

Comparison of Informant and Neuropsychological Ratings of Cognitive Impairment

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ABSTRACT

Objective: The PROCOG is a new instrument designed to measure the impact of cognitive impairment from the perspective of the patient or an informant for the patient; a total and 7 subscale scores are computed. The goal of this study was to explore the relationship between informant (PROCOG-I) ratings and patient neuropsychological performance.

Method: 19 DAT and 20 MCI patient-informant dyads were recruited from 2 clinical centers and completed the PROCOG independently; patients also completed neuropsychological assessments.

Results: Informants were 26% male, 62% spouses, mean age: 65±12.3; patients: 56% male, mean age: 76.2±6.0. Patient-informant agreement was low (intraclass correlations: 0.03–0.22). Highest correlations were observed between MMSE and informant rating on PROCOG-I skill loss subscale ($r = -0.56$), Verbal Fluency and PROCOG-I semantic memory subscale ($r = -0.50$), WAIS Similarities and PROCOG-I social impact subscale (-0.57), Delayed Word List Recall and Digit Span scores were moderately correlated with PROCOG-I ratings ($r = 0.37$, $r = 0.39$, respectively, to PROCOG social impact subscale).

Conclusion: Informant ratings correspond with some neuropsychological performance of cognitively impaired patients. The informant-completed PROCOG provides unique information on cognitive impairment and its impact that may supplement standard neuropsychological testing and patient self-report.

INTRODUCTION

- Mild Cognitive Impairment (MCI) has been defined as a potentially prodromal phase of dementia of the Alzheimer's type (DAT) based on clinical presentation and data on progression to DAT over time (Morris et al. 2001; Petersen et al. 1999). Detection and measurement of cognitive symptoms and their impact among patients with MCI and mild DAT is important for disease management and assessment of treatment efficacy.
- There is a growing body of research on the accuracy of caregiver reporters as proxies for patients with DAT (e.g., Arguelles et al. 2001; Kemp et al. 2002; Loewenstein et al. 2001; Neri et al. 1998; Rymer et al. 2002).
- The accuracy of informant perceptions is a key issue for assessment of patients with cognitive impairment because informant report may be obtained for many patients whose dementia interferes with insight. In comparison to patient-report, informant-report has been found to have higher correlations with objective measures of dementia-related deficits (Neri et al. 1998).
- Research examining the concordance between informant-reports and objective cognitive functioning measures has yielded mixed results. Some studies have found high concordance between informant-report and objective dementia measures (Cipolli et al. 1998; Clark & Ewbank 1996). In contrast, Loewenstein et al. (2001) found that caregivers overestimated patients' abilities in several functional areas, and Kemp et al. (2002) found that only 60% of informants gave responses that were consistent with objective testing.

OBJECTIVE

The objective of this study was to examine the relationship between informant-reports on the PROCOG-I, a recently developed informant-report measure of cognitive symptoms and their impact on patients' functioning and health-related quality of life, and objective, performance-based cognitive functioning measures.

METHODS

A total of 39 patient-caregiver dyads recruited from 5 US academic medical centers and memory clinics participated in the study. Informants completed a new self-report outcomes instrument (the PROCOG-I) designed to assess the impact of the patients' MCI or mild-to-moderate DAT on functional, behavioral, and health-related quality of life (HRQL) domains. Patients were administered a brief battery of neuropsychological tests.

Inclusion/Exclusion Criteria

Informants

Family member or friend of patient who either sees and/or speaks with the patient a minimum of 4 times per week or resides with the patient; > 21 years of age; free of severe mental illness, current substance abuse, or dementia-related illness such as Alzheimer's Disease.

Patient Inclusion Criteria

All patients: Age > 64, Center for Epidemiological Studies Depression Scale (CES-D) < 23. DAT Patients: Current diagnosis (last 3 months) of probable DAT (NINCDS-ADRDA) criteria; mild severity based on clinical evaluation.

MCI Patients: Memory complaints with informant corroboration of deficit; self-reported normal general cognitive function; Clinical Dementia Rating (CDR) score of 0.5 (memory box score of 0.5 or 1) within prior 3 months. Subjects could be currently taking prescription or non-prescription medication for their MCI or DAT.

