INTERNATIONAL JOURNAL OF NEUROLOGY. 2025; 59:285
doi: 10.62486/ijn2025228
ISSN: 0020-7446

Dr. Víctor Soriano
In Memoriam

SISTEMATIC REVIEW

Alzheimer's Prevention and Treatment Strategies in Older Adults

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Submitted: 26-03-2025 **Revised:** 29-07-2025 **Accepted:** 14-10-2025 **Published:** 15-10-2025

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ABSTRACT

Introduction: Alzheimer's disease represents an increasing challenge in the context of global aging. The objective of this systematic review was to identify effective strategies for the prevention and treatment of Alzheimer's disease in older adults.

Method: a structured search was conducted in SciELO and Google Scholar, selecting articles published between 2014 and 2024. Both pharmacological and non-pharmacological interventions were analyzed, including cognitive stimulation, physical activity, and dietary modifications.

Results: the findings showed that combined approaches provide better outcomes in preserving cognitive function and slowing disease progression.

Conclusion: we conclude that integrating pharmacological treatments with non-pharmacological strategies is the most effective option for managing Alzheimer's disease in older adults. Early diagnosis and comprehensive intervention are crucial factors for improving patients' quality of life.

Keywords: Alzheimer Disease; Prevention; Therapeutics; Cognitive Dysfunction; Elderly.

INTRODUCTION

Alzheimer's disease (AD) is one of the primary neurodegenerative diseases affecting the elderly population worldwide. With an increasing prevalence, mainly due to demographic aging, AD has become the leading cause of dementia, with a significant impact on both public health and the economy.[1] Despite advances in understanding its pathophysiological mechanisms, early diagnosis and effective treatments remain crucial challenges. Currently, it is estimated that a large proportion of individuals with dementia have not been diagnosed, highlighting the urgency of addressing this problem from a preventive and therapeutic perspective.[2]

The study of strategies for the prevention and treatment of AD in older adults has generated extensive discussion in the scientific community. While pharmacological treatments have shown benefits, integrating non-pharmacological approaches, such as cognitive stimulation, physical activity, and social support, has been the subject of research to improve patients' quality of life and slow the progression of the disease.[2,3] However, controversies remain about the effectiveness of these interventions compared to conventional treatments.[4]

This study aims to identify the most effective strategies for the prevention and treatment of Alzheimer's disease in older adults through a systematic review of the current scientific literature. It seeks to analyze pharmacological and non-pharmacological interventions, evaluating their impact on cognitive function and disease progression. The hypothesis is that comprehensive strategies combining pharmacological and non-pharmacological approaches may be more effective than conventional treatments in improving mental function and slowing disease progression. This study aims to contribute to improving care for Alzheimer's patients by offering evidence-based solutions for their treatment in the Argentine context, where access to resources and the implementation of preventive strategies still present significant challenges.

METHOD

This study consisted of a systematic review of the current scientific literature to identify and analyze the most effective strategies for the prevention and treatment of Alzheimer's disease in older adults. The design adopted was descriptive and cross-sectional, allowing a detailed review of previously published research and comparison of their approaches, interventions, and results without directly manipulating the variables under study.

The study population consisted of scientific articles addressing the prevention or treatment of Alzheimer's disease in older adults. To delimit the corpus of analysis, clearly defined inclusion and exclusion criteria were established.

Studies published between 2014 and 2024, written in Spanish or Portuguese, and available in full text were included. Systematic reviews, clinical trials, observational studies, and clinical practice guidelines that explicitly focused on older adults were considered eligible. Conversely, documents that did not directly focus on the study's central theme, were methodologically weak, lacked access to the full text, or had been published before 2014 were excluded.

The research environment was virtual, with article searches and analyses conducted in open-access databases, specifically SciELO and Google Scholar. These platforms were selected for their ease of access to scientific literature relevant to the Latin American context and for offering broad coverage of both national and international studies.

The interventions in this research consisted of a structured and methodical search for studies, applying key terms related to Alzheimer's, such as "Alzheimer's," "Alzheimer's prevention," "Alzheimer's treatment," "therapeutic strategies," and "older adults," as well as synonyms such as "cognitive impairment" and "dementia." Boolean operators were used to optimize the accuracy of the results obtained, strategically combining terms (e.g., "Alzheimer's" AND "prevention strategies" AND "older adults"; "Alzheimer's treatment" OR "Alzheimer's therapies" AND "older adults"). The results were then filtered by language, year of publication, and study type.

