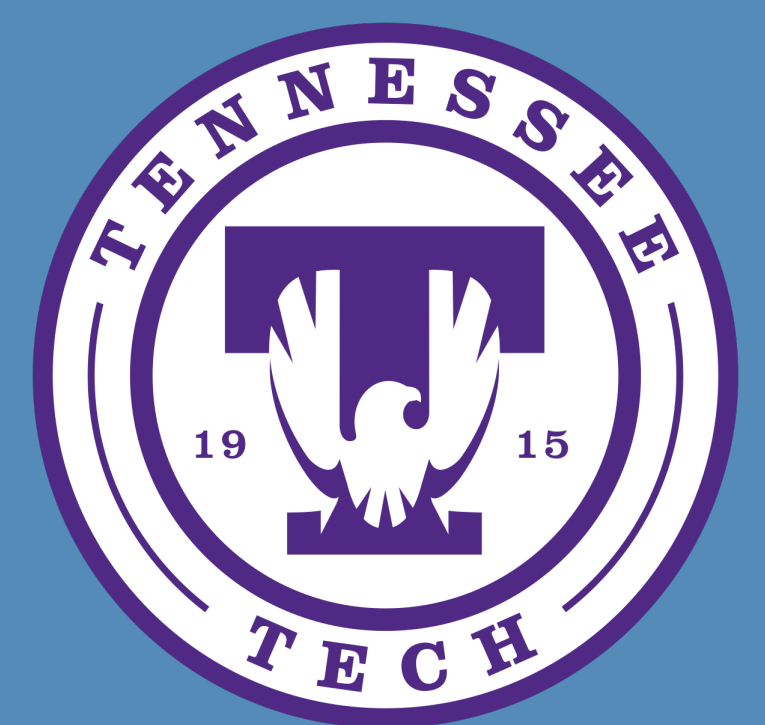


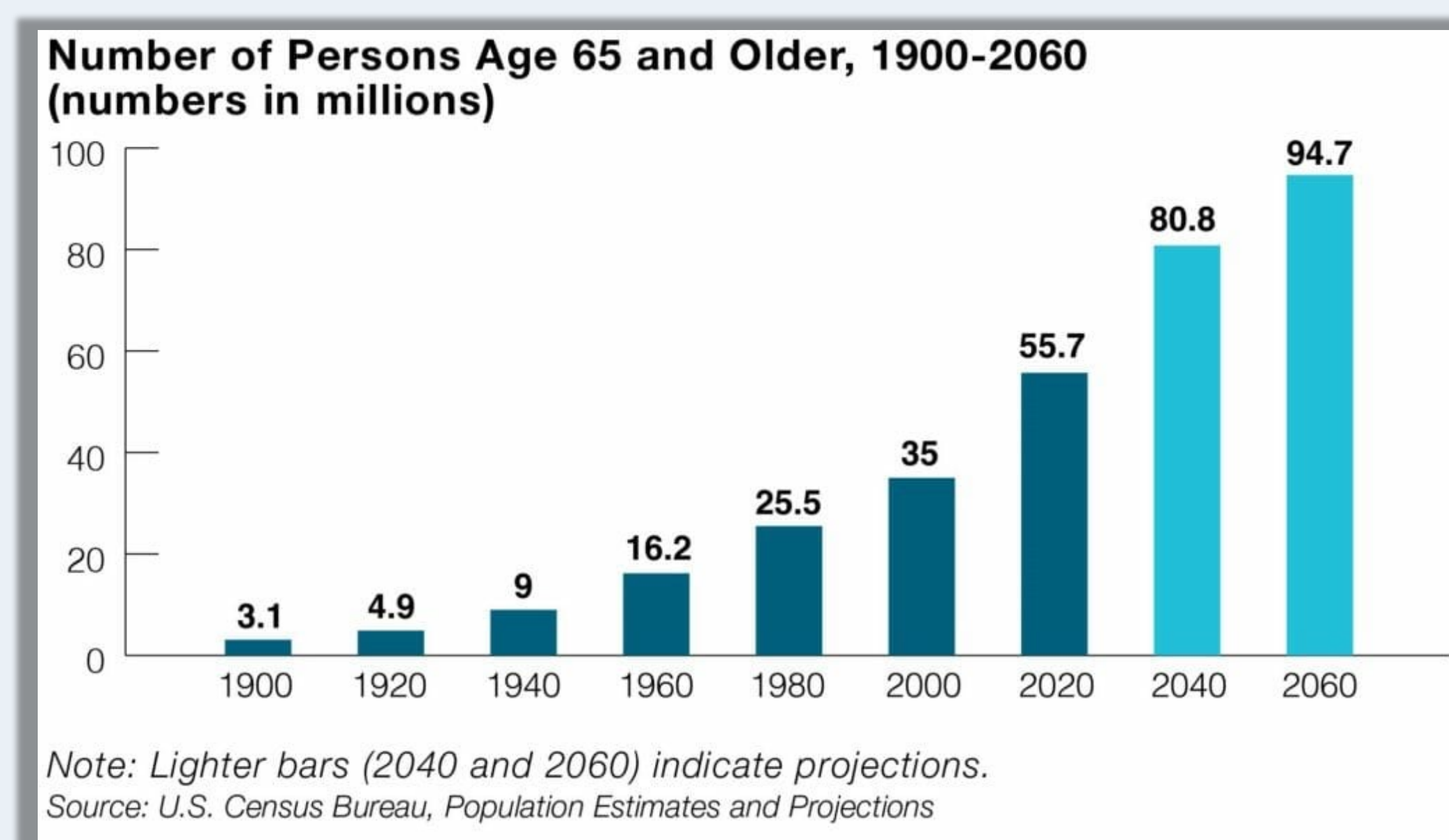
Links Between Nutritional Factors and Dementia in Older Adults



