
Validity and reliability of the Persian version of the Alzheimer's Disease Knowledge Scale among Iranian healthcare professionals and students

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Validity and reliability of the Persian version of the Alzheimer's Disease Knowledge Scale among Iranian healthcare professionals and students

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Abstract

Alzheimer's disease (AD) is the leading cause of dementia worldwide. With rising prevalence in countries such as Iran, assessing healthcare professionals' knowledge of AD is essential. This study translated and adapted the Alzheimer's Disease Knowledge Scale (ADKS) into Persian and provided preliminary evidence of validity and reliability. A cross-sectional study was conducted with 304 healthcare professionals and students. The mean Persian version of the Alzheimer's Disease Knowledge Scale (ADKS-P) score was 20.27 (standard deviation (SD) = 3.62; possible range 0–30). The ADKS-P was developed using forward–backward translation, expert review, and pilot testing. Content validity, item-level performance, internal consistency estimated with Kuder–Richardson Formula 20 (KR-20), and two-week test–retest reliability were assessed. Known-groups validity was examined through education, occupation, and familiarity with dementia. All items met the critical Content Validity Ratio (CVR) threshold. Internal consistency was modest (KR-20 = 0.64), test–retest reliability was moderate ($r = 0.53$, $p = 0.016$), and several items showed weak discrimination (item–total $r < 0.20$ for 15 items; item 24 $r = -0.05$). Higher ADKS-P

scores were associated with greater education, professional role, and dementia familiarity. The ADKS-P offers a preliminary, culturally adapted tool for group-level baseline knowledge assessment in Persian-speaking contexts. Further refinement and validation are recommended before broader application.

The study was approved by the ethics committee of the Tehran University of Medical Sciences (IR.TUMS.MEDICINE.REC.1401.202).

Keywords

Alzheimer's disease, Dementia knowledge, Alzheimer's Disease Knowledge Scale (ADKS), Healthcare professionals, Psychometric validation, Cross-cultural adaptation

Background

Alzheimer's disease (AD) is the most common cause of dementia, responsible for around 60–70% of cases worldwide ('2025 Alzheimer's Disease Facts and Figures', 2025). It is a progressive neurodegenerative disorder that impairs cognition and everyday functioning, placing major burdens on patients, families, and health systems. The number of people living with AD continues to rise with population ageing, and projections suggest a sharp increase in low- and middle-income countries, including Iran (Esteghamati et al., 2009; Flicker, 2010).

Awareness and knowledge of AD are critical for early recognition, appropriate care, and reduction of stigma. Yet studies consistently show gaps in knowledge among both the public and healthcare providers (Alzheimer's Disease International, 2019; Rudnicka et al., 2020; Sabayan & Bonneux, 2011). Inadequate knowledge can hinder diagnosis, delay support, and

weaken the quality of care (Jackson et al., 2008; Lowe et al., 2015; McParland et al., 2012). In the Middle East and North Africa region, studies have similarly documented limited dementia knowledge among healthcare professionals (Alsalem et al., 2024; Mowafi et al., 2025), underscoring the need for validated assessment tools in this context. This makes reliable tools to measure knowledge especially valuable for education and workforce planning.

Several instruments have been developed to assess dementia knowledge, including the Dementia Knowledge Assessment Tool (DKAT), Dementia Knowledge Assessment Scale (DKAS), the UJA Alzheimer's Care Scale, and the Alzheimer's Disease Knowledge Test (ADKT). These instruments have demonstrated acceptable psychometric properties across different contexts (Annear et al., 2017; Dieckmann et al., 1988; Parra-Anguita et al., 2019; Toye et al., 2014). Among them, the Alzheimer's Disease Knowledge Scale (ADKS) stands out as a brief, 30-item true/false questionnaire covering risk factors, symptoms, diagnosis, caregiving, and treatment (Carpenter et al., 2009). While the ADKS has been translated into various languages, such as Japanese, Arabic, Turkish, Polish, and Korean, each reporting acceptable validity and reliability (Amano et al., 2019; El-Masry et al., 2018; Kim & Jung, 2015; Leszko & Carpenter, 2021; Yılmaz & Yavuz Çolak, 2020).

