LETTERS TO THE EDITORS

Confirmatory factor analysis of the general activities of daily living scale: further evidences of internal validity

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The assessment of older adults with neurocognitive disorders involves the investigation of functional impairment. Usually, this is conducted by examining activities of daily living (ADL), everyday activities that should be performed without great difficulties by the patients.[1] The most common method for measuring ADL is the use of scales and questionnaires, since they are mainly brief, low cost, and accurate.[2]

In a previous issue of *Revista Brasileira de Psiquiatria*, we presented the General Activities of Daily Living Scale (GADL),[3] an instrument to assess different aspects of ADL in older adults. The GADL emphasized activities commonly assessed in clinical/research settings in Brazil, showing evidence of validity and reliability. At the time, an exploratory factor analysis suggested a three-factor structure based on activity complexity (self-care, domestic, and complex activities) as the latent structure of ADL in our sample. The GADL three-factor structure also met evidence of external validity, with each GADL factor differentially associated with complex (i.e., cognitive functioning) and more simple (i.e., finger dexterity) tasks.[4] However, Confirmatory Factor Analysis (CFA) can provide further evidence for the suggested three-factor GADL model.

In this letter, we tested the GADL three-factor hypothesis in a larger and more heterogeneous sample of older adults (n=578: 369 women) using CFA. We used a conjoined dataset of three research projects, approved by the local ethics committees of two universities in Belo Horizonte, Brazil. Participants or their caregivers, in the case of dementia, gave written consent for participation. Mean participant age was relatively high (76.0±7.0 years) and mean education predominately low (4.33±4.21 years). Participants had a diagnosis of minor (n=247) or major neurocognitive disorder (n=228) irrespective of etiological stratification, other mental disorders coursing with cognitive-functional complaints (n=46), or were considered healthy controls (n=66). We stratified the sample based on clinical dementia rating[5] (CDR) scores. Table 1 shows a brief description of the sample, according to CDR and GADL scores.

Confirmatory analysis was performed using MPlus 6.1 software. We used a diagonally weighted least squares method, which is commonly adopted to analyze ordinal data. Factors were defined as in the original study[3]: Self-care (dressing/undressing, using the toilet, showering, transferring to toilet, feeding), Domestic (washing/ironing, household chores, using the telephone, preparing meals), and complex (financial control, shopping, controlling medication, using transportation). As expected in CFA,[6] we used different fit indexes to test the model: the root mean square error of approximation (RMSEA, desired values < 0.06), the comparative fit index and the Tucker-Leis index (CFI and TFI, desired values > 0.95), and χ^2/degrees of freedom (χ^2/df, desired values < 3).

Standardized estimates (R^2) and factor correlations are shown in Figure 1. Our results indicated an adequate model fit for the three-factor model: RMSEA = 0.059, CFI/TLI = 0.984/0.980, and χ^2/df = 2.83, showing convergence with our previous research.[3,4] Most factor loads were above 0.6, showing a strong relationship with each factor. The only

Table 1 Participants description (percentiles 25, 50, 75)

Group	GADL Total	GADL Selfcare	GADL Domestic	GADL Complex
CDR = 0				
Percentile 25	23	10	6	6
Percentile 50	25	10	8	8
Percentile 75	26	10	8	8
CDR = 0.5				
Percentile 25	21	10	6	5
Percentile 50	25	10	8	7
Percentile 75	26	10	8	8
CDR = 1				
Percentile 25	18	10	5	2
Percentile 50	22	10	7	5
Percentile 75	25	10	8	7
CDR = 2				
Percentile 25	10	9	0	0
Percentile 50	12	10	2	0
Percentile 75	13	10	3	1

CDR = Clinical Dementia Rating (0 = no dementia; 0.5 = questionable dementia; 1 = mild dementia; 2 = moderate dementia); GADL = General Activities of Daily Living Scale.

