

THE IMPACT OF COMPREHENSIVE LIFESTYLE APPROACH TO ALZHEIMER'S PREVENTION AND TREATMENT

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ABSTRACT

In recent years, interest in the effects of a whole lifestyle approach to Alzheimer's prevention and treatment has grown. Alzheimer's disease is a degenerative brain condition that impairs thinking, behaviour, and memory. Although while there is no known cure for Alzheimer's, there is mounting evidence that adopting a healthy lifestyle can significantly lower the risk of contracting the condition and slow its progression. Making adjustments to one's diet, physical activity, stress management, and social involvement are all part of a comprehensive lifestyle approach. One diet that has been demonstrated to boost brain function and lower the risk of Alzheimer's disease is one that is high in fruits, vegetables, whole grains, and healthy fats but low in sugar and processed foods. It has also been demonstrated that exercise, such as walking, cycling, or resistance training, is beneficial for the health and function of the brain. An all-encompassing lifestyle approach to the prevention and treatment of Alzheimer's disease also includes stress management. Alzheimer's disease risk and brain health deterioration have both been connected to long-term stress. Deep breathing, yoga, and other stress-reduction practises can help lower stress levels and enhance brain health. Finally, it has been demonstrated that social engagement, such as taking part in group activities, spending time with family and friends, and volunteering, has a good effect on brain health and lowers the chance of developing Alzheimer's disease.

KEYWORDS: Alzheimer, Chronic, Degenrative.

INTRODUCTION

Alzheimer's disease (AD) is a complex and progressive neurodegenerative disorder that affects memory, thinking, and behavior. It is the most common cause of dementia in older adults and is characterized by a gradual decline in cognitive function, leading to severe memory loss, confusion, and difficulty with activities of daily living. The exact cause of AD is unknown, but it is believed to be a combination of genetic, environmental, and lifestyle factors. AD is characterized by the presence of two hallmark pathological features in the brain: amyloid plaques and neurofibrillary tangles. Amyloid

plaques are deposits of a protein called beta amyloid that build up between nerve cells, while neurofibrillary tangles are twisted fibers of a protein called tau that accumulate inside the neurons. These changes lead to the death of neurons and the loss of connections between them, resulting in the decline in cognitive function seen in AD. The incidence of AD increases with age, and it is estimated that approximately 5.8 million people in the United States are living with AD.^[1] There is currently no cure for AD, and available treatments only provide temporary symptomatic relief.

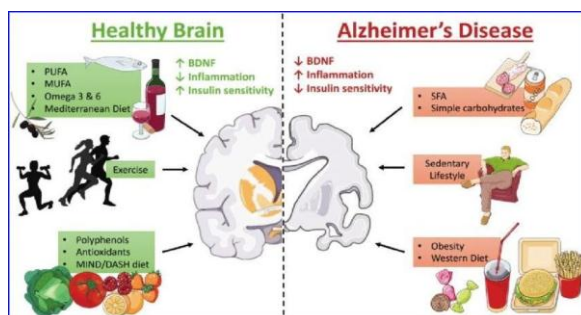


Fig.1- Comparison between healthy brain & Alzheimer disease.

Pathogenesis

The pathophysiology of Alzheimer's disease (AD) involves a complex interplay of factors that lead to progressive degeneration of brain cells and the decline of cognitive and behavioural function.

One key aspect of the pathophysiology of AD is the accumulation of abnormal protein deposits in the brain, including beta-amyloid plaques and tau tangles. Beta-amyloid is a sticky protein that accumulates outside nerve cells, forming plaques that disrupt communication between nerve cells and leading to their death. Tau is a protein that helps maintain the structural stability of nerve cells, but in AD, it becomes abnormal and forms tangles inside the cells, leading to their death and the decline of cognitive function.^[2] Inflammation and oxidative stress also play a role in the pathophysiology of AD. Chronic low-grade inflammation in the brain contributes to the death of nerve cells, while oxidative

stress results from an imbalance between the production of reactive oxygen species (ROS) and the body's antioxidant defenses, leading to cellular damage and the decline of cognitive function.^[3] Oxidative stress in Alzheimer's disease: from pathogenesis to treatment. Mitochondrial dysfunction is another important aspect of the pathophysiology of AD. Mitochondria are the powerhouses of cells and play a key role in providing energy and maintaining cellular function. In AD, mitochondrial function is impaired, leading to the decline of brain function and the death of nerve cells.^[4] Mitochondrial dysfunction in neurodegenerative disorders.

In conclusion, the pathophysiology of AD is a complex and multifactorial process that involves the accumulation of abnormal proteins, inflammation, oxidative stress, and mitochondrial dysfunction.

