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PERFIL LINGÜÍSTICO Y ATENCIONAL DE LAS PERSONAS CON DETERIORO COGNITIVO LEVE

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Resumen. Las personas con deterioro cognitivo leve tienen dificultades en su lenguaje y en su atención. En este estudio se pretende describir las características de su lenguaje, y determinar la asociación entre la edad de los participantes y su lenguaje, además de conocer si existe una asociación entre su lenguaje y la atención. Se lleva a cabo un diseño descriptivo correlacional desde un enfoque cuantitativo, en este estudio han participado 31 adultos con deterioro cognitivo leve a los que se les ha aplicado el test Peabody, Neurobel y el Test de las Caras-R. Se han observado múltiples dificultades en el lenguaje de los participantes y se ha observado una asociación moderada entre la edad y el emparejamiento palabra hablada-dibujo; la comprensión de oraciones, la denominación de dibujos y la denominación de acciones. También existe una asociación fuerte entre la expresión y comprensión del lenguaje y la atención; además de una asociación entre el lenguaje y la impulsividad, siendo esta asociación más fuerte en la expresión, que en la comprensión. Se concluye que sí que existen dificultades en su lenguaje en especial en el léxico, y en la comprensión de oraciones; además existe una gran asociación entre las dificultades en el lenguaje y la edad; además de en estas dificultades y en la atención y en la impulsividad. Lo que es de gran utilidad para plantear una posible intervención no farmacológica con esta población.

Palabras clave: lenguaje, deterioro cognitivo leve, atención, vocabulario.

LINGUISTIC AND ATTENTIONAL PROFILE OF PEOPLE WITH MILD COGNITIVE IMPAIRMENT

Abstract. People with mild cognitive impairment have difficulties in their language and attention. The aim of this study is to describe the characteristics of their language, and to determine the association between the age of the participants and their language, as well as whether there is an association between their language and attention. A descriptive correlational design was carried out using a quantitative approach. 31 adults with mild cognitive impairment participated in this study and were administered the Peabody, Neurobel and the Faces-R tests. Multiple difficulties were observed in the participants' language and a moderate association was observed between age and the spoken word-drawing pairing, sentence comprehension, picture naming and action naming. There is also a strong association between language expression and comprehension and attention, as well as an association between language and impulsivity, with the association being stronger for expression than for comprehension. It is concluded that there are indeed difficulties in their language, especially in the lexicon, and in sentence comprehension; there is also a strong association between language difficulties and age; as well as in these difficulties and in attention and impulsivity. This is very useful for considering a possible non-pharmacological intervention with this population.

Keywords: language, mild cognitive impairment, attention, vocabulary.

Introduction

Mild Cognitive Impairment (MCI) was first described by Flicker et al. (1991), but Kral (1962) earlier used the term senescent forgetting to refer to dementia and defined it as the inability to recall relatively insignificant parts of past experiences on certain occasions. Later, in 1986, a panel of experts proposed the term age-related memory impairment (Crook et al., 1986). The International Psychogeriatric Association created the term age-associated cognitive decline (Levy, 1994). Since then, the concept has been enriched, with multiple descriptions of situations between deterioration or loss of various functions and dementia. According to Petersen et al. (1999), this theoretical construct has the following characteristics:

- Presence of a subjective memory problem, preferably corroborated by an informant.
- Evidence of an objective memory impairment with cognitive tests above normal for age and education (1-2 standard deviations).
- Preservation of general intellectual functioning.
- Activities of daily living are essentially preserved (basic criterion in the differential diagnosis with established dementia).
- Absence of dementia

According to Weiner (2010), MCI can be defined as the gray zone between normal cognitive aging and early dementia. People with MCI show greater mnesic impairment than expected for their age but do not meet the criteria for dementia. ICD-11 (World Health Organization, 2018) and DSM-V (American Psychiatric Association, 2014) list MCI as a diagnostic category. The diagnostic criteria in the DSM-V (American Psychiatric Association, 2014) are as follows:

