

PSYCHOLOGICAL IMPACTS OF ALZHEIMER'S DISEASE AND POSSIBILITIES FOR REHABILITATION

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Abstract: The impacts resulting from Alzheimer's Disease characterize the loss of progressive cognitive functions, memory, language and learning failures, which, over time, tend to worsen as the disease progresses. Rehabilitation possibilities seek to improve the worsening of the disease, seeking an approach that integrates knowledge in the period (2010 - 2020), in medicine, neurology and psychology. Objective: to carry out a literature review on the impacts and possibilities of rehabilitation of Alzheimer's disease. Method: searches were performed from April to September 2021, in the following databases: SciELO and PepsiCo, observing the publication date and whether the text was in accordance with the search theme. Results: Ten articles were found that highlighted the impacts and possibilities of rehabilitation of Alzheimer's disease, in which it was evident how important it is still to research the subject.

Keywords: Alzheimer's Disease. Rehabilitation. Neurology.

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INTRODUCTION

The increase in the population, proportionally elderly, is a worldwide phenomenon, as are many diseases in this age group, Alzheimer's disease (AD) is one of the most feared as age advances. This strong threat affects millions of people around the world and moves many resources related to the market and research in the area. Many individuals remain invisible or desensitized to the diagnosis and treatments available for the disease. AD causes sick people and their families to experience the most fearful pains: the loss of oneself, the forgetfulness of one's loves, isolation and loneliness. Thus, by understanding the psychological impacts of Alzheimer's disease, we will be able to think about possibilities for rehabilitation.

This study sought to review the knowledge and research carried out in the last decade in order to alleviate the pain and ignorance that involve the many aspects of AD. With a specific search from the Psychological perspective to better understand how the pathology impacts our way of living and not just permeates aging. This review contains information based on recent scientific evidence about AD and its complexity so that new knowledge can be disseminated in a famous way, where we have possibilities far beyond a diagnosis and more effective solutions in the prevention or even reversal of the disease.

ALZHEIMER'S DISEASE

The researcher who had his name assigned to name the disease was born in Bavaria, Germany, in 1864. Aloisius Alzheimer became financially independent through marriage, dedicated himself to clinical-neuropathological research (GOEDERT; GHETTII, 2007). In 1907, Alzheimer published a case of presenile dementia from both a clinical and anatomopathological point of view (ALZHEIMER, 1907), thus recognizing the originality of his discovery (CAIXETA, 2012).

Stella (2016) conceptualizes persistent and progressive memory dysfunctions as dementia,



characterized by the decline in intellectual capacity, severe enough to interfere with social and professional activities of daily living, and may represent a clinical condition of a neurodegenerative nature, depending on the disorder and state of consciousness or wakefulness, which can be caused by the impairment of the central nervous system (BOTTINO, 2018). The term dementia comes from the Latin, dementia (de+mentia), which means “absence of mind”. In the twentieth century, this concept was modified by researchers, as what had been inherited from the eighteenth century associated the term with an irreversible and terminal state.

AD is a progressive neurodegenerative disease, being the most prevalent dementia in population-based clinical studies, with prevalence and incidence of 50 to 75% of cases (HERRERA et al., 2002; NITRINI et al., 2004). Clinical manifestation that includes progressive deterioration of intellectual abilities and cognitive decline. Most cases begin after 65 years of age (late), however, in some younger individuals (early) at 25 years of age. Age and low education are important risk factors for late onset. (HESTAD; KVEBERG; ENGEDAL, 2005).

Other risk factors for late onset are the presence of the e4 allele of the apolipoprotein E gene, history of head trauma with loss of consciousness, lack of control of cardio-vascular risk factors (hypertension, diabetes mellitus, dyslipidemia), sedentary lifestyle, and low cognitive demand throughout life (AMERICAN PSYCHIATRIC ASSOCIATION, 1995). Early-onset AD is usually associated with genetic mutations, and is most commonly described and related to the gene responsible for the amyloid precursor protein (app) on chromosome 21.

Regardless of the age of onset, neuropathological findings in AD patients are very similar: presence of neuritic (senile) plaques and neurofibrillary tangles, along with neuronal loss, dystrophic neurites, and amyloid-beta on histological examination. AD involves, among several processes, the progressive decline of cholinergic neurotransmission in some specific regions, such as the hippocampus and cerebral cortex. As the dysfunction progresses, cholinergic dysfunction leads to reduced ability to perform activities of daily living, impairments in attention, memory, and the appearance of mood and behavior changes. (MAIA, 2012).



The pathophysiology of Alzheimer's disease is currently based on the amyloid cascade hypothesis. Increasingly established evidence points to the accumulation of beta-amyloid peptides and, consequently, the formation of toxic amyloid plaque as the main characteristic in the pathogenesis of AD. In earlier stages, amyloid plaques destroy cholinergic neurons in the basal forebrain, causing memory disturbances and providing the basis for symptomatic treatment that boosts acetylcholine. It can be said that the deposit of B-amyloid material ends up destroying the brain diffusely. Therefore, one of the basic mechanisms related to the development of AD refers to a problem of excessive formation of B-amyloid or insufficient removal of it. Patients predestined to develop AD have abnormalities in genes that encode amyloid precursor protein (PPA) or in the enzymes that cleave this protein into smaller peptides, which through the release of toxic amino acids and their deposits, neurons are directly injured. (HERRERA et al., 2002).

Support for the amyloid cascade hypothesis comes from genetic studies of the rare autosomal dominant hereditary forms of AD. Cases linked to the early onset of the disease and mutation in at least three chromosomes: 21, 14 and 1. The relationship occurs in Down syndrome (trisomy 21) in which practically all individuals, after 50 years of age, have AD (TANZI and BERTMAN 2005).

Another part of the amyloid cascade hypothesis refers to the possibility that there is something wrong with the protein that binds to amyloid to remove it, called Apo-E. Their connection prevents the development of AD. However, a genetic abnormality in its formation makes Apo-E ineffective in efficiently removing B-amyloid and it starts to accumulate and damage neurons (ANDRADE, 2012).

Annunciato (2018) describes that in the year 2000, the number of people with AD in the United States was 4.5 million. The percentage of individuals with AD doubled approximately every 5 years, in age 60 years and older, representing 1% at 60 years of age and around 30% at 85 years of age. Without advances in treatment, the number of symptomatic cases in the US is expected to increase to 123.2 million in 2050, with a high cost for patient care being estimated.

