

ORIGINAL PAPER ΕΡΕΥΝΗΤΙΚΗ ΕΡΓΑΣΙΑ

Translation, cross-cultural adaptation, reliability and validity of the Greek version of the Disability Assessment for Dementia scale

OBJECTIVE The translation of the Disability Assessment for Dementia (DAD) scale into Greek, its cross-cultural adaptation in the Greek population and its validity and reliability in patients with dementia. **METHOD** Initially, the process of translating the scale from English to Greek took place, with two researchers doing the forward translation and one performing the backward translation. After discussions among the entire research team and its pilot application to patients, to ensure the understanding of its content, the final version of the DAD scale in Greek was created. The scale was administered to caregivers of 30 patients (24 women and 6 men dementia patients, mean age 82.26 ± 6.80), following the official scale guidelines. The Katz and Lawton scales were used to check validity and a total of two measurements were conducted to check reliability. Statistical analyses using Spearman's rank correlation coefficient and intraclass correlation coefficient (ICC) were performed to check validity and reliability, respectively. **RESULTS** The test-retest reliability of the overall DAD scores was found to be excellent ($ICC=0.99$). The subscale for basic and instrumental activities of daily living of the DAD scale were significantly correlated with Katz ($r_s=0.79$, $p<0.001$) and Lawton ($r_s=0.90$, $p<0.001$) scale scores, respectively. The total DAD scale score was significantly correlated with both Katz scale ($r_s=0.76$, $p<0.001$) and Lawton scale scores ($r_s=0.92$, $p<0.001$). **CONCLUSIONS** DAD-Gr found to be reliable and valid in the Greek population for the assessment of functional independence in patients with dementia.

Dementia is the greatest global health and social care challenge of the 21st century.^{1,2} According to the World Health Organization (WHO), dementia is a syndrome that can be resulted from a variety of diseases and injuries that affect the brain and it can be reported as chronic or progressive.³ Also, some researchers briefly add that it is a brain disorder in which there is significant cognitive decline.^{4,5} Dementia causes damage to various areas of the brain, which include memory, thinking, comprehension, understanding, learning, language and judgment causing changes in patient's emotions, social life, motivation and daily goals.⁶⁻⁸ Dementia can be distinguished firstly into two categories, neurodegenerative or irreversible and non-neurodegenerative or reversible and secondly in five types, Alzheimer's disease, Lewy body dementia, vascular

dementia, frontotemporal dementia and also Parkinson's disease.^{4,7} Alzheimer's disease is the most common type of dementia, while generally the majority of dementia occurs in women and in people over 85 years old.⁹⁻¹² Risk factors for the development of dementia include the presence of vascular disease, old age and the genetic profile of each patient.^{4,13,14}

It is noteworthy to mention that dementia, apart from cognitive impairment, affects the independence in activities of daily living (ADL).¹⁵ It is known that as the disease progresses, symptoms related to behaviour, psychology and functional independence of the patient worsen, which also has an impact on the caregiver.^{16,17} It seems necessary for professionals to provide caregivers with the appropriate

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2026, 43(1):62-67

P.M. Lykou,¹
G.M. Kyriakatis,¹
C. Christodoulou,²
Z. Dimitriadis,²
T. Besios¹

¹Human Performance and Rehabilitation Laboratory, Department of Physiotherapy, School of Health Sciences, University of Thessaly, Lamia
²Department of Physiotherapy, School of Health Sciences, University of Thessaly, Lamia, Greece

Μετάφραση, διαπολιτισμική προσαρμογή, έλεγχος εγκυρότητας και αξιοπιστίας της ελληνικής έκδοσης της κλίμακας Disability Assessment for Dementia

Περίληψη στο τέλος του άρθρου

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help and information about how to perform ADL and to continuously assess the deterioration of functional capacity of people with dementia.