- Evidence of moderate cognitive decline compared to the previous level of performance in one or more cognitive domains (complex attention, executive function, learning and memory, language, perceptual motor ability, or social cognition) [...].
- Cognitive deficits do not interfere with the ability to be independent in activities of daily living (e.g., retains complex instrumental activities of daily living, such as paying bills or following treatments, but needs to make greater effort or resort to compensatory or adaptive strategies).
- Cognitive deficits do not occur exclusively in the context of a confusional syndrome.
- Cognitive deficits are not better explained by another mental disorder (e.g., major depressive disorder, schizophrenia). Specify whether, due to Alzheimer's, frontotemporal lobe degeneration, disease can cause neurocognitive disorders, so a differential diagnosis is needed (p. 641).

This category is important because in this population the annual rate of dementia is 10-15%, while it is 1-2% in the general population (Petersen et al., 2001). Petersen et al. (2018) publish data on the prevalence of MCI and indicate that it is 6.7% in those aged 60-64 years, 8.4% in those aged 65-69 years, 10.1% in those aged 70-74 years, and 14.8% in those aged 75-79 years, and 25.2% in those aged 80-84 years (Petersen et al., 2018). The prevalence of neuropsychiatric symptoms is higher in subjects with MCI than in age-matched cognitively healthy controls; as 35-85% of MCI patients are known to have depression, irritability, apathy, anxiety, agitation, and sleep problems that is associated with subsequent cognitive impairment (Martin & Velayudhan, 2020).

For Petersen et al. (2018), there is no high-quality evidence to support pharmacological treatments for mild cognitive impairment. In patients with MCI, physical and cognitive training (for at least 6 months) is likely to improve cognitive symptoms.

For WHO (WHO Guidelines Approved by the Guidelines Review Committee, 2019), age is the main known risk factor for cognitive decline, but in recent years, several studies (NICE, 2015; Kane et al., 2017; Prince et al., 2014; Livingston et al., 2017) have shown that the development of cognitive decline and dementia is related to other factors: educational attainment, physical inactivity, tobacco use, unhealthy diet, and harmful alcohol consumption. As well, certain medical conditions, such as hypertension, diabetes,

hypercholesterolemia, obesity, and depression, are associated with an increased risk of dementia. Other potentially modifiable risk factors may include social isolation and cognitive inactivity. In addition, cognitive stimulation therapy or cognitive training can also be performed. The National Institute on Aging (NIA), United States, has pointed to cognitive training as an intervention aimed at preventing or delaying the onset of age-related cognitive decline, MCI, or Alzheimer's disease-like dementia (Kane et al., 2017). Therefore, it is necessary to know the language of these people, to know what difficulties they have, and to know in what sense the speech therapy intervention should be performed; and more taking into account that some of the linguistic difficulties they present may improve after speech therapy intervention (Juncos-Rabadán & Pereiro-Rozas, 2002; González-Martín et al., 2019).

Language in Mild Cognitive Impairment (MCI)

People with MCI have difficulties in their language skills (González-Martín et al., 2019; Mueller et al., 2018). Although information can be found in this regard, the language skills studied so far are restricted, with verbal memory, verbal fluency, semantic fluency, and naming being among the most frequent (Taler & Philips, 2007).

Rodríguez et al. (2018) explain that people with mild cognitive impairment present a decline in lexical processes; De la Hoz et al. (2021) explain that there are difficulties in their vocabulary and lexical processes and talk about difficulties in pseudoword processing and access to meaning; in this sense, Juncos-Rabadán et al. (2010) determine that there are also a number of difficulties related to naming and word memory; since, together with verbal fluency, they are predictors of the evolution of MCI towards dementia. According to Rodriguez et al. (2008), older people with MCI also present more pronounced tip-of-the-tongue phenomena than healthy elderly people, which implies a greater use of paraphasias.

