Psychometric attributes of the *Scales for Outcomes in Parkinson's Disease-Cognition (SCOPA-Cog), Spanish version*

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PSYCHOMETRIC ATTRIBUTES OF SCALES FOR OUTCOMES IN PARKINSON'S DISEASE-COGNITION (SCOPA-COG), SPANISH VERSION

Summary. Aim. *To test the psychometric attributes of the Scales for Outcomes in Parkinson's Disease-Cognition (SCOPA-Cog), in Spanish version.* Patients and methods. *It is a multicenter, cross-sectional study carried out on 387 Parkinson's disease (PD) patients, 70% of them were in Hoehn & Yahr stages 2 or 3; their mean age was 65.8 years and they underwent the disease for 8.1 years. Rater-based –SCOPA-Motor, modified Parkinson's Psychosis Rating Scale, Clinical Impression of Severity Index for PD (CISI-PD), Cumulative Illness Rating Scale-Geriatrics– and self-administered –SCOPA-Autonomic, SCOPA-Sleep, SCOPA-Psychosocial, Hospital Anxiety and Depression Scale, EuroQoL– assessments were applied. For SCOPA-Cog, the following psychometric attributes were analysed: acceptability, internal consistency, dimensionality, construct validity, and precision. A cut-off point for dementia and SCOPA-Cog score's predictors were explored.* Results. *SCOPA-Cog was free from floor and ceiling effect. The internal consistency was satisfactory (alpha = 0.83) and the item-total correlation resulted equal or upper than 0.45. Two factors were identified (52% of variance), one of them formed by 3 out of the 4 memory-related items. The correlation with other measures was weak (r_S < 0.35), except for the CISI-PD's item 'cognitive state' (r_S = 0.51). SCOPA-Cog scored significantly different for Hoehn & Yahr stages and for patients grouped by age, age at onset of PD, and education. The standard error of measurement was 3.02. A cut-off point 19/20 reached 76% sensitivity and specificity for dementia. Age and age at onset of PD resulted the strongest predictors.* Conclusion. *SCOPA-Cog is a consistent, valid, and precise measure for assessment of the cognitive disorder in PD. [REV NEUROL 2008; 47: 337-43]*

Key words. *Assessment. Cognitive impairment. Parkinson's disease. Predictors. Psychometric attributes. SCOPA-Cognition.*

INTRODUCTION

Parkinson's Disease (PD) is a neurodegenerative disease, with a prevalence in Spain of 1.5% to 2.7% among subjects over age 65 years [1,2]. It is manifested by a characteristic motor disorder and a series of non-motor complications [3,4], chief among which are cognitive impairment with dementia in 25-40% of patients [5-8], and mild cognitive deterioration in 21-29% of patients [9,10].

In PD, attention, working memory, verbal fluency, executive functions, and visuospatial function are particularly affected, whereas other functions (such as orientation and calculation) remain intact in the initial and intermediate disease stages [5,11]. Cognitive deficits associated with PD are thought to be related to fronto-subcortical and cortical disturbances, due, mainly, to neocortical impairment and Lewy-body involvement in the limbic system. Frequently, disorders of another type are also associated with PD (e.g., atrophy of the nucleus basalis of Meynert, senile plaques, and vascular disease) [12-14].

Some clinical characteristics have been identified as potential risk factors for dementia in PD. These include age, late age of PD onset (> 70 years), severe motor impairment, depression, early presence of hallucinations, behavioral disorder in REM sleep, akinetic subtype and phenotype with postural instability and gait difficulty [5,13,15-18]. Some aspects of PD-related cognitive deterioration were not properly assessed until specific instruments were applied to this end [19,20]. Traditionally, generic tests were used: however, not only were these usually targeted at Alzheimer's disease, but they took no account of the peculiarities of PD or the negative influence of motor disorders on the performance of certain items. Accordingly, the Scale for Outcomes in Parkinson's Disease-Cognition (SCOPA-Cognition, SCOPA-Cog) was purpose-designed as a short, specific instrument to assess cognitive deterioration in patients with PD [20].

This study's sought to evaluate the psychometric attributes of the Spanish version of the SCOPA-Cog applied to patients with Parkinson's disease in Spain.

