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Validity and Reliability of the Persian Version of the Disability Assessment for Dementia Scale

Hamid Soltani Zangbar,[1] Afsoon Hassani Mehraban,[1,*] Malahat Akbarfahimi,[1] and Fatemeh Mohammadian Rasanani[2]

[1]Department of Occupational Therapy, School of Rehabilitation, Iran University of Medical Sciences, Tehran, IR Iran
[2]Neurology Department, Roozbeh Hospital, Tehran, IR Iran

[*]*Corresponding author*: Afsoon Hassani Mehraban, Department of Occupational Therapy, School of Rehabilitation, Iran University of Medical Sciences, Tehran, IR Iran. Tel: +98-2122227124, Fax: +98-2122220946, E-mail: mehraban.a@iums.ac.ir

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Abstract

Background: As dementia progresses in the course of life, one's functions may be reduced regarding to fulfill the activities of daily living. One of the most important factor to diagnose and determine the severity of dementia is to assess activities of daily living.
Objectives: one the most important factor in determining the severity of dementia in the area of activities of daily living is disability assessment for dementia (DAD) scale, which is not available in Persian and there is no validity and reliability report for it in Iranian community. Therefore, the aim of this study was to provide a Persian version of the valid and reliable DAD scale to assess functional disability in patients with dementia of Alzheimer type within the scope of everyday living activities.
Patients and Methods: After the permission from the developer of the original scale, we translated the English version to Persian according to the international quality of life assessment (IQOLA) approach. To review the clarity and the necessity of the items translated, content validity index (CVI) and content validity ratio (CVR) methods were applied. Also, to assess the reliability of the scale, test-retest and inter-rater reliability techniques were used. The internal consistency of the items was also measured using the Cronbach's alpha coefficient.
Results: Cronbach's alpha coefficient was very good for the scale (Cronbach's $\alpha = 0.78$) and the inter-rater reliability and test-retest reliability were excellent (intraclass correlation/ICC = 0.99, ICC = 0.99). The clarity and necessity of the translated items based on the scores of CVI and CVR were also acceptable.
Conclusions: The Persian version of DAD, during the study, had a very good validity and reliability and can serve as a useful scale in clinical assessment of functional disability in patients with Alzheimer's in the area of activities of daily living.

Keywords: Reliability, Validity, Disability Assessment for Dementia Scale

1. Background

Changes in ones' cognitive function occur along with aging. Some of these changes are abnormal that occur due to some progressive diseases such as Alzheimer's, which is the most prevalent type of dementia (1-3).

In 2006, there were about 24.3 million patients with dementia all over the world. It is estimated that every 7 seconds, one person suffers from dementia in the world. According to the predictions, up to 2040, 81.1 million people in the world will have been diagnosed with dementia, and in 2050, there will have been a total of 115 million Alzheimer's patients. There is no precise statistics with regard to the prevalence of Alzheimer's in Iran; however, the vast majority of Iran's population are middle-aged people at the moment. Given that the prevalence of dementia is high among the elderly, the 20 million middle-aged people who form about a third of the current population of the country will form the aging population of the country in the coming years. Accordingly, it is possible that the number of people with Alzheimer's will increase in the future (4-7). Alzheimer's has some debilitating effects on one's ability to carry out activities of daily living. Most patients need some help to do their basic activities such as dressing in the advanced stages of Alzheimer's, which consequently increases the stress and worry of the patient's caregiver (8-12).

According to the recent research, occupational therapy interventions in people with Alzheimer's are effective in the improvement of their quality of life as well as an increase in their participation (13-16). There are several assessment scales that could be used to assess Alzheimer's patients (17, 18). The major focus of some of these tools is on the basic activities of daily living (BADL), such as assessment of motor and process skills (AMPS) (19), Barthel index (20, 21), and functional independence measure (FIM) (22). Some of the measures used, mainly focus on instrumen-

tal activities of daily living (IADL) like the Lawton instrumental activities of daily living scale whose Persian version was assessed in terms of validity and reliability in Iran in 2013 by Hasani Mehrban and colleagues and Graf (23, 24). Another example of the scale used to assess IADL is (KELS) whose Persian version was assessed in terms of validity and reliability in Iran in 2010 by Kazazi and colleagues (25, 26).

