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# Cognitive Stimulation Through Reading Strategies in People Prone to Alzheimer's Disease

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***Summary***

*The present research aims to use reading as a means to enhance the development of memory and cognitive reserve in young people with Alzheimer's predisposition of the "Abel Santamaría Cuadrado" neighborhood in Santiago de Cuba. It has been discovered that encouraging and maintaining the habit of reading helps to preserve the activity and cognitive functions of people suffering from this disease. From the diagnosis applied to a sample of 15 young adults with predisposition to Alzheimer's disease and the scientific observation, it was possible to know the insufficiencies in the cognitive processes of memory, and the presence of forgetfulness in the intellectual sphere that these subjects had. Theoretical and empirical methods, techniques and instruments were applied to gather the necessary information for the study. Narrative texts and poetry books were used to improve memory reserve. The proposal demonstrated that reading is an important tool for the stimulation of the capacities and memories of these people, considering the tastes, preferences, needs and interests of the person with Alzheimer's disease, in order to make reading attractive to them and even allow them to remember vital aspects or emotions of their personal life.*

**Keywords:** Cognitive Reserve, Predisposition to Alzheimer's Disease, Cognitive Functions, Cognitive Memory Processes, Narrative Texts.

## Introduction

Alzheimer's disease is a primary neurodegenerative disorder that usually appears after the age of 65, although it has also been shown to appear in people under 40 years of age. According to the World Health Organization (1992). When a person suffers from Alzheimer's disease, he/she experiences microscopic changes in the tissue of certain parts of his/her brain and a progressive loss of a chemical substance, vital for brain function, called acetylcholine. This substance allows nerve cells to communicate with each other and is involved in mental activities linked to learning, memory and thinking.

Alzheimer's disease is recognized as one of the most significant health crises of the 21st century, and together with other diseases that cause deterioration in brain functions and cause various brain syndromes, it has been given the collective name of dementia. The functions that may be affected are memory, thinking, recognition, language, planning and personality.

Alzheimer's disease accounts for 50 to 60 percent of dementia cases worldwide. Every three seconds, someone develops this disease; the number of people is expected to double in 20 years, so that by 2050 there will be 152 million [1].

Cuba is not exempt from this reality. Currently, one fifth of the population is 60 years of age or older, and that disease increases proportionally with aging. According to statistics, it is estimated that there are approximately 160,000 people with Alzheimer's

disease or a related dementia in the Antillean nation, and this number will increase to 273,000 in 2030, and 421,000 in 2050.

Fuentes (2008) points out that there are some activities such as chess, physical exercise and reading that provide preventive benefits against this degenerative disease that affects memory and language. These activities perform a training function of skills such as planning, memory, decision making and concentration, which are within everyone's reach.

Some experts from the ACE Foundation- Barcelona Alzheiemer Treatment & Research Center advise promoting reading among people with dementia as a tool to work on language and memory. It has been proven that encouraging and maintaining the habit of reading helps maintain the activity and cognitive functions of people with Alzheimer's disease [2].

Although reading skills are one of the processes that people lose later, it is common for them to progressively abandon this practice because of the effort involved in following the thread of the story and maintaining attention. In this situation, ACE Foundation experts recommend that family members and caregivers of people with dementia facilitate this activity by accompanying them in reading and making a book or newspaper available to them or writing, for example, a short text in clear handwriting.

Reading can be used as a tool to stimulate the abilities and memories of people prone to suffer from this disease, in order to create a defense mechanism to help the brain exercise its memory. In this regard, América Morera, deputy director of the Day Care Unit, in the Cognitive Stimulation Workshops recommends that family members and caregivers take into account the specific needs of the person and the stage of the disease in order to adapt and facilitate the readings [2]. Morera (Various, 2013) assures that "If we manage to adapt the readings to the needs and interests of the person with Alzheimer's disease, we can make this activity attractive to them and even allow them to remember vital aspects or emotions". Readings can be shared spaces between people prone to this condition and their families, promoting values, experiences, own experiences or not, which make this stage of the individual's life much more bearable.