There are few ADL assessment scales that are validated in Greek and can be used in patients with dementia. These are scales that examine aspects of the patient's functioning and it is considered that only one assessment scale is not sufficient in order to examine both basic and instrumental ADL.^{18,19} Moreover, these scales do not mention that they had dementia patients as their target population, but they can be used in the general population. To this important clinical issue the Disability Assessment for Dementia (DAD) scale can be more useful and more specific to these patients. DAD scale is a highly useful assessment scale that can help both various health professionals, caregivers and dementia patients themselves by providing a dementia-specific score. The originality of the DAD scale comes from the fact that it consists of a total of 40 items assessing both basic and instrumental ADL. All items refer to the person's ability to perform these activities in the last two weeks, without any assistance from the caregiver.²⁰ DAD scale is very important for medical staff as it can help thoroughly in monitoring the progress of the disease and also in the creation of treatment plan.¹⁵ DAD scale has also been translated and validated in Italy, Brazil (Portuguese), Korea, Spain, Thailand, Iran (Persian), China and Turkey. The findings of each study indicate that it is a reliable and valid assessment tool.^{15,21–27}

The purpose of this study was to translate the DAD scale into Greek, to carry out the cross-cultural adaptation in the Greek population and to investigate its validity and reliability in Greeks with dementia.

MATERIAL AND METHOD

The present study was conducted in three phases and the study protocol was firstly approved by the Ethics Committee of the Department of Physiotherapy of the University of Thessaly (protocol number: 416, 30.3.2023) and then, was registered on the international platform ClinicalTrials.gov (identification number: NCT05850715). Furthermore, the acquisition of the right to use the scale and the creation of the Greek version of the DAD scale achieved after communication with the creator of the scale, who referred the whole process to the MAPI Research Institute, which is the organization that supervised and approved, with specific guidelines, the whole process.

Disability Assessment for Dementia scale

It consists of 40 items and assesses both basic activities of daily living (BADL) with 17 items and instrumental activities of daily living (IADL) with 23 items. Regarding BADL, the 17 items are divided into

the following four categories: Hygiene, dressing, continence and eating, and on the other hand, for IADL the six categories include meal preparation, telephoning, going on an outing, finance and correspondence, medications, and leisure and housework. All the items refer to the patient's ability to perform them in the last two weeks without assistance or reminder. In addition, each item from each of the previously mentioned categories also addresses at a separate stage of activity performance, namely initiation, planning and organization, as well as effective performance.

The duration of the scale administration is approximately 15 minutes and the caregiver answers the questions/items with "Yes" (1 point), "No" (0 points) or "N/A" (not applicable). "Yes" indicates that the person has performed the activity without assistance or reminder in the past two weeks, even if it was performed only once. "No" indicates that the person did not perform the activity without assistance or reminder. If the answer is "N/A", because the person had never performed it before the onset of dementia or did not have the opportunity to do it in the last two weeks, it is not a scoring penalty and these items are not taken into account for the total score.

The final score can therefore range from 0 to 40, which is converted to a percentage from 0 to 100%, with high scores indicating high functioning in ADL. The psychometric properties, the reliability and validity of the scale have been tested primarily by the scale's creator, but also by other researchers who have investigated them in their own language and in their own country's population.^{15,20–27}

Translation

Two forward translations of the scale were carried out separately by two researchers (GMK, PML), who had excellent knowledge of both Greek and English. After agreement between them and with the local coordinator (TB), the first Greek version was created. A backward translation of the first Greek version of the scale carried out by a person (CC) who had no knowledge of the scale and had excellent knowledge of English and Greek. The group coordinator (GMK) compared the backward translation with the original scale and no significant differences were found between them. So, the four persons of the scale translation team agreed on the second version of the Greek Disability Assessment for Dementia Scale (DAD-Gr). Two main researchers (GMK, PML) on a pilot application with 12 caregivers of dementia patients checked the full understanding of the questionnaire. There were no difficulties found in the cognitive interviews that took place. Finally, the group coordinator (GMK) found that there were no typing, spelling or grammatical errors remaining and thus created the final official Greek version of the DAD scale (DAD-Gr).

Test-retest reliability and validity assessment

To assess test-retest reliability, participants (caregivers) took part in two different interviews to complete the DAD-Gr in a two-day time period between the two measurements.

The Katz index for BADL and the Lawton scale for IADL used to test the validity of the scale. The scales were completed for all participants on the first day of the study, either by the caregivers themselves or with the help of the researcher, who, if it was necessary, read and or explained the items on each scale. The whole process of the study is presented also in figure 1.