The identification of risk factors and the disease in its initial stage corroborate the agile and adequate referral and specialized care; something essential for a better therapeutic result and



prognosis of the cases. So the question arises, why diagnose an incurable disease early? By doing so, we increase the opportunity to anticipate the news of devastating illness for the family. There is, however, already a reasonable body of scientific evidence. DICKERSON et al., (2007) indicating that the early diagnosis of AD creates the opportunity for faster initiation of treatment, in addition to allowing the family and the patient to plan over time the best way to deal with the pathology and seek health resources without despair. CAIXETA (2006).

The use of clinical (neuropsychological) evaluation for early diagnosis is fundamental, since the patient effectively presents characteristics that signal a morbid process. To be able to map the disease, it is necessary to focus on insights and better understand the complex phenomenon of passage from the condition of normality to dysfunction, such a diagnosis brings together the complexity of the following areas: neuropsychology, internal medicine, psychopathology, imaging, genetics, in addition to multiple other variables that need to be properly gathered and systematized by the doctor. (CAIXETA, 2012).

When one understands and studies the higher nervous activities, it is necessary to have the necessary notion to be able to qualify the disorder and not simply verify it. Only a careful and well-done evaluation will lead to a neuropsychological understanding and analysis. The factors resulting from this qualitative examination contribute to improve the path of indication regarding reeducation in the patient's process. (CAIXETA, 2012).

THE PSYCHOLOGICAL IMPACTS OF ALZHEIMER'S DISEASE

When we think about presenting the impact of the psychological domains that AD alters on patients, we start with communication difficulties and neuro-psycholinguistic assessment to promote a better quality of life for patients, caregivers and family members. The verbal or non-verbal way that human beings communicate is the passport to their interpersonal relationships and the individual's social insertion in the world in which they live. How can we understand the complex and dynamic



model of symbols which is used so that communication and thought can be emitted and understood independently and effectively, whatever their mode of presentation. (ASHA, 1990). And the definition that involves the whole of communication is not just an isolated process, but involves intelligibility of speech and comprehension, reading, among others. CAIXETA, 2006).

In this sense, the focus becomes the efficiency and independence of communication as an appropriate response to the demands of everyday life (FRATALLI et al., 1995). The various mental processes that involve the use of language include the use of linguistic information, the formation of non-linguistic conceptual and perceptual systems. (ORTIZ; BERTOLUCCI, 2005).

Language impairment in AD accompanies the stages of the disease, which can progress with variable speed. During the neurolinguistic assessment, the mnemonic deficits are clearly observed by the rapid forgetting of verbal requests, stories and pictures (ORTIZ; BERTOLUCCI, 2005). Patients usually remember past facts, and some confuse current events with those already experienced. (KENSINGER; KRENDL; CORKIN, 2005).

The early stages of the disease are characterized by the presence of anomies (difficulty in finding words and naming objects), word substitution, and a tendency to use general terms, as in the case of hypernyms (“animal” for “dog”) and emission of semantic paraphasias, when there is a change for a similar semantic category (“pipe” for “cigarette”). The use of pleonasm is observed in spontaneous language. At this stage, the epilinguistic function is still preserved, with frequent correction and recognition of one’s own errors. (KOCH; TRAVAGLIA, 1990).

The language is elliptical, with the presence of circumlocutions, that is, the use of empty, generalized expressions, such as: “catch that business”. Vocabulary becomes impoverished and there is a reduction in verbal fluency (MANSUR et al., 2005). The deficit in episodic memory is usually expressed by forgetting people’s names, places where objects were kept, and the presence of repetitions (questions, statements) in conversation.

Discursive incoherence, when already manifest, shows the impairment of episodic memory and executive functions. Verbal and visuospatial memory alterations are expressed by forgetting



messages and by the frequency with which the patient can get lost in places he already knows. (IZQUIERDO, 2002).

Chart 1 shows how the synthesis of language alterations occurs in Alzheimer’s disease.

Chart 1 - Synthesis of Language Disorders in Alzheimer’s Disease

SIGNS	EARLY STAGE	INTERMEDIATE STAGE	A D V A N C E D STAGE
Memory difficulties	x	Xx	Xxx
Presence of anomie and production of paraphasias and neologisms	x	Xx	Xxx
Presence of pragmatic changes	x	Xx	Xxx
Syntactic changes		x	Xx
Disregard for conversational laws (pragmatic in nature)		x	Xx
Conversation reduction			x
Presence of echolalia			x
Auditory impairment for oral language			x

Source: Beilke and Pinho (2010)

With the characterization and understanding of how changes are occurring in the patient, we can proceed to a better investigation of the cognitive and linguistic functions that lead to neurolinguistic assessment to understand the importance of these roles played in the process of language comprehension and production. (CAIXETA, 2012).

Memory loss is a symptom that permeates all stages of the disease, but it is a way to understand when it may be something more serious. Just as a subject is someone independent and unexpectedly becomes dependent, because he has a devastating emotional illness. By losing memories and memory, the individual is left without the subjective identity. (ANNUNCIATO, 2018).



DEFICITS ASSOCIATED WITH ALZHEIMER'S DISEASE

Below, some of the signs that AD can relate according to the stage and advancement of the pathology will be presented.

Caution

Considering several criteria, attention is the function or operationalization that can be classified as: selective, divided, sustained or alternate. (CAIXETA, 2006). Alternating attention is defined as the ability to switch attentional focus from one stimulus to another during the execution of a task, as distinct from divided attention, because in the latter the intentional focus is maintained on more than one stimulus simultaneously. (SISTO et al., 2006).

Focused attention refers to the ability to select a stimulus from several, while sustained attention refers to the ability of the individual to keep their attention on a stimulus or a sequence of stimuli for the time necessary to perform a task. (REUDA, SISTO, 2009).

In the evolution of AD, attentional deficits appear relatively early. Usually, after the onset of episodic memory deficits, but in general, before the manifestations of language and visual-spatial alterations. In AD patients, the level of sustained attention is relatively preserved, but the use of time in the execution of the task tends to affect the quality of performance, especially in the more advanced phases of the moderate stage and with discrimination tasks, which suggests changes in surveillance. (CAIXETA, 2012).

Memory

Memory impairment is the clinical event of greatest magnitude for the diagnosis of AD (DICKERSON; EICHENBAUM, 2012). Generally, in the early stages, there is impaired episodic



memory and difficulties in acquiring new information, with impaired learning (probably justifiable, because the hippocampal pathology in AD is earlier, selective, and universal), evolving gradually with impairments in other cognitive functions. (GALLUCI NETO; TAMELINI; FORLENZA, 2005).

