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Clinical factorial distribution of Anosognosia Questionnaire for Dementia (AQ-D) in a sample of patients with Alzheimer's disease

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Introduction

Patients with anosognosia have been presented more dangerous behaviours and difficulties with treatment adherence, leading to increased burden on caregivers (Conde-Sala *et al*., 2015). Anosognosia Questionnaire for Dementia (AQ-D; Migliorelli *et al*., 1995) has been used to collect patients and caregivers' perceptions about anosognosia. A factor analysis of the AQ-D produced two factors: lack of awareness of cognitive deficits and behavioural symptoms (Starkstein *et al*., 2006). However, when we considered Alzheimer's disease (AD) diagnostic criteria from American Psychiatric Association, whose principal aspects are cognition, functionality and behaviour/personality; those two factors proposed may not be enough to analyse anosognosia.

We investigated the factorial structure of the AQ-D from a clinical perspective. Specifically, the objectives were to examine: 1. the discrepancies between patients and caregivers in AQ-D clinical factors, and 2. the association between the AQ-D clinical factors, and sociodemographic and clinical characteristics of patients and caregivers.

Methods

Design and study population

Cross-sectional study using 221 patients and their caregivers from Bellvitge University Hospital were included.

Variables and instruments

Patients evaluated their cognition and anosognosia level (AQ-D; Migliorelli *et al*., 1995). Caregivers evaluated patients' variables (age, gender, marital status, education, family

relationship, anosognosia, functionality, depression, neuropsychiatric symptoms and dementia severity) and had caregiver burden, physical and mental health assessed.

Statistical analysis

Wilcoxon test determined the differences between caregivers and patients' AQ-D scores and Cohen's *d* measured the effect size in these differences. Spearman's correlations explored the relationship between AQ-D and patients and caregivers' variables.

A principal components analysis for the AQ-D was carried out with rotation (varimax). To verify clinical perspective, the researchers grouped the 30 items of the AQ-D on three factors. Variance and Cronbach's alpha for each factor estimated contribution and internal consistency. Two multiple linear regression analyses were performed to determine the influence of the independent variables on existence of anosognosia.

The level of significance for comparisons was $p < 0.05$. SPSS v22.0 for Windows (SPSS Inc., Chicago) was used to statistical analysis.

Results

Most patients were females (63.3%), with mean age of 77.8 ± 6.3 years, with formal education > five years (36.7%), and with a mean MMSE score of 18.3 ± 5.4.

Cronbach's alpha was high ($\alpha = 0.91$), indicating excellent internal consistency. Three factors were grouped: 1 Cognition, 2 Functionality, and 3 Behaviour/Personality. In the multivariate analysis, to patients, the factor Functionality was the most relevant in the association between high levels of anosognosia and deficits in activities of daily living (ADLs) ($p < 0.001$), less depressive symptoms ($p < 0.001$), more neuropsychiatric symptoms ($p < 0.001$), and older patients ($p = 0.012$). To caregivers, the factor Personality was the most

important in the relationship between high levels of anosognosia and caregiver burden ($p < 0.001$) and female gender ($p = 0.022$).

Discussion

Factor 1 Cognition presented high Cronbach's alpha ($\alpha = 0.84$), indicating good to excellent internal consistency of the scale. Cronbach's alpha was moderate in Factor 2 Functionality ($\alpha = 0.77$), and Factor 3 Behaviour/Personality ($\alpha = 0.70$). Our results may suggest a relative independence between anosognosia levels for different abilities (Starkstein *et al*., 2006).

The highest discrepancy between patients and caregivers in AQ-D clinical factors occurred in factor 1 Cognition. Correa *et al*. (1996) indicated that AD patients showed anosognosia of the severity of their memory decline on a questionnaire and made fewer self-corrections.

AQ-D clinical factor varied according to the rater in the present study, to patients was factor 2 Functionality that was influenced by deficits in ADLs. This finding deserves attention, because functionality scores predicted the scores for the domains of anosognosia of functional deficits on the AQ-D clinical factor (Starkstein *et al*., 2006). Likewise, another consensus in literature is a higher frequency of neuropsychiatric symptoms in the anosognosia, and our study is in line with this finding (Conde-Sala *et al*., 2015). Furthermore, we suggested that less depressive symptoms in patients with AD were associated with high levels of anosognosia. The presence of low levels of depression may mean non-awareness of deficits (Portellano-Ortiz *et al*., 2014). While to caregivers, the factor was 3 Behaviour/Personality. Higher discrepancies of anosognosia between patients and caregivers have been mostly correlated with neuropsychiatric symptoms. Moreover, the presence of more neuropsychiatric symptoms and anosognosia were related to caregiver burden (Conde-Sala *et al*., 2015).

Finally, our findings indicated that in a clinical perspective, the grouping of AQ-D items on three factors Cognition, Functionality and Behaviour/Personality was consistent. Also, we confirmed that anosognosia is multidimensional phenomenon that it is in agreement with AD diagnostic criteria.

Conflict of interest

None declared.

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Table 1 Multivariate Linear Regression Analysis: AQ-D clinical factors and patients and caregivers' variables

		DAD			NPI			GDS-d			Age		
Patients	R^2	β	*t*	*p*	β	*t*	*p*	β	*t*	*p*	β	*t*	*p*
AQ-D total	0.666	-0.51	-10.9	< **0.001**	0.34	7.4	< **0.001**	-0.31	-8.0	< **0.001**	0.09	2.4	**0.014**
Factor 1	0.559	-0.51	-9.5	< **0.001**	0.25	4.7	< **0.001**	-0.30	-6.6	< **0.001**	0.10	2.2	**0.023**
Factor 2	0.596	-0.54	-10.5	< **0.001**	0.25	5.0	< **0.001**	-0.28	-6.5	< **0.001**	0.01	2.5	**0.012**
Factor 3	0.460	-0.24	-4.0	< **0.001**	0.47	8.1	< **0.001**	-0.25	-5.0	< **0.001**	0.02	0.5	0.585

		ZBI			Gender (women)			Age		
Caregivers	R^2	β	*t*	*p*	β	*t*	*p*	β	*t*	*p*
AQ-D Total	0.299	0.50	8.7	< **0.001**	0.14	2.3	**0.019**	0.13	2.3	**0.021**
Factor 1	0.220	0.42	6.9	< **0.001**	0.14	2.2	**0.023**	0.15	2.4	**0.016**
Factor 2	0.226	0.45	7.4	< **0.001**	0.09	1.4	0.140	0.11	1.8	0.068
Factor 3	0.305	0.51	8.9	< **0.001**	0.13	2.3	**0.022**	0.07	1.3	0.185

Factor 1: Cognition; Factor 2: Functionality; Factor 3: Behaviour/Personality.
R^2 = Determination coefficient; β = standardized beta coefficient; *t* = Students *t*, test.
AQ-D: Anosognosia Questionnaire for Dementia; DAD: Disability Assessment for Dementia; NPI: Neuropsychiatric Inventory; GDS-d: Geriatric Depression Scale; ZBI: Zarit Burden Interview.