

The Western Diet and Alzheimer's Disease: A Review of the Association Between Ultra-Processed Food Consumption, Neuroinflammation, and Cognitive Decline

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Abstract: Is there a connection between the Western diet and Alzheimer's disease, from a few centuries ago to the present day? The motivation for this research is to encourage the public to learn how to reduce the risk of Alzheimer's disease in later life. The methodology employed in this study involved the use of both quantitative and qualitative data gathered from secondary sources. The findings indicate that, as a consequence of the Industrial Revolution, the Western diet transformed significantly, becoming more harmful and increasing the risk of Alzheimer's disease. Specifically, the shift from fresh, minimally processed foods to diets high in saturated fats, refined sugars, and ultra-processed products has been associated with increased neuroinflammation and tau protein accumulation — both of which are key biological markers of Alzheimer's disease. When adhering to a wholesome diet such as the Mediterranean diet, the risk of Alzheimer's declines by up to 53%, as reported by Martha Clare Morris (2015). Therefore, the acceleration of processed food consumption and the high saturated fat content of the Western diet are contributing significantly to the prevalence of the disease.

Keywords: *Alzheimer's Disease, Western Diet, Mediterranean Diet, Saturated Fat, Neuroinflammation, Tau Protein, Processed Food.*

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I. INTRODUCTION

Over the past two centuries, the Western diet — commonly consumed in North America — has increased significantly in saturated fat and sugar content. Multiple sources, including Nichols (2023) and ScienceDirect (2024), indicate that the current Western diet is considerably less healthy than the diets of previous centuries, when food was fresher and less processed. The Western diet has transformed substantially since the Neolithic era, with the most dramatic changes occurring during the Industrial Revolution in the 19th century, which brought a substantial increase in processed foods. Prior to industrialisation, the average diet consisted primarily of whole grains, locally grown fruits and vegetables, and naturally sourced fats. The advent of industrial food production introduced mass-manufactured products with extended shelf lives, which typically contain higher levels of sodium, refined sugar, and chemically modified fats. Concurrently, the number of people diagnosed with Alzheimer's disease has escalated enormously. According to the Alzheimer's Association (n.d.), Alzheimer's

is a progressive brain disease — predominantly affecting elderly people — which gradually leads to permanent memory loss, the loss of speech, and rapid brain deterioration. The disease progresses through several stages, beginning with mild memory lapses and advancing to severe cognitive impairment, where patients may lose the ability to carry out basic daily activities and eventually require full-time care. The disease has surged dramatically over the past two decades, with deaths increasing by 145% between 2000 and 2019 (PubMed, 2023). According to research from the National Institute on Aging (2023), there is a relationship between Alzheimer's and diet. When saturated fat intake increases, it can cause chronic inflammation throughout the body and insulin resistance, both of which may lead to damage to brain cells. This connection between dietary intake and neurological health forms the central focus of this investigation.

II. LITERATURE REVIEW

Multiple sources (Lee, 2022; Ehrenfeld, 2022; Navarro-Tapia, 2020) suggest that the Western diet has changed substantially from the 1800s to the present day, transitioning from clean, minimally processed food to ultra-processed industrial food products. This dietary transition did not occur suddenly; rather, it accelerated in distinct phases — first with industrialisation in the 19th century, then with the rise of fast-food culture in the mid-20th century, and most recently with the mass availability of convenience foods in the 21st century. Evidence from additional sources (Fleck, 2025; Fishman, 2018; Alzheimer's Association, n.d.) illustrates the Alzheimer's risk specifically in the United States. The United States serves as a particularly instructive case study because it has both one of the highest rates of ultra-processed food consumption globally and one of the highest Alzheimer's prevalence rates among developed nations. Studies from the National Library of Medicine (2023) and Grant (2023) both highlight a potential link between high levels of bodily inflammation, insulin resistance, and Alzheimer's disease. Grant (2023) specifically notes that diets high in saturated fat and sugar contribute to oxidative stress, which accelerates neuronal damage over time. Lastly, the Cleveland Clinic (2024) and Morris (2015) both indicate that the Mediterranean diet — which is fresh, nutrient-rich, and free of highly processed foods, excessive saturated fats, and large portion sizes — is associated with a reduced risk of Alzheimer's disease. The Mediterranean diet is characterised by high consumption of olive oil, fresh vegetables, fruits, legumes, whole grains, and fish, with minimal red meat and virtually no processed foods. This dietary profile provides anti-inflammatory and antioxidant benefits that are believed to protect neurological health.