Patients with AD have difficulties in acquiring and consolidating information due to coding failures and, consequently, information is not transferred from short-term memory to long-term memory (“amnesia”). Impairments in retention, exemplified by classical amnesia, are characterized by difficulties in retrieval and recognition tasks. (CAIXETA, 2012)

Because there is a fundamental inability to “download” information, the patient benefits little from closed-ended questions and multiple-choice alternatives to open-ended questions. There is a loss of information, for example, of a short report, from an immediate recovery to a later recovery. (DICKERSON; EICHENBAUM, 2010).

Language

Limitations involving language occur due to a primary rupture in the structural elements of language-phonology, syntax, and semantics or as a consequence of non-linguistic factors, such as short-term memory, motivation, prosody, strategic functioning, pragmatism, and social perception. (JAKUBOVICZ; MEINBERG, 1992). The presence of grammatical errors or paraphasias of the phonemic type, and of the semantic type, thus arising an aphasia associated with cortical dysfunctions, affecting the classical areas of language.

When the standard tests of repetition of naming and linguistic comprehension are performed, patients obtain poor results. A semantic disparity in which the patient has great difficulty both naming and understanding the meaning of individual words, despite grammatically fluent speech, demonstrates an association with circumscribed lesions, involving the temporal, inferior, and middle gyri. (BAYLES, 1982).

The frontal lobe with dysfunction is associated with reduced speech production, leading the



patient to progressively speak less and in order to answer questions in a brief format. Poor results in linguistic tasks may occur due to the hurried way of responding, demonstrating a random nature of errors and absence of positive evidence or grammatical disturbances. (SOUZA et al., 2008).

Subcortical lesions cause problems in word retrieval, and patients perform poorly on naming tasks. Naming performance in a closed task is often superior to performance in open-ended tasks, involving information generation, such as verbal influence. Patients have no difficulty in understanding the meaning of individual words, but in naming them, as they make mistakes in comprehension, due to the need to apply mental effort and mental manipulation of information. (COSTELLO; WARRINGTON, 1989).

Perception

Problems in perception occur at the level of sensory discrimination, the acquisition of a structured perception (perceptual agnosia) or attribution of meaning. The regions involved are the occipital, parietal and temporal cortex respectively. (EFRON, 1968). Even with preserved visual acuity, patients may present sensory discrimination disorders, causing impairment in the detection of elementary forms and in combination tests. Perceptual disturbances as well as object recognition are altered secondarily, as many elementary tasks of sensory discrimination are performed normally, however, the patient has difficulty in recognizing objects, especially when they are superimposed on others, when the project is unfinished or presented with an unusual orientation. (DE RENZI; SCOTTI; SPINNLER, 1969).

The patient has difficulty copying drawing lines, although in associative agnosia he can discriminate between similar perceptual stimuli, find identities and copy drawings of objects that he does not recognize, indicating that the problem of recognition lies in the attribution of meaning, normal perception. Object recognition failure, however, may not be total. The patient may be successful in classifying figures, but may fail to identify more accurately. (DE RENZI; SCOTTI; SPINNLER,



1969).

Spatial Orientation

The parietal lobes cause spatial orientation to occur, including the ability to locate and appreciate the spatial relationships between objects. Visuospatial disturbances manifest themselves in tasks such as linear orientation, point counting, spatial location combination, and cubic estimation. When designing and performing block construction tasks, there is a loss of spatial configuration as a whole and disorder between the elements (visual-constructive disturbance). The subject cannot indicate, in a group of objects, the one that is farthest or closest, that is more to the right or to the left, longer or shorter.

Often, spatial orientation may be compromised for reasons that are not primarily spatial, but may be due to poor strategic and organizational skills associated with frontal lobe dysfunction. Thus, inadequate performance is observed, resulting from organizational difficulties instead of spatial ones, which have different characteristics. (HEILMAN VALENSTEIN, 1979).

Motor Apraxias

It is the memory of the motor act. Failures in motor commands occur in patients who are physically well (without motor deficits or alterations in comprehension), may occur as a result of a primary apraxia associated with damage to the parietal and/or frontal, premotor, or upper regions. At the same time, in a secondary way, there is a spatial disorder related to parietal lobe dysfunction or difficulty in temporal sequencing associated with lesions of the frontal lobe and subcortical regions. Apraxic patients have difficulty conceptualizing the appropriate action (conceptual apraxia), in others, the problem lies in converting the idea into action (ideomotor apraxia). Some patients even have discernment and recognize the discrepancy between the intention and the response performed.



Asymmetric apraxia occurs when altered motor responses correspond to spatial dysfunction and are generally bilateral and symmetrical (HEILMAN VALENSTEIN, 1979). It can also be distinguished from spatial dysfunction due to the preservation of performance in spatial tasks, in which motor responses are minimized or eliminated, such as left and right orientation or point counting. (WALDEMAR et al., 2007).

Patients with chronological sequential difficulties secondary to frontal lobe dysfunction are able to mimic hand postures correctly, but unable to reproduce them in sequence. There may be preservation of responses from one motor sequence to the next. (LÚRIA, 1966).

Front Executive Functions

Several tasks that involve planning, organization, sequencing, abstraction, decision-making, critical judgment, and strategy skills in activities aimed at an end goal are sensitive to frontal lobe damage and to those subcortical structures that project from these regions. Such changes help to distinguish the performance and characteristics of these functions. Mismatch in word generation and verbal fluency tasks demonstrate disproportionality in the naming pattern of things.

If the frontal lobe dysfunction is primary, it will lead to concrete answers, denoting the inability to abstract concepts. Disability is also observed when there is a change in the mental setting. Poor performance that occurs for non-frontal reasons often does not last, and patients may oscillate from one task to another.

DIAGNOSIS OF ALZHEIMER'S DISEASE

According to the DSM-5 (2013), the diagnosis of AD begins with the finding of neurocognitive disorder (CNT), from then on the central characteristics of major or mild CNT, due to Alzheimer's disease, include insidious onset and gradual progression of symptoms. The characteristic presentation



is amnesiac, but there are also uncommon non-amnesic presentations, especially visual, spatial, and aphasic ones.