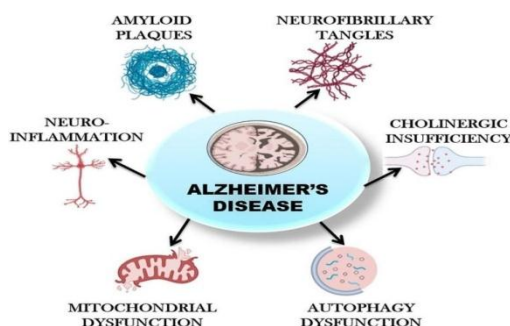


Fig.2- Pathogenesis of Alzheimer.

Types of Dementia

Alzheimer's disease (AD) is a progressive neurodegenerative disorder that affects memory, thinking, and behavior. There are several different subtypes of AD, including:

- 1. Early-onset Alzheimer's disease:** This subtype of AD occurs in individuals who are under the age of 65 and accounts for less than 10% of all AD cases.^[5]
- 2. Late-onset Alzheimer's disease:** This subtype of AD occurs in individuals who are 65 years or older and is the most common form of AD, accounting for approximately 90% of all AD cases.^[5]
- 3. Familial Alzheimer's disease:** This subtype of AD is rare and is caused by genetic mutations that run in families. It accounts for less than 1% of all AD cases.^[5]
- 4. Lewy body dementia:** This subtype of AD is characterized by the presence of Lewy bodies, which are clumps of abnormal protein, in the brain. Lewy body dementia can cause symptoms similar to AD, including memory loss, confusion, and difficulty with movement.^[6]
- 5. Vascular dementia:** This subtype of AD is caused by damage to the blood vessels that supply the brain and can result in cognitive decline.^[7]

Epidemiology of Dementia

Dementia is a complex and debilitating neurodegenerative disorder that affects millions of people worldwide. According to the World Health

Organization (WHO), an estimated 50 million people are living with dementia, and this number is projected to triple by 2050.^[8]

Epidemiology is the study of the distribution and determinants of health and disease in populations. The epidemiology of dementia has shown that the prevalence of dementia increases with age, with the highest rates of incidence in individuals over the age of 80.^[9] Other risk factors for dementia include genetics, lifestyle factors (such as smoking, physical inactivity, and poor diet), and other medical conditions (such as stroke, depression, and Parkinson's disease).

Several studies have also shown that the prevalence of dementia is higher in certain populations, including women, individuals with low education or socio-economic status, and people from ethnic minorities.^[10,11]

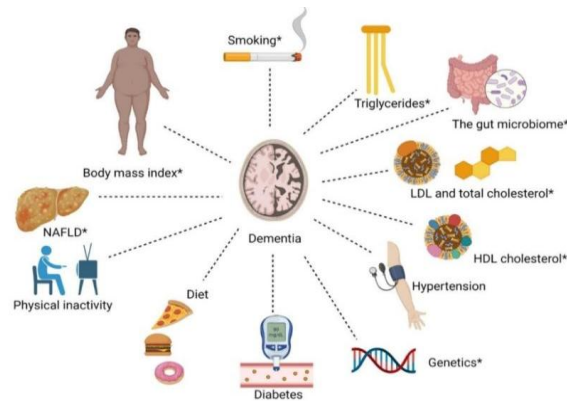


Fig.3: Risk factors for Dementia.

Prevalence & Impact

Dementia is a debilitating neurodegenerative disorder that has a significant impact on individuals, families, and societies worldwide. According to the World Health Organization (WHO), an estimated 50 million people are living with dementia, and this number is projected to triple by 2050.^[8]

The prevalence of dementia increases with age, with the highest rates of incidence in individuals over the age of 80.^[9] In high-income countries, the prevalence of dementia ranges from 5-8% in individuals aged 60-64 to over 50% in those aged 90 and over.^[12]

The impact of dementia extends beyond the individuals who have been diagnosed. It also affects their families, who often provide care for those with dementia. Caregiving can have significant physical, emotional, and financial consequences for family members, leading to increased stress, depression, and burden.^[13] In addition to its impact on individuals and families, dementia also has a significant economic impact on society. The total worldwide cost of dementia is estimated to be over \$1 trillion per year, including direct medical costs, informal care costs, and costs related to lost productivity.^[14]

Diagnosing strategies

Diagnosis of Alzheimer's disease (AD) is a complex process that typically involves several steps and a multi-disciplinary team of healthcare professionals. There are various methods used to diagnose AD, including:

- **Medical and neurological examination:** A thorough medical and neurological evaluation is performed to rule out other conditions that could cause symptoms similar to AD, such as depression, normal pressure hydrocephalus, and Parkinson's disease.
- **Psychological and cognitive testing:** Neuropsychological tests are used to assess memory, language, attention, and problem-solving abilities to determine if they are consistent with AD.
- **Imaging studies:** Structural brain imaging, such as magnetic resonance imaging (MRI), and functional brain imaging, such as positron emission tomography (PET), can provide valuable

information about brain structure and function and help to identify areas affected by AD.