Patient Exclusion Criteria

Serious life events in the previous 3 months that may have affected the HRQL of the participant in the judgment of the investigator; current participation in another research study/clinical trial that includes the use of investigational medications for cognitive indications; history of alcohol or substance abuse consistent with DSM-IV criteria within the past 2 years.

Measures

PROCOG-I

- The PROCOG-I is a 55-item questionnaire that assesses the impact of a patient's cognitive symptoms from the point of view of an informant. This instrument was developed through literature review, discussion with clinical experts, focus groups with patients and caregiver informants in the UK and US, and thorough psychometric validation (Frank et al. 2003).
- The PROCOG-I yields seven subscale scores:
 - Affect (11 items, e.g., embarrassed or ashamed about memory)
 - Skill Loss (11 items, e.g., find it more difficult to decide what to wear than it used to be)
 - Semantic Memory (5 items, e.g., remembering names of family or friends)
 - Memory for Recent Events (8 items, e.g., walk into a room and forget why you went there)
 - Cognitive Function (10 items, e.g., take you longer than you would like to figure things out)
 - Social Impact (9 items, e.g., how often have family members or friends avoided you)
 - Long Term Memory (1 item)
- Each item is rated on a 5-point Likert scale. Higher values on all scales indicate more severe impact of cognitive symptoms.
- The PROCOG-I demonstrates good item performance, internal consistency reliability, test-retest reliability, concurrent validity, and discriminant validity (Frank et al. 2003).

METHODS (CONT'D)

Neuropsychological Assessment

- Mini-Mental State Exam (MMSE) for the measurement of general cognitive functioning (Folstein et al. 1975; Tombaugh & McIntyre 1992)
- Wechsler Memory Scale Word List Delayed Recall (Wechsler 1997a)
- Verbal Fluency (letter S, 30 seconds)
- Wechsler Adult Intelligence Scale (WAIS) Digit Span (Wechsler 1997b).

Statistical Analysis

Pearson product-moment correlations were used to examine the relationship between scores on the PROCOG-I and the patients' neuropsychological testing. It was expected that correlations would be statistically significant and in the moderate range ($r > 0.50$). Analyses were performed with SAS statistical software version 8.2 (SAS Corporation, Cary, USA), using the combined sample of MCI and DAT informants.

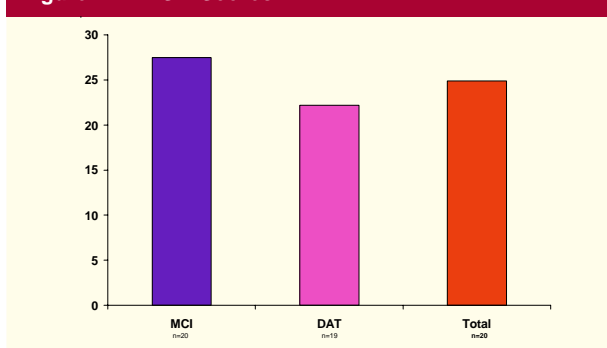
RESULTS

Table 1. Sample Demographics

Characteristic	MCI (N=20)	Patients DAT (N=19)	MCI+DAT (N=39)	Informant Caregivers (N=39)
Age (Mean years ± SD)	73.5 ± 6.3	79.2 ± 3.9	76.2 ± 6.0	65.0 ± 12.3
Gender (% Male)	75%	37%	56%	26%
Race/ethnicity (%)				
Caucasian	80%	100%	90%	92%
Highest Level of Education Completed (%)				
High School	15%	58%	36%	26%
College Degree	35%	16%	26%	28%
Postgraduate Degree	25%	16%	21%	26%
Retired (%)	75%	89%	82%	36%
Living with Patient (%)				69%

- 39 patient-caregiver dyads participated in the current study (See Table 1 for demographics).
- Mean Mini-Mental State Exam (MMSE) scores were 22.2 ± 3.3 for DAT, 27.5 ± 2.3 for MCI, and 24.9 ± 3.9 for total sample (See Figure 1).
- Caregiver informants were primarily female (74%) and spouses (62%) or children (31%) of the patients.