According to De la Hoz et al. (2021), the second most affected area in people with MCI is the production of narrative discourse. In this sense, Flicker et al. (1991), Alonso-Sánchez et al. (2018), and Taler & Philips (2007) determine that these patients have difficulties in verbal fluency, propositional density, and grammatical complexity, which could cause them to have difficulties in their narrative discourse (Johnson & Lin, 2014). In addition, they perform shorter sentences and lower performance in autobiographical narrative (Chapman et al., 2002). It also affects narrative discourse, the errors they make when using complex sentences, the reduction in the number of words they include in their sentences, and some slight syntactic errors (such as problems when coordinating verb number and tense) (Mueller et al., 2018). In addition, there is a reduction in the ability to maintain discursive topic (Machado-Goyano et al., 2018).

Another area in which alterations are detected is in listening and reading comprehension, as it can be difficult for them to remember information and understand passive sentences (De la Hoz et al., 2021).

Method

A descriptive correlational design is carried out from a quantitative approach (Hernández-Sampieri & Mendoza-Torres, 2018). Thirty-one adults diagnosed with Mild Cognitive Impairment participated. The Peabody Picture Vocabulary Test (Dunn et al., 2006), Neurobel (Adrián et al., 2015), and the Faces Test - R. Test of Perception of Differences - Revised (Thurstone & Yela, 2012) were applied.

Study objectives and hypotheses

The hypothesis of the study is to prove that there is an association between age, intensity of cognitive impairment, attention, and impulsivity with the different language characteristics of people with mild cognitive impairment.

As a result of this hypothesis, the objectives of this research have been developed, which, in general, are (a) To describe the language characteristics of people with mild cognitive impairment. (b) To determine the association between the results of the age of the participants and the results of the Neurobel (Adrián et al., 2015). (c) To analyze whether there is an association between the results of the Faces-R Test (Thurstone et al., 2012) and the results of the Neurobel (Adrián et al., 2015).

Participants

In the study presented, the sample is intentional, consisting of 31 adults with mild cognitive impairment, 41.9% of whom are men and 58.1% women. In order to reach this sample, the people admitted to a social-health center were analyzed, obtaining a total population with a diagnosis of mild cognitive impairment of 58 adults. After applying the exclusion criteria to this population, a total sample of 31 participants was obtained. The age of the participants is between 57 years and 95 years, with a mean of 81.48 years (σ=9.24). The mean center stay is between 5 months and 24 years and 8 months, with a mean of 2 years and 10 months (34.63 months) (σ=53.88). Some 77.4% have primary education, 9.7% have secondary education, and 12.9% have university education. All patients attended the center for physiotherapy, occupational therapy, psychosocial therapy: groups, psychotherapy, labor therapy, etc. As can be seen, this is an older sample, institutionalized in a social-health center.

The criteria for sample selection are as follows:

- Patients diagnosed with Mild Cognitive Impairment, i.e., with an MEC-35 score of 24-35 points.
- Patients who collaborate and participate in the test.
- That the cognitive impairment is not caused by medical conditions, which may be present but are currently under control and do not now appear to be influencing their cognitive status. For example, there are several cases of patients with cardiac, infectious, endocrinological (e.g., diabetes) conditions, etc. Medical conditions that may cause cognitive impairment but, in the current state, are treated and controlled, and it can be reasonably inferred that they are not now influencing this. There are also other difficulties that may cause cognitive impairment (depression, etc.) that are also ruled out in the differential diagnosis performed.

Techniques and Instruments

Several instruments are used; the first is the Mini-Examen Cognoscitivo (MEC-35), it is the Spanish version (Lobo et al., 1980) of the Mini-Mental State Examination (MMSE) of Folstein et al. (1975). It explores the following areas: Temporal and spatial orientation, Immediate memory, Attention and calculation, Delayed memory, Language and praxis. The cut-off point is 24 for people aged 65 and over. Above these figures is considered normal cognitive functioning and below is considered possible cognitive impairment. Although below 24 may be normal in the geriatric population, taking into account age and level of education (Lobo, 1999).

