

NUTRITION AS A STRATEGY FOR PREVENTING ALZHEIMER'S DISEASE

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Abstract: This study aimed to investigate the relationship between diet and Alzheimer's disease prevention, including dietary patterns and specific nutrients. An integrative literature review was conducted, analyzing articles retrieved from secondary databases such as the Virtual Health Library, Latin American and Caribbean Literature in Health Sciences, Scientific Electronic Library Online, and the Online System for Searching and Analyzing Medical Literature, using the descriptors “venomous animals,” “child,” and “adolescent,” and Boolean operators. Several studies have demonstrated that lifestyle factors play a central role in reducing the risk of developing Alzheimer's disease or, at least, in delaying the onset of symptoms. One of these factors is nutrition, which significantly influences the risk of cognitive decline, dementia, and Alzheimer's disease. One such dietary pattern is the Mediterranean diet, which plays a protective role in alterations in cognitive function, pre-dementia syndromes, and dementia, and therefore may represent an effective preventive strategy for Alzheimer's disease, with low costs and few side effects. These promising preventive measures could yield important epidemiological data, which could translate into significant progress in public health.



Keywords: Alzheimer's disease, lifestyle, food, nutrition.

INTRODUCTION

The projection of the Brazilian population according to the Brazilian Institute of Geography and Statistics (IBGE, 2020) is expected to grow considerably in future years, and the disparity between age groups requires to be highlighted, as children, adolescents and adults show a decrease while the elderly increase. In 2024 it is considered that the elderly will add up to 34.8 million (16.02%) of the population, however, it is expected that in 2060 this number will double to 73.4 million (32.17%). The World Health Organization (WHO) (2002) provides for the particularities of each country in defining the age range for the elderly, for developed countries it is classified from 65 years old while in developing countries, such as Brazil, it is considered elderly from 60 years old.

According to the Ministry of Health (Brasil, 2024), the epidemiological profile of the elderly consists of the three main health problems: chronic diseases and worsening of these conditions, and acute problems resulting from external causes. According to DATASUS (Brazil, 2024) the most frequent cause of death in the elderly from 2018 to 2022 is due to diseases of the circulatory system with 28.72%, followed by neoplasms with 15.96% and infectious and parasitic diseases with 12.74%. However, deaths from preventable causes were non-communicable diseases (NCDs) in first place with 79.53%, with an important impact of dementia and its impacts, in second place infectious diseases with 14.17%, and third external causes with 6.22%.

Aging occurs gradually and causes physiological changes in metabolism, body composition and nutrition in the elderly, so that they interfere and modify their habits from common daily activities to more complex ones. The aging process is directly reflected by the habits of life, that is, the individual's actions throughout their youth influence how the process will develop. Aging is subdivided into healthy and pathological, the first corresponds to senescence, which is the natural



and progressive process, while senility has pathological complications leading to a sharp decline in different systems (Freitas et al., 2013).

Dementia is a heterogeneous group of diseases typified by the progressive decline of the individual's executive and socio-occupational cognitive functions – memory, ability to identify and recognize objects, language, praxis, planning and attitudes (Santos; Bessa; Xavier, 2020).

With the increase in life expectancy throughout the twentieth century, dementia came to be considered an important clinical problem, since the prevalence of dementia doubles every 5 years from the age of 60, which allows us to determine that age is a fundamental factor associated with the condition, especially in those over 75 years of age (Zhang et al., 2021).

It is one of the main causes of disability in old age, requiring care throughout the course of this disease, which culminates in the total dependence of the sick person. The cognitive decline that occurs with advancing age is one of the great apprehensions of health professionals who work with human aging, so much so that statistical data show that the number of cases of dementia increases with advancing age worldwide, showing an average prevalence, above 65 years of age, diversifying from 2.2% in Africa, 5.7% in Asia, 6.2% in North America, 7.1% in South America, and up to 9.0% in Europe (Araújo et al., 2023).

In this sense, 60 to 70% of cases are neurodegenerative dementias and, among them, Alzheimer's disease stands out, being the main cause among neurodegenerative diseases, followed by dementia by lewy bodies and frontotemporal dementia (Nunes et al., 2023). Alzheimer's Disease is an irreversible and progressive degenerative neurological disease, which begins gradually, characterized by gradual losses of cognitive function and disturbances in affective behavior. It generates progressive changes in memory and intellectual reasoning, making the individual increasingly dependent and in need of more care (Braccialli et al., 2022).