Despite this broad uptake, no validated Persian version of the ADKS exists. This gap limits opportunities to evaluate AD knowledge among Persian-speaking healthcare professionals, students, caregivers, and the wider public. A culturally adapted and psychometrically tested version would provide an important foundation for education, training, and research in Iran and other Persian-speaking communities.

The present study therefore aimed to translate and adapt the ADKS into Persian and to examine its preliminary psychometric properties. Specifically, we assessed content validity, item performance, internal consistency, test–retest stability and known-groups validity in a sample of Iranian healthcare professionals and students.

Methods

Participants and Procedure

This cross-sectional study included 304 participants recruited from hospitals and educational settings in Iran using convenience sampling. The sample comprised healthcare professionals (nurses, physicians, allied health staff) and healthcare students (medicine, nursing, paramedical). Inclusion criteria were: (a) current employment or enrolment in a healthcare-related role or programme, and (b) ability to read and comprehend Persian. No exclusion criteria were applied beyond these requirements. Recruitment was conducted online, and all participants provided informed consent before participation. Confidentiality and anonymity of responses were assured. The response rate was not formally tracked due to the open online recruitment method. The study was approved by the ethics committee of Tehran University of Medical Sciences (IR.TUMS.MEDICINE.REC.1401.202).

A minimum sample size of 300 was targeted based on the recommendation of 10 participants per item for classical test theory analyses of a 30-item scale (Nunnally & Bernstein, 1994). The achieved sample of 304 met this threshold.

Demographic Form

A brief demographic questionnaire, reviewed by experts, collected data on age, gender, education, occupation, marital status, medical history, caregiving experience, and familiarity with Alzheimer's disease.

Persian version of the Alzheimer's Disease Knowledge Scale (*ADKS-P*) *Translation and adaptation*

The ADKS was employed to assess knowledge about AD. This scale consists of 30 true/false items that cover various aspects of the disease, including risk factors, assessment, and diagnosis, symptoms, impact on daily life, caregiving, and treatment. The scale has demonstrated adequate reliability and validity in previous studies (Carpenter et al., 2009).

Carpenter et al. reported internal consistency estimated with the Kuder-Richardson Formula 20 (KR-20) values ranging from 0.43 to 0.77 across different subsamples (community-dwelling older adults $\alpha = 0.55$, undergraduate students $\alpha = 0.59$, health professionals $\alpha = 0.68$, Alzheimer's disease caregivers $\alpha = 0.77$, and dementia professionals $\alpha = 0.43$). The predecessor instrument, the ADKT (Dieckmann et al., 1988), reported KR-20 = 0.71. In this study, ADKS was administered to participants in Persian after a translation and pilot-testing process to ensure clarity and comprehensibility.

The ADKS was translated into Persian using a forward–backward translation process. Two bilingual cognitive science specialists (fluent in both Persian and English) independently performed forward translation of the ADKS into Persian. Discrepancies were resolved through discussion involving both translators and a third reviewer. The scale was back-translated into English by a separate bilingual translator, who had not seen the original English version. The back-translated version was reviewed by the original ADKS author (B.D. Carpenter, a co-author

on this paper) to verify semantic equivalence with the original English items and piloted with 30 participants for clarity. Pilot data were excluded from the final analyses.

No items were substantively reframed for the Iranian context, as the ADKS addresses factual knowledge about Alzheimer's disease (e.g., symptoms, risk factors, diagnosis criteria) that is not culturally specific. However, minor linguistic adjustments were made during translation to ensure natural phrasing in Persian. The poor performance of item 24 in the current sample (see Results) may reflect culturally specific interpretations of the metaphorical language used in that item.

Statistical Analyses

Analyses were performed in Statistical Package for the Social Sciences (SPSS) version 27.

Descriptive statistics. Means, standard deviations, frequencies, and percentages were used to summarize demographic variables and ADKS-P scores. The overall ADKS-P score was calculated as the sum of correct responses (possible range 0–30). Floor and ceiling effects were examined by calculating the percentage of participants scoring at the minimum or maximum.