In the mild phase of TNC, Alzheimer's disease usually manifests itself with impairment in memory and learning, sometimes accompanied by impairments in executive functions, such as planning and organization. When CNT is moderate to severe, visual-constructive/perceptual motor skills and language are usually also impaired; Social cognition tends to be preserved until later in the course of the disease.

The diagnosis of mild or major neurocognitive disorder due to AD can be divided into possible and probable, considering cases in which there is a family history or genetic test suggestive of the presence of the disease; while cases in which the symptomatology and natural history of the disease are compatible with Alzheimer's disease are possible, without a family history or genetic test suggestive of the disease.

Although biomarkers, such as the dosage of metabolites of tau protein (responsible for the development of neurofibrillary tangles) and amyloid B-peptide (responsible for the formation of amyloid plaques) are being studied, the diagnosis of confirmation can currently only be given through visualization of the nervous tissue, presenting the pathologies previously discussed, which rarely occurs in vivo, given the risks involved in a brain biopsy and the accuracy of the clinical diagnosis. (STAHL, 2014). Therefore, for the diagnosis to be as accurate as possible, a good anamnesis and a good clinical history are necessary. (KUMAR et al., 2016).

Treatment

In the treatment of AD, in addition to medications, non-pharmacological interventions are necessary, which are often as effective or more effective in managing behavioral and psychological symptoms. These interventions include cognitive/neuropsychological rehabilitation, occupational therapy, physiotherapy, psychotherapy, music therapy, among others. (CARVALHO et al., 2016).



Currently, the pharmacological treatment of AD has four drugs: donepezil, galantamine, rivastigmine and memantine. Donepezil, galantamine and rivastigmine are acetylcholinesterase inhibitors, that is, they act by inhibiting the enzyme that destroys acetylcholine, thus increasing the availability of this neurotransmitter. Memantine, in turn, is a non-competitive receptor antagonist, reducing the effects of excessive release of this neurotransmitter that occurs in AD (STAHL, 2014; STAHL, 2017).

These drugs act on the symptoms of the disease, but cannot prevent its progression. However, numerous clinical trials are being carried out, researching how to attack the disease in different ways, such as immunotherapy to reduce the deposition of B-amyloid and tau protein, or even to try to reverse the degeneration caused by the disease in the brain. (STAHL, 2014; KANDEL, 2014). In Brazil, these drugs can be obtained free of charge through the SUS High-Cost Medication Program. Medications are also used to treat symptoms of depression, anxiety, and psychotic symptoms.

POSSIBILITY OF REHABILITATION OF PEOPLE WITH ALZHEIMER'S

The ideal of eternal youth is not just an allegory of fantastic stories. It is, more than that, an ideal that continues to be pursued, even if disguised. With the development of industrial civilization, aging has become a great fear, as we currently live with the terror embedded in the idea of becoming old. In the age of information and technology, aging incorporates another meaning, the possibility of developing a disease that takes away what is most precious – memory, criticism, one's own self, loves. It is the disease of Alzheimer 's. (ANNUNCIATO, 2018).

A new lease of life has been given to a relatively new area in the field of AD studies and its prevention. Results from several observational studies published during the last decade suggest that some factors associated with the disease can be modified. But a little distant, but possible.

By adequately understanding the factors involved in the genesis of the pathological process, the probability of reaching knowledge regarding the prophylaxis of this disease process obviously



increases. A good investigation of the potential causes of AD is based on identifying, in a simple way, the association between certain factors or events (exposures) and dementia (ALMEIDA, 2006).

METHOD

This study proposes a review of the scientific literature, which presents as a method the search, selection, analysis and description of the scientific production of a given theme or area, in an integrated and critical way, as well as the presentation of gaps and possibilities for new research. (ALVES; ROSE; SILVA; SARDINHA, 2016). This type of study can be carried out in the form of categorization or in the form of critical analysis and the procedures adopted in this review were: (a) identification of the theme and the guiding question; (b) choice of descriptors to be used in the research; (c) establishment of inclusion and exclusion criteria; (c) categorization of studies; (d) evaluation of the research; (e) interpretation of the results; (f) synthesis of knowledge.

According to Fonseca (2002, p. 32), bibliographic research is done from the survey of theoretical references already analyzed, and published by written and electronic means, such as books, scientific articles, web site pages. Therefore, any scientific work must begin with a bibliographic search. This initial step allows the researcher to know what has already been studied on the subject. However, there are scientific researches that are based solely on bibliographic research, looking for published theoretical references with the objective of collecting information or previous knowledge about the problem to which the answer is sought. (FONSECA, 2002, p. 32).

In this research, a search was carried out in the electronic databases: Scientific Electronic Library Online - SciELO and Electronic Journals in Psychology - PePSIC with the keywords Alzheimer's, rehabilitation, as they cover more publications than other terms. These databases were chosen because they are electronic databases of Brazilian journals.

The inclusion criteria established for this study were: (a) indexed articles; (b) national publications; (c) published in the period from 2010 to 2020; (d) empirical studies. The exclusion criteria



were: (a) central theme that did not contemplate the objective of the research; (b) articles published in the period before 2010 and after 2020; (c) articles with double indexing and (d) theoretical studies or studies that focused on themes unrelated to Alzheimer's and Rehabilitation.

The two databases were consulted between April and September 2021, and 10 articles were located in the PePSIC database and 03 in the SciElo database.

Based on the inclusion and exclusion criteria of the articles initially located, 01 was excluded, which was outside the period established for the research (1 previous publication).

An increase in scientific production was observed in the last decade in Brazil, which justifies the present review. 02 articles that studied AD from the perspective of other areas, or did not deal with empirical research (theoretical, reviews and historical surveys) were also excluded, most of the research was empirical. By considering only the articles that used Alzheimer's and Rehabilitation, in empirical research, 10 articles were selected, which were analyzed according to the theme cited, their objectives and the samples used fit the requested criteria. Thus, there is a trend of increasing production, but with a certain irregularity.

DATA ANALYSIS

This work proposes to present AD and its psychological impacts, the possibilities of psychological rehabilitation as an individualized process, with unique and distinct potentialities, making a distinction between normal and pathological old age. Alzheimer's is a disease in which brain cells and their connections degenerate and die.

Memory loss is the most evident and well-known sign. However, the individual may also present mental confusion, emotional instability and regression in motor capacity. AD is the most common cause of dementia, accounting for 70% of all cases worldwide. Dementia can be characterized as a persistent state of cognitive deterioration, including memory loss, difficulty in communication and comprehension, decreased attention span; functional deterioration, including coordination and



visual perception problems; and emotional deterioration, including depressive symptoms, anxiety, delusions, hallucinations, and aggressiveness. (APOSTOLOVA et al., 2012).