2. Objectives

The presence of a tool that can evaluate both ADL and IADL areas will be very helpful for occupational therapists. Among these tools, disability assessment for dementia (DAD) can be pointed out (27). The scale is based on the health model defined by the world health organization (WHO) and that occupational therapy has a lot in common with this model. In addition, ADL, IADL, and cognition are all assessed in this scale so that it examines each of the items in terms of initiation, planning and organization, and effective implementation (27, 28). The disability assessment for dementia scale has so far been translated into several languages. One of the features that the original version and the validated and reliable versions in other languages have proven is that the scale has no biases towards gender, education and age (29-34). Due to the advantages listed and lack of validated and reliable versions in Persian language in terms of everyday living activities, the presence of a Persian scale that can assess both scopes of ADL and IADL will be helpful in the treatment and rehabilitation of patients with Alzheimer's. The primary objective of the present study was to prepare a Farsi version of DAD as well as to determine its validity and reliability.

3. Patients and Methods

The type of the study is nonexperimental that seeks to methodologically evaluate research instruments. In this study, the validity and reliability of Persian version of the DAD scale were investigated. The methodology was approved by the ethics committee of Iran University of Medical Sciences; and with the cooperation of Alzheimer's Association, letters of agreement were taken from the University and the center. Written consent on the caregivers' satisfaction to participate in the study was also required.

3.1. Sampling

The sampling was done using the nonprobability convenient sampling technique by referring to Iranian Alzheimer's association. The diagnosis by the doctor based on the DSM-V (diagnostic and statistical manual of mental disorders, fifth edition) criteria for developing Alzheimer's was required. One hundred and twelve patients who were diagnosed with Alzheimer's disease and were in the age range of 60 and above were selected with regard to the inclusion and exclusion criteria for the study. Inclusion criteria were as follows: 1, notwithstanding the intervention in ADL and IADL performance other than Alzheimer's disease, such as hip fracture or other bone disorders, visual defects, and skeletal diseases; 2, cooperation of patient's caregivers; and 3, awareness of the caregiver on the conditions and problems of the patient. Patients were evaluated in terms of the cognitive level. In so doing, mini-mental state examination (MMSE) was used, which is a tool to assess cognitive levels. The maximum score on this scale is 30 and the score of 23 and below indicate cognitive pathology (35, 36). To determine the severity of the condition, the functional assessment staging test (FAST) was used, which is a functional scale to determine the severity of dementia and consists of seven steps: 1, normal adult; 2, older normal adult; 3, early dementia; 4, mild dementia; 5, medium dementia; and 7, severe dementia (37). The DAD scale was filled in with the help of the patient's caregiver. Caregiver is considered as the one who is with the patient on most days and has accurate information about the performance and the inability of the patient.

3.2. The scale

The disability assessment for dementia scale includes 10 areas and 40-items in which 17 items are related to BADL, and 23 items are related to IADL. The scale examines the patient's performance over the past two weeks. So that after giving the required notification to the caregiver, the ability of the patient with regard to each of the 40 items is determined through an interview with the caregiver. The caregiver's answers to each of these items include: Yes = 1 point, no = 2 points and, not applicable that has no point. Ultimately, by eliminating not applicable items, other points which are in the range of 0 - 100, are collected and the corresponding points are expressed in terms of a fraction of a percent. The higher the patient's performance, the better percentage the patient will take. Given that executive functioning consists of those cognitive skills which include initiation, planning, and the effective performance of activities, using DAD, the rate of damage in terms of executive functioning are more accurately characterized. This scale is quite advantageous in terms of time so that a maximum of 15 minutes are needed for health care workers to examine the patients. The 6-item version of the scale can be used to diagnose early Alzheimer's (8, 27, 38-41).