III. METHODOLOGY

This study employs secondary research methods to explore the correlation between the Western diet and Alzheimer's disease. A secondary research approach was selected because primary clinical trials examining dietary impact on Alzheimer's disease require longitudinal timeframes and controlled medical environments that are

beyond the scope of this study. By synthesising existing published research, this study is able to draw on a broad evidence base spanning multiple decades and populations. The research draws on both quantitative and qualitative data from published sources. Quantitative data are used to outline patterns and identify connections between dietary changes and Alzheimer's prevalence. Qualitative data provide a deeper understanding of how the Western diet has changed over time and how the Mediterranean diet may influence the occurrence of Alzheimer's disease.

Sources were selected from peer-reviewed journals, established medical institutions such as the Cleveland Clinic and Mayo Clinic, and national health research bodies, with preference given to publications from the last ten years to ensure the currency of findings. Scientific reports describe how the increased intake of saturated fats and excess sugar is associated with the accumulation of tau protein tangles. These protein tangles disrupt the internal structural support of neurons; as neurons decline, the brain's ability to function deteriorates, leading to the loss of brain function that characterises Alzheimer's disease.

➤ Data Presentation

The quantitative data are presented through graphs and tables that illustrate the increase in Alzheimer's disease prevalence and provide information about the composition of the Mediterranean diet. This information is examined to identify key findings about the relationship between the Western diet and Alzheimer's disease. The qualitative data are analysed to explore how the Western diet has changed over time and the influence of the Mediterranean diet on disease risk. Collectively, these data are used as evidence to support the findings of this study and to demonstrate how the Western diet is linked with the disease.

Figure 1 presents a bar graph showing the Alzheimer's death rate in the United States from 2000 to 2023, illustrating the steady upward trend in mortality over a period during which ultra-processed food consumption also increased significantly. Figure 2 presents an example image of the Mediterranean diet, highlighting the food groups and proportions that characterise this dietary pattern.

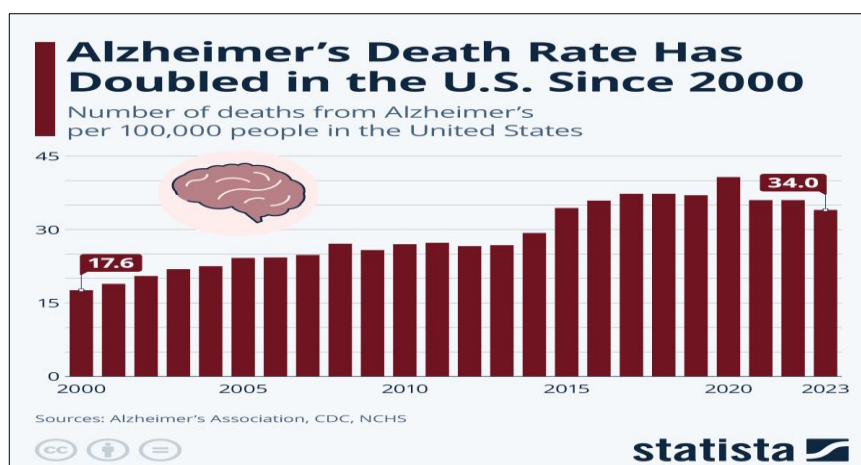


Fig 1 Bar Graph of the Alzheimer's Death Rate from 2000 to 2023
Source: Statista Daily Data (2023)