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PATIENTS AND METHODS

Design

Multicenter, observational, cross-sectional study with a one-point-in-time evaluation.

Patients

This study included 387 patients diagnosed with PD as per the United Kingdom Parkinson's Disease Society Brain Bank Criteria (UKPD-BB) [21], evaluated in 2006-2007, and belonging to the Longitudinal Parkinson's Disease Patient Study (*Estudio Longitudinal de Pacientes con Enfermedad de Parkinson* – ELEP). The methodology used has been described elsewhere [22]. In brief, the inclusion criteria were: age 30 years or over; diagnosis of idiopathic PD by a neurologist with competence in Movement Disorders-PD; and a stable principal caregiver. We excluded patients who failed to fulfill one or more of the inclusion criteria and those who presented severe medical or psychiatric comorbidity that barred a proper evaluation of PD. Patients were stratified for inclusion by age at PD onset, disease duration, and sex.

Ethical aspects

Informed written consent to participate in the study was obtained from all patients. The ELEP was approved in 2005 by the Research Committee of the Carlos III Institute of Health and the Clinical Research Ethics Committee of the Princesa Hospital (Madrid).

Assessments

Assessments were performed by neurologists and neuropsychologists during scheduled visits, with self-assessments being completed by the patients immediately thereafter. The time required for each evaluation ranged from 1.0-1.5 hours.

Sociodemographic and historical data were obtained from each patient, and the following measures were then applied:

– *In the case of the external evaluator:* Hoehn and Yahr Scale (HY), Scales for Outcomes in Parkinson's Disease-Motor Scale (SCOPA-Motor), Parkinson's Psychosis Rating Scale modified (PPRSm), Clinical Impression of Severity Index-Parkinson's Disease (CISI-PD), Cumulative Illness Rating Scale-Geriatrics (CIRS-G), and SCOPA-Cog.
– *In the case of self-assessment:* SCOPA-Autonomic, SCOPA-Sleep, SCOPA-Psychosocial, visual analog scale for fatigue (VAS-fatigue) and visual analog scale for pain (VAS-intensity, VAS-frequency), Hospital Anxiety and Depression Scale (HADS), and EuroQoL.

Table I. Sociodemographic characteristics of patients.

	n	%
Sexo		
Men	210	54.3
Women	177	45.7
Civil status		
Married	311	80.4
Single	31	8.0
Widow/widower	35	9.0
Divorced-separated	10	2.6
Lifestyle		
Living at home	373	96.4
Institutionalized	10	2.6
Living in relative's home	4	1.0
Type of habitat		
Urban	342	88.4
Rural	34	8.8
Intermediate	11	2.8
Activity		
Retired/pensioner	239	62.4
Housewife	77	20.1
Working (employed or self-employed)	52	13.6
Other	15	3.9

The HY is a global scale of PD progression, comprising five levels, ranging from stage 1 (mild with unilateral symptoms) to stage 5 (severe; confined to wheelchair or bedridden) [23].

The SCOPA-Motor contains three sections, namely, motor examination (10 items), activities of daily living (7 items), and motor complications (4 items). All items score from 0 (normal) to 3 (severe), such that the higher the total score (0 to 63), the greater the severity [24].

The PPRS evaluates psychotic manifestations in PD. It contains 6 items scored from 0 (absence of symptom) to 3 (severe). Total scores range from 0 to 18, with the highest scores indicating the greatest severity [25]. The modification to the original scale (PPRSm) consisted of amending:

– *Item 1:* so that not just visual but any type of hallucinations are considered.
– *Item 2:* so that the response options refer to intensity rather than frequency, as with the remaining items.

The CISI-PD reflects the evaluator's global judgment of the severity of PD, following clinical assessment, and is made up of 4 items (motor signs, disability, motor complications, and cognitive status) which score from 0 (normal) to 6 (very severe). Total scores range from 0 (normal) to 24 (severe) [26].

The CIRS-G is a scale for assessment of comorbidity in geriatrics. It assesses 14 organic systems, and scores severity on a scale from 0 (without problems) to 4 (extremely severe) [27]. This scale's usefulness in PD has been documented [28].