From this background, it was observed the increase of people with Alzheimer's disease in the community of Reparto "Abel Santamaría" of Santiago de Cuba, since from 16 people suffering from it in 2019, it increased to 27 people [3]. It was also proved the prevalence of young adults with the predisposition to suffer from Alzheimer's disease, so it is necessary to train the memory in the asymptomatic stage; to delay the development or appearance of this disease based on brain plasticity.

It was also learned that in the therapeutic areas that are attended by the professors of Therapeutic Physical Culture and health specialists; only treatments are applied to people with neurological diseases in their physical rehabilitation, not in their initial stage.

Due to the insufficient activities aimed at Alzheimer's prophylaxis in people predisposed to suffer it, this study was carried out with young adults who present genetic predisposing factors for inheriting this disease [4].

For this reason, insufficiencies in the use of intellectual exercises (work with text) to enhance the development of memory and cognitive reserve in young people with a predisposition to Alzheimer's disease in this urban community of Santiago de Cuba is declared as a research problem, and the objective of the research is to elaborate memory exercises with text to improve memory performance in young people with a predisposition to Alzheimer's disease.

## Methodology and Methods

In order to develop this proposal, it was necessary to use a set of methods and techniques that would make it possible to start from the most essential elements that characterize cognitive reserve in young people with a predisposition to Alzheimer's disease [5].

Among the theoretical methods we used the analysis - synthesis, to characterize from the epistemological point of view the cognitive reserve in young people with Alzheimer's predisposition, the dialectical hermeneutic method, for the understanding, explanation and interpretation of the research object.

As empirical methods, interviews with teachers, a survey of young people with a predisposition to Alzheimer's disease and observation of different activities were carried out to characterize the current state of cognitive reserve in these young people.

Statistical methods were used for the percentage evaluation of the results of the instruments applied and to support the processing of qualitative and quantitative data obtained in research process [6].

The training of the cognitive component of young people with a predisposition to Alzheimer's disease belonging to this community was assessed, the opinion of health professionals in the community regarding the implementation of the basic elements of the text and memory exercises in the prophylaxis of these young people was known, the medical records of Alzheimer patients were reviewed to find out when they manifested the first symptoms and who their descendants are.
The applied techniques allowed to know the memory and frequency failures, present in young adults with predisposition to Alzheimer's disease and to evaluate the learning level of young people on the basic elements of recreational chess. As for the psychological tests, they were used for the neuropsychological evaluation and memory capacity of young adults with predisposition to Alzheimer's disease.

## Results

The clinical histories of 27 people with Alzheimer's disease were reviewed to know their descendants, the type of Alzheimer's disease they present and the stage they are in, from which a population of 35 young adults was obtained, from which an intentional sample of 15 young adults with predisposition to Alzheimer's disease with memory failures was taken, representing 43% of the total population, belonging to the polyclinic ¨ Josué País¨. of Reparto Abel Santamaría [7].

These young adults are between 30 and 40 years old, nine are female and six are male. A pre-experimental study was developed with these individuals, with their previous approval, with the aim of determining the relevance of the application of a set of

memory exercises with a therapeutic approach, in order to train the memory to improve their efficient performance. We worked with a purposive sample determined because these people:
- They were between 30 and 40 years of age, predisposed to Alzheimer's disease and had memory impairment.
- Willingness to participate in the research.
- Like to read
- Failure to meet some of the exclusionary criteria.
- Do not present symptoms or neurological alterations that make it difficult to carry out the investigation.
- No history of alcoholism or drug abuse.

When working on cognitive stimulation with people prone to Alzheimer's disease, it is necessary to take into account the different phases they are in, as it cannot be the same as with people whose cognitive capacities are in good condition [8]. Therefore, this study focused on young people in Phase 1, which is the first phase of the disease, in which people have slight memory loss, find it difficult to learn new things and begin to surround themselves with familiar things and situations, with little chance of becoming involved in situations that are strange to them.

