Validation of the Italian version of Addenbrooke's Cognitive Examination Revised (ACE-R) in patients with Parkinson's Disease

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Background and Objectives: Cognitive deficit is a non-motor symptom of Parkinson's Disease (PD) and it is associated with a higher chance of developing dementia in the future, in addition to a significant deterioration in quality of life. For these reasons, recognition of cognitive deficits, mainly frontal and visuospatial dysfunctions is very important to identify those patients at high risk for dementia associated with PD. The Addenbrooke's Cognitive Examination Revised (ACE-R, Mioshi et al., 2006) is a short screening test that evaluates five different cognitive domains, for which you can calculate a score separate from the total, and that includes within it the items provided for the Mini Mental State Examination (MMSE). Specifically, the cognitive domains explored are: attention / orientation (18 points), memory (26 points), verbal fluency (14 points), language (26 points) and visuospatial abilities (26 points). Recently, Italian normative data of total ACE-R and its subscores have been provided (Siciliano et al., 2015). The main aims of this study were the validation of the Italian version of the ACE-R in non-demented PD patients and the evaluation of its usefulness in discriminating cognitive dysfunctions, compared to the Mini Mental State Examination (MMSE) and the Montreal Cognitive Assessment (MoCA).

Patients and Methods: 93 consecutive PD patients were enrolled in the present study and underwent to the Italian version of ACE-R, Mini mental State Examination (MMSE, already included in the ACE-R) and the Italian version of Montreal Cognitive Asessment (MoCA, Santangelo et al., 2014). Moreover, all patients underwent to behavioral scales for assessing depression and apathy (Beck Depression Inventory II, BDI-II and Apathy Evaluation Scale, AES, respectively) in order to investigate divergent validity.

Table 1 Descriptive statistics

	Minimum	Maximum	Mean	Standard Deviation
Age (year)	46	84	65,18	8
Educational level (year)	1	18	10,12	4,6
Duration of PD (year)	1	20	8.21	4.436
MMSE	21	30	27,79	2,071
MOCA	13	29	21,17	3,618
ACE-R	54	100	83,67	10,119
AES	18	59	31,48	8,150
BDI	0	36	7,80	8,082
COGNITIVE DOMAINS of ACE-R				
ATTENTION AND ORIENTATION	13	18	17,35	1,104
MEMORY	7	26	19,29	4,893
LANGUAGE	15	26	23,57	2,495
VERBAL FLUENCY	4	14	9,49	2,431
VISUOSPATIAL ABILITIES	8	16	13,97	1,997

Legend to Table 1: MMSE, Mini Mental State Examination; MOCA, Montreal Cognitive Assessment; ACE-R, Addenbrooke's Cognitive Examination - Revised; AES, Apathy Evaluation Scale; BDI, Beck Depression Inventory

Results: The Italian version of ACE-R revealed good internal consistency with Cronbach's alpha total of 0.82. As for the convergent validity, a strong correlation of ACE-R with MMSE (Spearman's rho = 0.84; P <0.01) and MoCA (Spearman's rho = 0.82; P <0.01). As for divergent validity, total ACE-R score showed low correlation with behavioural scores (BDI, AES)

Discussion: The results indicated that the Italian version of ACE-R with Italian normative values (Siciliano et al., 2015) is a reliable and useful screening tool for cognitive deficits in patients with PD because it showed good convergent validity with other cognitive battery widely used in PD (i.e. MoCA)

References.
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