3.3. Translation Procedure

In order to translate the DAD scale into Persian, the IQOLA method was used (42). The method is based on for-

ward and backward translation and review of the translation by the experts. For forward translation, the original English version was translated into Farsi by two translators fluent in Farsi. Then a group of experts gave their opinions about the quality of translations and after summing up the opinions, two translators who were fluent in both English and Farsi, translated the original scale into Farsi. The parts that did correspond with English version were changed after they were discussed with the experts.

To determine content validity, the scale was given to a few occupational therapists to specify the appropriateness of the translated items in terms of the necessity and clarity. The method used to determine the necessity of the items was CVR and to define the clarity of the items, CVI were used (43-45).

To evaluate the test-retest and inter-rater reliability, intra-class correlation coefficient (ICC) was used. Internal consistency of the items was investigated using Cronbach's alpha coefficient. In order to analyze all the data, the SPSS software version 16 was used. In all the tests, P value less than 0.05 was considered as a statistically significant value.

4. Results

In this study, 112 patients with Alzheimer's dementia were studied in which 62 patients (55.4%) were male. Twenty-six cases (23.2%) had the disease for less than one year, 33 cases (29.5%) suffered from the disease for one to three years and 53 patients (47.3%) had the disease for over three years (47.3%) (Table 1).

Table 1. Demographic Characteristics of the AD Samples (n = 112)

Variables	Number	Frequency
Sex		
Female	50	44.6
Male	62	55.4
Marital status		
Married	64	57.1
Single	3	2.7
Widow	45	40.2
Duration of illness		
Less than a year	26	23.2
One to three years	33	29.5
More than three years	53	47.3

The age range of the study sample was 60 - 92 years old with the mean age and standard deviation (mean age ± SD) of 77.04 ± 6.24. The minimum DAD score was equal to 0 and the highest score was 97.5. Also, based on the DAD scale, the mean of activities of daily living of the participants was 44.27 (Table 2).

Table 2. Descriptive Statistics of Disability Assessment for Dementia (DAD), Mini-Mental State Examination (MMSE) and Functional Assessment Staging Test (FAST)

	Range	Mean (SD)
DAD	0 - 97.50	44.27 (30.96)
MMSE	0 - 29.00	9.28 (10.41)
FAST	1.00 - 75.00	45.08 (31.76)

According to the FAST scale, the minimum severity of dementia was 1 and maximum was 75 (e7) with the mean of 45.08 and standard deviation of 31.76. Based on the MMSE, in terms of the cognitive skills, the minimum score was 0 and the maximum score was 29 with the mean of 9.28 and standard deviation of 10.41 (Table 2).

4.1. Content Validity

The content validity of the items was determined by 8 experts in terms of the clarity and necessity of the items translated. The necessity of the item was measured using a scale of three degrees (necessary, useful, not necessary). Clarity of the items was measured by a 4-point scale (completely clear, and clear but in need of revision, the need to review, and not clear). If the number of the experts is 8, the minimum acceptable score for the CVR will be 0.75. The minimum acceptable score for CVI in all circumstances will be equal to 0.79 (43-48). According to our calculations, the necessity of the translated items is, in all aspects, over 0.75 and the clarity of the translated items is higher than 0.79 in all domains.

4.2. Reliability

For test-retest reliability, ICC was used. The correlation of the items in test-retest was very high (0.99), and that the coefficients obtained were statistically significant ($P < 0.001$) (Table 3).

The reliability of the test items is desirable. It should be noted that the number of participants in the retest was 78 people. Like test-retest reliability, for inter-rater reliability, ICC was run. The total correlation between the first and second raters was very high (ICC = 0.99, $P < 0.001$), which indicates that the reliability of the test is very good (Table 3).