At this time cognitive stimulation would be more efficient, as the patient's cognitive abilities are not yet greatly affected. Cognitive stimulation directed towards the following areas is recommended (Course, 2019):
• Perform simple tasks that help mental activation.
• Work on temporal, spatial and personal orientation so that the patient can situate himself at all times and know where he is and who is around him.
• Carrying out exercises that stimulate memory. In the short term we can stimulate it with repetition games, but we must not forget to stimulate remote memory, making the patient remember events of his past.
• Calculation exercises are ideal to reinforce memory.
• Use basic reasoning.
• Reading and writing can be very helpful at this time: reading, dictation, journaling.
For this research, reading was used as the basis for the cognitive stimulation of these young people.

**Training for cognitive stimulation and memory performance through reading.**
Memory as pointed out by Alarcón, Mazzotti and Nicolini (2005) is: "process by which information is encoded, stored and retrieved. It is a cognitive process by which information that is collected can be encoded, stored and ultimately retrieved when needed."
The memory consists of several phases, according to Hernández (2012):
• Encoding: in this phase the information coming from the different sensory channels is processed and represented in the memory system.
• Retention: is the phase in which the information represented in the memory takes a place in the sensory memory, short-term memory or long-term memory, so that this information can be evoked and used immediately or later.
• Retrieval: this phase allows access to and recall of information previously stored during the retention phase.

According to Soriano (1986), low brain performance as a consequence of the loss of neurons can be reverted with training to reestablish neuronal connections or to produce new ones; that is to say, to establish new paths for the arrival of information to our cerebral cortex where activities such as memory are processed [9].

Montero (2016) highlights that cognitive training allows the stimulation of memory processes through structured exercises and situations with ascending difficulty adapted to the cognitive abilities of each individual in order to improve it, allowing the training also in certain cases of those abilities in the process of degenerating.

This approach of Montero (2016) leads to try to verify and prove the main objective raised in this research: to demonstrate this relationship between the continued practice of reading and the improvement of cognitive processes.

Reading, as several and numerous studies have shown, is one of the most beneficial habits for the brain.as Morera states "our brain, in order to enjoy good health, needs us to keep it active, to exercise it; but even though it is one of the most important organs of our body, we do not always spend enough time taking care of it [10].

Thus, as explained by García (2000), coordinator of the SEN Behavior and Dementias Study Group:
(...) reading is one of the most beneficial activities for health, as it stimulates brain activity and strengthens neuronal connections and, in addition, increases cognitive reserve, which preserves the proper functioning of our brain as we age and acts as a protective factor against the clinical symptoms of neurodegenerative diseases, among which Alzheimer's disease stands out.

An active brain improves its functions and increases the speed of response. As stated by SEN, "while reading, we force our brain to think, to order ideas, to interrelate concepts, to exercise our memory and to imagine, which allows us to improve our intellectual capacity by stimulating our neurons; in addition, reading also generates conversation topics, which facilitates interaction and social relations, another key aspect to keep our brain exercised.

Reading increases cognitive reserve and is a protective factor against the clinical symptoms of neurodegenerative diseases. Reading is a mental process of perception, comprehension, and reaction, or as Ontza (García, 2000) refers: ¨ is a process by which our eyes go through a piece of writing, and our brain interprets, organizes, and understands" [11].

Reading develops critical, analytical, reflective and creative thinking skills, thus exercising memory, imagination, abstraction capacity and intelligence. This author affirms that reading is the gymnastics room to prevent this disease, it is a habit that we must develop since childhood, so that our brain develops all its cognitive functions.

Reading is a complex process involving several areas of the brain that takes about ten years to develop and reach full maturity. It develops in the left hemisphere and the inferotemporal cortex - the area in charge of detecting and recognizing written

words - transmits the information to other areas. Garcia (2000) states that "a part of the brain is specialized in the interpretation of symbols, so that we are able to use non-verbal communication. (...) These symbols are grouped, ordered and linked to be understood"

When using reading as cognitive stimulation, the genre used is important because reading an adventure novel is not the same as reading a text on criminal law for the brain. "Novels activate regions that not only interpret symbols, but also stimulate the imagination or motor action [12].