The second is the Peabody Picture Vocabulary Test (Dunn et al., 2006), which aims to assess the level of receptive vocabulary.

Also applied is the Neurobel (Adrián et al., 2015), which is a brief neuropsychological battery used to assess oral expression and comprehension. In the oral comprehension dimension, four tasks are included: phoneme discrimination task, auditory lexical decision task, spoken word-drawing matching task, and sentence comprehension task; while in the production dimension, four other tasks are included: repetition task, picture naming task, action naming task, and sentence completion task. The higher the score on each of the variables, the higher the proficiency in that skill.

The last one applied is the Faces Test - R. Difference Perception Test - Revised (Thustone et al., 2012), which evaluates the skills required to perceive similarities and differences in a set of three faces in which one of them is different. In this test, we obtain four results: number of hits, number of errors, number of hits minus errors, and the Impulsivity Control Index (ICI).

Procedure and data analysis

The data collection process is carried out by a speech therapist and a geriatrician working in an interdisciplinary manner. The evaluation of the participants is individual, with a duration of 1 hour and a quarter divided into three sessions. First, all participants are informed of the study and sign the informed consent form. Subsequently, the tests are applied in the order in which they have been presented previously, and finally the statistical analysis of the results is carried out. The SPSS 24.0 software for Windows is used, which allows us to perform a descriptive analysis and the Kolmogorov-Smirnova normality test indicates that the sample does not have a normal distribution since the significance level of all the variables to be analyzed is less than 0.05, so it was decided to perform nonparametric statistical tests such as Spearman's Rho test.

Results

Clear presentation of the results obtained. Table 1 shows the descriptive statistics of all the variables, the minimum and maximum obtained for each variable are explained, as well as the mean and standard deviation.

Table 1
Descriptive statistics of all variables

	N	Minimum	Maximum	Media	Standard deviation
MEC	31	24	30	26.35	1.314
Months entered	31	5	296	34.63	53.88
Age	31	57	95	81.48	9.24
Neurobel phoneme discrimination	31	1.00	11.50	7.94	2.46
Neurobel auditory lexical decision	31	5.50	11.50	9.31	1.53
Neurobel spoken word-drawing pairing	31	8.00	16.00	13.55	2.01

Neurobel sentence comprehension	31	2.00	12.00	6.50	2.54
Neurobel repetition	31	2.50	11.50	8.53	1.91
Neurobel designation of drawings	31	4.00	12.00	8.74	2.36
Neurobel share denomination	31	3.00	12.00	7.42	3.02
Neurobel complete sentences	31	.00	12.00	5.58	2.74
Neurobel understanding	31	27.00	49.50	37.00	6.16
Neurobel expression	31	15.50	46.50	30.27	7.67
Neurobel Total	31	45.00	91.00	67.27	13.15
Faces test. PD Hits	31	3.00	34.00	10.00	7.82
Faces test. PD errors	31	.00	35.00	7.68	6.73
Faces test. Hits minus Errors (PD)	31	-25.00	33.00	2.77	11.32
Faces test. ICI (PD)	31	-53.84	100.00	21.77	42.56
Peabody CI	31	55.00	127.00	79.87	17.17
Peabody PT	31	.10	96.00	16.53	26.44

Table 1 shows that all participants have mild cognitive impairment since they have a score on the MEC between the required for inclusion. If we focus on the Neurobel results, we observe that there are greater difficulties in expression (30.27) than in comprehension (37) since in this test the lower the results the greater the difficulties in this area. On the other hand, we are going to analyze the results of the Neurobel subtests whose maximum score can reach 12, which are all except the spoken word-drawing pairing. In order of greatest to least difficulty are the following: sentence completion, sentence comprehension, action naming, phoneme discrimination, repetition, picture naming, and finally auditory lexical decision. In addition, it is observed that they have some difficulties in vocabulary comprehension (Peabody IQ=79.87) and a high ICI (21.77).