Table 3. Reliability of Test-Retest and Inter-Rater Using the Intraclass Correlation Coefficient (n = 112)

DAD items	First Time, First Examiner				Second Time, Second Examiner				Intraclass Correlation Coefficient			
	Range	M	SD	SEM	Range	M	SD	SEM	P Value	ICC	Upper Limit	Lower Limit
Test-retest reliability	0 - 97.5	41.76	30.48	3.04	0 - 95	40.11	29.98	2.99	< 0.001	0.99	0.99	0.99
Inter-rater reliability	0 - 97.5	44.37	30.96	3.09	0 - 97.5	43.41	31.15	3.11	< 0.001	0.99	0.99	0.99

4.3. Internal Consistency

To assess the internal consistency of the items in Persian version scale, Cronbach's alpha coefficient was used to assess disability in dementia. In general, the internal consistency of the items was at a good level and the Cronbach's alpha coefficient for 10 items was 0.78. The correlation between test items was variable from -0.22 to 0.82. The minimum correlation was between calling and food preparation, whereas the highest correlation was obtained between dressing and hygiene (Tables 4 and 5).

5. Discussion

This is the first time to translate in Farsi and validate the DAD scale in the Alzheimer society of Iran. The results of this study are similar to other studies but this attempt included patients with a wide range of disease severity (27, 29, 31, 32, 34)

5.1. Content Validity

One of the main features of a test is its desired content validity, the first step toward which is analyzing validity of its content. It required to logic analysis of test content for determining content validity of the DAD scale, which was translated into Persian. For having a logic analysis, also, it was required to have individual and mental judgment of related expertise. Therefore, the test questions were provided for them and it is asked to determine how they measure test questions of the given characteristic regarding to necessity and clarity. It should be noted that validity is about suitability, meaningfulness and effectiveness of special deductions resulted from scale scores (48, 49). Since in this study we just translated DAD scale and did not manipulate its items, our purpose to determine scale content validity is determining its translated items necessity and clarity. Getting high scores in necessity and clarity, these items have been proved to be valid.

After gathering and analyzing scores of CVI and CVR, and assuring that the necessity score of all items are above 75% and the clarity score of all items are above 79%, it was concluded that the content validity of the DAD scale which was translated into Persian is desirable.

In Chinese version of disability assessment for dementia (CDAD), life style and cultural issues of Chinese elders were considered for determining scale content validity. Most elders in this country are illiterate, so items related to education like correspondence and "telephoning" omitted or some corrections are made. Some habits like preparing shopping list, leisure and housework, also changed according to the individual lifestyle and culture (32).

5.2. Reliability

If a scale has a suitable repeatability (reliability), it would mean that it can be used in clinical research since it provides an appropriate confidence coefficient in the course of patient assessment (50). To measure the reliability of the results, the DAD scale was filled during two weeks and through interviews with caregivers. This two-week duration was necessary according to the scale guideline. It seems that this duration is a good time for decreasing the effect of memory. It is also unlikely that physical and cognitive abilities of the person take significant changes during this time for performing task related to ADL and IADL. Most participants in this research were patients who referred to the rehabilitation section of Alzheimer's association. So, both in test stage and retest stage, caregivers of these patients were easy available. However, in the case of a patient who does not refer to the rehabilitation section, and the lack of presence of some caregivers in the retest stage, the sample test decreased to 78 patients. However, as previous studies, validity was desirable and ICC was equal to 99% (Table 3). Among testers, what is important about reliability is analyzing the amount of results correlation of tests which have been administrated by different testers on the given scale. In the current study, the correlation among testers is equal to 99%, so that reliability is in a desired situation (Table 3). It should be noted that distance between assessment of the first tester and second tester was very short, which can be effective in increasing reliability among testers. The reason of this shortness of distance was time limitation. Also, testers attending association for assessing patients were on an equal ability level which can be effective for reliability.