The SCOPA-Cog contains 10 items relating to cognitive domains typically affected in PD and not influenced by fine motor activity, namely: memory (verbal and visual, immediate and delayed recall); attention (inverse series); executive function (motor planning, verbal fluency and task shifting); and visuospatial function (figure assembly). Maximum scores per domain are: memory, 22; attention, 4; executive functions, 12; and visuospatial function, 5. Total scale scores range from 0 to 43 points, such that the higher the score, the better the cognitive level. The instrument is administered in 15-20 minutes [20]. The original SCOPA-Cog (kindly supplied by its authors in English, in 2004) underwent translation into Spanish and backtranslation into English by two bilingual translators and a team of 3 experts in neurologic scales and assessments, who were fluent in English or Spanish.

The SCOPA-Autonomic is self-administered and contains 23 items in the following six areas: gastrointestinal (7 items); urinary (6 items); cardiovascular (3 items); thermoregulation (4 items); pupillomotor (1 item); and sexual dysfunction (male or female, 2 items). Each item scores from 0 (never) to 3 (frequently), with total scores ranging from 0 (normal) to 69 (severe autonomic dysfunction) [30].

The SCOPA-Sleep is a scale for self-assessment of nighttime sleep (5 items and 1 global assessment question; total scores: 0-15 and 1-7, respectively) and daytime sleepiness (6 items; total score: 0-18). Each item scores from 0 (never) to 3 (severe). The higher the total score, the greater the severity of the disorder [31].

The SCOPA-Psychosocial evaluates the psychosocial impact of PD in the preceding month. It comprises 11 items with response options ranging from 0 (not at all) to 3 (very much). The higher the score, the greater the impact of PD [32].

The EuroQoL assesses five dimensions (mobility, personal care, daily activities, pain/discomfort, and anxiety/depression) with each scoring from 1 (no problems) to 3 (severe problems). The scale furnishes a profile and a 'index', representative of perceived health state (range: 0, death, to 1, best

Table II. Descriptive statistics of the scales used.

Scale	Mean	SD	Range
SCOPA-Motor			
Total	16.5	9.6	0-56
Motor examination	8.5	5.3	0-31
Activities of daily living	5.8	3.8	0-20
Motor complications	2.1	2.8	0-11
CISI-PD	7.7	4.2	0-20
PPRSm	1.3	1.8	0-14
CIRS-G	5.0	3.8	0-24
HADS			
Anxiety	7.2	4.2	0-20
Depression	6.0	4.2	0-21
SCOPA-Autonomic	20.5	11.0	1-61
SCOPA-Nighttime sleep	5.4	4.0	0-15
SCOPA-Daytime sleepiness	3.7	3.0	0-15
SCOPA-Psychosocial	7.4	6.2	0-32
Pain	19.0	22.3	0-100
Fatigue	27.4	28.6	0-100
EuroQoL			
Index	0.7	0.3	–0.48-1
Visual analog scale	62.7	20.4	0-100

CIRS-G: Cumulative Illness Rating Scale-Geriatrics; CISI-PD: Clinical Impression of Severity Index for Parkinson's Disease; HADS: Hospital Anxiety and Depression Scale; PPRSm: Parkinson's Psychosis Rating Scale (modified); SCOPA: Scales for Outcomes in Parkinson's Disease; SD: Standard deviation.

health state imaginable), and adds a VAS on current health status, and one question on change in health in the preceding year [33]. The EuroQoL has been found useful for application to PD [34].

The HADS is made up of two subscales, with 7 items each, which assess anxiety and depression [35]. Each item scores from 0 (no problem) to 3 (severe problem), and total scores can be obtained for each domain. It has been shown that the HADS is a useful scale for use in PD [36].