A qualitative approach was chosen for the data analysis. No complex statistical procedures were applied, as the intention was to identify patterns, trends, and relevant findings from a critical comparison of the selected studies. A data extraction matrix was developed to record variables such as the type of intervention, duration of treatment, population addressed, diagnostic tools used, clinical results obtained, and reported limitations. This matrix facilitated systematic organization of information and enabled a narrative synthesis of the main contributions of each study. In addition, comparative tables were used to clearly visualize the preventive and therapeutic strategies described in the literature.

The main operational variables were defined according to the evidence reviewed. Alzheimer's prevention was understood as the set of actions aimed at delaying or preventing the onset of the disease, including non-pharmacological interventions, lifestyle changes, and cognitive therapies. Treatment, on the other hand, encompassed both approved medications, such as cholinesterase inhibitors, and psychosocial approaches and complementary therapies. The effectiveness of each strategy was assessed based on its ability to improve cognitive performance, slow disease progression, or enhance the patient's quality of life.

The instruments used included advanced searches across the databases mentioned above and a comprehensive analysis of each article's content. The collected information was systematized in spreadsheets, which facilitated both comparisons between studies and the preparation of the final report.

It should be noted that this study has some limitations inherent to its design. Among these, the potential publication bias stands out, as only articles available in SciELO and Google Scholar were included, potentially leaving out relevant research published in other databases or in different languages. Likewise, the methodological heterogeneity of the included studies may have influenced the comparability of the results. To mitigate this risk, rigorous methodological evaluation criteria were applied to select articles.

Finally, the resources required to carry out this research included access to the selected platforms, sufficient time for critical reading and analysis of the texts, and basic data-processing tools, such as text editors and spreadsheets. The review was carried out independently by the author, ensuring the transparency and consistency of the process.

The following flowchart was developed to organize and present the selection process for the studies included in this systematic review. This diagram describes in detail the stages of identification, selection, eligibility, and inclusion for the analyzed articles. Initially, a total of 387 articles were located (253 in Google Scholar and the rest in SciELO). After eliminating 78 duplicates and applying the defined inclusion and exclusion criteria, 20 articles were finally selected for discussion in this thesis.

The flowchart below shows the steps taken to select the articles found for the results and discussion of this thesis.

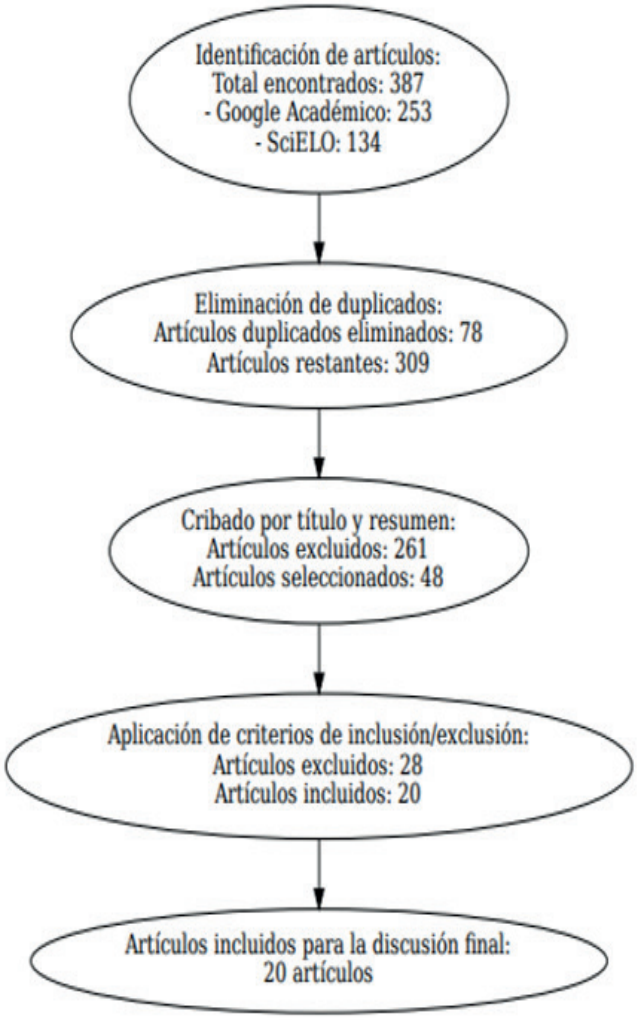

Figure 1. Steps used to select articles for the thesis

RESULTS

This section presents the results of the review of the selected studies on Alzheimer's disease. Below is a table with key details from each of the 20 studies, including the authors, year of publication, type of study conducted, objective of each study, and main findings. This information provides an overview of the latest advances in the prevention, diagnosis, treatment, and management of Alzheimer's disease, reflecting the diversity of approaches used in the current literature.