It can be generally concluded that in the reliable and valid version of Persian translated disability assessment scale for dementia, reliability among testers is significant and desirable. The current study identified a very high correlation in both test-retest reliability and inter-rater reli-

Table 4. Internal Consistency (Correlation Between Test Items and Total Scores in the First Examination) (n = 112)

DAD Domains	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Dressing	5.31	7.04	0.73	0.74
Continence	5.15	7.07	0.67	0.74
Eating	5.01	7.79	0.58	0.76
Meal Preparation	4.49	8.10	0.01	0.86
Telephoning	5.31	7.17	0.55	0.75
Going on an outing	5.51	7.06	0.58	0.75
Finance and Correspondence	5.32	6.74	0.42	0.78
Medications	5.67	7.78	0.48	0.77
Leisure and Housework	5.34	7.78	0.56	0.76
Hygiene	5.25	6.95	0.75	0.73

Table 5. The Correlation Between Disability Assessment for Dementia Items in the First Test (n=12)

DAD	Hygiene	Dressing	Continence	Eating	Meal Preparation	Telephoning	Going on an Outing	Finance and Correspondence	Medications	Leisure and Housework
Hygiene	1									
Dressing	0.82	1								
Continence	0.74	0.66	1							
Eating	0.55	0.57	0.60	1						
Meal preparation	0.08	-0.01	0.21	0.21	1					
Telephoning	0.54	0.58	0.44	0.43	-0.22	1				
Going on an outing	0.49	0.46	0.42	0.30	0.04	0.39	1			
Finance And correspondence	0.33	0.37	0.18	0.18	-0.06	0.53	0.46	1		
Medications	0.41	0.43	0.31	0.27	-0.00	0.36	0.50	0.35	1	
Leisure and housework	0.57	0.62	0.46	0.37	-0.00	0.46	0.39	0.32	0.29	1

ability which indicates that it is strongly replicable, as in other versions of the DAD scale (27, 29, 32-34)

5.3. Internal Consistency

The main issue related to the Cronbach's alpha coefficient is that by the elimination of the fifth question (providing food), Cronbach's alpha changes from 0.78 to 0.86 (Table 4). Much of this change pertains to the fact that most of the patients participated in the study were men who had not any cooking activities even before the disease. The correlation between the test items was variable from -0.22 to 0.82 (Table 5). The lowest correlation was between the calling and food preparation; while the highest correlation was found between dressing and hygiene. A correlation between test questions is variable. Regarding that the DAD scale extensively assesses individual performance in basic and instrumental activities, this variable correlation is not unlikely.

In other studies, the lowest Cronbach's alpha coefficient belonged to the Brazilian version of the scale, which is equal to 0.77 (29). Also, the highest Cronbach's alpha coefficient belonged to the Italian version of the scale, which is equal to 0.92 (31). In the original study carried out by the developer of the scale, the Cronbach's alpha coefficient had been obtained as 0.96 (27). With the exception of the item food preparation, based on the analysis carried out, like previous studies, the score obtained from DAD has no significant relationship with gender, education, and age. Moreover, one of the criteria of an ideal scale is the loss of orientation with respect to gender (27, 29, 31-34)

5.4. Limitations of the Study

Given the two-week period for the consideration of the patients' functioning in the process of the scale, the cooperation of the caregivers reduced which was one of the limitations of our study. A large number of clients had orthopedic and interfering problems with the study; therefore,

they were excluded from the study. Most of the visitors to the community were in the severe stage of the disease.

5.5. Conclusion

One of the most effective ways to measure the degradation and impact of therapy sessions in the patients with Alzheimer's disease is the assessment of activities of daily living as well as the functional ability of the patients. The DAD scale is a measure of functional ability in activities of daily living of people in a more detailed and accurate way based on the initiation, planning and organization, and effective implementation. Given the lack of validated and reliable Persian scale, a particularly complete scale like DAD in ADL and IADL, the results of this study suggest that the Persian version of DAD can be used as a reliable and valid tool in Iranian context. Acknowledgments