Health care for the elderly should be centered on the individual, considering their particularities and integration with the family, community and social determinants of health, so that prescriptive actions aimed at the disease and that do not contemplate health promotion are overcome. To this end,



professionals must include in the scope of action, knowledge related to food and its impact on the prevention or delay of diseases, such as Alzheimer's disease. It is essential that policies in the area of aging involve the expanded concept of health (BRASIL, 2011; BRAZIL, 2006).

Brazil is a country that has a significant number of elderly people, but living longer is not synonymous with living well, which interferes in the social imaginary, in which the idea that aging is associated with suffering and increased physical dependence, isolation, functional decline and depression is perpetuated, reflecting the lack of preparation in perceiving the health of the elderly, as a social issue (Ferreira et al., 2022). Regarding the food aspect, the inclusion of nutrients, physical activities and exercises for cognitive function are relevant to contribute to the reduction of the incidence of Alzheimer's Disease, which eliminates the need for clarification to reinforce the construction of public policies.

The social and scientific importance of the present study is based on the analysis of nutritional health conditions, which has repercussions on the process of building decision-making models in health and the institutions that provide care to this public. In addition, in the Brazilian scenario, studies on the subject are scarce, making the realization of this project significant. In addition, the expansion of research in the area, aiming to delimit this area of activity, can promote the establishment of new public policies that are based on evidence. In this sense, efforts are needed to understand the factors associated with the theme, given the positive impacts on patients, professionals and health institutions, in order to build protective measures. Thus, the present study sought to investigate the relationship between diet and Alzheimer's prevention, including dietary patterns and specific nutrients.

METHODS

An integrative literature review was conducted, which was defined as an instrument for obtaining, identifying, analyzing, and synthesizing studies related to a specific theme. It makes it possible to develop a comprehensive analysis of the literature, including analyses of methods and



results (Whittemore; Knafl, 2025). The integrative literacy review was chosen due to the possibility of gathering and synthesizing scientific evidence on the subject.

To construct the study, it was based on the phases proposed by Souza, Silva and Carvalho (2010): elaboration of the guiding question, search or sampling in the literature, data collection, critical analysis of the included studies, discussion of the results and presentation of the integrative review. How the guiding question was defined: What is the impact of diet on preventing or delaying the development of Alzheimer's disease?

Data were searched by means of an electronic search in the following databases available in the Virtual Health Library: Latin American and Caribbean Literature in Health Sciences (LILACS), in the Scientific Electronic Library Online (SciELO), in the Online System for Search and Analysis of Medical Literature (MEDLINE), in the National Library of Medicine (Pubmed) and in the Scopus database. These databases were selected due to their importance for the area of health sciences.

The inclusion criteria were: research available online, referring to studies developed on the object of study in a time frame of 10 years, observational studies, clinical trials, cohort studies and systematic reviews available in full in Portuguese, English and Spanish will be included. The exclusion criteria were: letters to the editor, case reports, editorials, duplicate articles, published in other languages, with the exception of Portuguese or English, and those that did not directly address the proposed theme.

The following descriptors were used in Portuguese: alzheimer's disease; beta-amyloid peptides, foods, diet and nutrition, functional food, alzheimer's, Mediterranean diet, dash, antioxidants, anti-inflammatories, and menopause, retrieved from the Health Sciences Descriptors (Decs), while in English, the following descriptors were used: alzheimer disease, amyloid beta-peptides, diet, food, and nutrition, functional food. The strategy for searching the studies will occur through descriptors included using the heading of medical subjects (MeSH), and the following terms will be combined with the help of Boolean operators from DeCS: AND. All terms are identified in the title or abstract of the studies. Articles with at least one keyword in the title were initially selected, followed by the



abstract being read to assess whether the study would be included.

For data collection, an instrument validated by Ursi (2005) for integrative reviews was developed, covering the following categories of analysis: identification code, title of the publication, author and author's education, source, year of publication, type of study, region in which the research was carried out and the database in which the article was published. After selecting the articles, the information that will be extracted from the studies was defined.

To enable the apprehension of the information, a database prepared in the Microsoft Office Excel software version 2010 was used, composed of the following variables: title of the article, year of publication, study design and main outcomes. The selected studies will be characterized and explained in a table according to: author, year, journal, country, objective, methodology (reference, data analysis, sample) and conclusion. The titles, abstracts and later the full texts were read for the selection of articles.

RESULTS

We included 12 studies in the present review that met the eligibility criteria; The following table describes the titles and main outcomes of the studies analyzed (Chart 1).

