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ORIGINAL ARTICLE

Episodic memory and self-perceived memory in older adults during the pandemic

Memoria episódica y memoria autopercibida en adultos mayores durante la pandemia

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Abstract

Background: To reduce the spread of the coronavirus disease 19 (COVID-19), measures such as lockdown and physical/ social distancing were implemented, generating concern about the impact of these measures on the functionality and performance of older adults in different areas. **Objectives:** The objectives of the study were to compare the functioning of episodic memory and self-perceived memory between men and women aged over 60 during the COVID-19 pandemic lockdown. **Materials and methods:** This was a cross-sectional, descriptive, and comparative study. Sociodemographic characteristics and memory functioning data were collected from 50 older adults. Student t-tests and Chi-square tests were conducted to compare performance between groups. In addition, correlations were conducted to determine the association between episodic memory and self-perceived memory, and between episodic memory and years of education. **Results:** Similar self-perception of memory and good functioning of episodic memory were found in both groups, except for memory curve encoding and Rey-Osterrieth figure encoding. The years of education were associated with performance in episodic memory. **Conclusion:** The lockdown and physical/social distancing during the COVID-19 pandemic negatively influenced self-perception of memory functioning. The maintenance of proper functioning of episodic memory may have benefited from the use of electronic devices and applications that functioned as sources of cognitive stimulation.

Keywords: Episodic memory. Self-perceived memory. Older adults. Coronavirus disease 19 pandemic. Lockdown.

Resumen

Antecedentes: Para reducir la propagación de la COVID-19, se implementaron medidas como el confinamiento y el distanciamiento físico/social, generando preocupación sobre el impacto de estas medidas en la funcionalidad y desempeño de los adultos mayores en diferentes áreas. Objetivo: Comparar el funcionamiento de la memoria episódica y la memoria autopercibida entre hombres y mujeres mayores de 60 años durante el confinamiento por la pandemia de COVID-19. Material y métodos: Estudio transversal, descriptivo y comparativo. Se obtuvieron características sociodemográficas y de funcionamiento de la memoria en 50 adultos mayores. Para comparar desempeño entre sexos se realizaron pruebas t de Student y Chi-cuadrado. Además, se realizaron correlaciones para determinar la asociación entre la memoria episódica, la memoria autopercibida y los años de escolaridad. Resultados: Se encontró similar autopercepción de la memoria y buen funcionamiento de la memoria episódica en ambos sexos, excepto en la codificación en curva de memoria y la figura de Rey-Osterrieth. Los años de escolaridad se asociaron con el funcionamiento de la memoria episódica.

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Conclusión: El confinamiento y el distanciamiento físico/social durante la pandemia por COVID-19 influyó negativamente en la autopercepción del funcionamiento de la memoria. El mantenimiento de buen funcionamiento de la memoria episódica pudo beneficiarse por el uso de dispositivos electrónicos y aplicaciones que funcionaron como fuentes de estimulación cognitiva.

Palabras clave: Memoria episódica. Memoria autopercibida. Adultos mayores. Pandemia de COVID-19. Confinamiento.

Introduction

The coronavirus disease 19 (COVID-19) pandemic revealed the vulnerability of the elderly population worldwide. COVID-19 was characterized by significant variability in signs, symptoms, recovery periods, sequelae, and mortality. Regarding the latter, the World Health Organization reported high rates in the elderly population¹. The Panamerican Health Organization indicated that the usual presence of a weakened immune system and multiple comorbidities hindered the ability of this age group to respond to infectious processes originating from COVID-19². In addition to this, the disease was highly contagious. To reduce the spread of the virus through preventive strategies, measures such as lockdown and physical/social distancing were implemented^{1,3}, generating concern about the impact of these measures on the functionality and performance of older adults in different areas. It was considered that there would be a clear impact on cognitive functions due to a decrease in stimulation⁴. It is worth noting that episodic memory (the ability for conscious recall of facts and events)⁵ has been reported in the literature as one of the most vulnerable types of memory during aging⁶. Likewise, Navarro-González et al. confirmed previous reports documented in the scientific literature indicating that women have better performance in verbal memory, as well as a higher capacity for verbal learning⁷.

The objective of this study was to compare the functioning of episodic memory and self-perceived memory between men and women aged over 60 during the COVID-19 pandemic lockdown.

Materials and Methods

The results reported here are part of the findings from a larger cross-sectional, descriptive, and comparative study.