Between 2012 and 2015, the disease registered a 75% increase in cases of hospitalization in Brazilian hospitals. Currently, it is estimated that there are about 35.6 million people with this type of dementia in the world. This number will practically double by 2030 and triple by 2050, according to data from the World Health Organization (WHO), 2020. In Brazil, the possibility is that there are about 1.2 million people with AD. It should be noted that most people with the disease have not yet received the medical diagnosis and the necessary treatment.

The cognitive problem was first described in 1906 by the German psychiatrist and neurologist Alois Alzheimer. On September 21, 1994, in Edinburgh, the capital of Scotland, the 10th annual conference of Alzheimer's Disease International was opened, at which time the World Alzheimer's Day campaign was launched. The conference was chaired by Princess Yasmin Aga Khan, daughter of actress Rita Hayworth diagnosed with Alzheimer's in the early 80s, died of the disease in 1987. (INFORMA SUS).

The campaign was created through the signing of a document in conjunction with the World Health Organization (WHO), with the participation of Brazilian doctor José Manuel Bertolone, a WHO employee at the time. The campaign, then, originated as a way to raise awareness and inform leaders, politicians and the population around the world about Alzheimer's Disease. The document encouraged the creation, at a global level, of local organizations to support patients and their families. Currently, there are numerous Alzheimer's institutions around the world. In Brazil, we have the Brazilian Alzheimer's Association (ABRAZ).

But more than a century has passed and with the increase in the population's life expectancy, more families have begun to live with people who "disappear", lose their identities, regress in their emotional and motor behaviors, needing specific care 24 hours a day, seven days a week.

Even though the accumulation of cases shows that the disease has an important genetic slant, the evidence about what was happening in the brains of people diagnosed with Alzheimer's was still



unclear. Until recently, there was a lack of indicators on what increased risk during the development of the entire process. And without knowing the cause, it was extremely delicate to talk about something primordial, but totally unknown: prevention and rehabilitation.

Analyzing it as follows: if we do not know the cause, we cannot prevent the result. Over the years, with studies, case analysis and the growing concern of not letting a loved one be devastated by the lack of memories, many specialists are finding strong answers so that prevention can already be applied, and that the regression of the disease is something concrete and possible (ANNUNCIATO, 2018).

Researchers in the area, together with Dr. BREDESEN (2018) have already identified that in the brain, of those with Alzheimer's, there is a higher concentration of a protein called beta-amyloid, which is one of the responsible for the distribution of the ability to remember. This protein has always been considered the great villain of the problem, a lot of money and has already been spent in an attempt to "break the plates". But the big surprise for the researchers was the discovery that these plaques arise in an attempt to help protect our neurons when the brain feels threatened.

More advanced studies BREDESEN (2018) found that this beta-amyloid protein has a very important link between Alzheimer's and diabetes. The latest research indicates that glucose and, consequently, elevated insulin in the blood (insulinemia) can rapidly increase beta-amyloid levels, paving the way for all brain phenomena that result in the loss of memory and cognitive functions.

In addition, the scientific trials of ANNUNCIATO (2018) show connections between other diseases. Toxic particles typical of AD (the ADDLs) make neurons resistant to insulin and this impairs the transmission of data between them.

These trials allowed for a unique understanding of the causes of the disease, not just having to accept the consequences. Once the theoretical approaches of the work are presented, the titles and how the evolution of this literature review work took place will be chronologically arranged.

In the table below are the articles selected in the literature review and their descriptors.



Chart 02 - Evolution of research on Alzheimer's disease

Author	Article Title	Year
Oliveira et al.	Aging, Alzheimer's disease and the contributions of the instrumental enrichment program (IEP)	2010
Da-Silva et al.	Neuropsychological rehabilitation program of memory applied to dementia: an uncontrolled intrasubject study.	2011
Vale et al.	Treatment of Alzheimer's disease in Brazil: I. Cognitive disorders.	2011
Gutierrez et al.	Economic impact of Alzheimer's disease in Brazil: is it possible to improve care and reduce costs?	2013
Oak; Magellan; Pedroso	Non-pharmacological treatments that improve the quality of life of older adults with Alzheimer's disease: a systematic review.	2016
Andrade et al.	Transcranial continuous current stimulation in the adjuvant treatment of Alzheimer's disease.	2016
Morello; File; Brandão	Language and communication interventions in Alzheimer's disease: a systematic review. communication intervention in Alzheimer's	2017
Vilela et al.	What Cochrane systematic reviews say about non-social interventions. Pharmacological Disorders for the Treatment of Cognitive Decline and Dementia?	2017
Madureira et al.	Effects of multidisciplinary rehabilitation programs in the treatment of patients with Alzheimer's disease: a systematic review.	2018
Sá et al.	Efficacy of cognitive rehabilitation in improving and maintaining activities of daily living in patients with Alzheimer's disease: a systematic review of the literature.	2019

Source: the authors (2021).

As the table has shown, we can understand how studies have been happening and research has advanced in search of rehabilitation possibilities in the context of the last decade. The expansion of research contributes to changes in paradigms related to aging and maximization of knowledge and possible rehabilitation of AD.

The 2010 article, AGING, ALZHEIMER'S DISEASE AND THE CONTRIBUTIONS OF THE INSTRUMENTAL ENRICHMENT PROGRAM (PEI), demonstrates how successful aging depends largely on disease prevention. With an adequacy of physical conditioning and preservation of cognitive functions, because studies show that elderly people who have mild cognitive alterations tend to have a higher risk of developing AD. (OLIVEIRA, 2010).



Considering that an affected brain causes loss of memories and various cognitive impairments, alternative treatment alternatives have been proposed in addition to pharmacological therapy characterizing neuropsychological rehabilitation. In this work, in particular, the use of the Instrumental Enrichment Program and the Mediated Learning Experience was addressed, aiming to favor the optimization of residual capacities and the reduction of negative impacts on people's quality of life.

In the March 2011 study, *NEUROPSYCHOLOGICAL REHABILITATION PROGRAM OF MEMORY APPLIED TO DEMENTIA: AN INTRA-SUBJECT UNCONTROLLED STUDY*, reports the participation of elderly people with AD and other dementias who participated in rehabilitation workshops, with gardening and colored tracks, and at the end of the program there was an increase in the scores of the learning and memory tests. At the same time, a reduction in Depression scores was observed and these reductions were associated with treatment with anticholinesterases.