Table 1. Characteristics of the studies

Authors	Year	Type of Study	Objective of the Study	Main Findings
Llibre-Rodríguez et al.[1]	2022	Review	Update knowledge on the prevention, diagnosis, and treatment of Alzheimer's disease.	Importance of early detection and preventive strategies.
Daiver et al.[2]	2021	Intervention study	Evaluate a mobile app to prevent Alzheimer's disease in older adults.	The app promoted preventive habits.
Castro[3]	2014	Narrative review	Analyzing occupation as a protective factor against dementia.	Occupational activity linked to lower risk of Alzheimer's disease.
Arizaga et al.[4]	2018	Review	Investigate the relationship between diet and Alzheimer's prevention.	Mediterranean diet reduces risk of Alzheimer's disease.
Bravo Loor et al.[5]	2015	Thesis	Implement Android system for preventive therapies against Alzheimer's.	App developed for cognitive therapies.
León-Salas et al.[6]	Undated	Participation in a multicenter study	Present advances in Alzheimer's prevention and treatment in Costa Rica.	LatAm FINGERS promotes healthy habits.
García-Moreno, et al.[7]	2021	Systematic review	Evaluate the effects of physical exercise on fall prevention in Alzheimer's disease.	Exercise reduces the risk of falls.
González[8]	2023	Clinical manual	Addressing nutrition in adult patients with Alzheimer's disease.	Diet improves quality of life in Alzheimer's disease.
Coca García et al.[9]	2024	Review	Analyzing nutrition in the prevention and treatment of Alzheimer's disease.	Key antioxidant nutrients in prevention.
Sánchez et al.[10]	2015	Conference presentation	Create an app for preventive therapies against Alzheimer's disease.	Mobile apps improve access to cognitive therapies.
Rodríguez et al.[11]	2016	Review	Identify dietary factors in the prevention of Alzheimer's disease.	Specific nutrients protect against cognitive decline.
Sánchez García et al.[12]	2023	Thesis	Identifying risk factors for Alzheimer's disease in older adults.	Advanced age, diabetes, and hypertension as relevant factors.
Lara et al.[13]	2015	Review	Relate nutrition and oxidative stress in Alzheimer's prevention.	Antioxidant nutrition reduces the risk of Alzheimer's disease.
Pérez et al.[14]	2017	Narrative review and intervention program	Developing a program using surfing to reduce the effects of Alzheimer's disease.	Aquatic activity improves cognitive functions.
Merayo Asensio et al.[15]	2016	Review	Explore nutrition in the management and prevention of Alzheimer's disease.	Anti-inflammatory nutrients delay cognitive decline.
Caroni et al.[16]	2023	Integrative review	Analyze the influence of diet on Alzheimer's disease.	Antioxidants in diet prevent cognitive decline.
Casado et al.[17]	2017	Experience report	Report on health education activities to prevent Alzheimer's disease.	Education promotes preventive habits.
Bento et al.[18]	2023	Review	Present causes, symptoms, treatment, and prevention of Alzheimer's disease.	Early diagnosis and interdisciplinary treatment are essential.
Assunção et al.[19]	2022	Review	Link physical activity and diet to Alzheimer's prevention.	Exercise and a healthy diet reduce Alzheimer's disease.
Santa Bárbara et al.[20]	2024	Review	Identify modifiable risk factors for Alzheimer's dementia.	Hypertension, obesity, and a sedentary lifestyle increase the risk.

Prevention of Alzheimer's through nutritional strategies

Several studies have highlighted the positive role of nutrition in preventing Alzheimer's disease. Rodríguez et al.[11] identified that a diet rich in antioxidants, omega-3 fatty acids, and B vitamins could reduce the risk of cognitive decline. Coca García et al.[9] reinforced these findings, showing that dietary interventions can not only delay the onset of the disease but also improve patients' quality of life in the early stages. Merayo Asensio et al.[15] concluded that the Mediterranean diet is particularly effective in reducing the risk of Alzheimer's. Similarly, Lara et al.[13] emphasized the importance of nutrition in preventing oxidative stress, a factor related to the onset of the disease.

Physical activity as a preventive tool

Physical exercise was consistently highlighted as a protective factor. García-Moreno et al.[7] demonstrated that regular exercise reduces the risk of falls and maintains functional abilities in patients with Alzheimer's disease. Assunção et al.[19] also found that combining physical activity with a healthy diet has a synergistic effect on disease prevention.

