Cognitive training in patients with cognitive impairment in Parkinson's disease: a systematic review

Ana Torres Gargallo

Tutor: Mercè Correa Sanz
Cotutor: Carla Carratalá Ros

Resumen

La Enfermedad de Parkinson (EP) es un trastorno neurodegenerativo que cursa con síntomas tanto motores como cognitivos. Los síntomas cognitivos más comunes en la EP son déficits en la velocidad de procesamiento, en funciones visoespaciales, en la memoria, en la función ejecutiva y en la atención. Estos déficits cognitivos son más evidentes cuando los pacientes necesitan generar conductas en base a señales internas y cuando necesitan cambiar de tarea entre tareas bien aprendidas. El deterioro cognitivo produce un peor desarrollo de actividades de la vida cotidiana, y por tanto, disminuye la calidad de vida de estas personas. Además, normalmente el deterioro cognitivo derivará en demencia en pacientes EP. El objetivo de este trabajo es evaluar los síntomas cognitivos predominantes en la Enfermedad de Parkinson (EP) y como el tratamiento no farmacológico, puede mejorar estos síntomas. Durante la revisión se siguieron las directrices de PRISMA para las diferentes fases: 1) fase de identificación (número total de registros encontrados), 2) fase de cribado (número de registros excluidos), 3) fase de elegibilidad (los estudios finalmente incluidos). Se establecieron los siguientes criterios de inclusión: ensayos clínicos, publicados entre 2011-2021, en inglés y población con EP. Los resultados mostraron que, en su gran mayoría, los entrenamientos cognitivos utilizados fueron eficaces para mejorar el rendimiento cognitivo tanto en memoria, velocidad de procesamiento, atención como en función ejecutiva, en pacientes con EP. En conclusión, tratamientos no farmacológicos como las estrategias de entrenamiento cognitivo o la estimulación cognitiva pueden retrasar el desarrollo de deterioro cognitivo en personas con EP, por lo tanto, estas pueden contribuir a una mejora de la calidad de vida de estas personas. Aunque, son necesarios más estudios en este campo.

Palabras clave: *Enfermedad de Parkinson, deterioro cognitivo, tratamiento, estrategias cognitivas*

Abstract

Parkinson's disease (PD) is a neurodegenerative disorder with both motor and cognitive symptoms. The most common cognitive symptoms in PD are deficits in processing speed, visuospatial functions, memory, executive function and attention. These cognitive deficits are most evident when patients need to generate behaviors based on internal cues and when they need to switch tasks between well-learned tasks. Cognitive impairment results in poorer performance of activities of daily living, and therefore decreases the quality of life of these individuals. In addition, cognitive impairments are usually the main core for dementia in PD. The main objective of this study is to evaluate the predominant cognitive symptoms in Parkinson's disease (PD) and how non-pharmacological treatment can improve these symptoms. The PRISMA guidelines for the different phases were followed during the review: 1) identification phase (total number of records found), 2) screening phase (number of records excluded), 3) eligibility phase (the studies finally included). The following inclusion criteria were established: clinical trials, published between 2011-2021, in English and PD population. The results showed that, for the most part, the cognitive training used was effective in improving cognitive performance in memory, processing speed, attention and executive function in patients with PD. In conclusion, non-pharmacological treatments such as cognitive training strategies or cognitive stimulation can delay the development of cognitive impairment in people with PD, therefore, they can contribute to an improvement in the quality of life of these people. However, more studies are needed in this field.

Key words: *Parkinson's disease, cognitive impairment, treatment, cognitive strategies*

Cognitive training in patients with cognitive impairment in Parkinson's disease: a systematic review

Student : Ana Torres Gargallo
Tutor: Mercè Correa Sanz
Co-tutor: Carla Carratalá Ros
PS1048-TFG Psicología 2020-2021

INTRODUCTION

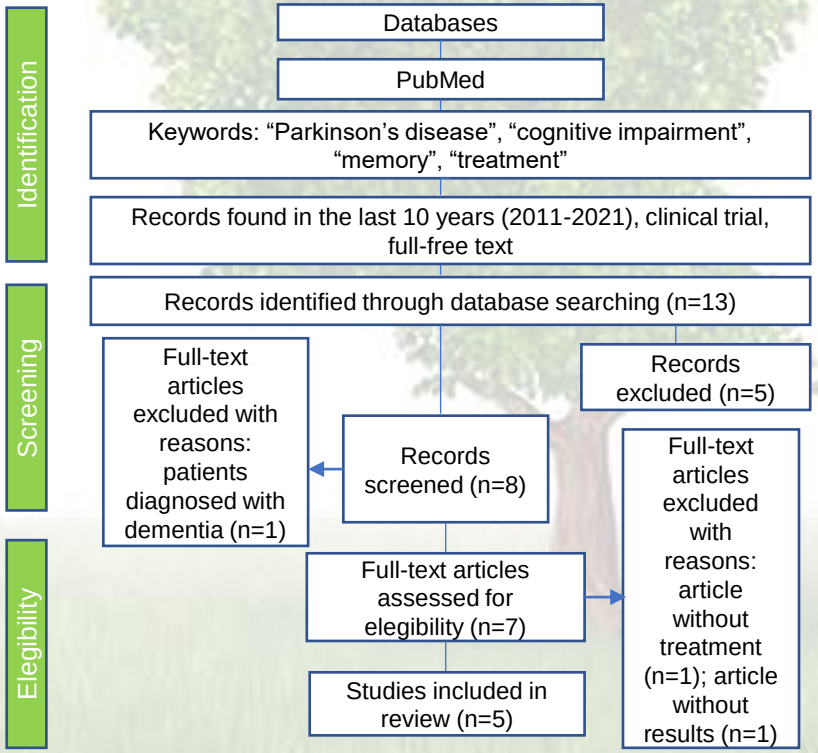
Parkinson's disease (PD) is a neurodegenerative disorder with motor and cognitive symptoms. The most common cognitive symptoms in PD are deficits in processing speed, visuospatial functions, memory, executive function and attention. In addition, cognitive impairments are usually the main core for dementia in PD.