In another article from September 2011, *TREATMENT OF ALZHEIMER'S DISEASE IN BRAZIL: I. COGNITIVE DISORDERS*, this study was recommended by the Brazilian Academy of Neurology, through its Scientific Department of Cognitive Neurology and Aging, the consensus involves researchers in the medical field and other professionals. Seeking guidance for pharmacological and alternative treatment of cognitive disorders of AD. The inclusion of drugs in therapeutic recovery includes: acetylcholinesterase inhibitors, memantine and other drugs and substances. As for non-pharmacological recommendations, they include cognitive rehabilitation, physical activity, occupational therapy and music therapy, and psychological follow-up for the behavioral symptoms of dementia.

The 2013 study, *ECONOMIC IMPACT OF ALZHEIMER'S DISEASE IN BRAZIL*: is it possible to improve care and reduce costs? With the objective of reducing costs related to AD in terms of assistance and assistance to families and caregivers in the management of AD. When the disease is in the mild stage, it is the cost of time for the unpaid caregiver, while those in which the disease is more advanced, it is the care in relation to institutionalization. The literature indicates GUTIERREZ



et al., (2013), in view of this scenario, care models that make it possible to maximize the functional independence of the elderly and the maintenance of their abilities, but it is something that needs to be discussed, structured and implemented in the Brazilian reality.

In 2016, this study NON-PHARMACOLOGICAL TREATMENTS THAT IMPROVE THE QUALITY OF LIFE OF ELDERLY PEOPLE WITH ALZHEIMER'S DISEASE: A SYSTEMATIC REVIEW, seeking to review the literature in the last ten years and the studies that adapted to the objectives of the theme showed that the most described treatments indicated both cognitive and multidisciplinary rehabilitation. These techniques have been shown to improve the quality of life in elderly people with mild disease.

In the 2016 research, TRANSCRANIAL CONTINUOUS CURRENT STIMULATION IN THE ADJUVANT TREATMENT OF ALZHEIMER'S DISEASE: A CASE STUDY. This is a case report of a 73-year-old patient diagnosed with Alzheimer's disease who underwent 10 daily sessions of transcranial direct current stimulation (tDCS).

tDCS was applied to the left dorsolateral cortex as an adjuvant therapy to the traditional treatment that the patient received (anticholinergic medication and cognitive training). The results obtained demonstrated that tDCS had a stabilizing effect on the patient's general cognitive function and led to increased performance in all tests. Preliminary results indicate that tDCS has adjunctive therapeutic potential for cognitive rehabilitation in Alzheimer's disease.

In September 2017, the LANGUAGE AND COMMUNICATION INTERVENTIONS IN ALZHEIMER'S DISEASE: A SYSTEMATIC REVIEW. COMMUNICATION INTERVENTION IN ALZHEIMER'S. Alzheimer's disease (AD) considerably compromises communication skills. As the disease progresses, language and cognition deteriorate, reducing the ability to hold conversations, which has a negative impact on social interaction. Interventions focused on language found that in most interventions there were benefits for at least one language or communicative skill, pointing to higher levels of evidence and are recommended in the investigation of interventions focused on language and communication skills of patients with dementia.



In the 2017 study, WHAT DO COCHRANE SYSTEMATIC REVIEWS SAY ABOUT NON-PHARMACOLOGICAL INTERVENTIONS FOR THE TREATMENT OF COGNITIVE DECLINE AND DEMENTIA? Dementia is a condition with a high prevalence and global incidence. Its chronic and progressive characteristic has an impact on physical, psychosocial and public health aspects. Cochrane reviews on non-pharmacological interventions for cognitive dysfunction and/or any type of dementia were included, following independent assessment by two authors.

Reviews have shown that carbohydrate intake and validation therapy may be beneficial for cognitive disorders. For dementia, there is a potential benefit of physical activity programs, cognitive training, psychological treatments, aromatherapy, light therapy, cognitive rehabilitation, cognitive stimulation, hyperbaric oxygen therapy associated with donepezil, functional analysis, reminiscence therapy, transcutaneous electrical stimulation, structured decision in feeding options, case management approach, and interventions applied by non-specialist health workers and health care units. specialized care. Several non-pharmacological interventions for patients with cognitive impairment and dementia have been studied, showing potential benefits.

In the 2018 article, EFFECTS OF MULTIDISCIPLINARY REHABILITATION PROGRAMS IN THE TREATMENT OF PATIENTS WITH ALZHEIMER'S DISEASE: A SYSTEMATIC REVIEW. Multidisciplinary actions with AD patients aim to interfere directly in the health/disease process, with a comprehensive approach to individuals and family members, appropriate to their realities. The studies showed the efficiency of this treatment option with AD patients, significant improvements in neuropsychiatric symptoms and quality of life. However, as for cognition, the results were not significant or conflicting.

In 2018, the book "THE END OF ALZHEIMER'S: THE FIRST PROGRAM TO PREVENT AND REVERSE COGNITIVE DECLINE" arrived in Brazil by the author Dr. Dale E. Bredesen, who is internationally known as a specialist in the mechanisms of degenerative diseases and presides over renowned institutions in his field.

In the 2019 Literature review, COGNITIVE EFFICACY IN IMPROVING AND



MAINTAINING ACTIVITIES OF DAILY LIVING IN PATIENTS WITH ALZHEIMER'S DISEASE: A SYSTEMATIC REVIEW OF THE LITERATURE. In order to validate the efficacy of cognitive rehabilitation in patients with mild to moderate AD, the study presented cognitive rehabilitation with non-pharmacological interventions. The studies demonstrated an improvement in the performance of patients in the assessment instruments, especially with regard to the performance of activities of daily living, demonstrating how much the patient's independence is a consequence of rehabilitation in daily activities, generating functional and structural changes. However, more studies are needed to prove and apply this practice.

Thinking about ways and possibilities of how to put all this knowledge into practice, it was decided to make the connection between the knowledge already demonstrated previously with Psychology through Psychoeducation: which is a technique of Cognitive Behavioral Therapy (CBT), recognized for helping new patterns of thought and behavior (LEAHY, 2004). In this approach, collaboration and psychoeducation aim to develop strategies so that clients learn to recognize their thoughts, emotions and behaviors and to be able to modify them (KENDALL & BEMIS, 1983).