Statistical analysis

In addition to descriptive statistics (sociodemographic, historical data, evaluations), the following psychometric attributes of the SCOPA-Cog were analyzed:

- *Acceptability:* missing data, computable data (standard, > 95%) [37], observed and possible range, measures of central trend (mean-median difference: arbitrary standard, ≤ 10% of maximum score); floor and ceiling effect (standard, < 15%) [38].
- *Internal consistency:* Cronbach's α (standard, ≥ 0.70) [39]; coefficient of item homogeneity (standard, ≥ 0.30) [40]; and item-total correlation (standard, ≥ 0.40) [41].
- *Exploratory factor analysis* (principal-component factor, Varimax and oblique rotation).
- *Convergent construct validity with respect to the following hypotheses:* there should be a high correlation ($r_S \geq 0.50$) between the SCOPA-Cog and the cognitive item of the CISI-PD; there should be a moderate association between SCOPA-Cog scores and those of other motor measures, mental aspects and quality of life (HY, SCOPA-Motor, CISI-PD, PPRSm, HADS, SCOPA-Psychosocial, EuroQoL) ($r_S = 0.35$-0.50), and a weak association with the remaining measures (CIRS-G, SCOPA-Autonomic, SCOPA-Sleep) ($r_S \leq 0.34$) (levels of correlation according to Feeny et al, 2005) [42]. Spearman's correlation coefficient was used, due to the assumptions for parametric tests not being met. For the scale's internal validity, it was hypothesized that the correlation between the component domains would stand at 0.30 to 0.70 [43]. The capacity to distinguish between groups of patients (known groups validity) by age, sex, age at onset, HY stage, years of education and disease duration, was analyzed using the Mann-Whitney or Kruskal-Wallis tests.
- *Precision:* was estimated using the Standard Error of Measurement (SEM) [38,39].
- *The CISI-PD cognitive-status item score*: was categorized as follows: 0 to 2 = normal or mild cognitive deterioration; and 3 to 6 = dementia. This variable was arbitrarily deemed to be a 'criterion' for dementia, and on this basis we then proceeded to calculate the cut-off point of the SCOPA-Cog that best differentiated between the two situations, and the area under the ROC curve.
- *Multiple linear regression analysis:* the study variables which, due to their potential interaction, could influence cognitive status were grouped into factors (principal components method), and a multiple linear regression analysis was then performed, taking the SCOPA-Cog as the dependent variable and the factors that contained the other measures as the independent variables.

RESULTS

The study covered 387 patients, 54.3% men, mean age 65.8 ± 11.1 years (range: 31-91 years). Age at PD onset was 57.7 ± 12.1 years, and mean duration of PD 8.1 ± 6.0 years. Table I shows the other sociodemographic data of the series.

Distribution by HY was as follows: 25.1%, stage 1; 50.4%, stage 2; 19.3%, stage 3; 4.7%, stage 4; and 0.5%, stage 5 (median: 2). Most of the sample received levodopa (76.2%) or dopaminergic agonists (67.4%), with both types of medication being combined in 50.8% of cases. A total of 16.1% and 12.4% of patients were treated with antidepressants and/or anxyolitics, respectively. Average years of education were10.0 ± 5.6 (range: 0-30).

The descriptive statistics of the study scales are shown in Table II, and the SCOPA-Cog acceptability data in Table III: 99% of the data were totally computable, and the mean score was 23.3 ± 7.3 (range: 2-40). The difference between the observed mean (23.3) and the theoretical median of the total score (21.5) was 1.80 points, 4.2% of the maximum possible score. While neither ceiling nor floor effects were observed for the SCOPA-COG (both, 0.3%), in the case of its domains a ceiling effect was observed for attention and visuospatial function (57% and 34.4%, respectively).

Cronbach's α for the SCOPA-Cog was 0.83. Inter-item correlations ranged from 0.18 to 0.61, with an item homogeneity coefficient of 0.33. Corrected item-total correlation was 0.45 (months backward) to 0.61 (digits backward).

The factor analysis identified two factors that accounted for 52% of the variance. Factor 1 grouped all the items save three relating to memory (and constituting Factor 2) and semantic fluency, which displayed similar saturations in both factors. The Factor 2 components were verbal recall, digits backward, and delayed recall. The correlation between factors was 0.66.

The correlation between SCOPA-Cog and other study variables is shown in Table IV. The correlation among its dimensions ranged from 0.38 (attention with visuospatial function) to 0.59 (memory with executive function).