Content validity. Five geriatric specialists rated item essentiality. The Content Validity Ratio (CVR) was calculated using the Lawshe method (Lawshe, 1975), with item-level CVRs compared to the critical value for five raters (CVR-critical = 0.99).

Item analysis. For each item, we calculated the proportion of correct responses (item difficulty) and the corrected item–total correlation. Items with corrected item–total correlations below 0.20 were flagged as having weak discrimination.

Internal consistency. Reliability was estimated using the KR-20, which is the appropriate internal consistency coefficient for dichotomous (true/false) items and is mathematically equivalent to Cronbach's alpha for such items. The overall KR-20 was 0.64.

Test-retest reliability. A subset of 30 participants completed the ADKS-P twice, two weeks apart. Pearson's correlation coefficient was used ($r = 0.53$, $p = 0.016$). While an intraclass correlation coefficient (ICC) would be preferable for assessing absolute agreement, the paired retest data were no longer available for reanalysis at the time of revision; therefore, only Pearson's r could be reported.

Known-groups validity. Group comparisons were conducted using one-way Analysis of Variance (ANOVA) (for education and occupation) and independent-samples t-tests (for familiarity variables).

Effect sizes were reported as eta-squared (η^2) for ANOVAs and Cohen's d for t-tests. Post-hoc pairwise comparisons for significant ANOVAs were performed with Bonferroni correction for multiple comparisons. Normality of score distributions was supported by inspection of skewness values (overall skewness = -0.19) and visual assessment of histograms.

Construct validity via known-groups comparisons. To examine construct validity from a discriminant perspective, group differences by marital status, gender, and history of physical disease were examined.

Results

Participant Characteristics

The final sample included 304 participants (mean age = 33.0 years, SD = 10.9, range = 19–72).

The majority were female (57.9%). Educational attainment varied, with 43.8% holding a university degree and 39.5% a higher university degree. Occupations included medical students (26.3%), nurses (23.4%), physicians (21.7%), paramedical students (7.2%), and other health staff. Approximately one in five participants reported caregiving experience with a person with dementia. Further demographic details are presented in Table 1. The mean ADKS-P total score was 20.27 (SD = 3.62), with scores ranging from 9 to 29 out of a possible 0–30. No floor or ceiling effects were observed (0% of participants scored at the minimum or maximum).

Table 1. Demographic Characteristics of ADKS-P Participants.

	All N=304
Female (%)	176 (57.9%)
Mean Age (SD)	33.02 (10.9)
Under 20, N(%)	12(3.9%)
20-30, N(%)	149(49.0%)
30-40, N(%)	57(18.8%)
40-50, N(%)	62(20.4%)
Over 50, N(%)	24(7.9%)
Marital Status	
Widowed, N(%)	1(0.3%)
Married, N(%)	131(43.1%)
Single, N(%)	171(56.3%)

Divorced, N(%)	1(0.3%)
Highest Education Level	
Secondary School (9y)	1(0.3%)
High School (12y)	50(16.4%)
University Degree (16-18y)	133(43.8%)
Higher University Degree (>18y)	120(39.5%)
Occupation	
Auxiliary Nurse, N(%)	3(1.0%)
Nurse, N(%)	71(23.4%)
General Physician, N(%)	23(9.2%)
Specialist Physician, N(%)	38(12.5%)
Paramedical Student, N(%)	22(7.2%)
Nursing Student, N(%)	5(1.6%)
Medical Student, N(%)	80(26.3%)
Medical Staff, N(%)	17(5.6%)
Non-Medical Staff, N(%)	19(6.3%)
Scientific Committee Member, N(%)	21(6.9%)
Chronic Disease History, YES(%)	39(12.8)
Mental Disorder History, YES(%)	50(16.4)
Educated about Dementia, YES(%)	124(40.8)
Family/Relative History for Dementia, YES(%)	100(32.9)

Ever Lived with a Person with Dementia, YES(%)	30(9.9)
Care Giving Experience, YES(%)	60(19.7)

SD = Standard Deviation. Percentages may not total 100 due to rounding.