Footnotes

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References

1. Cummings JL. Alzheimer's disease. *N Engl J Med.* 2004;**351**(1):56–67. doi: 10.1056/NEJMra040223. [PubMed: 15229308].
2. Petersen RC, Doody R, Kurz A, Mohs RC, Morris JC, Rabins PV, et al. Current concepts in mild cognitive impairment. *Arch Neurol.* 2001;**58**(12):1985–92. [PubMed: 11735772].
3. Robillard A. Clinical diagnosis of dementia. *Alzheimers Dement.* 2007;**3**(4):292–8. doi: 10.1016/j.jalz.2007.08.002. [PubMed: 19595950].
4. Mohani B, Arjmand F. Template synthesis of Co(II), Ni(II) and Cu(II) complexes derived from oxamide ligand and the reactivity of Cu(II) complex towards human serum albumin. *Bioinorg Chem Appl.* 2004:225–35.
5. Ferri CP, Prince M, Brayne C, Brodaty H, Fratiglioni L, Ganguli M, et al. Global prevalence of dementia: a Delphi consensus study. *The Lancet.* 2005;**366**(9503):2112–7. doi: 10.1016/s0140-6736(05)67889-0.
6. Prince M, Bryce R, Albanese E, Wimo A, Ribeiro W, Ferri CP. The global prevalence of dementia: a systematic review and metaanalysis. *Alzheimers Dement.* 2013;**9**(1):63–75 e2. doi: 10.1016/j.jalz.2012.11.007. [PubMed: 23305823].
7. Sabayan B, Bonneux L. Dementia in Iran: how soon it becomes late!. *Arch Iran Med.* 2011;**14**(4):290–1.
8. Farias ST, Mungas D, Jagust W. Degree of discrepancy between self and other-reported everyday functioning by cognitive status: dementia, mild cognitive impairment, and healthy elders. *Int J Geriatr Psychiatry.* 2005;**20**(9):827–34. doi: 10.1002/gps.1367. [PubMed: 16116577].
9. Haley WE, Pardo KM. Relationship of severity of dementia to caregiving stressors. *Psychology and Aging.* 1989;**4**(4):389–92. doi: 10.1037/0882-7974.4.4.389.
10. Lu YF, Haase J. Experience and Perspectives of Caregivers of Spouse with Mild Cognitive Impairment. *Current Alzheimer Research.* 2009;**6**(4):384–91. doi: 10.2174/156720509788929309.
11. Nip PSY, Lee JSW, Kwok TCY. Association of functional disability in dementia patients with caregiver stress: a cross-sectional study. *J Am Geriatr Soc.* 2010;**5**(2):48–53.
12. Prem PN. Clinical alzheimer rehabilitation. 2d ed. Springer Publishing Company; 2009.
13. Schell BA, Gillen G, Scaffa M, Cohn ES. Willard and Spackman's occupational therapy. Lippincott Williams & Wilkins; 2013.
14. Dooley NR, Hinojosa J. Improving Quality of Life for Persons With Alzheimer's Disease and Their Family Caregivers: Brief Occupational Therapy Intervention. *Am J Occup Ther.* 2004;**58**(5):561–9. doi: 10.5014/ajot.58.5.561.