Article Title	Main results
MIND Diet and the Incidence of Alzheimer's Disease	Strict adherence to this diet (hybrid between Mediterranean and DASH) reduced the risk of Alzheimer's by fifty-three percent.
Fish Consumption, Omega-3 Fatty Acids, and the Risk of Cognitive Impairment	Regular consumption of omega-3-rich fish is associated with a lower rate of cognitive decline and reduced amyloid plaques.
Prospective Study on the Mediterranean Diet and Alzheimer's Risk	Greater adherence to the Mediterranean diet was significantly associated with a lower risk of developing dementia over ten years.
The Role of Vitamin E and Vitamin C in the Prevention of Alzheimer's Disease	The combination of vitamin E and vitamin C supplements was associated with a reduction in the prevalence and incidence of the disease.
Cocoa Flavonoids and Cognitive Function in the Elderly	Daily consumption of cocoa flavonoids improved executive function and glucose metabolism in adults with mild impairment.



Green Leafy Vegetable Intake and Cognitive Change	Consuming at least one serving of green leafy vegetables a day helps slow cognitive aging by up to eleven years.
Curcumin and Its Efficacy in Alzheimer's Disease Pathology	The antioxidant and anti-inflammatory properties of curcumin have demonstrated potential in reducing the accumulation of tau proteins in the brain.
Gut microbiota and its influence on Alzheimer's Disease	Diets rich in fiber and probiotics modulate the gut-brain axis, reducing systemic neuroinflammation.
The Impact of the Ketogenic Diet on Cognitive Function	The ketogenic diet may improve memory in patients with mild cognitive impairment by providing ketone bodies as alternative energy.
Consumption of berries and berries in brain health	The anthocyanins present in strawberries and blueberries are linked to delaying brain oxidation and improving communication between neurons.
Relationship between coffee consumption and dementia risk	Moderate caffeine consumption throughout adulthood was associated with a lower risk of Alzheimer's in old age.
Calorie restriction and protection against neurodegeneration	Controlled reduction of caloric intake without malnutrition can activate genes that protect neurons against oxidative stress.

Source: study data.

DISCUSSION

According to the World Health Organization (WHO), Chronic Non-Communicable Diseases (NCDs) are the group of diseases with the highest burden of morbidity and mortality on the planet and mainly affect populations with a higher degree of economic and school vulnerability, due to more intense exposure to risk factors or limited access to health information and services. Smoking, physical inactivity, unhealthy eating habits, and harmful use of alcohol are among the modifiable behavioral risk factors and are also the risk factors for metabolic disorders that favor the development of these diseases (BRASIL, 2021).

The elderly population in Brazil has been increasing significantly, triggered by the large reduction in the fertility rate associated with the sharp decline in the infant mortality rate, with this life expectancy has increased considerably, in addition to the impact of NCDs. In 2010, the population



corresponded to a total of 190,755,799 inhabitants, of which 20,590,599 were elderly, about 11% of the population. By 2015, it is estimated that Brazil will reach about 32,000,000 elderly people (Moraes, 2022).

Taking into account the criteria of the United Nations, criteria that are also adopted by Brazil, individuals aged 60 years or older are considered elderly. Aging, inherent to the evolution of humanity, is a dynamic and progressive process, marked by a series of changes that can result in loss of functional capacity and greater dependence. Old age is the last period of the natural evolution of life and is characterized by a set of biological, economic, political, and social parameters that make up the daily lives of people living in this phase (Bueno et al., 2022).

In view of this demographic scenario, it is plausible to conclude that such population aging, added to higher rates of health care use by the elderly, pressures health systems to use, on the one hand, new specialized therapies and, on the other hand, creates awareness of the relevance of strengthening communication relations between health professionals and the elderly as an agency factor to improve the health conditions of this group age (Melo et al., 2019).

In the aging process, irreversible changes occur. To delay these losses, in the context of health services, some strategies that help stimulate bodily and mental functions are highlighted, since the decline is great and most are subject to falls and functional losses. Among these strategies, healthy eating stands out to prevent neurodegenerative diseases, especially dementias, such as Alzheimer's dementia (Charney et al., 2023). Several studies have shown that lifestyle factors play a central role in reducing the risk of developing Alzheimer's disease or, at least, in delaying the onset of symptoms. One of these factors is nutrition, which significantly influences the risk of cognitive decline, dementia, and Alzheimer's disease. One of these dietary patterns is the Mediterranean diet, which plays a protective role in cognitive function alterations, pre-dementia syndromes and dementia, and therefore may represent an effective preventive strategy for Alzheimer's disease, with low costs and few side effects. These promising preventive measures may result in important epidemiological data, which may translate into significant progress in public health (Sousa; Guimarães, 2015).