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Introduction

- Dementia is a common condition plaguing older adult populations.
- Older adults is defined as adults aged 65 and older.¹
- As compared to roughly 54.1 million older adults in 2019, the number is expected to reach 80.8 million by the year 2040 and 94.7 million by 2060.²
- There are 5 main variations of the disease, the most common being Alzheimer's and mixed dementia, which is a combination of different forms.³
- Currently, around 47 million people have been diagnosed with dementia worldwide, and it is estimated that about 8 million new cases are diagnosed each year.⁴
- Researchers have become aware of the potential implications of nutrition and lifestyle factors on the aging brain. Consequently, more and more studies are coming out relating to the possible connections between nutritional variables and dementia development.
- Discussed here are studies relating to both preventative dietary measures as well as nutrition therapies to help slow down or treat existing dementia.
- The purpose of this literature review is to explore links between dietary habits, nutritional variables, and dementia and cognitive decline in older adults.



Methods

- The Tennessee Technological University Volpe Library Database and the Journal of the Academy of Nutrition and Dietetics were used to search for literature relating to the topic.
- In both databases, the criteria were set to peer-reviewed articles published in the last 10 years. This was to ensure relevant and reliable research.
- The search was further specified to primary research articles that relate to nutrition variables and their association with dementia.
- Key words searched included dementia, nutrition, Alzheimer's, Mediterranean diet, older adults, and cognitive decline.

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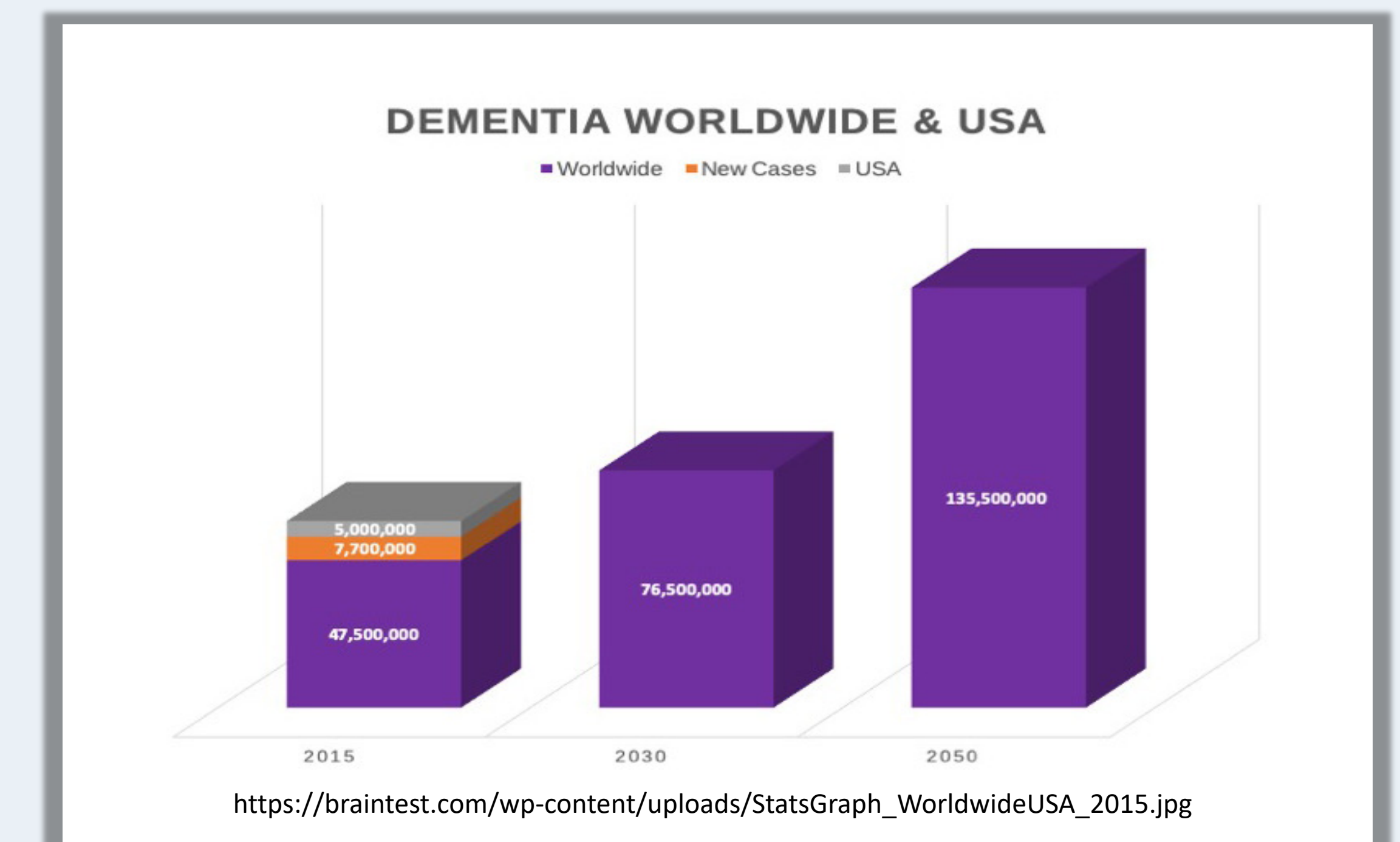
Discussion

