

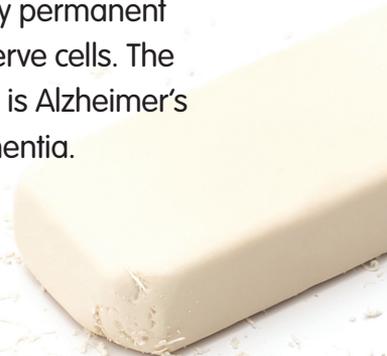


CAN MY WEIGHT CAUSE MEMORY ISSUES?

by Taraneh Soleymani, MD, FTOS

OBESITY AND DEMENTIA are common, complex and chronic diseases that significantly impact public health. Genetics, lifestyle, socioeconomic status and environmental factors all contribute to these conditions.

Whereas obesity is characterized by excess body fat and is often measured by Body Mass Index (BMI), cognitive decline involves problems with memory, language, thinking and judgment that are greater than normal changes we experience with age. Meanwhile, dementia is a general term used to describe a group of symptoms that are severe enough to impact an individual's everyday activities – including loss of memory, judgment, language and ability to perform complex movement. Dementia is caused by permanent damage or death of the brain's nerve cells. The most common cause of dementia is Alzheimer's disease followed by vascular dementia.



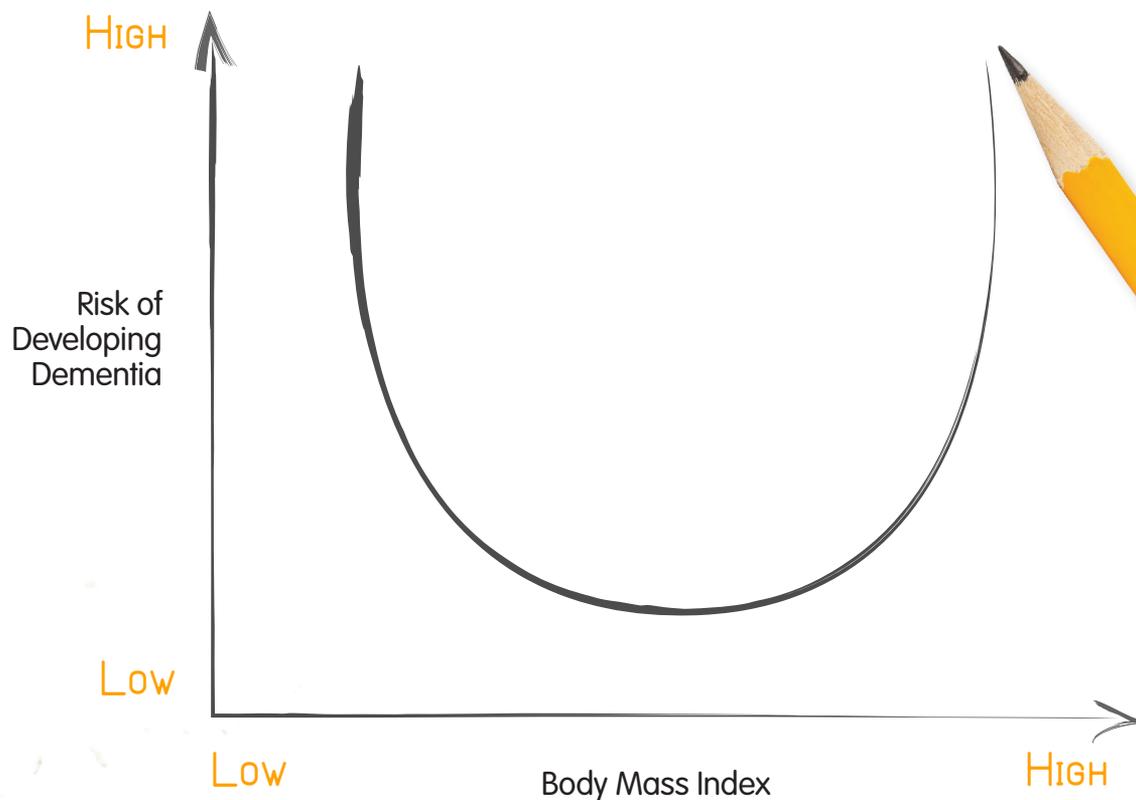
The connection between body fat, cognitive decline and dementia can be difficult to understand, but there is growing evidence that points to a relationship between them. The Swedish performed a study to further test the relationship between high levels of body fat and cognitive decline. The Swedish twin study reported these results:

