippocampus and frontal cortex, with women showing greater vulnerability to this effect
- › Research involving 10,001 adults found that people aged 20 to 39 with increased visceral fat had nearly six times higher odds of reduced gray matter volume in their brain compared to those without
- › Visceral fat accounts for 77% of the relationship between high BMI and amyloid protein accumulation in the brain
- › Elevated visceral fat levels significantly impair cerebral blood flow, creating a double threat by reducing oxygen delivery to the brain while simultaneously promoting inflammation
- › Maintaining healthy waist-to-hip ratios, building muscle mass through strength training, and avoiding processed seed oils are key strategies for reducing harmful visceral fat accumulation

Alzheimer's disease is a progressive neurological disorder that impairs memory, thinking and behavior. This condition is characterized by the gradual loss of cognitive functions. Common symptoms include persistent memory loss, confusion, difficulty in performing routine activities and noticeable changes in mood and personality.

As Alzheimer's disease advances, it not only affects cognitive abilities but also impacts the overall structure of your brain. Individuals with Alzheimer's often experience significant shrinkage in areas such as the hippocampus, which is essential for memory formation, and the frontal cortex, responsible for decision-making and problem-solving.

These structural changes exacerbate the challenges faced by those with Alzheimer's, ultimately resulting in severe impairment and increased dependence on caregivers. Researchers are exploring the role of body fat and body mass index (BMI) in this complex condition. A study published in *Alzheimer's Research & Therapy* involved 1,736 Asian participants without dementia, categorizing them into underweight, normal weight and obese groups based on their BMI.<sup>1</sup>

The findings showed that being underweight significantly increased the risk of amyloid-beta ( $A\beta$ ) positivity. In contrast, obesity was associated with a decreased risk of  $A\beta$  positivity. Notably, within the metabolically healthy group, obesity further reduced the risk of  $A\beta$  positivity. Additionally, obesity was linked to a higher risk of severe white matter hyperintensities (WMH), another marker associated with Alzheimer's and vascular health.

These findings highlight the complex interplay between body weight, metabolic health and Alzheimer's disease. Maintaining a healthy weight and metabolic status helps reduce the risk of Alzheimer's.

However, obesity also increases vascular markers like WMH, indicating that weight management strategies need to be personalized based on an individual's metabolic health. By addressing both weight and metabolic factors, you mitigate Alzheimer's risk and support better cognitive health outcomes.

## **Understanding the Role of Fat in Cognitive Health**

Alzheimer's is a complex condition with several risk factors, including age, genetics and lifestyle choices. Conventional treatments often focus on managing symptoms rather than addressing the root causes. These treatments include medications with side

effects such as nausea, dizziness or even increased confusion. It's important to understand that while these treatments provide temporary relief, they do not halt the progression of the disease.

Visceral fat, a type of body fat stored within your abdominal cavity, is a significant underlying cause of Alzheimer's. This fat is not just a passive storage of energy but actively contributes to inflammation and metabolic disturbances.

Other factors include insulin resistance, which affects how your body processes sugar, and low levels of high-density lipoprotein (HDL), often referred to as "good" cholesterol. These elements create an environment that accelerates the development of AD.

The process by which these factors lead to Alzheimer's involves complex interactions within the body. Visceral fat releases inflammatory substances that damage brain cells and disrupt normal brain function. Insulin resistance impairs your brain's ability to use glucose, its primary energy source, leading to cognitive decline.

**Diagnosing Alzheimer's** is challenging due to its gradual onset and the overlap of symptoms with other conditions. Early symptoms like memory loss and confusion are often mistaken for normal aging. This leads to delays in diagnosis, preventing timely intervention. Additionally, standard diagnostic tools don't typically detect the disease until significant brain damage has occurred.

## **Study Reveals Strong Link Between Abdominal Fat and Brain Volume**

A study explored how different types of body fat influence brain structure. The research examined both visceral fat, which surrounds internal organs, and subcutaneous fat, located beneath your skin. Using MRI scans, the study assessed the brain volumes of 10,001 healthy North American adults, averaging 52.9 years old.<sup>2</sup>

The findings indicated that higher levels of both visceral and subcutaneous fat are associated with reduced brain volumes. This reduction was evident in multiple brain

regions, including the total gray matter, white matter, hippocampus, frontal cortex and various lobes. Notably, women experienced greater brain volume loss related to increased visceral fat compared to men.<sup>3</sup>

The study also showed that segmented visceral abdominal fat significantly predicted lower volumes in several areas of the brain. Specifically, higher visceral fat was linked to smaller volumes in the hippocampus and the frontal cortex, regions necessary for maintaining cognitive functions.<sup>4</sup>

In addition to regional brain volume decreases, the research uncovered that visceral fat increased the risk of having lower total gray matter across different age groups. For individuals aged 20 to 39, the odds of reduced gray matter volume were nearly six times higher for those with increased visceral fat. This pattern persisted across older age brackets, highlighting the pervasive impact of abdominal fat on brain health.<sup>5</sup>

Furthermore, the study revealed that higher subcutaneous fat also contributes to brain volume loss, sometimes even more so than visceral fat. This suggests that all forms of excess body fat, not just the fat around the organs, negatively affects brain structure. Maintaining a healthy body fat percentage is thus important for preserving brain volume and function.<sup>6</sup>

The biological mechanisms behind these findings appear to involve inflammation. Excess visceral and subcutaneous fat lead to chronic inflammation, which in turn damages brain cells and disrupts normal brain function. This inflammatory response is believed to contribute to the shrinking of brain regions essential for cognitive abilities, thereby increasing the risk of neurodegeneration.<sup>7</sup>