OBJECTIVE

To evaluate the predominant cognitive symptoms in Parkinson's disease (PD) and how non-pharmacological treatment can improve these symptoms.

METHODOLOGY

PRISMA guidelines



RESULTS

AUTHOR	OBJECTIVE	METHODOLOGY	RESULTS
Foster, E.R., et al. (2017)	To investigate the effect of implementation intentions (II) on PM performance in PD.	3 groups: II, RR and control group Virtual Week Repeated/non repeated tasks, event/time, T0/T1	- PM performance better with the use of any strategy (II or RR) than with standard instructions - Better performance for repeated, event-based and T1 (strategy) tasks compared to non-repeated, time-based and T0 (non-strategy) tasks. - Group II had a greater improvement in T1 than RR. - II better in non-repetitive tasks than RR.
Peña, J., et al. (2014)	To examine the efficacy of REHACOP to improve cognition, clinical symptoms and functional disability in patients with PD.	2 groups: REHACOP and control Neuropsychological evaluation: TMT, Salthouse Letter Comparison Test, Hopkins Verbal Learning Test, Brief Visual Memory Test, Stroop, MMSE	- Cognitive performance of the control group was better than the REHACOP group at baseline. - PD patients who received cognitive training with REHACOP demonstrated statistically significant and clinically relevant changes in processing speed, visual memory.
Lau, C.I., et al. (2019)	To explore the single-session tDCS effects on cognitive performance in PD	2 groups: tDCS anodal and tDCS sham in left DLPFC Visual working memory task and go/no-go	- Single-session anodal tDCS over the left DLPFC didn’t significantly improve cognitive tasks in PD compared to the control group (sham tDCS). So, it isn’t sufficient to improve WM and inhibitory control in PD patients.
van de Weijer, S. C., et al. (2016)	To evaluate the effects of a cognitive health games intervention on cognition in PD.	2 groups: intervention and control group MoCA → global baseline cognition Intervention group: MyCognition Quotient, MyCQ and AquaSnap	- Cognitive training has been shown to be able to produce improvements in the main neuropsychological domains involved in PD such as memory, attention, processing speed and executive function compared to the control group.
Goedeken, S., et al. (2018)	To compare the effects of II (implementation intentions) and VR (verbal rehearsal) training on daily prospective memory in PD patients.	2 groups: II II (implementation intentions) and VR (verbal rehearsal) PRMQ-Pro in baseline and one month after training MoCA	- The PRMQ-Pro scores of the VR group decreased from before to after training, whereas those of group II remained stable.

CONCLUSIONS

Non-pharmacological treatments such as cognitive training strategies or cognitive stimulation can delay the development of cognitive impairment in people with PD.

These are able to improve the main neuropsychological cognitive domains involved in PD, such as memory, attention, processing speed and executive function (van de Weijer et al, 2016).

Therefore, they can contribute to an improvement in the quality of life of these people.

More studies are needed in this field since there are few of them and they have limitations.

Bibliografía

Foster, E. R., McDaniel, M. A., & Rendell, P. G. (2017). Improving prospective memory in persons with Parkinson disease: A randomized controlled trial. *Neurorehabilitation and neural repair*, *31*(5), 451-461.

Goedeken, S., Potempa, C., Prager, E. M., & Foster, E. R. (2018). Encoding strategy training and self-reported everyday prospective memory in people with Parkinson disease: A randomized-controlled trial. *The Clinical Neuropsychologist*, *32*(7), 1282-1302.

Lau, C. I., Liu, M. N., Chang, K. C., Chang, A., Bai, C. H., Tseng, C. S., ... & Wang, H. C. (2019). Effect of single‐session transcranial direct current stimulation on cognition in Parkinson's disease. *CNS neuroscience & therapeutics*, *25*(11), 1237-1243.

Peña, J., Ibarretxe-Bilbao, N., García-Gorostiaga, I., Gomez-Beldarrain, M. A., Díez-Cirarda, M., & Ojeda, N. (2014). Improving functional disability and cognition in Parkinson disease: randomized controlled trial. *Neurology*, *83*(23), 2167-2174.

van de Weijer, S. C., Duits, A. A., Bloem, B. R., Kessels, R. P., Jansen, J. F., Köhler, S., ... & Kuijf, M. L. (2016). The Parkin'Play study: protocol of a phase II randomized controlled trial to assess the effects of a health game on cognition in Parkinson's disease. BMC neurology, 16(1), 1-11.