The SCOPA-Cog yielded significantly lower scores for more advanced HY stages (Table V), age groups and age at onset, and for patients with fewer years of education (Kruskal-Wallis, $p < 0.0001$). Men registered scores that were marginally higher than those of women (24.1 ± 7.0 vs. 22.3 ± 7.6; Mann-Whitney, $p = 0.02$). There was no association between SCOPA-Cog score and disease duration. The SEM was 3.02 (upper limit of the 95% CI = 5.92).

In accordance with the clinical global impression of a given patient's cognitive status, a SCOPA-Cog score of 19 or less would be indicative of dementia, with a sensitivity of 76.7%, specificity of 76.3%, predictive value positive of 37.70%, predictive value negative of 94.60%, positive likelihood ratio of 3.24, and negative likelihood ratio of 0.31. The area under the curve was 83% (95% CI = 0.77-0.89).

Factor analysis of the variables considered for linear regression, identified four groups (66% of variance), namely: Factor 1, comprising PD dura-

tion, HY, SCOPA-Motor and PPRSm; Factor 2, comprising the HADS subscales, SCOPA-Autonomic and SCOPA-Sleep subscales; Factor 3, which included age and age at PD onset; and Factor 4, comprising patients' sex and years of education. In the multiple linear regression model, all four factors proved to be significant and separate predictors of the SCOPA-Cog score ($F = 49.82$; $p < 0.0001$; adjusted R-squared, 0.36) (Table VI), with the association being negative and more intense with Factor 3, followed by Factor 1. In the case of Factor 4, female gender and fewer years of education were weakly associated with a lower SCOPA-Cog score.

Table III. SCOPA-COG acceptability.

Item/subscale	Mean	Median	SD	Range	Skewness	Floor effect (%)	Ceiling effect (%)
Immediate word recall	1.5	1	1.3	0-4	0.2	32.3	2.6
Digits backward	2.9	3	1.3	0-7	0.5	0.8	0.3
Cubes	3.0	3	1.5	0-5	–0.3	5.5	21.1
Delayed word recall	0.6	0	1.1	0-5	1.8	66.1	0.8
Memory-learning	8.0	8	3.7	0-19	0.4	0.5	0.5
Digits backward	1.5	2	0.8	0-2	–1.0	18.8	65.9
Months backward	1.6	2	0.7	0-2	–1.6	12.5	76.3
Attention	3.1	4	1.3	0-4	–1.3	7.0	57.0
Fist-edge-palm	2.1	3	1.2	0-3	–0.9	17.2	57.0
Semantic fluency	4.0	4	1.2	1-6	0.2	0.3	14.1
Dice	2.3	3	1.1	0-3	–1.3	14.1	66.1
Executive functions	8.5	9	2.6	2-12	–0.7	2.6	8.9
Figure assembly	3.7	4	1.4	0-5	–1.0	4.2	34.4
Visuospatial function	3.7	4	1.4	0-5	–1.0	4.2	34.4
Total SCOPA-Cog	23.3	24	7.3	2-40	–0.4	0.3	0.3

SD: standard deviation.

DISCUSSION

The SCOPA-Cog was developed as a simple instrument to assess the characteristic cognitive disorders of PD. Given its potential utility, the SCOPA-Cog underwent the necessary linguistic adaptation and its principal metric attributes were subjected to two pilot studies [22,44], prior to its being incorporated into the Longitudinal Parkinson's Disease Patient Study. At the same time, the scale was also included in a parallel study in South America, and, as a result, the first independent formal validation of the SCOPA-Cog in Brazil has now been published [29]. Our study constitutes the first formal evaluation of the SCOPA-Cog in Spain in line with the principles and methods of the Classical Test Theory.

For the scale as a whole, the data quality and acceptability parameters were very satisfactory, inasmuch as they all clearly came within the standard values. Two dimensions -attention and visuospatial function- registered a ceiling effect, indicating, either that these domains were less affected, or that the scale does not detect alterations in a high proportion of patients. In view of the fact that this finding coincides with that reported by the Brazilian study [29], it seems logical to conclude that it must depend on factors other than those characteristic of the sample, and must thus be related with:

- A lower frequency of impairment in these areas (since PD patients display worse functioning in memory and executive function tasks).
- Little difficulty posed by the tasks examined.
- A low number of tests (items) involved in the two domains that have a ceiling effect (3 items between the two).

