

# COGNITIVE REHABILITATION EFFICACY IN PARKINSON'S DISEASE WITH MILD COGNITIVE IMPAIRMENT: GENDER-RELATED EFFICACY DIFFERENCES

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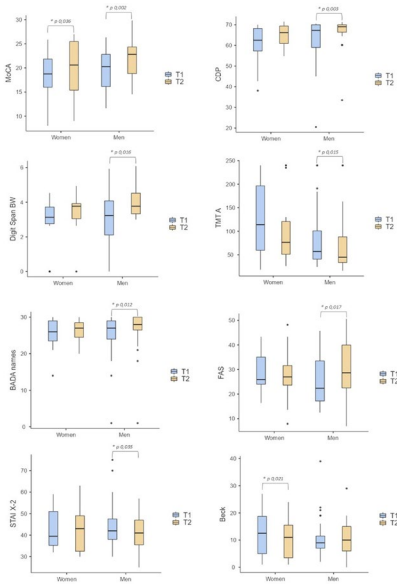
## Introduction

Cognitive stimulation (CS) is a promising treatment in people affected by Parkinson's disease (PD) associated with mild cognitive decline (MCI) [1]. Sex and gender may influence treatment response in PD but no data on gender differences in CS efficacy in PD are available. The aim of this study was to investigate gender-related differences in cognitive performances and efficacy of CS in subjects with PD and MCI (PD-MCI).

## Methodology

Forty-five patients with PD-MCI were enrolled and divided into two groups: a tele-rehabilitation group (TRG, men = 15, women = 10) receiving remote CS, and a control group (CG, men = 15, women = 5) undergoing conventional CS. Neuropsychological assessments were conducted at baseline (T1), after 20 sessions of CS (T2), and after six-months follow-up (T3). This work was supported by the Italian Ministry of Health ("MultiPlat\_Age" project, grant number: NET-2016-02361805-5) [2].

## Results



**FIGURE 1** | Box plot of pre- to post-treatment scores (T1-T2) in men and women. Separate panels show scores for each outcome measure. (A) MoCA, (B) CDP, (C) Digit Span BW, (D) TMT-A, (E) BADA Names, (F) FAS, (G) STAI X-2, (H) Beck. Statistical significance was considered for  $p < 0.05$ . Abbreviations: MoCA = Montreal Cognitive Assessment; CDP = Copy Drawing Performance; BW = Digit Span Backward; TMTA = Trail Making Test Part A; T BADA = Battery for the Analysis of Aphasic Deficits; FAS = Phonemic Verbal Fluency; Beck; STAI X2 = Trait Anxiety Inventory.

At baseline, women showed a lower cognitive reserve (CR) compared to men ( $p=0.039$ ). After adjusting for CR, women performed worse than men in global cognition, attention, and visuospatial abilities. Between T1 and T2, men exhibited significant cognitive improvements in MoCA ( $p = 0.0002$ ), FAS ( $p = 0.0036$ ), FAB ( $p = 0.0047$ ), BADA Naming test for names ( $p = 0.0029$ ) and verbs ( $p = 0.0170$ ). Working memory also improved, as indicated by better performance on the Digit Span Backward ( $p = 0.0045$ ) and Forward ( $p = 0.0130$ ) tests. Enhancements were also observed in visuospatial and praxis abilities (CDP test,  $p = 0.0006$ ), as well as attention (Trail Making Test A,  $p = 0.0055$ ). Women showed significant improvements also in global cognition (MoCA  $p = 0.0252$ ), and mood (BDI  $p = 0.021$ ). Men outperformed women in several domains, both in TR and in-person rehabilitation groups. We performed a repeated-measures ANOVA to compare pre- and post-treatment values (T1 vs. T2) and to test the interaction between treatment modality (tele-rehabilitation vs. face-to-face) and time in both men and women, examining the general outcomes. No statistically significant differences were observed in any performed comparison. Regression models revealed a stronger modulatory effect of CR in global cognition, attention, memory, and language, in women. After a 6-month treatment discontinuation, cognitive performance measures significantly worsened in all subjects, regardless of gender.

## Discussion and Conclusion

Men and women showed different patterns of cognitive impairment at baseline. CS appears effective in enhancing cognitive performance in both genders, with a greater improvement in men than in women. Moreover, women showed a lower cognitive reserve, this result could be related to their reduced response to CS. Given that treatment benefits may diminish over time, longer-term interventions could be necessary to sustain cognitive improvements.

The results highlight the importance of developing gender-tailored cognitive rehabilitation strategies to enhance treatment outcomes and improve the quality of life for individuals with PD-MCI.

## References

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