Psychoeducation can use resources such as videos, audios, pamphlets, campaigns, etc. In these psychoeducational plannings, they can be involved by professionals from different areas of health, providing an interdisciplinary work that provides the client with a care whose integrality is present. (LEMES & ONDERE NETO, 2017, p. 26)

One of the most impactful studies regarding the natural treatment for Alzheimer's is the "Reversal of cognitive decline: A novel therapeutic program", by Dr. Dale E. Bredesen, from the University of California at Los Angeles (UCLA) and published in the scientific journal *Aging* in 2014. In this study, Dr. Bredesen gathered 10 patients with progressive memory loss in recent years and diagnosed with Alzheimer's. For each of the patients, Dr. Bredesen put together a protocol that considered, as key elements, the use of supplements, combined with specific nutrition and physical activities. After the change in the lifestyle of these patients, there was regression of Alzheimer's symptoms in 09 out of 10 patients. (BREDESEN, 2018).



Also in 2018, neuroscientist Dr. Nelson Annunziato released his book “SUPERBRAIN WITHOUT ALZHEIMER’S”, which contains information and directing studies to an area that has been largely neglected, because according to him, we can have “SUPERBRAINS”.

The articles demonstrate that the implementation of policies that favor prevention and awareness about care and possibilities for improvement for AD patients and their families, dealing with the reduction of suffering and the psychological impacts on patients and their families. The aforementioned articles from 2018/2019 report the possibilities of rehabilitation through multidisciplinary teams and with the effectiveness of neurocognitive plasticity, but regarding Psychology few contributions related to the subject addressed.

FINAL CONSIDERATIONS

The information from this research shows that the degenerative process of AD is permeated by issues that cannot yet be dribbled, in addition to being understood and experienced differently by the various subjects who participate in it. It is through this context that strategies can be constituted for each patient to face and prevent illness and, although they belong to a group of people, they transcend each one individually.

Thus, influenced by the literature and recent research, facing the disease from another perspective should be a goal to be pursued by health professionals. Therefore, Psychology aims to make preventive health psychoeducation add this new perspective through a sharing of knowledge.

From this context, the present study finds that elements such as family, social relationships and culture have an impact on the way the experience of AD is lived. After all, alongside a person with the disease, professionals put into practice a wide range of knowledge, beliefs, values and attitudes that surround the health, disease and care process.

In addition, this study also demonstrates that knowledge determines and provides care to sick patients, and must be the common denominator of many of the actions and strategies adopted



by professionals. And so it becomes difficult without communication skills, interpersonal and multiprofessional theoretical framework.

To establish a care plan appropriate to the individual needs of the patient with Alzheimer's, for this complex process to be effective, one type of treatment is not enough, but the set of multidisciplinary knowledge. Thus, this study reveals that understanding the disease is capable of providing security and new possibilities of treatment and prevention for professionals and researchers, who tend to feel more self-confident in the face of issues related to AD from the moment they receive a logical explanation for the manifestations presented by the patient. This is a way to allow the professional to realize, for example, that the behavioral symptoms of dementia are not directed on purpose, but a consequence of the symptoms.

It is possible to verify that psychological mechanisms (stigma, denial and negative view of the disease) and ideas about the manifestations of the disease associated with stereotypes about aging can compromise the achievement of a more secure knowledge about this type of dementia. Although professionals report being aware of the biological nature of the disease, interpretations of causality between the patient's life history and this type of dementia exist, which leads to the idea that changes that emotionally impact the subject can influence the development of the disease.

The physiological, genetic, and hereditary dimensions were addressed in this study to explain the causes of AD, but psychosocial and sociocultural dimensions also occur when we question the etiology of this type of dementia. These different interpretations have repercussions on the acquisition of awareness of the disease and, consequently, on attitudes towards a person with AD.

In view of these findings, it is considered that knowing these representations in health practices means overcoming the scientific view and advancing towards the understanding of the complexity inherent to psychoeducation in preventive health of AD.

Thus, the present research contributes to stimulate the creation of training programs and research in Psychology, through Psychoeducation aimed at prevention and possible reversal in AD. Thus, professionals would have support to deal with the behavioral manifestations of the disease and



would receive clarification regarding basic and preventive care, such as feeding and sleep hygiene, which contributes to alleviating difficulties that arise during the illness process. The research showed that enough is already known to achieve psychological and functional health rehabilitation for people affected by AD, but there is still little work that connects the areas of health in order to obtain better results.

REFERENCES

ALMEIDA OP. Strategies to prevent dementia. In: CAIXETA L, editor. Dementia: multidisciplinary approach. Rio de Janeiro: Atheneu; 2006.p. 563-71.

ALZHEIMER A. Uber eine eigenartige Erkrankung der Hirnrinde. Allgemeine Zeitschrift für Psychiatrie und psychischgerichtliche. Medizim. 1907; 64:146-8.

AMERICAN Psychiatric Association. Diagnostic and statistical manual of mental disorders: DSM-IV. 4. ed. Porto Alegre: Artimed; 1995.

AMERICAN Psychiatric Association. Section II Diagnostic Criteria and Codes: Neurocognitive Disorders. In: AMERICAN PSYCHIATRIC ASSOCIATION. Diagnostic and Statistical Manual of Mental Disorders: DSM-5. 5. ed. Porto Alegre: Artmed, 2014.

ANDRADE, Artur Guerra de. 100 Questions in Psychiatry. 2012; Manole, 2006-2012.

Andrade et al. Transcranial continuous current stimulation in the adjuvant treatment of Alzheimer's disease. 2016

ANNUNCIATO, Nelson. Super Brain Without Alzheimer's. 1. Ed. São Paulo: Jolivi, 2018

BAYLES K.A. Language function in senile dementia. Brain Lang. 1982; 16(2):265-80.

BEILKE HMB, Pinto RCN. Narrative in Alzheimer's dementia: reorganization of language and "memories" through dialogical practices. Estud Linguísticos (São Paulo).2010; 39(2)557-67.



BOTTINO, Cassio M. de Campo (In Memoriam); Manole, 2. ed 2018. Chapter 33.

Caixeta, Leonardo et al. Alzheimer's disease. *Artmed* 2012; 34-40.

CAIXETA L. *Dementias: multidisciplinary approach*. São Paulo: Atheneu;2006.

BREDESEN, Dale E. *The End of Alzheimer's*. 1st ed. – Rio de Janeiro: Objetiva, 2018.