Content Validity

Five geriatric specialists evaluated the content of the ADKS-P. All items met the critical CVR threshold for five raters, indicating strong agreement that the items were essential to measure Alzheimer's disease knowledge.

Item Analysis

Item-level statistics are presented in Table 2. 15 items showed corrected item-total correlations below 0.20. Item 24 had a negative item-total correlation ($r = -0.05$). Removing item 24 would decrease the KR-20 from 0.64 to 0.63. The most difficult item was item 2 (proportion correct = 0.10) and the easiest were items 21 and 27 (proportion correct = 0.94).

Table 2. Item-level difficulty and item-total correlations for the ADKS-P

Question	Proportion Correct	Corrected Item-Total Correlation
1. People with Alzheimer's disease are particularly prone to depression.	0.898	0.154

Question	Proportion	Corrected
	Correct	Item–Total
		Correlation
2. It has been scientifically proven that mental exercise can prevent a person from getting Alzheimer’s disease.	0.095	0.094
3. After symptoms of Alzheimer’s disease appear, the average life expectancy is 6 to 12 years.	0.638	0.248
4. When a person with Alzheimer’s disease becomes agitated, a medical examination might reveal other health problems that caused the agitation.	0.891	0.287
5. People with Alzheimer’s disease do best with simple instructions given one step at a time.	0.724	0.260
6. When people with Alzheimer’s disease begin to have difficulty taking care of themselves, caregivers should take over right away.	0.283	0.085
7. If a person with Alzheimer’s disease becomes alert and agitated at night, a good strategy is to try to make sure that the person gets plenty of physical activity during the day.	0.684	0.056
8. In rare cases, people have recovered from Alzheimer’s disease.	0.533	0.152
9. People whose Alzheimer’s disease is not yet severe can benefit from psychotherapy for depression and anxiety.	0.888	0.255

Question	Proportion	Corrected
	Correct	Item–Total
		Correlation
10. If trouble with memory and confused thinking appears suddenly, it is likely due to Alzheimer's disease.	0.734	0.269
11. Most people with Alzheimer's disease live in nursing homes.	0.641	0.067
12. Poor nutrition can make the symptoms of Alzheimer's disease worse.	0.878	0.215
13. People in their 30s can have Alzheimer's disease.	0.464	0.530
14. A person with Alzheimer's disease becomes increasingly likely to fall down as the disease gets worse.	0.885	0.307
15. When people with Alzheimer's disease repeat the same question or story several times, it is helpful to remind them that they are repeating themselves.	0.720	0.274
16. Once people have Alzheimer's disease, they are no longer capable of making informed decisions about their own care.	0.484	0.174
17. Eventually, a person with Alzheimer's disease will need 24-hour supervision.	0.743	0.068
18. Having high cholesterol may increase a person's risk of developing Alzheimer's disease.	0.724	0.180

Question	Proportion	Corrected
	Correct	Item–Total
		Correlation
19. Tremor or shaking of the hands or arms is a common symptom in people with Alzheimer’s disease.	0.632	0.228
20. Symptoms of severe depression can be mistaken for symptoms of Alzheimer’s disease.	0.852	0.167
21. Alzheimer’s disease is one type of dementia.	0.941	0.311
22. Trouble handling money or paying bills is a common early symptom of Alzheimer’s disease.	0.707	0.241
23. One symptom that can occur with Alzheimer’s disease is believing that other people are stealing one’s things.	0.747	0.159
24. When a person has Alzheimer’s disease, using reminder notes is a crutch that can contribute to decline.	0.191	–0.048
25. Prescription drugs that prevent Alzheimer’s disease are available.	0.470	0.217
26. Having high blood pressure may increase a person’s risk of developing Alzheimer’s disease.	0.796	0.299
27. Genes can only partially account for the development of Alzheimer’s disease.	0.941	0.195
28. It is safe for people with Alzheimer’s disease to drive, as long as they have a companion in the car at all times.	0.743	0.161

Question	Proportion	Corrected
	Correct	Item–Total
		Correlation
29. Alzheimer’s disease cannot be cured.	0.585	0.194
30. Most people with Alzheimer’s disease remember recent events better than things that happened in the past.	0.757	0.257

Proportion correct = percentage of participants who answered each item correctly.