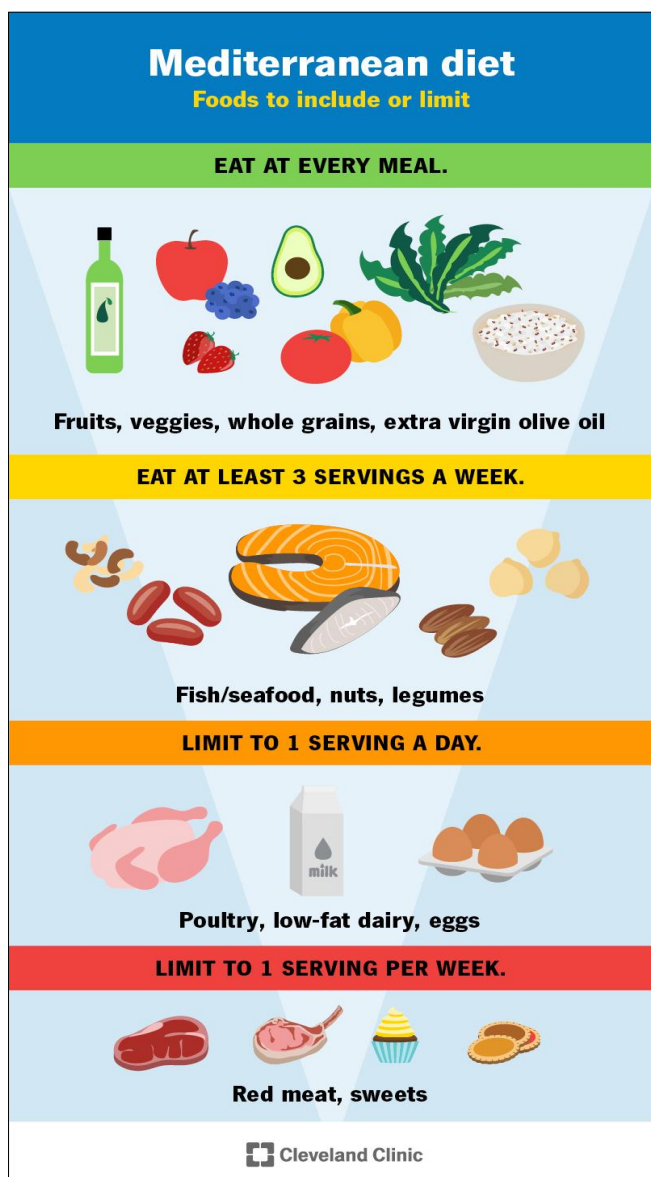


Fig 2 Example Image of the Mediterranean Diet
Source: Cleveland Clinic (2024)

IV. RESULTS

The findings demonstrate that due to the unhealthy nature of the Western diet, Alzheimer's rates are significantly higher among Western diet consumers than among those following diets such as the Mediterranean diet. Ehrenfeld (2022) describes the Western diet of a few hundred years ago, which included healthy practices such as consuming 8 to 10 portions of fruit per person per day, eating a variety of nuts, and consuming omega-3 fatty acids. This mid-Victorian era diet, while not without its own health challenges, provided substantially higher levels of vitamins, minerals, and natural anti-inflammatory compounds than the modern Western diet. According to Koren (1904), no fewer than 32,457 people were recorded as having insanity in 1890. In earlier periods, Alzheimer's disease had not yet been identified; cases of cognitive decline were categorised under the broad term 'insanity.' It is important to note that this does not mean Alzheimer's did not exist in earlier periods, but rather that it

was not recognised as a distinct condition. However, the significantly lower recorded rates of severe cognitive decline during this era — when diets were markedly healthier — support the broader argument that dietary quality is a contributing factor. Moving towards the Industrial Revolution in North America, Lee (2022) reports that the proportion of processed and ultra-processed foods in the diet increased from approximately 5% in 1800 to 60% of all foods consumed today. Over a span of approximately 220 years, the share of processed foods has increased by more than twelve times. Natural fats have declined while chemically modified fats have risen, and there has been an increase in excess sugar and white flour alongside a decline in natural, organic foods. Navarro-Tapia (2020) also notes that the modern Western diet is low in fibre, which is additionally linked to obesity.

