# LANGUAGE IN ELDERLY PEOPLE WITH ALZHEIMER'S DISEASE: A SYSTEMATIC REVIEW

## Linguagem em Idosos com Doença de Alzheimer: uma Revisão Sistemática

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**ABSTRACT**

With increasing life expectancy, the dementias are affecting the population with Alzheimer's disease. It is defined by a gradual disappearance of memory and other cognitive functions, including the language. Human language is important to establish interpersonal connections and social inclusion of the individual. The aimed is to conduct a systematic review regarding scientific studies on the association between Alzheimer's disease and the language. The articles were researched in three databases: SciELO, Lilacs and BIREME, being used as main descriptors: Alzheimer's Disease Language and Communication in the period October-December 2013. The final sample was formed by 07 articles and included articles that characterized the language in Alzheimer's Disease at different stages. Through the results of this study, it was possible to check  changes in the language at all stages of the disease and the importance of early identification of such changes. This identification can provide time for patients and their families to program and to organize their future, seek assistance services to the patient, trying thus aid in the communication process and the  individual's quality of life. These findings point to the importance of knowledge of the major changes made by individuals with Alzheimer's disease, whether of language, cognitive or behavioral. It is essential to develop studies that address the relationship between tests used to identify the main language disorders in individuals with Alzheimer's Disease.

**KEYWORDS:** Alzheimer's Disease; Communication; Language

## ■ INTRODUCTION

According to the Brazilian Institute of Geography and Statistics (IBGE), the population is experiencing an increase in age. In 2000, the Brazilian population over 65 years old was only 5%; it is assumed that in 2050 it will be 18%. In addition, it is estimated that, by 2050, life expectancy will be of 81.3 years old[1]. Thus, with increasing life expectancy, concern with this population quality of life is necessary.

Neurodegenerative diseases, such as dementia, define a large portion of this population. Dementia prevalence in the general population reaches 1%, reaching 20% among the elderly population. It is assumed that dementia incidence doubles every five years after 60 years of age[2].

Dementias are defined by at least two cognitive deficits, such as memory coupled to at least one other impairment of daily living activities. In addition to affect the memory function, dementia must demonstrate the production of another cognitive disorder, such as aphasia (language functions decrease), apraxia (loss in the ability to perform motor activities), agnosia (difficulty to recognize or identify objects) or executive function change (the ability to think abstractly and schedule, start, sequence, follow and stop a complex behavior)[3].

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Alzheimer's Disease (AD) is a neurodegenerative disease that is the most frequent dementia form in the elderly, with prevalence and incidence of 50 to 75% of cases[4,5]. Intellectual abilities progressive deterioration and cognitive decrease are observed in this disease. Most cases begin after 65 years of age (late onset), but may affect younger individuals (AD early onset). Both age and poor education are the most significant risk factors for late beginning[6].

The first perceived disease symptom is often the memory decline, especially for recent events (episodic memory), and spatial disorientation, which are cognitive aspects mostly subjected to hippocampal formation. Language changes (especially anomie), planning (executive functions) and visuospatial skill disorders appear with the disease evolution[7].

Language damage observed in AD follow the disease stages, which can progress at variable speeds. Early stages can be marked by anomie presence (trouble finding words and naming objects), word substitutions, tendency to use more general terms, such as hypernyms ("animal" for "dog"). In spontaneous language, pleonasm use is found, increasing deictic and periphrase use[8].

In intermediate stages, the patient shows decline in the ability to understand messages that require abstract thinking. Reasoning becomes more concrete, and remote memory damage starts. In advanced stages of the disease, there are comprehension (aphasia), writing (dysorthographies, agraphia) and reading (alexia) difficulties, with complete silence scenarios linked to several modifications, such as apraxia and agnosia[9].

This study aims to conduct a systematic review regarding scientific papers published on the association between Alzheimer's disease, language and communication.

### ■ METHODS

The used method was of literature systematic review, as it deals with collection of primary data published in scientific literature. Initially, article search was conducted through descriptors in Health Sciences: Language, Communication and Alzheimer's disease. The following bibliographic databases were used: SciELO, Lilacs and Bireme virtual library, during the reference period from October to December 2013.

Used descriptor combinations were: Linguagem AND Doença de Alzheimer (Portuguese)/Language AND Alzheimer Disease; Comunicação AND Doença de Alzheimer (Portuguese)/Communication AND Alzheimer's Disease.

