

A Malay Version of the Dementia Attitude Scale (DAS-M) Questionnaire: Its Adaptation, Validation, and Reliability among Malaysian Informal Dementia Caregivers

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ABSTRACT

INTRODUCTION: Dementia is an increasing public health concern globally and in Malaysia, where informal caregivers, mainly family members, provide most care. Caregivers' attitudes may influence the quality of care and outcomes of people living with dementia (PLwD). However, no validated Malay questionnaire is available to assess dementia-related attitudes. This study aimed to translate, cross-culturally adapt, and evaluate the psychometric properties of the Malay Dementia Attitude Scale (DAS-M) among Malaysian informal dementia caregivers. **MATERIALS AND METHODS:** This cross-sectional study involved 355 informal caregivers recruited from geriatric clinics at Hospital Kuala Lumpur and Universiti Malaya Medical Centre between March and July 2025. The DAS underwent forward-backward translation, expert content validation, and pilot testing for face validity. Construct validity was evaluated using exploratory factor analysis (EFA) with principal axis factoring and Promax rotation. Internal consistency and test-retest reliability were assessed using Cronbach's alpha and the intraclass correlation coefficient, respectively. **RESULTS:** The DAS-M demonstrated excellent content validity (I-CVI=1.00; S-CVI/Ave=1.00) and strong face validity (S-FVI/Ave=0.995). EFA supported a two-factor structure comprising Social Comfort and Knowledge, which explained 40.2% of the total variance. Three items were removed due to low factor loadings and communalities, resulting in a 17-item scale. The final scale showed good internal consistency (Cronbach's α =0.825) and moderate-to-good test-retest reliability. **CONCLUSION:** The DAS-M demonstrated acceptable validity and reliability for assessing dementia-related attitudes among Malaysian informal caregivers. These findings support its potential use in research, caregiver training programmes, and public health interventions in Malaysia.

Keywords

Dementia, Caregivers, Attitude, Validation, Malaysia.

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INTRODUCTION

Dementia is a global public health priority, precipitating significant disability, dependency, and diminished quality of life. The World Health Organisation (WHO) estimates that over 55 million people live with dementia (PLwD) worldwide, with 10 million new cases annually,

primarily in low- and middle-income countries.^{37,39} As prevalence climbs alongside global population ageing, the socioeconomic burden increasingly shifts towards informal caregivers, most of whom are family members.³⁸

In Malaysia, these challenges are intensified by an accelerated demographic transition. The nation is projected to reach an aged status by 2030, with over 15% of the population aged 60 and above. The National Health and Morbidity Survey (NHMS) 2018 reported a prevalence of probable dementia of 8.5% among older adults, a figure expected to more than double by 2050.^{1,18} Despite this rising burden, negative attitudes towards PLwD remain prevalent at the global level and in Malaysia, highlighting the need for valid and culturally appropriate questionnaires to assess caregiver attitudes.^{1,22,23,38}

A caregiver's attitude is a fundamental determinant of caregiving behaviour, resilience, and the quality of care provided. Attitudes are conceptualised using the tripartite model, comprising cognitive beliefs, affective reactions, and behavioural components.^{4,9,15} Literature demonstrates that negative attitudes, such as fear, social discomfort, and therapeutic pessimism, are associated with higher caregiver burden and psychological distress. Conversely, positive attitudes characterised by empathy, acceptance and person-centredness are associated with better quality of life for both the caregiver and PLwD.^{4,6-7,9,15,35,42}

Several questionnaires have been developed to assess attitudes towards dementia, although they differ in their conceptual scope. The Approaches to Dementia Questionnaire (ADQ) primarily measures hope and person-centred attitudes, providing a narrower assessment of dementia-related attitudes.²⁶ In contrast, the Dementia Attitude Scale (DAS), developed by O'Connor and McFadden in 2010, offers a broader multidimensional framework grounded in the tripartite model of attitudes. It assesses cognitive (Knowledge) and affective and behavioural (Social Comfort) dimensions of attitudes towards PLwD, providing a more comprehensive evaluation of dementia-related attitudes.²⁸ The DAS has also demonstrated good psychometric properties across diverse populations, making it particularly suitable for cross-cultural adaptation and use among Malaysian informal dementia caregivers.²⁸