Alzheimer's disease is a more frequent neurodegenerative disease associated with age, whose cognitive and neuropsychiatric manifestations result in progressive disability and eventual disability (Zhao; Tang, 2022). It is estimated that, in 2050, more than 25% of the world's population will be elderly, thus increasing the prevalence of the disease. According to the medical literature (Prado et al., 2007; Mosconi et al. 2017; Savolainen-Peltonen, 2019), Alzheimer's disease affects more women than men, which generates a significant number of scientific articles on the disease based on studies conducted exclusively with women. Initial reviews identified more than 20 risk factors associated with Alzheimer's disease (AD), including age, family inheritance, aluminum exposure, traumatic brain injury (TBI), and associated comorbidities such as vascular disease and infection (Zhao; Tang, 2022).

The study by Ota et al., (2019) also demonstrated some cognitive effects when administering a ketogenic formula based on medium-chain triglycerides in patients with mild to moderate Alzheimer's disease. In these, single and permanent doses were administered, with no increase in concentrations for 12 months, in two groups of patients. Both ingested TGCMs formulas (Ketonformula), but one of the groups received the sample with about 16g more. Although good results were observed in both groups, the one with the highest supply of TGCMs showed improvement in the tests of immediate logical memory, encoding and digit of symbols, as well as improvement in the tests of delayed logical memory at the end of eight weeks of study.

Positive effects were also observed in the study by Taylor et al., (2017) carried out with 15 participants with AD who underwent a dietary change for three months with low carbohydrates and high fats, most of which were composed of medium-chain triglycerides, administered gradually. Patients who persisted in the study had improved AD and cognitive status.

Nevertheless, studies involving eating habits that include high consumption of vegetables, fruits and fish, foods richly included in the Mediterranean diet; and dietary patterns such as diets for hypertension treatment have been associated with slowing cognitive decline and reduced risk of dementia at all ages (Filippini et al., 2020).

Through a prospective multiethnic population study by Gustafson et al., (2020) it was observed



that two long-chain polyunsaturated fatty acids, docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) were protective against the development of AD and other dementias. Compounds such as omega-3, omega-6, vitamin E and folate, as well as the Mediterranean diet rich in long-chain polyunsaturated fatty acids were linked with the lowest risk of AD, as they are important for cell membrane and nervous system synthesis, as well as neuronal cell integrity, synaptic health and synaptic plasticity. Experimental studies have shown that DHA deficiency in the brain makes dendrites vulnerable to amyloid beta and in the long term leads to mild cognitive impairment. Therefore, it was also concluded that the consumption of these foods is more efficient if done early in the evolution of the disease (Gustafson et al., 2020).

However, contrary to the evidence presented in previous research, other studies have also been done that claim there is no protection against AD through dietary intake of EPA and DHA. Similarly, they did not obtain significant evidence that the intake of fatty fish or long-chain polyunsaturated fatty acids and omega 3 caused a cognitive change over six years of follow-up in elderly men, it was also found that these foods have no effects on cognitive function in adults with mild to moderate depression at 12 weeks (Gustafson et al., 2020).

Other components studied were wheat amylase trypsin inhibitors (ATIs), which are common in dietary proteins from gluten-containing cereals such as wheat, rye, and barley. This substance is a toll-like receptor 4 ligand and resistant to intestinal proteases, which causes an intestinal inflammatory state after consumption. As recent studies suggest that peripheral inflammation has also been shown to be relevant in the pathology of AD, intestinal alterations, such as in the microbiota, would be able to aggravate neuroinflammation and even neurodegeneration (Guilherme et al., 2020)

CONCLUSION

The research conducted in this study reiterates that diet transcends the basic biological function, consolidating itself as a strategic pillar in neuroprotection and in mitigating the risks



associated with Alzheimer's Disease (AD). Through the analysis of scientific evidence, it is observed that the relationship between nutrition and cognitive health is not the result of isolated interventions, but rather of the synergy between specific nutrients and sustainable dietary patterns. One of these dietary patterns is the Mediterranean diet, which plays a protective role in cognitive function alterations, pre-dementia syndromes and dementia, and therefore may represent an effective preventive strategy for Alzheimer's disease, with low costs and few side effects. Such promising preventive measures could result in important epidemiological data, which could translate into significant progress in public health.

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