Studies that met the following criteria were included: articles that addressed the association between language and Alzheimer's disease, comprising individuals aged 46 years old or more and literature review articles; Doctoral dissertation; expressive language changes; Portuguese and English articles that addressed one of the selected keywords and that were performed in the last ten years.

Studies with one or more of the following characteristics were deleted: articles and dissertations that do not meet the selected inclusion criteria; studies repeated in different databases and those that were not available in its entirety.
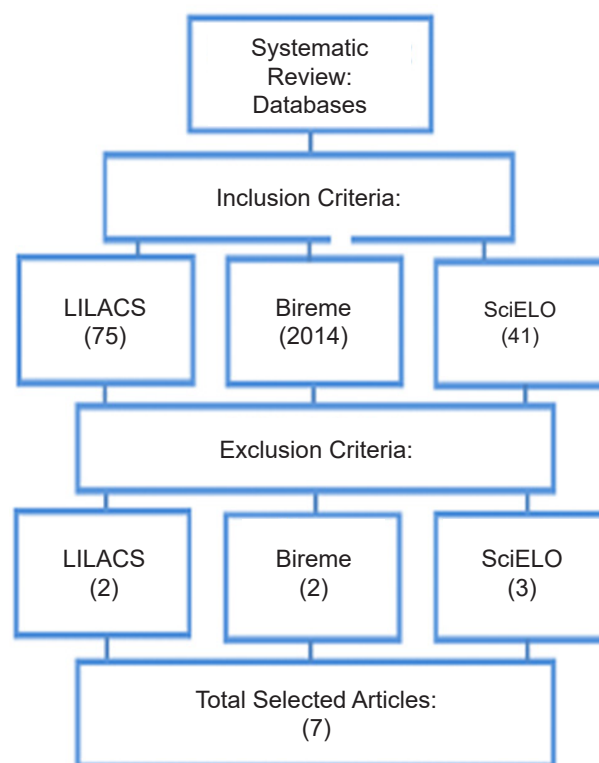


**Figure 1 – Criteria flowchart for inclusion and exclusion of articles used in the systematic review**

### ■ LITERATURE REVIEW

Of the seven articles included in the survey, all were carried out in Brazil and included elderly men and women. Analyzed variables were: location, disease stage, sample and objective, methods and main found language impairments, as shown in Table 1.

Regarding the publication year, studies were concentrated between 2005 and 2012. Selected

**Table 1 – Description of the 14 selected research articles**

| Study | Location | Disease Stage | Sample (N) | Aim | Assessment Methods | Language Disorders |
|---|---|---|---|---|---|---|
| Ortiz & Bertolucci; (2005) | São Paulo | Inicial Stage | 12 with AD | Check **language disorders** in patients with AD | Boston Test | Statistically significant differences were found in listening and naming tasks. |
| Paula, et al; (2012) | Minas Gerais | Inicial Stage | 80 with AD and 80 GC | Identify the ability of the Token Test in AD evaluation. | Token Test | Not Found |
| Carvalho; (2006) | São Paulo | Initial and moderate | 32 elderly people com light AD, 25 with moderate AD and 51 GC. | Validate Functional Assessment scale of Communication Skills - ASHA FACS for Brazilian population use. | ASHA FACS. | Not Found |
| Azevedo, et al; (2009) | São Paulo | Moderate Stage | 27 with AD | Assess cognitive changes in AD patients according to their level of education | Verbal and Non-Verbal Apraxia Assessment. | Subjects with higher levels of education showed better performance in the Boston Naming subtest |
| Cera, et al; (2011) | São Paulo | All Stages | 90 with AD and 30 in each stage | Identify praxic demonstrations in Azheimer individuals. | CERAD | There were no demonstrations in the early and moderate stage. |
| Alegria; (2012) | São Paulo | No Description | 23 with AD and 23 GC | Analyze lexical items in the oral speech of patients with Alzheimer's disease | Stablex | Among lexical items, it was more difficult to name nouns. |
| Cecato, et al ; (2010) | São Paulo | No Description | 10 with AD and 10 GC | Evaluate the phrase repeat in two cognitive tests | MMSE and MOCA(behavior) | The Moca test showed to be more efficient in evaluating echoic verbal behavior in language identification of patients with AD. |

Legend: AD: Alzheimer's disease; GC: control group; Clinical Dementia Rating (CDR), Mini Mental State Examination (MMSE), Daily Living Instrumental Activities Assessment (Lawton index), Montreal Cognitive Assessment (MOCA) and Consortium to Establish a Registry for Alzheimer's Disease (CERAD).

studies sample amount ranged from 12-160 elderly with Alzheimer's disease.

