

**Updated Criteria for the Diagnostic Procedure for Parkinson's Disease
Dementia on Level I**

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Introduction

Methods

Participants

The data of patients with idiopathic PD diagnosed by a movement disorder specialist fulfilling the Movement Disorder Society (MDS) Clinical Diagnostic Criteria for Parkinson's disease (PD) (Postuma et al., 2015) were retrospectively gathered from clinical records acquired between January 2014 and December 2023. All the patients underwent a neuropsychological assessment by a trained clinical psychologist (OB) during a routine examination of cognitive functions as a part of the evaluation process for the indication of Deep Brain Stimulation (DBS) at General University Hospital in Prague. The Ethics Committee of the General University Hospital in Prague had approved the study protocol. All patients provided written informed consent prior to the examination.

Neuropsychological Assessment

Participants were assessed with both MMSE (Folstein et al., 1975; Stepankova et al., 2015) and MoCA (Kopecek et al., 2016; Nasreddine et al., 2005) to measure overall cognitive performance. Moreover, a comprehensive neuropsychological assessment was performed in accordance with MDS Task Force Level 2 criteria for MCI in PD (Litvan et al., 2012). We described our battery including a regression based calculator for normative scores in another study (Bezdicek et al., 2017). Besides other neuropsychological tests, the comprehensive assessment employed Clock Drawing Test (CDT) and Letter Fluency. To establish cognitive performance in individual cognitive domains according to Level 1 criteria for PDD, we used test scores proposed by (Dubois et al., 2007) and their analogues in MoCA, see Table A for details.

Table 1*Comparison of criteria.*

Criteria	Former	New
	MMSE < 26	MoCA < 26
	Serial 7's/months	Serial 7's
Attention	reversed	
	Lexical	Lexical
	Fluency	Fluency
Executive functions	(S)/ Clock	(K)/ Clock
	Drawing Test	Drawing Test
Visuo-spatial functions	Drawing of Pentagons	Drawing of Cube
Memory	3-Word Recall	5-Word Recall
Language	-	Naming of Animals

To measure independence in activities of daily living, we administered Functional Activities Questionnaire (FAQ) (Bezdicek et al., 2011; Pfeffer et al., 1982). To assess neuropsychiatric functioning, we used Beck Depression Inventory II (BDI) (Beck et al., 1996; Ciharova et al., 2020) and State-Trait Anxiety Inventory (STAI)

(Mullner et al., 1980; Spielberger et al., 1983). Psychotic symptoms were assessed in an interview by a trained psychiatrist.

Results

Discussion

References

- Beck, A. T., Steer, R. A., & Brown, G. (1996). *Beck depression inventory-II*. American Psychological Association (APA). <https://doi.org/10.1037/t00742-000>
- Bezdicek, O., Lukavsky, J., & Preiss, M. (2011). Validizační studie české verze dotazníku FAQ. *Ceska a slovenska neurologie a neurochirurgie*, 74(107), 36–42.
- Bezdicek, O., Sulc, Z., Nikolai, T., Stepankova, H., Kopecek, M., Jech, R., & Růžička, E. (2017). A parsimonious scoring and normative calculator for the Parkinson's disease mild cognitive impairment battery. *The Clinical Neuropsychologist*, 31(6-7), 1231–1247. <https://doi.org/10.1080/13854046.2017.1293161>
- Ciharova, M., Cígler, H., Dostálová, V., Šivicová, G., & Bezdicek, O. (2020). Beck depression inventory, second edition, Czech version: demographic correlates, factor structure and comparison with foreign data. *International Journal of Psychiatry in Clinical Practice*, 24(4), 371–379. <https://doi.org/10.1080/13651501.2020.1775854>
- Dubois, B., Burn, D., Goetz, C., Aarsland, D., Brown, R. G., Broe, G. A., Dickson, D., Duyckaerts, C., Cummings, J., Gauthier, S., Korczyn, A., Lees, A., Levy, R., Litvan, I., Mizuno, Y., McKeith, I. G., Olanow, C. W., Poewe, W., Sampaio, C., ... Emre, M. (2007). Diagnostic procedures for Parkinson's disease dementia: Recommendations from the movement disorder society task force. *Movement Disorders*, 22(16), 2314–2324. <https://doi.org/10.1002/mds.21844>
- Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). "Mini-mental state". *Journal of Psychiatric Research*, 12(3), 189–198. [https://doi.org/10.1016/0022-3956\(75\)90026-6](https://doi.org/10.1016/0022-3956(75)90026-6)
- Kopecek, M., Stepankova, H., Lukavsky, J., Ripova, D., Nikolai, T., & Bezdicek, O. (2016). Montreal cognitive assessment (MoCA): Normative data for old and very old

- Czech adults. *Applied Neuropsychology: Adult*, 24(1), 23–29.
<https://doi.org/10.1080/23279095.2015.1065261>
- Litvan, I., Goldman, J. G., Tröster, A. I., Schmand, B. A., Weintraub, D., Petersen, R. C., Mollenhauer, B., Adler, C. H., Marder, K., Williams-Gray, C. H., Aarsland, D., Kulisevsky, J., Rodriguez-Oroz, M. C., Burn, D. J., Barker, R. A., & Emre, M. (2012). Diagnostic criteria for mild cognitive impairment in Parkinson's disease: Movement Disorder Society Task Force guidelines. *Movement Disorders*, 27(3), 349–356. <https://doi.org/10.1002/mds.24893>
- Mullner, J., Ruisl, I., & Farkas, G. (1980). *Dotazník na meranie uzkosti a uzkostlivosti - STAI*. Bratislava: Psychodiagnostické a didaktické testy.
- Nasreddine, Z. S., Phillips, N. A., Bédirian, V., Charbonneau, S., Whitehead, V., Collin, I., Cummings, J. L., & Chertkow, H. (2005). The Montreal Cognitive Assessment, MoCA: A Brief Screening Tool For Mild Cognitive Impairment. *Journal of the American Geriatrics Society*, 53(4), 695–699.
<https://doi.org/10.1111/j.1532-5415.2005.53221.x>
- Pfeffer, R. I., Kurosaki, T. T., Harrah, C. H., Chance, J. M., & Filos, S. (1982). Measurement of Functional Activities in Older Adults in the Community. *Journal of Gerontology*, 37(3), 323–329. <https://doi.org/10.1093/geronj/37.3.323>
- Postuma, R. B., Berg, D., Stern, M., Poewe, W., Olanow, C. W., Oertel, W., Obeso, J., Marek, K., Litvan, I., Lang, A. E., Halliday, G., Goetz, C. G., Gasser, T., Dubois, B., Chan, P., Bloem, B. R., Adler, C. H., & Deuschl, G. (2015). MDS clinical diagnostic criteria for Parkinson's disease. *Movement Disorders*, 30(12), 1591–1601.
<https://doi.org/10.1002/mds.26424>
- Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. &. (1983). *Manual for the state-trait anxiety inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Stepankova, H., Nikolai, T., Lukavsky, J., Bezdicek, O., Vrajova, M., & Kopecek, M. (2015). Mini-Mental State Examination – česká normativní studie. *Ceska a slovenska neurologie a neurochirurgie*, 78(111), 57–63.