Reliability

Internal consistency. The overall internal consistency of the ADKS-P, estimated using KR-20, was 0.64.

Test–retest stability. In a subsample of 30 participants who repeated the ADKS-P after two weeks, scores were moderately correlated (Pearson’s $r = 0.53$, $p = 0.016$), indicating moderate temporal stability.

Known-Groups Validity

ADKS-P scores varied significantly by education, occupation, and familiarity with dementia.

- Education. ANOVA showed significant group differences ($F(3, 300) = 17.76$, $p < 0.001$, $\eta^2 = 0.151$) indicating a large effect. Bonferroni-corrected post-hoc comparisons revealed that participants with higher university degrees ($M = 21.9$, $SD = 3.4$) scored significantly higher than those with university degrees ($M = 18.9$, $SD = 3.3$; $p < 0.001$, $d = 0.89$) and those with high school education ($M = 19.6$, $SD = 3.4$; $p < 0.001$, $d = 0.69$). The secondary

school group ($n = 1$, $M = 22.4$) should be interpreted with extreme caution because the estimate is based on a single participant and is therefore not stable or generalizable.

- **Occupation.** Scores differed significantly across occupational groups ($F(9, 294) = 7.40$, $p < 0.001$, $\eta^2 = 0.186$) indicating a large effect. General physicians ($M = 22.7$, $SD = 2.8$), specialist physicians ($M = 22.2$, $SD = 2.9$), and scientific committee members ($M = 22.2$, $SD = 3.2$) scored highest ($M = 22.2$ – 22.7), while auxiliary nurses scored lowest ($M = 16.7$, $SD = 4.0$).
- **Familiarity.** Participants with prior dementia education scored significantly higher than those without ($M = 21.9$ vs. 19.1 ; $t = 7.1$, $p < 0.001$, $d = 0.84$), as did those with a family history of dementia ($M = 21.8$ vs. 19.5 ; $t = 5.1$, $p < 0.001$, $d = 0.65$) and those who had lived with a person with dementia ($M = 22.2$ vs. 20.1 ; $t = 3.2$, $p = 0.002$, $d = 0.61$). Participants with caregiving experience also scored higher ($M = 21.9$ vs. 20.5 ; $t = 2.1$, $p = 0.035$, $d = 0.40$).

Full results for education, occupation, and familiarity are presented together in Table 3.

Table 3. Known-groups validity of the ADKS-P: comparisons by education, occupation, and familiarity with dementia

Variable	Groups	Mean (SD)	Test statistic	p-value
Education	Secondary school (9y)	22.40 (NA)	$F = 17.76$	<0.001
	High school (12y)	19.59 (3.39)		
	University (16–18y)	18.94 (3.33)		
	Higher degree (>18y)	21.91 (3.35)		
Occupation	Auxiliary nurse	16.67 (4.04)	$F = 7.40$	<0.001
	Nurse	18.49 (3.12)		
	General physician	22.71 (2.79)		
	Specialist physician	22.21 (2.93)		

Familiarity	Paramedical student	19.09 (2.54)		
	Nursing student	19.20 (4.55)		
	Medical student	20.36 (3.56)		
	Medical staff	18.59 (4.26)		
	Non-medical staff	20.58 (3.91)		
	Scientific committee	22.24 (3.22)		
	Family history of dementia: Yes	21.75 (3.30)	t = 5.1	<0.001
	Family history: No	19.50 (3.50)		
	Dementia education: Yes	21.90 (3.40)	t = 7.1	<0.001
	Dementia education: No	19.10 (3.30)		
	Lived with person with dementia: Yes	22.20 (3.01)	t = 3.2	=0.002
	Lived with person with dementia: No	20.05 (3.60)		
	Cared for person with dementia: Yes	21.90 (3.60)	t = 2.1	0.035
	Cared for person with dementia: No	20.50 (3.50)		

ANOVA = Analysis of Variance; SD = Standard Deviation; NA = not applicable because the group contained only one participant.