All papers were made in Brazil, with the largest number from the state of São Paulo, and only one made in Minas Gerais.

Regarding Alzheimer's disease stages, it is clear that the initial stage was the most prevalent in the analyzed articles. Only two articles have not described at which disease stage Alzheimer individuals were.

Among used methods in the studies, the following were found: Clinical Dementia Rating (CDR) scale, Mini Mental State Examination (MMSE), Daily Living Instrumental Activities Assessment (Lawton index), Montreal Cognitive Assessment (MOCA), Consortium to Establish a Registry for Alzheimer's Disease (CERAD).

Among the main language changes, differences in listening and denomination tasks were observed. It was found that subjects with higher education levels performed better on cognitive assessments. Many articles showed no language problems.

Results shown in this review revealed that losses are not only related to memory in Alzheimer's disease. They are also observed in early disease stages. AD language loss follows the disease stages, developing with variable speed. Since the early to advanced stages, AD patients showed changes related to language[10].

When considering the established period for this review, it was noted that the number of studies related to language disorders in individuals with Alzheimer's disease is still scarce. A study by Mansur[8], with the purpose of reviewing the recent Brazilian literature about language in Alzheimer's disease, concluded that studies involving the language in Alzheimer's disease are still scarce. The same author also notes that more research in the area will result in diagnosis improvement, minimizing deficits for secondary patients to this progressive disease.

All articles that make up this review were conducted in Brazil, from 2005 to 2012 (Table 1), and had similar goals, such as: analyzing and identifying possible language disorders in individuals

with Alzheimer type dementia. With respect to Alzheimer's disease stages, three articles have addressed the initial stage, [10-12] two articles the moderate stage[12,13], one article addressed all stages [14] and two reported no stage[15,16].

In the first stage (Table 1), memory impairment, episodic subsystem deficits prevalence and semantic and language memory impairment were observed. One study that examined this disease stage was the one of Ortiz and Bertolluci[10], who had the objective of verifying language disorders presence in patients with early stage DA. 12 patients diagnosed with probable DA were assessed using the Boston test, and results were compared with population without AD. A similar research has been developed by Paula et al.[11], who investigated Token Test applicability for Alzheimer's disease diagnosis in its early stage. The Boston test proved suitable to identify the disease at this stage.

The study by Azevedo et al.[13] sought to analyze cognitive changes (memory and language) in patients with Alzheimer's disease in the moderate stage, verifying if the following variables: gender, age and education interfere in these skills. This stage is characterized by showing cognitive functions, such as praxis, gnosis, executive functions and problem solving capacity loss, among others.

Finally, in the third disease stage, there were difficulties in understanding (aphasia), writing (dysorthographies, agraphia) and reading (Alexia), with full mutism scenario linked to several modifications, such as apraxia and agnosia[9]. Changes such as apraxia are justified at this stage by disease evolution, because more brain areas are affected, leading to verbal praxic demonstrations worsening. These data corroborate with the study of Cera et al.[14], which sought to identify praxic manifestations of 90 patients with Alzheimer's disease, 30 at each disease stage, with similarity between their occurrences being verified.

In relation to the used tests to assess the language (Table 1), the Boston test, proposed by Kaplan, Goodglass and Weintraub[17], is a quantitative and qualitative capacity language test applied through naming capacity. The study of Ortiz and Bertolucci[10], through the Boston test, identified well defined language changes at a very early stage of AD. They also observed statistically significant differences in listening and naming tasks. Another study that took the Boston naming test into account was the one by Azevedo et al.[13], which comprises the Consortium to Establish a Registry for Alzheimer's Disease (CERAD) multifunctional Battery. With this test, it was observed that subjects with higher education levels performed better in the language test related to the Boston Naming subtest.

The study by Paula et al.[11] investigated the Token Test (TT) psychometric properties, which is a verbal comprehension test, and its applicability in the diagnosis of Alzheimer's disease (AD) at an early stage. The test shows good consistency related to understanding and attention. It was found that TT is suitable for language impairment characterization in AD. This research result showed no language change, and the test is insufficient for dementia detection and diagnosis. The study of Carvalho[12] also showed no language change, but found that the Asha Facs is a basic instrument for communication skills assessment in the individual natural environment, being valid and reliable to verify communication alterations in AD patients, doing a better diagnosis to the patient, family and caregivers.