This is what we call "getting into a book", explains the neurologist. In reading there are two important aspects: one refers to the syntactic complexity -which decodes language- and the other to the symbolic thinking or the narrative that reading itself has, that is, by increasing the efficiency of neurons with reading, we would have to lose many more connections for it to begin to be noticed (instead of at fifty to seventy years of age) [13]. Thus, it has been shown that active reading practice decreases the impact of the disease.

Reading can be monotonous at first and cause effort or fatigue, but when this barrier is overcome, it begins to awaken curiosity, motivate and can be very satisfying. Reading awakens the desire to learn, fantasy, creativity, imagination and curiosity to know other places and other realities and awakens the desire to live.

One of the greatest richness of reading is being able to imagine what you are reading through images. In addition, it is an activity that connects with all the other learning you have (inferences). Imagination is so powerful that just by reading a verb that implies an action, regions in charge of movement are also activated, as shown by many functional magnetic resonance imaging studies [14]. "This implies that there is a connection between the areas of symbol interpretation and others, such as movement, that we were unaware of until now," concludes García (2000)

**Methodology to be followed for working with the text and people prone to Alzheimer's disease**

In the initial stage or phase I, tools should be provided in the use of reading for the cognitive stimulation of young people with a propensity to suffer from Alzheimer's disease.

• We recommend reading short stories, tales or news in the press, as well as texts such as poetry, fables or short stories with few characters.

• As they read, they should make notes in a notebook about the actions that occur during the reading.

• The annotations have a retrospective function, they will remind you of the storyline and make the reading activity more complete.

• Reading together will allow you to comment on the plot, talk about the characters or the memories that the reading arouses. If the reaction is not positive, stop the activity.

• The subject matter or genre of the readings provided must meet the taste or preference of the persons concerned, even if they are readings that have already been done in the past.

• Attention should be paid to the symptoms shown by the person and avoid reading to cause agitation, distrust or discomfort.

• Particular attention should be paid to visual tracking, selective attention to words and their meaning in the text, working memory, light perception and manual dexterity in handling the text.

• Selected books should be carefully attentive to details of printing, format and content, including graphic design, typeface, syntax, style, visual contrast, reference language and subject matter.

• Books must have integrity in content and vocabulary to provide an enriching experience for these individuals.

• Books will provide relevant vocabulary and images alongside the text, photographs and words that stimulate personal and episodic memories. This will allow the person to describe and share in conversation elements of the reading done more easily.

• Easy to read books: high contrast texts, clear, concise and accessible language for people with memory problems, with real full color images of universal appeal and large print.

• Among the suggested books are adventure and swashbuckling books, such as: The Three Musketeers(Alexandre Dumas), Treasure Island, Around the World in 80 Days, Tales of the Jungle( by Horacio Quiroga) , (by Daniel Defoe)

Methodological Steps to be Followed for the Application of Reading Memory Exercises General Objective:

• The set of memory exercises is aimed at improving memory performance in young people predisposed to Alzheimer's disease in the ¨Abel Santamaría Cuadrado¨ neighborhood of Santiago de Cuba.

Specific objectives:

1. To delay the onset or possible development of memory disorders in young people predisposed to Alzheimer's disease.
2. Training in memory strategies and techniques.
3. Stimulate basic cognitive processes such as: attention, perception, language, logical capacity.
4. Promote the practice of reading

The proposal consists of eight activities, distributed in the work with eight different texts selected and adapted to the characteristics and possibilities of young people with a predisposition to Alzheimer's disease. They contain in their structure the most important methodological principles for working with the text they comprise:

I. Text selection

II. The understanding itself.

It must be taken into account for these people that:

1. The reader's cognitive capacity allows him to penetrate the text and for this he needs to possess sufficient knowledge and concepts that can be of different types: his general knowledge of the world or universe of knowledge, of the theme or topic he is reading about, and information about the state of his own knowledge base.
2. Linguistic competence refers essentially to the semantic and syntactic aspects of the language. The semantic aspect is made up of the designations of concepts in the language, while the syntactic aspect is based on the way in which the language is constructed. These two elements are closely related in the comprehension process because throughout the reading of a text the reader is constructing and reconstructing the meaning as he/she continually accommodates the information received, since we understand the general context, the way sentences are chained and linked; even, the text sometimes contains words whose meaning we do not know and we rely on the context to infer it [15].