Construct validity via known-groups comparisons

No significant differences in ADKS-P scores were observed across marital status ($F = 0.78$, $p = 0.51$), gender ($p = 0.35$), or history of physical disease ($p = 0.14$). Results are shown in Table 4.

Table 4. Construct validity via known-groups comparisons of the ADKS-P: comparisons by marital status, gender, and history of physical disease

Variable	Groups	Mean (SD)	Test statistic	p-value
Marital status	Widowed (n=1)	15.00 (NA)	F = 0.78	0.505
	Married (n=131)	20.30 (3.58)		
	Single (n=171)	20.27 (3.66)		
	Divorced (n=1)	22.00 (NA)		
Gender	Female	20.40 (3.50)	t = 0.95	0.345
	Male	20.03 (3.70)		
History of physical disease	Yes	21.07 (3.20)	t = 1.40	0.136
	No	20.15 (3.60)		

SD = Standard Deviation; NA = not applicable (group contained only one participant).

Discussion

This study translated and culturally adapted the ADKS into Persian and provided preliminary evidence of its psychometric performance in a sample of Iranian healthcare professionals and students. The findings show that the ADKS-P has strong content validity, moderate internal consistency, and acceptable test–retest stability. Known-groups validity was supported: higher knowledge scores were observed among participants with greater education, professional experience, and familiarity with dementia.

Comparison with Other Adaptations

The results align broadly with validations of the ADKS in other languages. Reported internal consistency values across adaptations include Turkish KR-20 = 0.74 (Yılmaz & Yavuz Çolak, 2020), Arabic α = 0.71 (El-Masry et al., 2018), and Korean KR-20 = 0.71 (Kim & Jung, 2015). The present value (KR-20 = 0.64) falls within this range and is consistent with the original ADKS, for which Carpenter et al. (2009) reported values of 0.43–0.77 across different subsamples.

Although below the commonly cited threshold of 0.70 (Nunnally & Bernstein, 1994), this level of reliability is characteristic of knowledge scales composed of heterogeneous, fact-based items spanning multiple content domains, where high internal consistency is not expected (Streiner, 2003). However, it limits the ADKS-P to group-level comparisons (e.g., evaluating educational interventions at the programme level) rather than individual-level diagnostic decisions. Like those studies, the Persian adaptation demonstrated that knowledge levels are influenced by education and professional role.

However, some item-level findings suggest cultural and contextual challenges. For example, item 24 ('When a person has Alzheimer's disease, using reminder notes is a crutch that can

contribute to decline'; correct answer: False) showed a negative item–total correlation ($r = -0.05$), indicating it did not function well in the Persian sample. This may reflect cultural and linguistic factors: the Persian translation of 'crutch' (as a metaphor for unhelpful dependence) may not carry the same negative connotation in Farsi, leading to ambiguity in interpretation. Additionally, only 19.1% of participants answered this item correctly, making it the most difficult item on the scale. In the Iranian cultural context, external memory aids may be viewed differently, either as genuinely helpful tools or, conversely, as signs of giving up on cognitive effort, leading to inconsistent responding. We recommend that item 24 be revised or supplemented with a culturally appropriate alternative in future iterations of the ADKS-P. Similar issues have been reported in other adaptations, where certain items required linguistic or contextual adjustment (Carnes et al., 2021).

Unlike some prior validations, this study did not attempt full exploratory or confirmatory factor analyses. The available sample size and analytic approach were not optimal for such methods, and recent critiques note that the ADKS is best treated as a unitary knowledge index rather than a multidimensional scale (Carpenter et al., 2009; Wen et al., 2025).