Malnutrition and Cognitive Decline

- Feng et al⁵ conducted a cross-sectional study to assess the prevalence of cognitive decline in oldest-old (80-99 years) and centenarian (100+ years) Chinese adults as well as to determine if there was a relationship between cognitive decline and nutrition. Malnutrition was identified as a significant factor that directly affected neurons and the inflammatory response in the blood-brain barrier.
- A study performed by Lu et al⁶ attempted to observe the relationship between poor nutritional status and cognitive decline or neurocognitive disorder in 3128 Chinese adults aged 55 or older. It was found that the following affected dementia risk: moderate to high risk of malnutrition, use of 5+ drugs, inadequate fruits/vegetables, inadequate dairy, low albumin, and low total cholesterol.

Preventative Measures for Dementia and Cognitive Decline

- Ye et al⁷ conducted a study relating to the Mediterranean diet and the Healthy Eating Index (HEI) 2005 and their associations with cognitive function in a sample of 1269 Puerto Rican adults aged 45 to 75. Adherence to the Mediterranean Diet was associated with lower likelihood of cognitive impairment.
- Douaud et al⁸ conducted a study that focused on the possibility of preventing atrophy of brain regions tied to cognitive decline and Alzheimer's utilizing B-vitamin treatment—more specifically folic acid, B12, and B6 with a sample of 156 elderly individuals at increased risk for dementia. Results showed a significant reduction in gray matter atrophy with treatment.
- Cansev et al⁹ conducted a study involving a multi-nutrient enriched diet called Fortasyn Connect (FC) to determine its effects on hippocampal cholinergic neurotransmission, which is mediated by acetylcholine (ACh)—a neurotransmitter. The FC diet contains nutrients that are necessary for maintaining neuronal membranes, including uridine, omega-3 PUFAs, choline, phospholipids, folic acid, vitamins B12, B6, C, and E, and selenium.⁹ The result was significantly increased ACh levels (low in Alzheimer's patients).
- Bowman et al¹⁰ performed a study to determine if omega-3 polyunsaturated fatty acids (O3PUFAs) were associated with less cognitive decline as humans age, as well as if white matter hyperintensity (WMH) volume mediates the relationship between O3PUFAs and executive function. WMH volume was not found to mediate the relationship, but greater O3PUFAs were linked to less WMH, which can be a marker of small vessel disease and dementia.
- Navale et al¹¹ conducted a study to determine the connections between 25-hydroxyvitamin D (25(OH)D), neuroimaging features, and risk of dementia and stroke with a sample population of 427,690 participants. Twenty-five-hydroxyvitamin D is an indicator of vitamin D status. The results found that higher risk of dementia and stroke were seen in patients with the lowest levels of vitamin D, and lower 25(OH)D was connected to greater volumes of WMH.



Limitations

- Limited demographics within the studies
- Lack of long-term follow up, or data from only a single point in time

Implications

- This research is consistent in its findings that nutrition is significant in the prevention or slowing of cognitive decline and dementia in older adults.
- Not only has malnutrition been identified as a possible contributing factor, but specific nutrients have been shown to be beneficial to areas of the brain associated with cognitive decline and connected to lower rates of dementia.
- This knowledge is invaluable to vulnerable populations and may mark the beginning of new nutrition-based prevention therapies.
- If nutrition affects the brain as much as this research suggests, this may pave the way for the study of other diseases involving the brain and nervous system in their relationship with nutritional status.

Conclusions

- All 7 studies reviewed were conclusive in their results supporting the evident association between nutritional status and risk of cognitive decline and dementia.
- The first area of discussion revolved around malnutrition, and it was determined that malnutrition involving inadequate protein and nutrient intake are strongly associated with decreased neuronal plasticity, mild cognitive impairment, and dementia.^{5,6}
- The Mediterranean diet and Fortasyn Connect nutrition supplementation showed promising results with decreased rates of dementia and its preceptors.^{7,9}
- B-vitamin treatments, adequate omega-3 polyunsaturated fatty acids, and adequate vitamin D were all effective measures that showed decreased brain atrophy in key areas related to dementia.^{8,10,11}
- This research as a whole establishes a consistent connection between nutrition and cognitive health in older adults, particularly in relation to their risk of developing dementia.

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