CARVALHO, Paula D. P. et al. Non-pharmacological treatments that improve the quality of life of older adults with Alzheimer's disease: a systematic review. *Brazilian Journal of Psychiatry*, Rio de Janeiro, 2016.

COSTELLO A.L, Warrington E.K. Dynamic aphasia: the selective impairment of verbal planning. *Cortex*. 1989; 25(1):103-14.

De RENZI E, SCOTTI G, SPINLER H. Perceptual and associative disorders of visual recognition: relationship to the site of lesion. *Neurology*. 1969; 19(7):637-42.

DA SILVA, Sérgio Leme, PEREIRA, Danilo Assis, VELOSO, Fabrizio; SATLER, Corina Elizabeth; ARANTES, Adriana; GUIMARÃES, Renato Maia. (2011), Neuropsychological rehabilitation program of memory applied to dementia: an intra-subject uncontrolled study.

DICKERSON BC, Eichenbaum H. The episodic memory system: neurocircuitry and disorders. *Neuropsychopharmacology*. 2010; 35(1):86-104.

DICKERSON BC, Sperling RA, Hyman BT, Albert MS, Blacker D. Clinical prediction of Alzheimer disease dementia across the spectrum of mild cognitive impairment. *Arch Gen Psychiatry*. 2007; 64(12):1443-50.

EFRON R. What is perception? In: Cohen RS, Wartofsky MW, editors. *Boston studies in the philosophy of science*. New York: Humanities; 1968.

FONSECA, J. J. S. *Methodology of scientific research*. Fortaleza: UEC, 2002. Handout.



FRATALLI Cat al. Functional Assessment of Communication Skills for Adults (ASHA FACS). Rockville: ASHA;1995.

GALLUCCI Neto J, Tamelini MG, Forlenza OV. Differential diagnosis of dementias. *Reve Psiqu Clin.* 2005; 32(3):119-30.

GOEDERT, M. Ghetti, B. Alois Alzheimer: his life and times. *Brain Pathol.* 2007; 17(1):57-62.

GUTIERREZ et al. Economic impact of Alzheimer's disease in Brazil: is it possible to improve care and reduce costs?2013

HEILMAN KM, VALENSTEIN E. Mechanisms underlying hemispatial neglect. *Ann Neurol.* 1979; 5(2):166-70.

HERRERA et al. Epidemiologic survey of dementia in a Community-dwellign Brazilian population. *Alzheimer Dis Assoc Disord.* 2002; 16(2):103-8.

HESTAD K.; KVEBERG B.; ENGEDAL K. Low blood pressure is a better predictor of cognitive deficits thanthe apolipoprotein e4 allele in the oldest old. *Acta Neurol Scand.* 2005; 111(5):323-8.

IZQUIERDO I. Memory. Porto Alegre: Artimed; 2002.

JAKUBOVICZ, F. Meinberg, R. Introduction to aphasia. 5 ed. Rio de Janeiro: Revinter; 1992.

KANDEL, Eric R. et al. The Aging Brain. In: KANDEL, Eric R. et al. Principles of Neuroscience. 5. ed. Porto Alegre: AMGH, 2014.

KENSINGER E.; Krendl A.C.; Corkin S. Memories of an emotional and a nonemotional event: effects of aging and delay interval. *Exp Aging Res.* 2006;32(1):23-45.

KOCH IGV, Travaglia LC. Textual coherence. São Paulo: Contexto; 1990.

KUMAR, Vinay et al. The Central Nervous System: Neurodegenerative Diseases. In:

KUMAR, Vinay et al. Robbins & Cotran Pathology: Pathological Bases of Diseases. 9. ed. Rio de



Janeiro: Guanabara Koogan, 2016.

LEAHY, R. L. (2004). Contemporary cognitive therapy: Theory, research, and practice. New York: The Guilford Press.

LEMES, C. B. & ONDERE NETO, J. (2017). Applications of psychoeducation in the context of health. *Themes in Psychology*, 25(1), 17-28.

LURIA AR, Tsetskova LS. Towards the mechanisms of dynamic aphasia. *Found Lang*. 1978; 4:296-307.

MAIA, João Mauricio Castedelli. 100 Questions in Psychiatry. 2012; Manole, 2006-2012.

MANSUR LL, Carthery MT, Caramelli P, Nitrini R. Language and cognition in Alzheimer's disease. *Psicol Reflex Crit*. 2005; 18(3):300-7.

NITRINI R. et al. Incidence Of dementia in a community-dwelling Brazilian population. *Alzheimer Dis Assoc Disord*. 2004; 18(4):241-6.

OLIVEIRA, Antônia Roseli Roberto de. (2010) Aging, Alzheimer's disease and the contributions of the instrumental enrichment program (IEP), *Cuad. Neuropsicol*. Vol. 4

ORTIZ K.Z., BERTOLUCCI PHF. Language changes in the early stages of Alzheimer's disease. *Arq. Neuropsychiatry*. 2005; 63(2nd):311-7.

REUDA F.J.M, SISTO. FF. Concentrated attention test: TEACO-FF. São Paulo: Casa do Psicólogo; 2009.

SISTO F. et al. Tests of divided and sustained attention: AD and AS. São Paulo: Vetor; 2006.

SOUZA, Ricardo de Oliveira et al. Cognition and executive functions. In: LENT, Roberto. *Neuroscience of mind and behavior*. Rio de Janeiro: Guanabara Koogan, 2008.

STAHL M. *Stahl's Essential Psychopharmacology: Prescriber's Guide*. 6. ed. United Kingdom: Cambridge University Press, 2017.



STAHL, Stephen M. Dementia and its Treatment. In: STAHL, Stephen M. Psychopharmacology: neuroscientific bases and practical applications. 4. ed. Rio de Janeiro: Guanabara Koogan, 2014.

STELLA, Florindo. Interdisciplinary Psychiatry. 2016; Manole, 108-116.

TANZI RE, BERTMAN L. Twenty years of the Alzheimer's disease amyloide hypothesis: a genetic perspective. Cell.2005; 120(4):545-55.

DA SILVA et al. Neuropsychological rehabilitation program of memory applied to dementia: an intra-subject uncontrolled study. 2011

WALDEMAR G. et al. Recommendations for the diagnosis and management of Alzheimer's disease and other disorders associated with dementia: EFNS guideline. Eur J Neurol.2007; 14(1): E1-26.