Obesity is linked with Alzheimer's disease, as both Grant (2023) and the National Library of Medicine (2023) indicate that high saturated fat and excess sugar intake cause chronic inflammation throughout the body. This inflammation leads to a reduction in neurons in the brain, as tau protein tangles form inside neurons and disrupt their transport system. The biological mechanism operates as follows: when the body experiences sustained inflammation due to poor diet, inflammatory markers cross the blood-brain barrier and trigger neuroinflammation. This neuroinflammation promotes the hyperphosphorylation of tau proteins, which then form the tangles that are a hallmark of Alzheimer's pathology. Over time, this process leads to progressive neuronal death and the cognitive decline associated with the disease. Using data from Fleck (2025), the graph indicates that in 2023, there were approximately 360,000 recorded Alzheimer's-related deaths in the United States. This figure represents a substantial increase from approximately 150,000 recorded deaths in 2000, reflecting both improved diagnosis and a genuine rise in disease prevalence over a period of significant dietary deterioration.

When examining the differences in Alzheimer's prevalence among those following the Mediterranean diet, the known rates of Alzheimer's were only 5–7%, and the risk was reduced by up to 53% according to Morris (2015). Morris's study, known as the MIND diet study, specifically found that even moderate adherence to a Mediterranean-style diet produced measurable reductions in Alzheimer's risk, while strict adherence yielded the most significant protective effect. Following a strict Mediterranean diet provides a clearer understanding of how unhealthy the current Western diet is, as well as how a wholesome diet may help prevent Alzheimer's disease. This finding is particularly significant because it suggests that dietary changes represent a modifiable risk factor — unlike genetic predisposition, diet is something individuals can actively control to reduce their Alzheimer's risk.

V. DISCUSSION

The findings of this study indicate that the high saturated fat, excess sugar, and ultra-processed food content of the Western diet are significantly associated with increased Alzheimer's disease rates. When compared to the clean, fresh

Mediterranean diet, Alzheimer's risk can be reduced by up to 53%, and fewer cases of the disease are observed among Mediterranean diet adherents. A similar pattern is evident when comparing the modern Western diet to the Western diet of the 1800s. This temporal comparison is particularly revealing: the same cultural population — North Americans — experienced substantially different rates of cognitive decline when their dietary patterns were fundamentally different, suggesting that diet is a significant independent variable in Alzheimer's risk. The data are significant because they converge on the same conclusion: individuals who are obese or who consume unhealthy, ultra-processed diets face a substantially higher risk of Alzheimer's disease, while those following healthy diets experience reduced rates. One of the most striking findings of this research was how Alzheimer's disease begins at the cellular level — with tau protein tangles disrupting individual neurons — and gradually destroys the brain over a period of years or even decades. This suggests that the dietary choices made in middle age may have consequences that only become apparent decades later, which underscores the importance of early dietary intervention and public health education. A limitation of this study is that no official documents were found stating how many cases of Alzheimer's occurred around the 1900s, as the disease had not yet been formally named and cases of cognitive decline were generally categorised as 'insanity.' However, other historical information was available to support the broader argument. A further limitation is that correlation does not equal causation — while the data strongly suggest a link between the Western diet and Alzheimer's disease, other factors such as increased life expectancy, improved diagnostic methods, and genetic predisposition also contribute to the rise in Alzheimer's cases and cannot be fully isolated in a secondary research study. This research could be improved in the future by gathering data from a wider range of sources and by incorporating comparative studies of Alzheimer's prevalence across countries with different dominant dietary patterns. Overall, the current Western diet influences Alzheimer's disease risk negatively, while a healthy diet such as the Mediterranean diet has a positive effect in reducing the risk of the disease.

VI. CONCLUSION

In conclusion, individuals who consume the Western diet have a higher risk of developing Alzheimer's disease. There were approximately 360,000 recorded Alzheimer's-related deaths in the United States in 2023, while individuals adhering to the Mediterranean diet experienced up to 53% fewer cases of Alzheimer's. This relationship is directly linked to diet: consuming ultra-processed foods high in saturated fat increases the risk of Alzheimer's, while following a strict, fresh, and nutrient-rich diet reduces it. Furthermore, Alzheimer's disease was not formally identified until the early 1900s, which suggests that the disease was far less prevalent in earlier periods when diets were cleaner and free of ultra-processed foods. Given these findings, it is recommended that public health authorities consider incorporating dietary guidance specifically targeting Alzheimer's risk reduction into their health education programmes, and that further primary research be conducted to establish the precise causal mechanisms linking specific

dietary components to neuroinflammation and tau protein accumulation. Understanding this relationship more deeply could contribute meaningfully to the global effort to reduce the burden of Alzheimer's disease.

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