Figure 1. MMSE Scores



RESULTS (CONT'D)

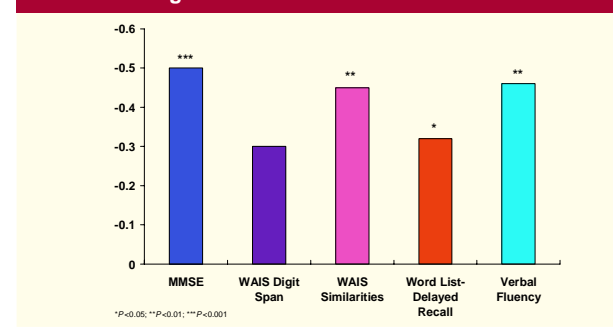
Table 2. Correlations: PROCOG-I with Cognitive Tests*

	MMSE*	WAIS Digit Span ^d	WAIS Similarities*	Word List-Delayed Recall	Verbal Fluency
PROCOG-I ^b TOTAL SCORE	-0.50***	-0.30	-0.45**	-0.32*	-0.46**
SUBSCALE 1: AFFECT	-0.31	-0.21	-0.31	-0.27	-0.30
SUBSCALE 2: SKILL LOSS	-0.56***	-0.32*	-0.37*	-0.31	-0.38*
SUBSCALE 3: SEMANTIC MEMORY	-0.38*	-0.22	-0.44**	-0.01	-0.50**
SUBSCALE 4: MEMORY FOR RECENT EVENTS	-0.30	-0.05	-0.22	-0.31	-0.33*
SUBSCALE 5: COGNITIVE FUNCTION	-0.44**	-0.25	-0.42**	-0.21	-0.43**
SUBSCALE 6: SOCIAL IMPACT	-0.49**	-0.39*	-0.57***	-0.36*	-0.48**
SUBSCALE 7: LONG TERM MEMORY	-0.14	-0.16	-0.15	-0.08	-0.35*

*Pearson product-moment correlations; ^b Patient Reported Outcome for Cognitive Impairment questionnaire, Informant version; ^c Mini Mental State Exam; ^dWechsler Adult Intelligence Scale Section 4, Digit Span; ^eWechsler Adult Intelligence Scale Section 4, Similarities; * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$; ns = not statistically significant

- The total PROCOG-I score was most highly correlated with the MMSE ($r = -0.50$) (see Figure 2).
- For the Affect subscale, the highest correlations were with the MMSE and the WAIS Similarities score (both $r = -0.31$).
- The Skill Loss subscale was moderately correlated ($r = -0.56$) with the MMSE and less highly correlated with the other tests.
- The Semantic Memory subscale was moderately correlated with verbal fluency ($r = -0.50$). There was a weak correlation between the Semantic Memory subscale with the WMS Word List Delayed Recall score ($r = -0.01$).
- The Memory for Recent Events subscale produced its highest correlation ($r = -0.33$) with the verbal fluency score.
- The PROCOG-I Cognitive Function subscale was most highly correlated with the MMSE ($r = -0.44$).
- The Social Impact subscale was moderately correlated ($r = -0.57$) with WAIS Similarities.

Figure 2. Correlations: PROCOG-I Total Score with Cognitive Tests



DISCUSSION & CONCLUSIONS

- Results add to the literature suggesting that there is a strong concordance between informant-reports and objective performance-based measures of some cognitive functioning domains (Cipolli et al. 1998; Clark & Ewbank 1996). In the current study, the overall score on the informant-report measure (PROCOG-I) was significantly associated with global cognitive functioning as measured by the MMSE.
- Findings suggest that concordance between informant-reports and objective cognitive measures varies depending on the domain being measured. For example, patients' verbal fluency performance was significantly correlated with almost all subscales of the PROCOG-I, suggesting that this particular cognitive domain is associated with functional impairments that are noticeable to informants.
- Results provide support for the use of the PROCOG-I and informant-report in studies of patients with MCI and mild DAT. As expected, all subscales of the PROCOG-I were negatively correlated with global cognitive functioning as measured by the MMSE, and most correlations were statistically significant. The total score and the social impact, skill loss, cognitive function, and semantic memory subscales were significantly associated with a range of neuropsychological tests.
- Informant-report provides unique information beyond neuropsychological data for measuring the impact of cognitive impairment on patients.

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