The DAS has demonstrated robust psychometric properties across healthcare professionals and family caregivers globally.²⁸ Cross-cultural adaptation and validation studies in Greece, Turkey, Indonesia, Croatia, and China have further confirmed its reliability while identifying culturally specific nuances in attitudinal expression.^{7,9,15,27,43}

Although the DAS has been successfully validated in several countries, a validated Malay version remains unavailable. This represents a significant research gap in Malaysia, where family-based care is deeply influenced by cultural frameworks such as filial piety, religious beliefs, and localised stigma. The absence of a validated Malay questionnaire limits the assessment of dementia-related attitudes among Malaysian caregivers and the evaluation of dementia-related educational or psychosocial interventions.

This study addresses this gap by cross-culturally adapting and translating the original DAS into Malay (DAS-M). It also aims to evaluate the psychometric properties of the DAS-M, including its validity and reliability, among Malaysian informal dementia caregivers. By providing a culturally appropriate and psychometrically sound questionnaire, this study supports research, clinical practice, and the evaluation of dementia-related interventions, ultimately contributing to improved dementia care in Malaysia.

MATERIALS AND METHODS

Study Design and Setting

A cross-sectional study was conducted between March and July 2025 among informal dementia caregivers recruited from geriatric clinics at Hospital Kuala Lumpur (HKL) and Universiti Malaya Medical Centre (UMMC). HKL and UMMC are tertiary referral hospitals in the Klang Valley, receiving referrals from both urban and rural populations across Kuala Lumpur and Selangor, thereby providing a diverse pool of caregivers for the validation study.

The study was guided by established recommendations for cross-cultural adaptation and psychometric validation of questionnaires, including forward and backward translation, expert review, content validation, face validation, pilot testing, exploratory factor analysis (EFA) to assess construct validity, and assessment of internal consistency and test–retest reliability.^{3,5,24}

Participants

Eligible participants were caregivers aged ≥ 18 years who provided at least 4 hours of unpaid care daily and were able to understand Bahasa Malaysia. Professional (formal) caregivers were excluded.

The Dementia Attitude Scale (DAS)

The DAS is a 20-item questionnaire grounded in the tripartite model of attitudes towards PLwD. It comprises two 10-item subscales: Social Comfort, reflecting affective and behavioural responses, and Dementia Knowledge, representing cognitive beliefs. Items are rated on a 7-point Likert scale (1 = “strongly disagree” to 7 = “strongly agree”), with six items (Items 2, 6, 8, 9, 16, and 17) reverse-scored. Total scores are summed, with higher values indicating more positive attitudes. The DAS has demonstrated robust psychometric properties, including Cronbach’s α ranging from 0.83 to 0.85 and strong construct validity.²⁸

Questionnaire Translation and Adaptation

The original Dementia Attitude Scale (DAS) was translated into Malay using a standard forward–backward translation procedure.^{3,5,31} Two independent forward translations from English into Malay were performed by a bilingual linguist and a medical doctor. Subsequently, two independent backward translations into English were carried out by another bilingual linguist and a medical doctor, both of whom were blinded to the original questionnaire. The two back-translated versions were then compared with the original English DAS by the research team together with the expert panel, comprising two public health medicine specialists, two geriatricians, one linguist, and one

experienced dementia caregiver. Any discrepancies identified between the backward translations and the original version were discussed until consensus was reached, with emphasis on preserving semantic, conceptual, and cultural equivalence rather than literal wording.