- **Biomarker testing:** Biomarker tests, such as cerebrospinal fluid (CSF) analysis and betaamyloid imaging, can help to confirm a diagnosis of AD by detecting changes in the brain associated with the disease.
- **Genetic testing:** In some cases, genetic testing may be performed to determine if a person has a genetic mutation associated with AD.

It is important to note that there is no single test that can diagnose AD with 100% certainty, and a definitive diagnosis can only be made through a combination of these methods.

Stages of Disease

The Alzheimer's disease (AD) is typically divided into several stages based on the progression of symptoms:

- **Preclinical stage:** During this stage, there may be subtle changes in the brain, but no noticeable symptoms.
- **Mild cognitive impairment (MCI) due to AD:** At this stage, a person may experience mild memory loss or other cognitive symptoms, but they do not interfere with daily activities.
- **Early stage AD:** At this stage, a person may experience more noticeable memory loss and difficulty with daily tasks, but they are still able to live independently.
- **Middle stage AD:** At this stage, a person may need assistance with daily activities, such as bathing and dressing, and may have difficulty communicating.
- **Late stage AD:** At this stage, a person may require full-time care and assistance with all activities of daily living.

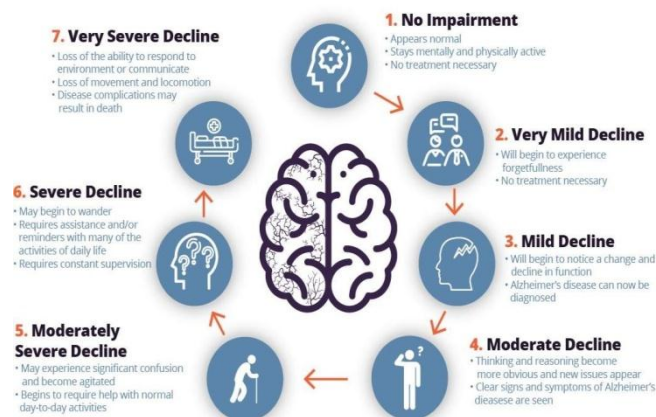


Fig.4: Stages of Disease.

It is important to note that the progression of AD can vary greatly from person to person, and the stages are not always clearly defined.

Nutrition requirement of the older people

The nutritional requirements for older individuals with Alzheimer's disease can vary depending on the individual's stage of the disease and associated symptoms. However, in general, older adults with Alzheimer's may require a balanced diet that includes a variety of foods from all food groups to maintain their health and prevent malnutrition. According to a study published in the Journal of the American Medical Directors Association^[15], older adults with Alzheimer's disease are at risk of malnutrition due to a decline in their cognitive abilities and difficulty with eating. The study recommends incorporating high-protein foods, such as lean meats, poultry, fish, dairy, and legumes, in their diets to help maintain muscle mass and prevent weight loss. Another study published in the journal Geriatrics & Gerontology International^[16] suggests that older adults with Alzheimer's disease may benefit from a modified diet that is easy to chew and swallow, with a focus on nutrient-dense foods. The study also highlights the importance of maintaining hydration by encouraging the consumption of fluids, such as water, broths, and soups. It is always important to consult with a healthcare professional, such as a registered dietitian, for personalized nutrition recommendations for individuals with Alzheimer's disease.

Impacts of Dietary supplements on the AD risk

The use of dietary supplements has been proposed as a potential strategy for reducing the risk of Alzheimer's disease (AD). Several studies have investigated the impact of various dietary supplements on AD risk, with mixed results. One commonly studied supplement is vitamin E, which has been shown to have antioxidant properties that may help protect against cognitive decline and AD.^[17] Vitamin B12 has also been studied, with some research suggesting a link between low levels of B12 and an increased risk of AD.^[18] Another supplement of interest is omega-3 fatty acids, which are thought to have anti-inflammatory effects that may help reduce the

risk of AD.^[20] Results from clinical trials have been mixed, with some studies showing a positive impact on cognitive function in individuals with AD^[19] and others finding no effect.^[14] Despite these findings, it is important to note that most of the research on dietary supplements and AD risk has been conducted in animal models or observational studies, and the results may not be applicable to humans. In addition, supplements can interact with medications and other health conditions, so it is important to speak with a healthcare provider before starting any new supplement regimen. In conclusion, while dietary supplements may show promise in reducing the risk of AD, more research is needed to determine their efficacy and safety in human populations.