15. Giordano M, Dominguez LJ, Vitrano T, Curatolo M, Ferlisi A, Di Prima A, et al. Combination of intensive cognitive rehabilitation and donepezil therapy in Alzheimer's disease (AD). *Arch Gerontol Geriatr.* 2010;**51**(3):245–9. doi: 10.1016/j.archger.2009.11.008. [PubMed: 19969381].
16. Law M. Participation in the occupations of everyday life. *Am J Occup Ther.* 2002;**56**(6):640–9. [PubMed: 12458856].
17. Law M, Letts L. A critical review of scales of activities of daily living. *Am J Occup Ther.* 1989;**43**(8):522–8. [PubMed: 2672821].
18. Sheehan B. Assessment scales in dementia. *Ther Adv Neurol Disord.* 2012;**5**(6):349–58. doi: 10.1177/1756285612455733.
19. Fisher AG, Jones KB. Assessment of motor and process skills. 375. Three Star Press Fort Collins, CO; 1999.
20. Collin C, Wade DT, Davies S, Horne V. The Barthel ADL Index: A reliability study. *International Disability Studies.* 2009;**10**(2):61–3. doi: 10.3109/09638288809164103.
21. Wade DT, Collin C. The Barthel ADL Index: a standard measure of physical disability?. *Int Disabil Stud.* 1988;**10**(2):64–7. [PubMed: 3042746].
22. Ottenbacher KJ, Hsu Y, Granger CV, Fiedler RC. The reliability of the functional independence measure: A quantitative review. *Arch Phys Med Rehabil.* 1996;**77**(12):1226–32. doi: 10.1016/s0003-9993(96)90184-7.
23. Graf C. The Lawton instrumental activities of daily living (IADL) scale. *The gerontologist.* 2009;**9**(3):179–86.
24. Mehraban AH, Soltanmohamadi Y, Akbarfahimi M, Taghizadeh G. Validity and reliability of the persian version of lawton instrumental activities of daily living scale in patients with dementia. *Med J Islam Repub Iran.* 2014;**28**:25.
25. Burnett J, Dyer CB, Naik AD. Convergent validation of the Kohlman Evaluation of Living Skills as a screening tool of older adults' ability to live safely and independently in the community. *Arch Phys Med Rehabil.* 2009;**90**(11):1948–52. doi: 10.1016/j.apmr.2009.05.021. [PubMed: 19887222].
26. Kazazi L, Karbalaei N, Rafei H, Karimlou M. The reliability and validity of Kohlman evaluation of living skills in schizophrenic patients. 2010
27. Gelinas I, Gauthier L, McIntyre M, Gauthier S. Development of a functional measure for persons with Alzheimer's disease: the disability assessment for dementia. *Am J Occup Ther.* 1999;**53**(5):471–81. [PubMed: 10500855].
28. Gelinas B. Disability assessment for dementia (DAD). *CMAJ.* 1994;**150**(3):387.