The finding that the secondary school group ($N = 1$) scored comparably to the higher degree group should be interpreted with caution given the very small sample size, which yields an unreliable estimate. Among the adequately sized groups, the pattern was consistent with expectations: participants with higher university degrees, who are more likely to have received clinical training in neurodegenerative conditions, scored significantly higher than those with university or high school education ($d = 0.89$ and 0.69 , respectively).

Implications for Practice and Research

The ADKS-P offers a pragmatic tool for identifying knowledge gaps among Persian-speaking healthcare professionals and students at the group level. By detecting areas of weakness, it can guide the development of targeted education and training programs. The scale may also serve as a baseline measure to evaluate interventions aimed at improving dementia awareness. Given its brevity and simplicity, the ADKS-P is feasible for use in both clinical and educational settings. However, its role should be viewed as preliminary: scores provide a broad indication of knowledge but may not capture deeper attitudes or applied skills in dementia care (Zhao et al., 2022).

Strengths and Limitations

Strengths of this study include the structured forward–backward translation, expert input for content validation, and inclusion of both healthcare professionals and students, allowing for comparison across groups. The relatively large sample ($N = 304$) also provides adequate precision for classical reliability and validity estimates.

Several limitations should be acknowledged. First, internal consistency and test–retest reliability were modest, and item-level analyses revealed some poorly performing items. Second, the test–retest subsample was small ($N = 30$), limiting the precision of stability estimates. Additionally, the test-retest analysis relied on Pearson's r rather than the preferred ICC, as the paired subsample data were no longer available for reanalysis at the time of revision. This is a methodological limitation, and future studies should report ICC (two-way mixed, single measures, absolute agreement) for test-retest reliability. Third, the use of convenience sampling from healthcare-related groups, without including caregivers or community members, limits generalizability. Fourth, the cross-sectional design precludes causal inferences about the relationship between demographic factors and knowledge levels. Fifth, online recruitment without a tracked response rate may introduce self-selection bias, whereby participants with greater interest in dementia may have been more likely to respond. Finally, more

advanced psychometric methods (e.g., tetrachoric exploratory factor analysis, confirmatory factor analysis with appropriate estimators, or item response theory) were not conducted here but are recommended for future research (Wen et al., 2025).

Future Directions

Future studies should refine problematic items, expand validation to more diverse samples (including caregivers and the general population), and test the ADKS-P in intervention contexts to evaluate its sensitivity to change. Comparative work with alternative tools such as the DKAS would also clarify the strengths and limitations of the ADKS framework in Persian-speaking settings. Incorporating more advanced statistical approaches, such as parallel analysis or item response theory, would provide deeper insights into the scale's dimensionality and item functioning.

Declarations

Ethical approval

The study was approved by the ethics committee of Tehran University of Medical Sciences (IR.TUMS.MEDICINE.REC.1401.202). All procedures involving human participants were performed in accordance with the ethical standards of the institutional research committee and with the Declaration of Helsinki.

Consent to participate

Written informed consent was obtained from all participants prior to their inclusion in the study. Participants were assured of the confidentiality and anonymity of their responses.

Consent to publish

Not applicable.

Data Availability Statement

The data supporting the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions

Declaration of Competing Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Author Contributions

M.A. wrote the original draft of the manuscript and contributed to review and editing. O.G. contributed resources, managed data curation, and oversaw project administration. B.D.C. validated the study and participated in manuscript review and editing. Z.V. contributed to conceptualisation and study methodology. F.S. contributed to methodology, performed formal analysis, and participated in review and editing of the manuscript. F.E. led the conceptualisation, supervised the project, and contributed to manuscript review and editing. All authors reviewed and approved the final manuscript.

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List of abbreviations

AD – Alzheimer’s Disease

ADKS – Alzheimer’s Disease Knowledge Scale

ADKS-P – Persian Version of the Alzheimer’s Disease Knowledge Scale

CVR – Content Validity Ratio

KR-20 – Kuder–Richardson Formula 20

SD – Standard Deviation

SPSS – Statistical Package for the Social Sciences (used for data analysis)

ANOVA – Analysis of Variance

ICC – Intraclass Correlation Coefficient

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