Causes For Inadequate Nutrition

Inadequate nutrition is a common problem in older adults with Alzheimer's disease and can result from a combination of physical, cognitive, and functional factors. According to a study published in the Journal of the American Medical Directors Association^[15], the causes of inadequate nutrition in Alzheimer's disease may include:

- ✦ Difficulty with chewing and swallowing (dysphagia)
- ✦ Reduced appetite and food intake
- ✦ Changes in taste and smell, leading to decreased food enjoyment
- ✦ Difficulty in shopping, cooking, and eating independently
- ✦ Depression and anxiety, which can lead to decreased food intake
- ✦ Interactions between medications and food, leading to decreased nutrient absorption and increased nutrient losses.

The study highlights the importance of addressing these factors through a multidisciplinary approach that includes the involvement of healthcare professionals, such as registered dietitians, speech therapists, and occupational therapists. Another study published in the journal Geriatrics & Gerontology International^[16] also emphasizes the importance of recognizing and addressing the causes of inadequate nutrition in older

adults with Alzheimer's disease to prevent malnutrition and maintain their overall health.

Current Intervention To Improve Nutrition

Interventions to improve nutrition in older adults with Alzheimer's disease may vary depending on the individual's stage of the disease and associated symptoms. However, several interventions have been shown to be effective in improving nutrition in this population. According to a study published in the Journal of the American Medical Directors Association^[15], some of the interventions that have been shown to improve nutrition in older adults with Alzheimer's disease include:

1. Nutrition education for the individual and their caregivers
2. Modifying the texture and presentation of food to make it easier to eat
3. Increasing mealtime support, such as providing assistance with feeding or offering mealtime companionship
4. Encouraging hydration through the consumption of fluids, such as water, broths, and soups
5. Using adaptive devices, such as weighted utensils, to improve hand function and independence with eating

The study also highlights the importance of involving registered dietitians in the care of older adults with Alzheimer's disease to provide personalized nutrition recommendations and monitor the individual's nutritional status. Another study published in the journal *Geriatrics & Gerontology International*^[16] suggests that a modified diet, with a focus on nutrient-dense foods and easy-to-chew textures, may be beneficial for older adults with Alzheimer's disease. The study also emphasizes the importance of promoting social interaction and creating a positive mealtime environment to improve food intake and overall nutrition.

Suggestion for improvement

There is still much to be done to improve the care and outcomes for individuals with Alzheimer's disease. Here are a few suggestions for improvement:

- **Improving early diagnosis:** There is a need for more sensitive and specific diagnostic tools for Alzheimer's disease, which could improve early detection and allow for earlier intervention.^[21] Developing new treatments: While current treatments can help manage symptoms, there is a need for more effective treatments that can slow the progression of the disease and potentially even reverse the damage caused by Alzheimer's.^[22]
- **Improving caregiver support:** Caregivers of individuals with Alzheimer's disease often face significant physical, emotional, and financial strain. Improving access to resources and support for caregivers can improve their quality of life and ensure that individuals with Alzheimer's receive the best possible care.^[23] Increasing funding for

research: Significant funding is needed to advance our understanding of Alzheimer's disease and develop new treatments and preventive measures. Increased investment in Alzheimer's research is critical to improve patient outcomes and find a cure for this devastating disease.^[24]

- **Improving access to care:** Access to quality care and support for individuals with Alzheimer's disease remains a challenge in many parts of the world. Improving access to care, especially for underserved populations, is important to ensure that everyone has access to the care they need.^[25] These suggestions for improvement in Alzheimer's disease are based on current knowledge and research, and more work is needed to fully understand and address the challenges faced by individuals with Alzheimer's disease and their families.

CONCLUSION

The current scenario of nutritional patterns in the prevention and treatment of Alzheimer's disease (AD) is that diet and nutrition play a significant role in the development and progression of the disease. Evidence suggests that certain dietary patterns, such as the Mediterranean diet, high in fruits, vegetables, whole grains, and fish, are associated with a reduced risk of AD, while a diet high in processed and fried foods, sugar-sweetened beverages, and red and processed meat is linked to an increased risk. Additionally, high levels of antioxidants and polyunsaturated fatty acids have also been shown to have a protective effect against AD.

However, it is important to note that the relationship between diet and AD is complex and influenced by many factors. While much research has been conducted on the subject, more studies are needed to fully understand the impact of nutritional patterns on the prevention and treatment of AD. As a result, the present scenario is one of continued investigation and the development of further research to provide a more complete understanding of the role of diet in AD.

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