Katz index for Basic Activities of Daily Living and Lawton Scale for Instrumental Activities of Daily Living were used for the comparisons about the validity of DAD-Gr. Katz index measures the independence in basic and common ADL.^{28,29} Activities are divided into six categories including bathing, dressing, toileting, transferring, continence and feeding. For each category the examinee chooses whether there is independence from the patient for 1 point or complete dependence on the activity for 0 points. Scores range from 0 to 6, with 6 indicating full functioning and lower scores representing moderate or severe loss of functioning. This scale has been translated and validated in the Greek population.¹⁹ Lawton scale consists of questions on 8 IADL including the ability to use telephone, shopping, food preparation, housekeeping, laundry, mode of transportation, responsibility for own medications and ability to handle finances.³⁰ Women are scored on all eight areas of function, and men are not scored in the domains of food preparation, housekeeping and laundry. Depending on the answer chosen by the examinee, the corresponding score is given for each question from 0 to 1. The total score ranges from 0 to 8 for women and from 0 to 5 for men, where high scores indicate high functioning and independence, while low scores indicate low functioning and complete dependence on IADL. The scale was translated and validated in the Greek population.^{18,31}

Design, participants and procedure

A total of 30 participants (24 women, six men, age range 68–94 years old) took part in the study. The inclusion criteria for the study were: (a) The presence of a caregiver who can complete the assessment/interview with the assistance of the researcher, after written consent, (b) the caregivers provided care and support to patients with diagnosed dementia, (c) the patients were 60–95 years old.

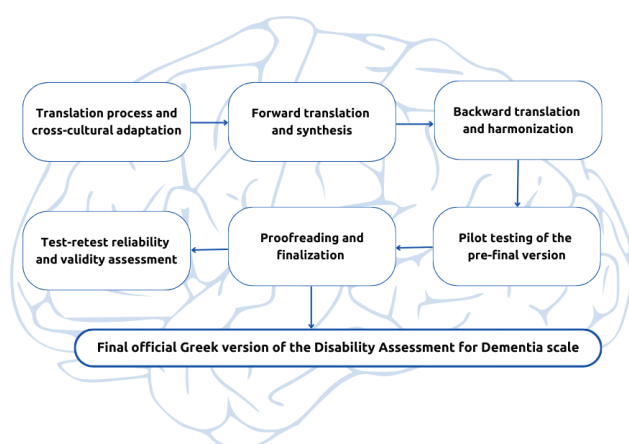


Figure 1. Graphical representation of the phases of the present study.

The exclusion criterion was that patients were not end-stage or bedridden. Participants were recruited to the study from four different Greek cities (Chalkida, Lamia, Livadeia, Trikala) through public elderly support services, either after consultation with private doctors or by any other legal way. Participants (caregivers) in the first contact with the researchers were informed about the whole study procedure and after agreeing and reading the full study document, they signed the consent form.

On the first day of the study procedure, one of the researchers first collected the demographic characteristics of the patients. The interview that took place to carry out the assessment of the DAD scale was in the form of a discussion and consisted firstly by the explanation of the procedure by the researcher, who then read the items of the scale to the caregiver, who in turn responded and the researcher wrote the responses on the sheet. After a period of two days and the reassessment, this meant the end of the research process with each participant.

Statistical analysis

The Kolmogorov-Smirnov test and Q-Q plots used to test the regularity of the data. Spearman's rank correlation coefficient (r_s) was used to investigate the concurrent validity of the two subscales of the DAD with the other two scales assessing the same conceptual domains (Katz index and Lawton scale). To investigate the test-retest reliability of the DAD scale and its subscales was used the intraclass correlation coefficient (ICC) which is considered the most appropriate for this analysis.³² Based on Cicchetti,³³ was also the interpretation of the results of the analyses, meaning that when the ICC is from 0–0.4, it was interpreted as poor, from 0.4–0.59 as fair, from 0.6–0.74 as good and from 0.75–1.0 as excellent. For reliability was also used the respective standard error of measurement (SEM) and smallest detectable difference (SDD). The significance level was set at $p=0.05$. The Statistical Package for Social Sciences (IBM SPSS), version 29.0 was used for all the statistical analyses.

RESULTS

Regarding the demographic characteristics of the participants shown in table 1, both in the pilot application of the scale and in the assessment of test-retest reliability and validity, the participants had the right to answer only in the questions they wished due to medical confidentiality.

The DAD scale successfully translated and adapted to the Greek population. The twelve participants during the pilot application of the scale did not express any difficulty in understanding the terminology and content of the scale, so any major changes in the editing and correctness of the text were not necessary. Test-retest reliability of the DAD's total scores was found to be excellent ($ICC=0.99$), as well as of its subscales ($ICC=0.99$) (tab. 2). Subscale for BADL of DAD-Gr was significantly correlated with the scores

Table 1. Demographic characteristics of sample.