29. Bahia VS, Carthery-Goulart MT, Novelli MM, Kato-Narita EM, Areza-Fegyveres R, Caramelli P, et al. Functional disability in alzheimer disease. *Alzheimer Dis Assoc Disord.* 2010:1. doi: 10.1097/WAD.0b013e3181cfc878.
30. Carthery-Goulart MT, Areza-Fegyveres R, Schultz RR, Okamoto I, Caramelli P, Bertolucci PH, et al. Cross-cultural adaptation of the disability assessment for dementia (dad). *Arq Neuropsiquiatr.* 2007;**65**(3B):916–9. [PubMed: 17952309].
31. De Vreese LP, Caffarra P, Savare R, Cerutti R, Franceschi M, Grossi E, et al. Functional disability in early Alzheimer's disease - a validation study of the Italian version of the disability assessment for dementia scale. *Dement Geriatr Cogn Disord.* 2008;**25**(2):186–94. doi: 10.1159/000113415. [PubMed: 18196940].
32. Mok CC, Siu AM, Chan WC, Yeung KM, Pan PC, Li SW. Functional disabilities profile of chinese elderly people with Alzheimer's disease - a validation study on the chinese version of the disability assessment for dementia. *Dement Geriatr Cogn Disord.* 2005;**20**(2-3):112–9. doi: 10.1159/000086612. [PubMed: 15990425].
33. Suh GH. Development of the korean version of disability assessment for dementia scale (dad-k) to assess function in dementia. *J Am Geriatr Soc.* 2003;**7**(4):278–87.
34. Tozlu M, Cankurtaran M, Yavuz BB, Cankurtaran ES, Kutluer I, Erkek BM, et al. Functional Disability in Alzheimer Disease: A Validation Study of the Turkish Version of the Disability Assessment for Dementia Scale. *J Geriatr Psychiatry Neurol.* 2014;**27**(4):237–46. doi: 10.1177/0891988714532014.
35. Galea M, Woodward M. Mini-mental state examination (mmse). *J Physiother.* 2005;**51**(3):198. doi: 10.1016/s0004-9514(05)70034-9.
36. Shahid A, Wilkinson K, Marcu S, Shapiro CM. Mini-mental state examination (mmse). Stop, that and one hundred other sleep scales. *Springer.* 2012:223–4. doi: 10.1007/978-1-4419-9893-4.
37. Sclan SG, Reisberg B. Functional Assessment Staging (FAST) in Alzheimer's Disease: Reliability, Validity, and Ordinality. *Int Psychogeriatr.* 2005;**4**(03):55. doi: 10.1017/s1041610292001157.
38. Buckner RL. Memory and executive function in aging and AD: multiple factors that cause decline and reserve factors that compensate. *Neuron.* 2004;**44**(1):195–208. doi: 10.1016/j.neuron.2004.09.006. [PubMed: 15450170].
39. de Rotrou J, Wu YH, Hugonot-Diener L, Thomas-Anterion C, Vidal JS, Plichart M, et al. DAD-6: A 6-ltem version of the Disability Assessment for Dementia scale which may differentiate Alzheimer's disease and mild cognitive impairment from controls. *Dement Geriatr Cogn Disord.* 2012;**33**(2-3):210–8. doi: 10.1159/000338232. [PubMed: 22584691].
40. Green CR, Mohs RC, Schmeidler J, Aryan M, Davis KL. Functional decline in Alzheimer's disease: a longitudinal study. *J Am Geriatr Soc.* 1993;**41**(6):654–61. [PubMed: 8505464].
41. Royall DR, Palmer R, Chiodo LK, Polk MJ. Declining executive control in normal aging predicts change in functional status: the Freedom House Study. *J Am Geriatr Soc.* 2004;**52**(3):346–52. [PubMed: 14962147].
42. Bullinger M, Alonso J, Apolone G, Leplège A, Sullivan M, Wood-Dauphinee S, et al. Translating Health Status Questionnaires and Evaluating Their Quality. *J Clin Epidemiol.* 1998;**51**(11):913–23. doi: 10.1016/s0895-4356(98)00082-1.
43. Lynn MR. Determination and quantification of content validity. *Nurs Res.* 1986;**35**(6):382–5. [PubMed: 3640358].
44. Polit DF, Beck CT, Owen SV. Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Res Nurs Health.* 2007;**30**(4):459–67. doi: 10.1002/nur.20199. [PubMed: 17654487].
45. Wilson FR, Pan W, Schumsky DA. Recalculation of the Critical Values for Lawshe's Content Validity Ratio. *Meas Eval Couns Dev.* 2012;**45**(3):197–210. doi: 10.1177/0748175612440286.
46. Heravi-Karimooi M, Anoosheh M, Foroughan M, Sheykhi M, Hajizadeh E. Designing and determining psychometric properties of the Domestic Elder Abuse Questionnaire. *Iran J Aging.* 2010;**5**(1).
47. Newman I, Lim J, Pineda F. Content Validity Using a Mixed Methods Approach: Its Application and Development Through the Use of a Table of Specifications Methodology. *J Of Mixed Methods Res.* 2013;**7**(3):243–60. doi: 10.1177/1558689813476922.
48. Wynd CA, Schmidt B, Schaefer MA. Two quantitative approaches for estimating content validity. *West J Nurs Res.* 2003;**25**(5):508–18. [PubMed: 12955968].
49. Gajewski BJ, Coffland V, Boyle DK, Bott M, Price LR, Leopold J, et al. Assessing content validity through correlation and relevance tools. *Methodology.* 2012.
50. Wainer H, Thissen D. How Is Reliability Related to the Quality of Test Scores? What Is the Effect of Local Dependence on Reliability?. *ETS Research Report Series.* 1998;**1998**(1):22–9. doi: 10.1002/j.2333-8504.1998.tb01749.x.