Twenty-five men and twenty-five women responded to a call disseminated on social networks. Inclusion criteria were being 60 years of age or older, elementary school as minimum scholarship, report access to the Internet, skills to participate in an online video call, and a MoCA⁸ score \ge 24 points. The MoCA was administered to rule out the presence of cognitive impairment. The memory section of Neuropsi⁹ was used to determine the functioning of episodic memory, and a questionnaire created in a Google Form was used to collect demographic information and to respond two questions about self-perceived memory: (1) On a scale from 1 to 10, how do you rate your memory during this period of lockdown? Where 1 corresponds to "very poor" and 10 to "very good," and (2) On a scale from 1 to 10, do you consider that your memory has become a problem for you during this time? Where 1 corresponds to "not problematic at all" and 10 to "very problematic."

Volunteers received an email containing the link to an on-line questionnaire created in the platform Google Forms. Once their response was recorded in the system, a video call meeting was scheduled, beginning with the administration of the MoCA and followed by the Neuropsi memory test. It is worth noting that the subtest of cubes in regression (Corsi cubes) was excluded due to the difficulty of performing it through a video call. The protocol was approved by an Institutional Research and Ethics Committee (No. 32/21). Participants signed an informed consent and authorized the use of anonymized data.

Statistical analysis

A descriptive analysis was conducted, obtaining means and standard deviations for quantitative variables and frequencies and percentages for qualitative variables. To determine differences between groups by gender, Student t-tests and Chi-square tests were performed. Pearson and Spearman correlations were calculated to determine the association between episodic memory, self-perceived memory, and years of education. The analysis was conducted using SPSS Statistics version 26, with a significance level set at $p \leq 0.05$.

Results

The mean age for the groups was similar, 68.9 years for women and 67.7 for men and the years of education

Characteristics	Women	Men	p-value
Age (\overline{x})	68.96	67.76	0.465
Residence Mexico city (%) Morelos (%) Estado de México (%) Querétaro (%) Puebla (%) Yucatán (%) Hidalgo (%) Guanajuato (%) Durango (%)	60 16 - 8 4 4 4 4 4 -	76 8 - 4 - - 4	0.331
Marital estatus Single (%) Married (%) Widowed (%) Common-law (%)	36 44 16 4	20 68 - 12	0.059
Educational level Basic education (%) Higher education (%)	56 44	28 72	0.045*
Years of education (\overline{x})	16.8	18.4	0.051
Overall performance in episodic memory High normal (%) Normal (%) Mild to moderate impairment (%)	32 68	24 72 4	0.518
Self-perception of memory Functioning (0 = very poor - 10 = very good) (\overline{x}) Problematic (0 = not problematic at all - 10 = very problematic) (\overline{x})	6.8 4.2	7.3 3.2	0.385 0.220

Table 1. Sociodemographic characteristics, episodic memory functioning, and self-perception of memory

p-value calculated with Student's t-test for age and self-perception of memory, and Chi-square for variables where percentages are reported. * $p \le 0.05$.

of 16.8 years for women and 18.4 for men. For both groups, the most common place of residence was Mexico City, and the marital status was predominantly married. A significant difference was found in the level of education, with basic education being the most common for women and higher education for men. When analyzing the overall functioning of episodic memory and self-perceived memory, no significant difference was found between the groups (Table 1).

On analyzing the performance in the memory subtests of the Neuropsi, proficient functioning was observed, similar between men and women. However, a significant difference was found in the encoding phase for the memory curve and Rey-Osterrieth figure subtests, indicating that women exhibited superior performance (Table 2).

Furthermore, a correlation was found between self-perception of memory functioning and self-perception of memory as problematic in women (rho = -0.463; p < 0.05) and in men (rho = -0.728; p < 0.01), indicating in both cases that a better perception of memory

functioning was associated with a lower perception of memory as problematic during the lockdown.

In addition, an association was found in women between self-perception of memory functioning and working memory performance (digits retention in regression) (r = -0.435; p < 0.05), indicating that a higher perception of poor memory functioning was associated with the lower performance in digits retention in regression.

Conversely, the number of years of education in men showed a correlation with the recall of the Rey-Osterrieth figure (r = 0.424; p < 0.05), while in women, it correlated with paired associates in both encoding (r = 0.632; p < 0.01) and recall (r = 0.636; p < 0.01). This suggests that in both groups, a higher level of education is associated with better performance in these tests.