Demographic information	n (%) or mean±SD
<i>Participants (n=30)</i>	
Females	24 (80)
Males	6 (20)
Age (in years) (n=30)	82.26±6.80
<i>Educational level (n=30)</i>	
None	7 (23.33)
Primary school	17 (56.66)
Middle school	1 (3.33)
High school	3 (10.0)
University	2 (6.66)
Duration of disease (in years) (n=20)	2.95±2.21
<i>Dementia type (n=20)</i>	
Not otherwise specified	9 (45)
Alzheimer	6 (30)
Vascular	4 (20)
Frontotemporal	1 (5)

n: Number of participants who answered, %: Percentage, SD: Standard deviation

Table 2. Test-retest reliability of the Disability Assessment for Dementia scale (DAD) instrument and its subscales.

Instrument	GM	ICC2.1	95%CI	SEM	SDD
DAD _{total}	59.48	0.99	0.98–1.00	2.48	6.87
DAD _{BADL}	74.47	0.99	0.97–0.99	3.96	10.97
DAD _{IADL}	47.70	0.99	0.97–0.99	3.32	9.20

DAD_{total}: Total score of DAD scale, DAD_{BADL}: Subscale of basic activities for daily living of DAD scale, DAD_{IADL}: Subscale of instrumental activities for daily living of DAD scale, GM: Grand mean, ICC_{2.1}: Intraclass correlation coefficient (2nd model), 95% CI: 95% confidence intervals, SEM: Standard error of measurement, SDD: Smallest detectable difference

of the Katz index ($r_s=0.79$, $p<0.001$). Subscale for IADL of DAD-Gr was significantly correlated with the scores of the Lawton scale ($r_s=0.90$, $p<0.001$). The total score of DAD-Gr was significantly correlated with the scores from both Katz ($r_s=0.76$, $p<0.001$) and Lawton scales ($r_s=0.92$, $p<0.001$).

DISCUSSION

The variety of assessment scales related to ADL is very wide. This is why the DAD scale is very important as it assesses the functionality specifically of patients with dementia. It is even more important for this scale to be available to all health professionals and in as many languages and

populations as possible, which led to the translation and adaptation of the scale into the Greek language.

Assessment of the test-retest reliability and validity of DAD have been evaluated in eight more countries.^{15,21–27} Regarding test-retest reliability the results between this study and the others were quite similar according to ICC values. More specifically, our study showed ICC=0.99, which is the same as the study conducted in Chinese, Turkish and Persian, and similar to the other studies which ranges from 0.94–0.98.^{22,25,27}

To assess validity, the present study used the Katz and Lawton scales, which were also used in the Italian validity study, with the comparative results showing differences, since in the present study validity was found for BADL $r=0.76$, $p<0.001$, compared to the Italian which found $r=0.53$, $p<0.001$, and for IADL $r=0.92$, $p<0.001$, compared to the Italian which found $r=0.54$, $p<0.001$.²⁴ However, in terms of validity in the other studies for BADL, the r value ranged from 0.82–0.92, $p<0.001$ and for IADL from 0.87–0.94, $p<0.001$, which was not significantly different from the results of the present study, although it should be noted that several studies have used different assessment scales for BADL.

It is worth mentioning that the scale can be applied both in primary care facilities, as well as in private clinics and home care services by health professionals, as it is very short (about 15 minutes), simple to understand by all stakeholders, regardless of educational background, and specific for drawing definite conclusions about the patient's functionality. More specifically, DAD-Gr will be able to give more relevance to the treatment of patients with dementia, since there was no appropriate and specialized assessment tool for ADL in Greek until now. Finally, the DAD scale is able to extract results both in terms of the different functional domains that it has and the stage at which the patient can achieve each of the activities, helping health professionals to focus on very particular points in the rehabilitation process.

The present study had some limitations. Firstly, the sample size of the study was small and women were more than men. Also, the period for assessing test-retest reliability seems to be short, which may have affected the result in terms of memory of answers from the caregiver's and the researchers' perspective. Finally, 1/3 of the participants did not answer two demographic questions, so we could not know the exact representation and status of the patients in each category, such as the proportion of dementia types.

In conclusion, DAD-Gr is a reliable and valid tool for the assessment of both BADL and IADL for dementia pa-

tients and can easily be used by all health professionals extracting safe findings without fear and insecurity about whether or not they will be understood by the caregivers of these patients.