Reading strategies used for cognitive stimulation in people prone to Alzheimer's disease.
1. Activate prior knowledge: recognize what information is already known that can be linked to the new information provided by the text.Prior knowledge.
2. Contextualize the text. Reading is understood as a social experience that involves both the reader and the text, as well as the context; consequently, meaning can be defined as a variable product of that interaction (Interactive components in reading comprehension).
3. Read the text one or more times. Reading aloud. It requires concentration and effort to penetrate its meaning.
4. Know what is the function of headings, subheadings or indexes.
5. Work with lexical unknowns or search for contextual meaning through inferences.
6. Determine the semantic key of the text, that syntagmatic word or sentence that constitutes the essence of what is said in the text, the nucleus around which the whole statement revolves. It is always explicit in the text: it is there, we just have to find it.
7. Segment the text into semantic units or subtexts and establish networks of words linked to the keywords.
9. Pause to summarize what is being read in long texts.
10. Elaborate diagrams about the information that can be represented in the texts.
11. Identify in the organization of text patterns such as problem-solution, cause- consequence, comparisons, general ideas containing details.
12. Questioning new knowledge acquired through reading.
13. Establish intertextual relationships.
The reading and comprehension of text requires a guide to achieve self-preparation of the person prone to Alzheimer's disease through independent work with the notes obtained from the reading done. The reading guide will allow the consolidation of what has been read and the acquisition of new knowledge, as well as habits and skills for working with the text. It will also take into account the diversity and particularities according to the characteristics of these people.

Example of an activity to stimulate the cognitive memory
Activity 1. Approach to the reading of Cuentos de la selva, by Horacio Quiroga. Objective: To reinforce visual and procedural memory.

**Methodology:** do a quick reading of a story from the book. Read aloud the story. Recognition of the topic. Look for the meaning of unfamiliar words. Identify the thematic nucleus around which the story revolves. Main characters. Linking the theme of the story with personal experiences. Establish the new knowledge acquired in the reading. To make a brief summary of what has been read.

Materials: book
Variant: after the initial reading, relate a lived experience similar to the one read in the story. Talk about the protagonists of that personal experience. Compare that experience with the one in the story.

Evaluate: the acquisition of new words and the narration of what has been read.

From memory training with memory exercises through reading to increase cognitive stimulation in people prone to Alzheimer's disease and thus prevent the loss of neurons by improving their connections.

By exercising the brain, the onset of Alzheimer's disease is delayed; in addition to reducing as much as possible the daily forgetfulness of memory in young adults with a predisposition to this disease in the "Abel Santamaría" neighborhood in Santiago de Cuba.

The achievements reached after the use of reading as a tool for cognitive stimulation in people prone to Alzheimer's disease are expressed in:
• Improve the quality of life of these people.
• To slow down (where possible) the progression of the disease.
• Maximize the patient's personal autonomy in daily tasks.
• Enhance the mental capacities that they still retain.
• Avoid isolation and help them to increase their contact with reality.
• Minimize the stress they experience.
• Dignify the patient.
• Reading awakens the desire to learn, fantasy, creativity, imagination and curiosity to know other places and other realities.

## Conclusions

The theoretical basis made it possible to identify from the process of Therapeutic Physical Culture it is possible to work in the prophylaxis of diseases such as Alzheimer's, affecting it, in its asymptomatic stage; through the training of our memory in the cognitive processes with memory exercises from the practice of reading. In the diagnosis carried out through the different instruments applied, it reveals that young adults with Alzheimer's predisposition of the "Abel Santamaría" neighborhood of Santiago de Cuba have a decrease in memory capacity with a low performance.

We were able to select the activities to work with the text taking into account the most frequent memory performance and forgetfulness of young adults for their training of processes such as perception, attention, memory and executive functions.

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