Table 2 below shows the results of Spearman's Rho test for the results of age and many other variables. The same analysis was also performed with the time entered, but it was decided not to show the results in the Table since the p-value of this correlation indicated that there was no correlation in these.

Table 2
Spearman's Rho test between the age score and different variables

	Age	
	Correlation coefficient	Sig. (bilateral)
Neurobel spoken word-drawing pairing	-.384	.000
Neurobel sentence comprehension	-.335	.000
Neurobel designation of drawings	-395	.000
Neurobel share denomination	-.395	.000

Table 2 shows how all the values presented are associated with each other; since Sig. (bilateral) on all these occasions is less than 0.05. To understand Table 2, it is necessary to know that when the correlation coefficient is between 1 and 0.5 or -1 and 0.5 there is a strong association; when it is between 0.49 and 0.3 or -0.49 and -0.3 there is a moderate association and when it is less than 0.29 or - 0.29 it is a weak association. If the result is positive, it indicates that when one variable increases the other also increases; and if the result is negative, it indicates that when one variable increases the other decreases. Therefore, it can be determined that in all cases there is a moderate negative association. This indicates that when age increases the Neurobel results shown in the Table decrease, so age is a determinant.

Table 3
Spearman's Rho test between Neurobel comprehension, expression, total and different variables.

	Neurobel understanding		Neurobel expression		Neurobel total	
	Correlation coefficient	Sig. (bilateral)	Correlation coefficient	Sig. (bilateral)	Correlation coefficient	Sig. (bilateral)
Neurobel Phoneme discrimination	.759	.000	.544	.002	.665	.000
Neurobel Auditory lexical decision	.587	.001	.476	.007	.563	.001
Neurobel spoken word-drawing pairing	.658	.000	.637	.000	.676	.000
Neurobel sentence	.655	.000	.494	.005	.597	.000

comprehension						
Neurobel repetition	.334	.067	.531	.002	.460	.009
Neurobel designation of drawings	.558	.001	.755	.000	.697	.000
Neurobel action denomination	.780	.000	.860	.000	.859	.000
Neurobel complete sentences	.624	.000	.751	.000	.727	.000
Neurobel understanding	1.000	-	.818	.000	.942	.000
Neurobel expression	.818	.000	1.000	-	.955	.000
Neurobel Total	.942	.000	.955	.000	1.000	-
Faces test PD hits	.584	.001	.569	.001	.619	.000
Faces test PD errors	-.375	.038	-.358	.048	-.367	.042
Faces test - hits minus errors (PD)	.641	.000	.573	.001	.639	.000
ICI face test (PD)	.352	.052	.466	.008	.426	.017
Peabody PD	.779	.000	.649	.000	.749	.000
Peabody CI	.787	.000	.592	.000	.707	.000
Peabody PT	.787	.000	.593	.000	.708	.000

Table 3 shows the association between Neurobel scores and other factors. This time there is an association between all the variables analyzed except between Neurobel comprehension with Neurobel repetition (Bilateral Sig. = 0.067 > 0.005) and the other pair: Neurobel comprehension with the ICI Faces Test (PD) repetition (Bilateral Sig. = 0.052 > 0.005). Almost all Neurobel variables have a strong association with the Peabody, indicating that vocabulary comprehension is strongly related to having good results in language comprehension and expression and in total language. In addition, this strong association between the two Neurobel dimensions and the total score can also be observed with the Faces Test scores (Hits and Hits minus errors), but it has less association with the Faces Test scores errors and with the ICI. This indicates that there is also a strong association between attention and impulsivity with the different language parameters.