Another study[15] assessed the echoic behavior using the Sentence Repeat test from cognitive instruments, such as the Mini Mental State Examination (MMSE) and the Montreal Cognitive Assessment (MOCA). Cognition was assessed through phrase repetition. The purpose of these tests in the present study was to assess the echoic verbal behavior. The MOCA test proved more effective in evaluating echoic verbal behavior in AD patients when compared to MMSE. MMSE simple phrases repetition proved to be less sensitive to detect slight language decline in AD patients.

With regard to the most common language found in the researched articles (Table 1), verbal apraxia was found, which is a disorder that causes loss of the ability to program speech muscles positioning and sequence movements during phonemes voluntary production. Studies such as the one by Cera et al. [14] used verbal tasks from the verbal and non-verbal apraxia assessment protocol. This protocol verbal apraxia assessment includes sentences repetition, automatism emission, spontaneous speech and reading aloud tasks. It was observed that rehearsal, repetition and addition proportions were similar in the light phase, as well as omission, substitution and self-correction. In the moderate phase, rehearsal and repetition, substitution, omission, addition and self-correction were similar. In the severe stage, all manifestations were similar, except addition. It was observed that there were no apraxia signs in the initial and moderate stages.

A Study by Alegria[16], "Analysis of lexical items of oral speech of the patient with Alzheimer's disease", sought to examine these items in oral speech of patients with Alzheimer's disease, in order to verify the most preserved words. The aim was to prepare adequate language strategies, allowing discursive mechanisms development, in order to identify strategies to improve the interaction between caregivers

and patients. This study evaluated the verbs, nouns, hapax and eight other grammatical categories of the Portuguese language. This study results showed that patients with the disease have greater difficulty in naming nouns, especially living beings. Therefore, lexical items analysis in oral speech of patients with Alzheimer's disease not only contributed to language deficits understanding, but also offered ways to improve communication between patients and caregivers. Discursive characteristics of participants with AD correlate with their cognitive abilities. Thus, speech production (and understanding) remains as an important field to increase knowledge about language dissolution in Alzheimer's disease. It is a potential instrument of functional screening and therapeutic technique tools, improving people's lives. Such data can contribute to broaden and deepen early detection methods, assessment and

intervention of discursive disorders in people with DA[18,19].

The discussed literature provided important data on the language of people with AD. It is noticed that studies in the area have contributed in an increasing way for the development of clinical applications in the field of assessment and intervention of language of these patients.

## ■ CONCLUSION

Language abnormalities observed in individuals with dementia affect the communication activity, mainly causing isolation and increased risk of premature institutionalization. For this reason, the completion and publication of a greater number of studies aimed at obtaining more knowledge to base the clinical practice is relevant, in order to provide a better quality of life for these patients.

**RESUMO**

Com o aumento da expectativa de vida, as demências vêm acometendo a população, sendo a doença de Alzheimer a mais comum. Essa se define por um desaparecimento gradativo de memória e de outras funções cognitivas, entre elas, a linguagem. A linguagem humana é importante para estabelecer as ligações interpessoais e promover a inclusão social do indivíduo. O presente artigo teve por objetivo realizar uma revisão sistemática a respeito de trabalhos científicos sobre a associação entre a Doença de Alzheimer e a Linguagem. Os artigos foram pesquisados em três bases de dados: Scielo, Lilacs e Bireme, sendo utilizados como principais descritores de busca bibliográfica: Doença de Alzheimer, Linguagem e Comunicação, no período de outubro a dezembro de 2013. A amostra final formou-se por 07 artigos, sendo incluídos aqueles que caracterizavam a linguagem na Doença Alzheimer em seus diferentes estágios. Através dos resultados desse estudo, foi possível verificar a existência de alterações da linguagem em todos os estágios da Doença e a importância da identificação precoce de tais alterações. Essa identificação pode proporcionar tempo ao paciente e seus familiares de programarem e organizarem seu futuro, buscando serviços de assistência ao paciente, bem como auxílio no processo de comunicação do indivíduo e na qualidade de vida. Esses achados apontam para a importância do conhecimento das principais alterações apresentadas pelos indivíduos com a doença de Alzheimer, sejam elas de linguagem, cognitivas ou de comportamento. É fundamental o desenvolvimento de estudos que contemplem a relação entre testes utilizados para identificarem as principais alterações de linguagem em indivíduos com Doença de Alzheimer.

**DESCRITORES:** Doença de Alzheimer; Comunicação; Linguagem

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