The internal consistency data proved satisfactory, coming within the criterion values and close to those obtained in previous studies ($\alpha = 0.81$-0.83; corrected item-total correlation: 0.38-0.64) [20,22,29,44]. Overall, these indices express an appropriate interrelation among scale items at a given point in time, scant random error, and, possibly, a high level of scale precision.

The exploratory factor analysis indicated a two dimensional structure, one dimension of which is very closely linked to items that explore memory, and the other –a more complex dimension- which groups the remaining scale components. In the absence of previous data that would serve as a comparison and a confirmatory factor analysis, this SCOPA-Cog structure must be regarded as provisional.

With respect to convergent validity, the closest association was –as expected– with the CISI-PD cognitive item, with a coefficient value > 0.50 [42, 45]. In the case of the other measures, the correlations were weak, in contrast to the total CISI-PD and SCOPA-Motor values from previous studies (–0.56 to –0.59 and –0.47 to –0.65, respectively) [22,29,44]. Our findings come from a collective database with a multitude of evaluators, something that could lead to an increase in differences among measures and, by extension, to a decline in their interrelationship. In contrast, our study sample by far exceeded the combined sample of all the previous studies and, from this standpoint, could be more representative of the genuine relationships among the different aspects of the disease. The force of these associations must be properly established in future studies.

Patients who reported a more advanced age, lower educational level, later PD onset, and showed greater disease severity registered significantly lower SCOPA-Cog scores. Not only have these variables been previously described as risk factors for development of dementia [5,46], but regression analysis identified these factors as predictors of total SCOPA-COG score, a result that is globally concordant with previous studies, as regards this [20,29] and other types of measures [47-49].

The SEM indicates scale precision [39] and is an index of intra-subject variability, regardless of the sample. It represents the error that conceals the true value in the observed score, and –in repeated observations– indicates the threshold which must be exceeded in order for a change to be deemed real. With reliability coefficients > 0.70 (inferior limit of the standard), the SEM would be ≤ 0.5 standard deviation of the baseline score, with the

Table IV. Convergent validity of the SCOPA-Cognition.

	r_s
Age	–0.42
Education (years)	0.45
Age at disease onset	–0.33
Disease duration (years)	–0.11
CISI-PD cognitive status Item	–0.51
Hoehn and Yahr Scale	–0.29
SCOPA-Motor	–0.31
CISI-PD	–0.32
Parkinson Psychosis Rating Scale (m)	–0.30
HADS-Anxiety	–0.14
HADS-Depression	–0.26
SCOPA-Psychosocial	–0.12
EuroQoL 'Index'	0.25
CIRS-G (score)	–0.20
SCOPA-Autonomic	–0.14
SCOPA-Nighttime sleep	–0.04
SCOPA- Daytime sleepiness	–0.18
Pain (frequency x intensity)	–0.15
Fatigue	–0.09

CIRS-G: Cumulative Illness Rating Scale-Geriatrics; CISI-PD: Clinical Impression of Severity Index for Parkinson's Disease; HADS: Hospital Anxiety and Depression Scale; r_S: Spearman's correlation coefficient; SCOPA: Scales for Outcomes in Parkinson's Disease; SD: standard deviation.

Table V. SCOPA-Cognition scores according to Hoehn and Yahr's disease stage.

	n	Mean	Standard deviation
Stage 1	96	25.6	6.2
Stage 2	191	23.6	7.0
Stage 3	74	21.2	7.3
Stage 4	16	15.6	8.2
Stage 5	2	10.5	9.2

Table VI. Predictors of the SCOPA-Cognition in the study.

Factors [a]	Standardized β coefficient	Standard error	95% CI	*t*	*p*
Factor 3	–0.41	0.31	–3.60 to –2.35	–9.51	0
Factor 1	–0.33	0.32	–3.10 to –1.85	–7.80	0
Factor 2	–0.22	0.32	–2.23 to –1.00	–5.11	0
Factor 4	0.19	0.31	0.76 to 2.00	4.4	0

[a] Ranked in order of standardized β values. $F = 49.82$; $p < 0.0001$; adjusted $R^2 = 36\%$. Factor composition in text (results, last paragraph).

magnitude of the error being related to the variance at this point in time. In previous studies, SEM values for the SCOPA-Cog have ranged from 2.73 [44] to 3.2 [29], with the values obtained by us ranking between the two (3.02). In absolute terms, 3 points represent 7% of the theoretical scale maximum and less than half a standard deviation (3.65 in the current study) [50,51], meaning that the scale can be regarded as precise. For studies with analysis of change, differences of less than 3 points (5.90 for a 95% confidence level) cannot be deemed a real change [38,51-53].