- Adults with overweight (BMI 25.0 – 29.9) at mid-life (about 45-55 years) have a higher chance of having dementia or Alzheimer's disease later in life. (≥ 65 years).
- Adults at mid-life with obesity (BMI > 30.0) have a higher chance of acquiring Alzheimer's disease as well as vascular dementia later in life.

Similarly, a meta-analysis of 15 studies showed that overweight and obesity in mid-life are associated with increased risk for dementia when compared with a normal BMI. It was also discovered that individuals with a BMI suggesting underweight during their middle years were associated with an increased risk for dementia later in life.

These findings below suggest that there is a U-shaped relationship between mid-life BMI and a risk of developing dementia in late-life, where individuals with either overweight, obesity or underweight in mid-life have an increased risk of developing dementia in their older years. This analysis also found that obesity in mid-life affects the risk of developing dementia in women and men differently, with women at an increased risk of developing Alzheimer's dementia (3.08 times) compared to men (2.4 times).

The relationship between changes in body weight and cognitive function from mid-life to late-life contradicts itself. Studies suggest that individuals with excess weight or affected by obesity in mid-life are more likely to develop dementia at 65 years of age or older, while having excess weight after the age of 65 years may actually protect them from developing it. In one study, weight-loss preceded the diagnosis of dementia in women by 11-20 years. A similar finding did not exist in men. Other studies have suggested that a BMI greater than 25.0 could protect individuals in late life from developing dementia.



The Relationship Between Mid-life BMI and Risk of Developing Dementia in Late life.

CAN EXCESS WEIGHT AFFECT YOUR BRAIN?

Cognitive decline with age is a normal process in older adults due to changes in the brain that result in decreased cognitive ability. When testing for cognitive aging, a negative association remains between BMI and cognitive performance in adulthood. This is because obesity negatively affects brain function and structure (such as volume) in adulthood as well as in childhood and adolescence.

Structures of the Brain

The Hippocampus is an important brain structure that is responsible for learning and memory. If the hippocampus decreases in size, this can also cause problems with cognition and dementia. Obesity in mid-life has been linked to a decrease in both the size of the hippocampus and the brain's executive functions. These include the ability to perform complex tasks requiring knowledge, understanding, thought and experience.

“ Obesity negatively affects BRAIN FUNCTION AND STRUCTURE (such as volume) in adulthood as well as in childhood and adolescence. ”

Similarly, other studies have highlighted the relationship between decreased hippocampus volume and impaired attention among adolescents with metabolic syndrome. Other structural changes in the brain caused by increased BMI include reduced volume of the temporal lobe and gray matter density in the frontal lobe. The negative effect that obesity has on cardiovascular health and metabolic functions (such as diabetes and elevated cholesterol) is clear. Obesity impacts the brain and its blood vessels, often promoting atherosclerosis (a process in which plaque made of fatty material is deposited in the inner walls of our arteries) and resulting in the development of vascular cognitive impairment.

Changes in Brain Function

Another change in brain function for individuals affected by severe obesity is increased activity among two specific proteins in the hippocampus:

- Amyloid-beta precursor protein (APP)
- Tau protein

These proteins are the markers of Alzheimer's disease. This shows that obesity may increase the risk of developing Alzheimer's dementia. However, the exact process is not fully understood.

What is Obesity?