Discussion

The results obtained in the present study suggest that the performance of episodic memory in a sample

Table 2. Percentage of episodic memory functioning in women and men

Characteristics	Women	Men	p-value
Working memory Digit retention in regression High normal (%) Normal (%) Mild to moderate impairment (%) Severe impairment (%)	16 76 8 -	12 84 4 -	0.750
Encoding Memory curve High normal (%) Normal (%) Mild to moderate impairment (%) Severe impairment (%)	36 60 4 -	8 80 12	0.046*
Associated pairs High normal (%) Normal (%) Mild to moderate impairment (%) Severe impairment (%)	12 88 - -	12 80 8 -	0.351
High normal (%) Normal (%) Mild to moderate impairment (%) Severe impairment (%) Bev-Osterrieth figure	28 68 4 -	20 68 12 -	0.513
High normal (%) Normal (%) Mild to moderate impairment (%) Severe impairment (%) Faces	92 - 8	4 76 20	0.039*
High normal (%) Normal (%) Mild to moderate impairment (%) Severe impairment (%)	- 100 - -	- 100 - -	-
Recall Spontaneous verbal memory High normal (%) Normal (%) Mild to moderate impairment (%) Severe impairment (%)	24 72 4	20 76 4	0.943
Verbal memory cues High normal (%) Normal (%) Mild to moderate impairment (%) Severe impairment (%)	40 56 4	24 76 -	0.252
Verbal memory recognition High normal (%) Normal (%) Mild to moderate impairment (%) Severe impairment (%)	32 68 -	28 68 4	0.587
Associated pairs High normal (%) Normal (%) Mild to moderate impairment (%) Severe impairment (%)	36 60 4	32 60 4 4	0.787
Logical memory of stories High normal (%) Normal (%) Mild to moderate impairment (%) Severe impairment (%)	32 64 4	40 56 4	0.837
High normal (%) Normal (%) Mild to moderate impairment (%) Severe impairment (%)	8 84 8	24 72 12	0.277

Characteristics	Women	Men	p-value
Face recognition High normal (%) Normal (%) Mild to moderate impairment (%) Severe impairment (%)	- 92 8 -	4 84 4	0.524

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p-value calculated with Chi-square.

[•] *p ≤ 0.05.

of men and women residing in Mexico City remained in good functioning order during the lockdown resulting from the COVID-19 pandemic, with women performing better in the memory curve and copy Rev-Osterrieth figure subtests at the time of encoding. In this regard, the results of this study are consistent with previous research that highlights a greater ability of older women in verbal memory and learning⁷. On the other hand, the better performance in the Rey-Osterrieth figure, in this case, may not be related to visuospatial skills but rather to the encoding process. Quantitatively (Table 2), it is possible to observe that men showed a higher frequency of mild to moderate impairment at the encoding moment, that is, during the recording, manipulation, and initial organization of information⁹. In addition, it was observed that the years education positively influence men's performance in recalling the Rey-Osterrieth figure, aligning with existing literature that highlights their enhanced visuospatial abilities7. For women, on the other hand, years of education were found to enhance both encoding and recall in the paired associated subtest, indicating a heightened proficiency in verbal learning⁷. In this sense, Carbone et al.¹⁰ conducted a study in which good functioning of working memory and long-term memory was found in older adults during the pandemic. On the other hand, guantitatively, the self-perception of memory was perceived as regular by both groups, data that aligns with findings reported in studies conducted during the pandemic^{11,12}, where between 28% and 54% of participants reported poor functioning^{13,14}, with women reporting more subjective memory failures¹². It is worth noting that, despite the volunteers' less than encouraging self-perception of memory, the functioning of episodic memory reflected good performance. Therefore, it is possible that the situation of lockdown and physical and social distancing may have negatively influenced emotions, mental health, and consequently, their perception of functioning. In this regard, it is worth considering the cognitive model of depression proposed by Aaron Beck¹⁵, in which he suggests that a critical event (in this case, the

pandemic) can activate dysfunctional schemas characterized by negative perceptions or thoughts that foster a negative view of oneself, promoting in this case an unfavorable self-perception about one's memory functioning. In addition, anxiety symptoms, very frequent during the COVID-19 pandemic, have been identified associated to health concerns in older adults during this critical event¹⁶.

Therefore, it is possible that the skills for using electronic devices, and the use of applications that allowed them to initiate and maintain contact through email, text messages, and video calls with family and friends, may have functioned as a significant cognitive stimulator during the pandemic. Virtual connectivity in older adults favored the maintenance of social contact and learning related to its use, promoting neurostimulation, neurogenesis, and increased synaptic activity¹⁷⁻¹⁹.

Conclusion

No significant differences were found in the performance of episodic memory between men and women during the lockdown nullifying the advantage that women present in the previous studies of memory. The confinement and physical/social distancing during the COVID-19 pandemic negatively impacted the self-perception of memory functioning. However, the maintenance of good functioning of episodic memory could have been benefited by the use of electronic devices and applications that served as sources of cognitive stimulation and facilitated social interaction.

In this study, it is possible that the years of education have contributed to the cognitive reserve of the participants, favoring the preservation of the proper functioning of episodic memory.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Ethical disclosures

Protection of human and animal subjects. The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

Use of artificial intelligence for generaring text. The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript, nor for the creation of images, graphics, tables, or their corresponding captions.

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