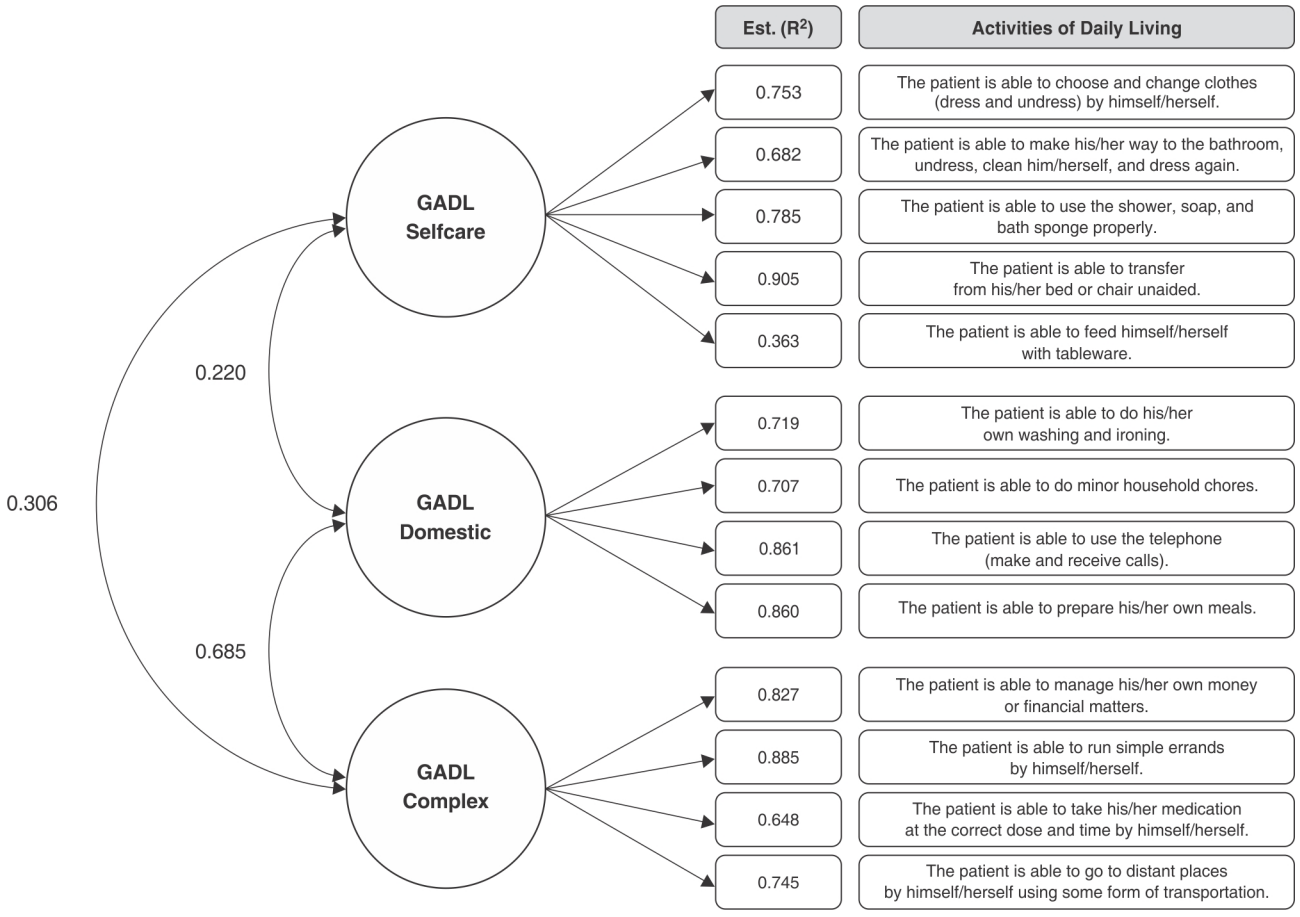

Figure 1 Confirmatory factor analysis of the General Activities of Daily Living Scale.

item with a lower factor load was "The patient is able to feed himself/herself with tableware". This probably occurred due to the low variance of the measure, since our sample only included patients with moderate or milder dementia, and this activity is usually impaired in advanced stages of dementia.[7]

Therefore, GADL is a brief, easy to use, and well-validated measure of functional performance for the assessment of older adults as increasing evidence suggests. Future studies should attempt to replicate these results in other samples, thus heightening the reliability and consistency of GADL for clinical use.

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Disclosure

The authors report no conflicts of interest.

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