Obesity is characterized by excess body fat that mostly consists of white adipose tissue (a type of fat cell). The enlarged tissue contains immune cells (such as lymphocytes and macrophages) that produce inflammation, and this is the reason why obesity is often described as an inflammatory condition. The increased level of inflammatory markers has a negative effect on brain structure and function. Studies have shown that an increase in specific blood levels is associated with dementia and a decrease in executive functions. Inflammation can potentially explain the association between obesity and cognitive impairment.

Weight-loss can be achieved by lifestyle modification, medications and bariatric surgery. Lifestyle modification includes:

- DIET
- PHYSICAL ACTIVITY
- BEHAVIOR CHANGE



Weight-loss improves blood pressure, insulin resistance and inflammation. However, the degree of cognitive function improvement achieved through lifestyle modification is not consistent. In a six-month weight-loss study comparing the effects of low-carbohydrate and high-carbohydrate diets on cognitive function in middle-aged, healthy adults affected by excess weight or obesity, results showed little improvement in executive function and memory. However, a one-year weight-loss study of elderly individuals (>60 years) affected by obesity and mild cognitive impairment showed that a decrease in BMI achieved through reduced caloric intake and increased physical activity was associated with improved verbal memory, language and executive function. The effect of increased physical activity on cognitive function appears to be more clear, resulting in increased gray matter, blood volume and circulation in the hippocampus.

CONCLUSION

More studies need to be done to better understand the role of diet and physical activity on cognitive impairment in adults of all ages. Bariatric surgery is an effective tool for weight-loss and is recommended for patients with class III obesity (BMI of 40.0 or higher) or class II obesity (BMI of 35.0 -39.9) with obesity-related comorbidities (i.e. hypertension, type 2 diabetes and obstructive sleep

apnea). Weight-loss from bariatric surgery and lifestyle modification is more achievable long-term when compared to lifestyle intervention alone. Studies consistently show that bariatric surgery is associated with improvement in cognitive function that lasts for several years.

Additionally, further studies must also be done to fully understand the process of underlying cognitive improvement after bariatric surgery. Several factors such as improved obesity-related diseases (i.e. hypertension, type 2 diabetes and obstructive sleep apnea), reduced inflammation, changes in appetite hormones) and gut microbiota have been suggested.

About the Author:

Taraneh Soleymani, MD, FTOS, is an assistant professor in the Department of Nutrition Sciences and Medicine at the University of Alabama at Birmingham (UAB), and the medical director of EatRight by UAB, a comprehensive weight management program. Dr. Soleymani is also the co-director of UAB's Weight-loss Medicine Center, and the director of nutrition consultation services at Birmingham VA Medical Center. She is board certified in internal medicine with fellowship training in clinical nutrition and obesity management, and her clinical expertise includes patient tailored comprehensive medical management of obesity and inpatient nutrition management for the critically ill.



ABOUT THE OBESITY ACTION COALITION (OAC)

The Obesity Action Coalition (OAC) is a National non-profit organization dedicated to giving a voice to individuals affected by obesity and helping them along their journey toward better health. Our core focuses are to elevate the conversation of weight and its impact on health, improve access to obesity care, provide science-based education on obesity and its treatments, and fight to eliminate weight bias and discrimination.



VIBRANT COMMUNITY



NATIONAL AWARENESS CAMPAIGNS



ANNUAL CONVENTION



ADVOCACY



PUBLIC EDUCATION

LEARN, CONNECT, ENGAGE

The OAC knows that the journey with weight can be challenging but we also know that great things happen when we learn, connect and engage. That is why the OAC Community exists. Our Community is designed to provide quality education, ongoing support programs, an opportunity to connect, and a place to take action on important issues.

Through the OAC Community, you can get access to:

- Weight & Health Education • Community Blogs
 - Community Discussion Forum
 - Ongoing Support • Meaningful Connections
- AND MUCH MORE**



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