Despite the fact that the SCOPA-Cog was not designed for screening [20], an effort was nevertheless made to ascertain a cut-off for dementia, taking the overall clinical impression of this aspect as the 'gold standard'. Albeit an arbitrary criterion, it has to be said that the immense majority of patients had experienced years of follow-up with the ELEP neurologists and that CISI-PD scores are allocated after interviewing and examining the patient. A cut-off point of 19/20 yielded the most balanced sensitivity and specificity results between patients with and without dementia (correct classification in 76% of cases). This aspect was not explored in earlier studies, but the finding is compatible with the mean scores observed for similar groups established by reference to other criteria [20,29,44].

The study limitations are connected with the selection of the sample (severe impairment was an exclusion criterion), and the predominance of patients in stages 2 and 3 (70% of the total). Nonetheless, the sample covered a broad spectrum and all PD severity levels were represented. No reference measure of cognitive status (e.g., the MMSE) was included, since comparison between measures was not a study objective, and longitudinal properties were not explored.

The SCOPA-Cog, Spanish version, possesses satisfactory psychometric attributes insofar as acceptability, internal consistency, construct validity and precision are concerned. It is a useful measure for assessing cognitive function in PD, in clinical practice and research alike.

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ATRIBUTOS PSICOMÉTRICOS DE LA SCALES FOR OUTCOMES IN PARKINSON'S DISEASE-COGNITION *(SCOPA-COG), VERSIÓN EN CASTELLANO*

Resumen. Objetivo. *Evaluar los atributos psicométricos de una versión de la* Scales for Outcomes in Parkinson's Disease-Cognition *(SCOPA-Cog) en castellano.* Pacientes y métodos. *Estudio multicéntrico, transversal. Se incluyeron 387 pacientes con enfermedad de Parkinson (EP), un 70% en estadio 2 o 3 de Hoehn y Yahr, con edad media de 65,8 años y 8,1 años de EP. Se aplicaron medidas por evaluador –SCOPA-Motor*, Parkinson's Psychosis Rating Scale *modificada*, Clinical Impression of Severity Index-Parkinson's Desease *(CISI-PD)*, Cumulative Illness Rating Scale-Geriatrics– *y autoevaluaciones –SCOPA-Autonómica, SCOPA-Sueño, SCOPA-Psicosocial, escala hospitalaria de ansiedad y depresión y EuroQoL–. Se analizaron la aceptabilidad, consistencia interna, dimensionalidad, validez de constructo y precisión de la SCOPA-Cog. Se exploró un punto de corte para demencia y predictores de la puntuación.* Resultados. *La SCOPA-Cog no mostró efecto suelo o techo. Su consistencia interna fue satisfactoria (alfa = 0,83) y la correlación ítem-total, igual o superior a 0,45. Se identificaron dos factores (un 52% de la varianza), uno de ellos constituido por tres de los cuatro ítems de memoria. La correlación con otras medidas del estudio fue débil (*r_S *< 0,35), excepto con el ítem 'estado cognitivo' del CISI-PD (*r_S *= 0,51). La SCOPA-Cog discriminó significativamente entre estadios Hoehn y Yahr, grupos de edad, edad al inicio de la EP y años de estudio. El error estándar de la medida resultó 3,02. Un punto de corte 19/20 mostró un 76% de sensibilidad y especificidad para demencia. La edad y edad al inicio de la EP resultaron los predictores más destacados.* Conclusión. *La SCOPA-Cog es una escala consistente, válida y precisa para evaluar el trastorno cognitivo de la EP. [REV NEUROL 2008; 47: 337-43]*

Palabras clave. *Atributos psicométricos. Deterioro cognitivo. Enfermedad de Parkinson. Evaluación. Predictores. SCOPA-Cognición.*