By identifying visceral and subcutaneous fat as modifiable factors, the study emphasizes the importance of weight management in preserving brain health. Addressing excess body fat through lifestyle changes could lower the risk of brain volume loss and associated cognitive decline, offering a proactive approach to safeguarding mental function.<sup>8</sup>

# Visceral Fat and Alzheimer's Disease Risk

Another study, presented at the annual meeting of the Radiological Society of North America (RSNA), also investigated the connection between visceral fat and the development of Alzheimer's disease, uncovering significant links that emerge up to two decades before symptoms appear.<sup>9</sup>

This research aimed to determine how excess visceral fat influences the buildup of proteins in the brain that are characteristic of Alzheimer's, providing insights into preventive measures through lifestyle changes.

The study focused on a group of midlife adults, specifically targeting individuals in their 40s and 50s, to assess the long-term impact of visceral fat on brain health.<sup>10</sup> The participants underwent MRI scans to measure the amount of visceral fat in their abdominal region, alongside evaluations of their cognitive functions.

The findings revealed that higher levels of visceral fat were strongly associated with increased accumulation of amyloid and tau proteins in the brain, both of which are hallmarks of Alzheimer's disease.<sup>11</sup> Additionally, individuals with elevated visceral fat levels exhibited reduced cerebral blood flow, further exacerbating the risk of cognitive decline.<sup>12</sup>

The study found that visceral fat accounted for 77% of the effect of a high BMI on amyloid accumulation.<sup>13</sup> This indicates that not just the amount of body fat, but its specific location, plays a role in Alzheimer's pathology. Interestingly, other types of fat, such as subcutaneous fat, did not show the same level of association with increased Alzheimer's risk, underscoring the unique impact of visceral fat.<sup>14</sup>

Moreover, the research emphasized that visceral obesity negatively affects the brain by reducing blood flow, which is essential for maintaining healthy brain function.<sup>15</sup> One of the significant aspects of this study was the exploration of metabolic factors related to visceral fat. Higher insulin resistance and lower levels of HDL cholesterol were also linked to increased amyloid levels in the brain.<sup>16</sup>

Insulin resistance, a condition where your body's cells don't respond effectively to insulin, leads to elevated blood sugar levels and is a precursor to Type 2 diabetes.<sup>17</sup> In this study, insulin resistance was found to worsen the relationship between visceral fat and Alzheimer's pathology, suggesting that managing insulin levels could be key in mitigating Alzheimer's risk.<sup>18</sup>

The researchers also observed that individuals with higher HDL cholesterol levels experienced a partial reduction in the negative effects of visceral fat on amyloid pathology.<sup>19</sup> Improving HDL levels could lessen the detrimental impact of visceral fat on brain health, providing a protective mechanism against the buildup of Alzheimer's-related proteins.<sup>20</sup>

Previous research had primarily focused on overall obesity without distinguishing between fat types, leading to mixed results when measuring cognitive impairment in older adults.<sup>21</sup> By using MRI scans to accurately measure visceral fat, the researchers were able to establish a more precise relationship between fat distribution and Alzheimer's risk.<sup>22</sup>

Managing Alzheimer's risk, therefore, requires addressing not only obesity but also the related metabolic and lipid issues that come with higher visceral fat.<sup>23</sup> This involves a comprehensive approach that includes dietary changes, regular physical activity and strategies to reduce insulin resistance.<sup>24</sup>

## **Simple Steps to Protect Your Brain from Visceral Fat Damage**

Your brain health depends heavily on controlling visceral fat. Here are four powerful ways to address this risk:

- 1. Build and maintain muscle mass through regular strength training** – Greater muscle mass protects against cognitive decline by improving insulin sensitivity and metabolic health. Incorporate regular resistance training with daily walks and regular movement throughout your day.

**2. Monitor your waist-to-hip ratio rather than just weight or BMI** – This measurement provides a more accurate picture of visceral fat levels and disease risk. Keep track of changes in this ratio as you make lifestyle modifications to ensure you're reducing harmful belly fat. You get your ratio by dividing your waist measurement by your hip measurement. These are the waist-to-hip ratio norms:

Waist-to-Hip Ratio	Men	Women
Ideal	0.8	0.7
Low Risk	<0.95	<0.8
Moderate Risk	0.96 - 0.99	0.81 - 0.84
High Risk	>1.0	>0.85

**3. Focus on eating saturated fats from grass fed animal sources while eliminating processed seed oils** – Seed oils, found in most processed foods, are high in **linoleic acid** (LA), which increases visceral fat and **drives obesity**. Tallow, grass fed butter and ghee are healthy alternatives.

**4. Get adequate protein from quality sources, with one-third coming from collagen** – This balanced protein intake supports muscle maintenance while providing the building blocks needed for brain health. Adequate protein intake also helps reduce visceral fat. **Maintain protein intake** at 0.8 grams per pound of ideal body weight, with one-third of protein derived from collagen-rich sources to support muscle mass and metabolic function.

## Sources and References

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- <sup>1</sup> [Alzheimer's Research & Therapy August 29, 2024, 16, Article number: 194. doi: 10.1186/s13195-024-01563-z](#)
- <sup>2, 3, 4, 5, 6, 7, 8</sup> [Aging and Disease August 1, 2024; 15\(4\):1831-1842](#)
- <sup>9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24</sup> [Radiological Society of North America December 2, 2024](#)