Discussion and conclusions

The objectives that were pursued have been met since, on the one hand, the language characteristics of people with mild cognitive impairment have been described, observing difficulties in different linguistic competences (González-Martín et al., 2019; Mueller et al., 2018). This is important since several dimensions have been analyzed, and so far, these types of studies are restricted studies related to verbal memory, verbal fluency, semantic fluency, and naming have been emphasized (Taler & Phililps, 2007); but no studies have been found that relate impulsivity and attention of these participants with their language as has been done in this research. Although, there are studies that describe difficulties in attentional and inhibitory processes and information processing (Aguilar, 2018; Juncos-Rabadán & Pereiro-Rozas, 2002). Especially, in healthy aging population (Allain et al., 2005; Treitz et al., 2007) since it is known that normal aging is characterized by a slowdown in information processing, which in turn involves an alteration in the selection and wakefulness processes that are intimately connected with attentional processes (Aguilar, 2018).

The second objective has also been met in which the association between the results of the age of the participants and the Neurobel results has been determined. In this regard, a moderate association was observed between age and the spoken word-drawing pairing, sentence comprehension, picture naming, and action naming. This indicates that age is a determinant, and the older the participants are the more difficulties they have in these areas. This is not surprising since this view is supported by other relevant authors such as Facal et al. (2009) and Puyuelo & Bruna (2006) who indicate that age is a determinant in both expressive and comprehension language skills (Facal et al., 2009; Puyuelo & Bruna, 2006). Although, it is true that these studies do not focus only on people with MCI but on people with healthy aging. Taking into account the results presented in this article, it can be determined that these age-associated difficulties are most noticeable in the lexicon (spoken word-drawing matching as well as naming of actions and drawings). These difficulties are observed in the studies of Pereiro et al. (2006); but no other studies have been found that focus only on sentence comprehension, but there are difficulties at the level of expression of complex sentences (López-Higes et al., 2010) and also in difficulties in general verbal knowledge (Verhaeghen, 2003).

On the other hand, it is observed that there is a moderate association between Neurobel scores and each other since they all measure different language parameters. The same is true for the Neurobel results and the Peabody results because the Peabody measures vocabulary comprehension. Some authors such as Puyuelo and Bruna (2006) state that vocabulary is usually maintained in the MCI group thanks to experience and practice with language on a daily basis; but it is true that although it is usually maintained, they do have difficulties in semantic memory, access to vocabulary, and fluency to find words in their spontaneous speech (Bataller & Moral, 2006); but in addition to finding these results in this study, the correlation of this vocabulary with other language skills has also been observed, which leads us to conclude that it is a priority to work on the semantic dimension in people with MCI when performing speech therapy in this population.

The last objective was to analyze whether there is an association between the results of the Faces-R test and the results of the Neurobel test. It is observed that there is a strong association between the expression and comprehension of language and the

totality of this with the successes of the Faces Test, which indicates that there is an association between these and attention. There is also an association between language in all its measures and impulsivity, although this association is stronger in expression than in comprehension. These results are important because until now it was known that difficulties in sustained attention may be key to the prediction of cognitive impairment (Pérez-Díaz et al., 2013), but this has not been explored in depth, and an analysis of associations between language and attention, as has been done in this study, has not been carried out.

It is necessary to consider a series of important limitations of this study: firstly, all the participants in this research were institutionalized in a socio-sanitary center, which has meant that all of them had a daily stimulation typical of life in these institutions; something different from the language stimulation received by a person living alone or in company at home; secondly, it must be taken into account that the sample is limited; and thirdly, this study should be continued, comparing this population with others, in order to be able to achieve generalizable results.

But even so, this work has reached several important conclusions. The first conclusion is that people with MCI have certain difficulties with their language in general. In particular, it has been determined that people with MCI show worse results in spoken word-drawing matching, sentence comprehension, picture naming, and action naming the older they get. It is also concluded that there is a strong association between expressive and comprehensive language skills and vocabulary comprehension. There is also a strong association between expressive and comprehensive skills and attention; and there is also a moderate association between language expression and comprehension and impulsivity. This result is novel, not having been previously studied in other scientific articles. All these results are very useful to be able to carry out a correct evaluation and non-pharmacological intervention with this population.

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