Use of technologies and mobile applications

A growing trend was found in the use of technologies for the prevention and early management of Alzheimer's disease. Daiver et al.[2] developed a mobile application aimed at improving cognitive functions in older adults, achieving favorable results in slowing deterioration. Bravo Loor et al.[5] designed and implemented an Android-based tool for preventive and corrective therapies, while Sánchez et al.[10] reported on the usefulness of such tools in promoting adherence to preventive treatments.

Health education and intervention programs

Health education emerged as a relevant strategy. Casado et al.[17] reported that continuing education on risk factors helped maintain autonomy in active older adults. Bento et al.[18] emphasized that information on causes and symptoms facilitates early disease identification. Pérez et al.[14] designed an intervention program based on surfing, resulting in a reduction in symptoms of Alzheimer's disease.

Occupational and lifestyle factors

Castro[3] found that employment and the maintenance of cognitively stimulating daily routines are protective factors against dementia. León-Salas et al.[6] participated in the LatAm FINGERS study, which links multidomain lifestyle interventions with a reduced risk of cognitive decline. Santa Bárbara et al.[20] identified the main modifiable risk factors, including physical inactivity, an unbalanced diet, and social isolation.

Associated risks and predisposing factors

Sánchez García et al.[12] analyzed risk factors in older adults and found a strong association between family history, hypertension, and diabetes mellitus and the onset of Alzheimer's disease. Llibre-Rodríguez et al.[1] reaffirmed the importance of early diagnosis to control predisposing factors and improve the disease's prognosis.

Integrative nutritional approaches

Caroni et al.[16] conducted an integrative review, highlighting that healthy eating patterns not only prevent Alzheimer's disease but also improve response to conventional treatments. González[8], in the "Manual de nutrición clínica ambulatoria del adulto" (Manual of Clinical Outpatient Nutrition for Adults), proposed specific dietary guidelines for older adults at risk of cognitive decline.

DISCUSSION

First, several of the studies reviewed agree on the importance of early prevention through interventions such as physical exercise, a proper diet, and management of oxidative stress.[8,13] These approaches are key to delaying the onset of the disease or mitigating its symptoms, consistent with the existing literature that highlights the need for a comprehensive, preventive approach.[4,15]

However, some studies point to limitations in the effectiveness of interventions, especially in patient adherence to exercise and diet programs. Research by García-Moreno et al.[7] highlights the difficulty of maintaining patients' commitment to long-term physical exercise programs, which may explain the variability in results. In addition, some authors, such as Bravo Loor et al.[5], indicate that although mobile applications for the management of preventive therapies have shown positive results, it is still necessary to improve their accessibility and adaptability to ensure their effectiveness.

In terms of nutrition, several studies have identified the relationship between specific dietary patterns and the prevention of Alzheimer's disease. The findings of Rodríguez et al.[11] on nutritional factors and their impact on the disease are consistent with the results of other studies, such as that of Coca García et al.[9], which reinforce the idea that a balanced diet rich in antioxidants may be a protective factor. However, some studies, such as that by Casado et al.[17], indicate a lack of consensus on which diet is most effective, underscoring the need for more targeted research in this field.

One aspect that has become clear throughout the studies reviewed is that, despite advances in the prevention and treatment of Alzheimer's, there are still significant challenges in the implementation and accessibility of interventions. The studies by Sánchez García et al.[10] and Pérez et al.[14] highlight that the lack of resources in specific sectors and the resistance of some patients to conventional treatments limit the positive impact of interventions. This is a limitation that should be taken into account in future research, which should focus efforts on improving access to preventive and treatment services, as well as health education for patients and caregivers.

Finally, the results obtained in this review highlight the importance of a multidisciplinary approach to the treatment of Alzheimer's disease. Advances in technology, such as the mobile applications mentioned in several studies,[2,5] should be leveraged to complement traditional approaches to treatment and prevention. This integrative approach is key to the proper management of the disease, and its successful implementation depends on collaboration among professionals from various fields, including physicians and technology specialists.

In conclusion, although there have been significant advances in the treatment and prevention of Alzheimer's disease, it is still necessary to continue research and improve current interventions. The studies reviewed offer valuable information that can guide future research, especially regarding the effectiveness of long-term interventions and the personalization of treatments. In addition, work must continue to overcome economic, social, and technological barriers that limit access to and adherence to preventive and therapeutic strategies.

FUNDING

The authors did not receive funding for the implementation of this study.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTION

Conceptualization: Lucas Reis Simões Neri, Patrícia Susana Salgueiro.

Research: Lucas Reis Simões Neri, Patrícia Susana Salgueiro.

Writing - initial review: Lucas Reis Simões Neri, Patrícia Susana Salgueiro.

Writing - proofreading and editing: Lucas Reis Simões Neri, Patrícia Susana Salgueiro.

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