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ORIGINAL ARTICLE

# Validation of the Spanish-language version of the Relevant Outcome Scale for Alzheimer's Disease☆,☆☆

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**KEYWORDS**
Alzheimer disease;
Dementia;
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Reliability;
Validity

**Abstract**
*Introduction and objectives:* The Relevant Outcome Scale for Alzheimer's Disease (ROSA) is a useful tool for evaluating and monitoring dementia patients. This study aims to evaluate the validity and reliability of the Spanish version of ROSA.
*Patients and methods:* Spanish multicentre study involving 39 researchers and including 237 patients with Alzheimer disease (78 mild, 79 moderate, and 80 severe). The patients were tested with the following: Mini—Mental State Examination (MMSE), Fototest, Neuropsychiatric Inventory (NPI), Blessed dementia scale, and a Spanish-language version of ROSA. A subsample of 40 subjects was retested in the 14 days following the initial evaluation. The construct validity was evaluated with the Spearman correlation coefficient ($r$), internal consistency with Cronbach's alpha (alpha), and test—retest reliability with the intraclass correlation coefficient (ICC).
*Results:* ROSA requires $13.8 \pm 7.4$ minutes to administer and its results show a significant association with the clinical stage of AD (mild, $116.7 \pm 23.1$; moderate, $92.9 \pm 19.8$; and severe, $64.3 \pm 22.6$), and with results on the MMSE ($r = 0.68$), Fototest ($r = 0.63$), NPI ($r = 0.53$), and Blessed dementia scale ($r = -0.80$). ROSA shows high internal consistency (alpha = 0.90) and excellent test—retest reliability (ICC 0.97).
*Conclusion:* The Spanish version of ROSA is a brief, valid, and reliable tool permitting overall evaluation of patients with dementia.


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◊ The members of the ROSA Study group are listed in the Appendix.

**PALABRAS CLAVE**
Enfermedad de Alzheimer;
Demencia;
Escala ROSA;
Fiabilidad;
Validez

**Estudio ROSA: validación de la versión española de la *Relevant Outcome Scale for Alzheimer's Disease***

**Resumen**
*Introducción y objetivos:* La escala *Relevant Outcome Scale for Alzheimer's Disease* (ROSA) es una herramienta útil para la evaluación y seguimiento de pacientes con demencia. Nuestro objetivo es evaluar la validez y fiabilidad de una versión española de la escala ROSA.
*Pacientes y métodos:* Estudio multicéntrico nacional en el que 39 investigadores han incluido 237 sujetos con enfermedad de Alzheimer (78 en estadio leve, 79 moderado y 80 grave) a los que se les ha aplicado Mini-Mental, Fototest, Neuropsychiatric Inventory (NPI), escala de Blessed y una versión adaptada al español de la escala ROSA. En una submuestra de 40 sujetos se realizó un retest en los 14 días siguientes a la evaluación inicial. La validez de constructo se ha evaluado mediante el coeficiente correlación de Spearman (r), la consistencia interna con el coeficiente alfa de Cronbach (alfa) y la fiabilidad test-retest con el coeficiente correlación intraclase (CCI).
*Resultados:* La escala ROSA se aplica en 13,8 ± 7,4 min y sus resultados están asociados de forma significativa al estadio clínico (leve 116,7 ± 23,1, moderado 92,9 ± 19,8 y grave 64,3 ± 22,6), Mini-Mental (r = 0,68), Fototest (r = 0,63), NPI (r = 0,53) y escala de Blessed (r = −0,80). La escala ROSA muestra una alta consistencia interna (alfa = 0,90) y una excelente fiabilidad test-retest (CCI = 0,97).
*Conclusión:* La versión española de la escala ROSA es un instrumento breve, válido y fiable para la evaluación global de pacientes con demencia.


## Introduction

Alzheimer disease (AD) is a neurodegenerative disease characterised by extracellular deposition of amyloid beta in the form of senile plaques and intraneuronal deposition of hyperphosphorylated tau protein forming neurofibrillary tangles. These alterations lead to mitochondrial and synaptic dysfunction resulting in neuronal loss and atrophy; this translates clinically into progressive cognitive dysfunction (mainly memory loss) and behavioural disorders which result in increasing functional impairment.[1,2] Mounting evidence suggests that the pathological processes of AD start decades before onset of the first symptoms; involvement occurs progressively and in an organised fashion, explaining the progressive and sequential character of symptoms and the deficits caused by this condition.[3]

Scales are both necessary and frequently used for diagnosis, follow-up, and assessment of response to AD treatment. Ideally, using one single scale for assessing AD globally and throughout its course would make intra- and inter-patient comparisons easier. Nonetheless, the progressive and multifaceted character of AD explains the use of multiple scales to measure such specific domains as cognition (e.g. ADAS-Cog),[4] behaviour (e.g. Neuropsychiatric Inventory[5] [NPI]), functional status (e.g. Pfeffer),[6] or patients' and carers' quality of life (e.g. Zarit).[7] However, we still lack a global scale which is easy and quick to administer, applicable at any stage of the disease, and sensitive to progression and the effects of treatment.[8]

Some scales measure multiple AD domains (cognition, behaviour, functional status, and quality of life), but none of them meets each and every one of the requirements mentioned above; some of them are time-consuming and complex to administer (e.g. the Sandoz Clinical Assessment Geriatric[9] and the Gottfries-Brane-Steen[10] scales require specific training and take 30 minutes to administer), while others have been specifically designed for certain stages of the disease (e.g. the Vienna List[11] for advanced stages), require direct observation (these are more suitable for closed institutions than for clinical practice; e.g. the Nurses' Observation Scale for Geriatric Patients),[12] or focus on a single domain of the disease (e.g. Behavioral Rating Scale for Geriatric Patients[13] for behaviour, Clinical Dementia Rating scale[14] for cognition and functional status).

The Relevant Outcome Scale for Alzheimer's Disease (ROSA)[15] is a new instrument that can be applied at any stage of the disease, requires little time to administer, and enables the assessment of cognition, behaviour, functional status, quality of life, and caregiver burden. This scale, which has been validated in a German population,[15] has been shown to be valid, reliable, and very sensitive to changes in progression. The psychometric properties of this scale and the fact that it assesses different aspects of the disease make the ROSA scale a very useful instrument for long-term patient follow-up in clinical practice, observational studies, and clinical trials.

In this study, we aim to assess the validity, reliability, and factorial structure of a Spanish-language version of the ROSA