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ΠΕΡΙΛΗΨΗ

Μετάφραση, διαπολιτισμική προσαρμογή, έλεγχος εγκυρότητας και αξιοπιστίας της ελληνικής έκδοσης της κλίμακας Disability Assessment for Dementia

Π.Μ. ΛΥΚΟΥ,¹ Γ.Μ. ΚΥΡΙΑΚΑΤΗΣ,¹ Χ. ΧΡΙΣΤΟΔΟΥΛΟΥ,² Ζ. ΔΗΜΗΤΡΙΑΔΗΣ,² Θ. ΜΠΕΣΙΟΣ¹

¹Εργαστήριο Ανθρώπινης Δραστηριότητας και Αποκατάστασης, Τμήμα Φυσικοθεραπείας, Σχολή Επιστημών Υγείας, Πανεπιστήμιο Θεσσαλίας, Λαμία, ²Τμήμα Φυσικοθεραπείας, Σχολή Επιστημών Υγείας, Πανεπιστήμιο Θεσσαλίας, Λαμία

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ΣΚΟΠΟΣ Η μετάφραση της κλίμακας Disability Assessment for Dementia (DAD) στα Ελληνικά, η διαπολιτισμική προσαρμογή της στον ελληνικό πληθυσμό και η εγκυρότητα και η αξιοπιστία της σε ασθενείς με άνοια. **ΥΛΙΚΟ-ΜΕΘΟΔΟΣ** Αρχικά, πραγματοποιήθηκε η διαδικασία μετάφρασης της κλίμακας από τα Αγγλικά στα Ελληνικά, με δύο ερευνητές να κάνουν την προς τα εμπρός μετάφραση και έναν να πραγματοποιεί την προς τα πίσω μετάφραση. Ύστερα από συζητήσεις μεταξύ όλης της ερευνητικής ομάδας και την πιλοτική εφαρμογή της σε ασθενείς, για τη διασφάλιση της κατανόησης του περιεχομένου της, δημιουργήθηκε η τελική μορφή της κλίμακας DAD στα Ελληνικά. Η κλίμακα χορηγήθηκε σε φροντιστές 30 ασθενών (24 γυναίκες και 6 άνδρες ασθενείς, μέση ηλικία 82,26±6,80), ακολουθώντας τις επίσημες κατευθυντήριες γραμμές της κλίμακας. Για τον έλεγχο της εγκυρότητας χρησιμοποιήθηκαν οι κλίμακες Katz και Lawton, ενώ για τον έλεγχο της αξιοπιστίας πραγματοποιήθηκαν συνολικά δύο μετρήσεις. Για τον έλεγχο της εγκυρότητας και της αξιοπιστίας πραγματοποιήθηκαν στατιστικές αναλύσεις με τη χρήση του συντελεστή συσχέτισης του Spearman και του συντελεστή συσχέτισης intraclass correlation coefficient, αντίστοιχα. **ΑΠΟΤΕΛΕΣΜΑΤΑ** Η αξιοπιστία επαναληπτικών μετρήσεων των συνολικών βαθμολογιών της DAD βρέθηκε εξαιρετική (ICC=0,99). Η υποκλίμακα για τις βασικές και τις σύνθετες δοκιμασίες καθημερινής ζωής της κλίμακας DAD συσχετίστηκε σημαντικά με τις βαθμολογίες της κλίμακας Katz ($r_s=0,79$, $p<0,001$) και Lawton ($r_s=0,90$, $p<0,001$), αντίστοιχα. Η συνολική βαθμολογία της κλίμακας DAD συσχετίστηκε σημαντικά τόσο με τις βαθμολογίες της κλίμακας Katz ($r_s=0,76$, $p<0,001$) όσο και με τις βαθμολογίες της κλίμακας Lawton ($r_s=0,92$, $p<0,001$). **ΣΥΜΠΕΡΑΣΜΑΤΑ** Η κλίμακα DAD-Gr βρέθηκε να είναι αξιόπιστη και έγκυρη στον ελληνικό πληθυσμό για την αξιολόγηση της λειτουργικής ανεξαρτησίας σε ασθενείς με άνοια.

Λέξεις ευρητηρίου: Alzheimer, Άνοια, Δραστηριότητες καθημερινής ζωής, Λειτουργικότητα, DAD-Gr

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- Corresponding author:*
- G.M. Kyriakatis, 3rd km Old National Road Lamia-Athens, 351 00 Lamia, Greece
e-mail: georgemarioskiriakatis2000@gmail.com