Cross-cultural adaptation extends beyond literal translation to ensure semantic, idiomatic, experiential, and conceptual equivalence between the original and adapted questionnaires. This process helps to ensure that questionnaire items are interpreted consistently within the target population while preserving the validity of the underlying construct. It is particularly important for attitude measures because perceptions and beliefs about dementia are influenced by sociocultural norms and may vary across cultural settings.³

Content Validity

Content validity was evaluated by a six-member expert panel comprising two public health medicine specialists from a public university and the Ministry of Health, two geriatricians from the Ministry of Health and a university hospital, one linguistics expert, and one dementia caregiver with over a decade of caregiving experience. The experts independently assessed each item for relevance, clarity, simplicity, and ambiguity. Any comments, discrepancies, or suggested amendments were reviewed by the research team and discussed with the expert panel until consensus was achieved. Revisions were made with emphasis on preserving item relevance, clarity, cultural appropriateness, and conceptual equivalence with the original DAS. Based on the experts’ feedback regarding translation accuracy and cultural appropriateness, the questionnaire was further refined to ensure clinical and contextual relevance.^{31,40}

Face Validity and Pilot Testing

The questionnaire then underwent a face validity assessment in March 2025 among 30 dementia caregivers aged 18 years and above at the HKL geriatric clinic. These participants met the study’s eligibility

criteria but were excluded from the final analysis. Cognitive debriefing was subsequently conducted as part of the face validation process to assess the clarity, comprehensibility, and cultural appropriateness of the pre-final Malay version among the target population.^{31,41}

Sample Size Determination for Construct Validity and Reliability

The required sample size for exploratory factor analysis (EFA) was determined using a participant-to-item ratio of at least 10:1, a widely recommended threshold for construct validation studies to ensure stable factor solutions.^{10,21} For the 20-item DAS-M, this required a minimum of 200 participants. After allowing for a potential 20% non-response rate, the target sample size was increased to 240 participants. Ultimately, 355 caregivers were recruited, corresponding to approximately 18 participants per item, thereby exceeding the recommended sample size for EFA.^{10,21} For test–retest reliability, a subsample of 30 caregivers from a similar population was reassessed after a two-week interval.²⁰

Sampling

Convenience sampling was employed because recruitment was conducted in geriatric outpatient clinics, where a relatively small number of eligible informal dementia caregivers attended each clinic session. Consecutive eligible caregivers who met the inclusion criteria were invited to participate throughout the study period until the required sample size was achieved.

Statistical Analysis

Data analysis was conducted using IBM SPSS Statistics version 30 and Microsoft Excel. Descriptive statistics were used to summarise the sociodemographic and caregiving characteristics of the participants. Psychometric evaluation of the 20-item DAS-M encompassed content and face validation, construct validation, and reliability testing.²⁹

Content validity was quantified through the Content Validity Index (CVI), including item-level CVI (I-CVI)

and scale-level CVI (S-CVI). According to established benchmarks, an item-level CVI (I-CVI) ≥ 0.78 was required for item retention, while a scale-level CVI (S-CVI/Ave) ≥ 0.80 indicated robust overall validity.^{30,31,40}

Face validity was subsequently assessed via the Face Validity Index (FVI), including item-level FVI (I-FVI) and scale-level FVI (S-FVI), with a pilot group of 30 respondents. Items were accepted if they achieved I-FVI and S-FVI values ≥ 0.80 ; those that failed to meet this threshold were refined based on participant feedback to improve linguistic clarity and comprehensiveness.^{31,41}

Construct validity was examined using EFA with Principal Axis Factoring (PAF) and Promax rotation to account for potential correlations between factors. Factor retention was guided by eigenvalues greater than 1.0, inspection of the scree plot, theoretical interpretability, and consistency with the original DAS factor structure. Items with factor loadings < 0.32 or communalities < 0.20 were considered to have poor structural contribution. Items with weak loadings, low communalities, or loading patterns inconsistent with the original theoretical framework were qualitatively reviewed before final decisions on retention or exclusion were made.^{8,10,21}

Reliability was established by evaluating internal consistency and test-retest stability for the finalised factor structure. Internal consistency was measured using Cronbach's alpha (α), with a threshold of ≥ 0.70 considered acceptable.³⁴ Test-retest reliability was assessed via the Intraclass Correlation Coefficient (ICC) and interpreted as poor (< 0.50), moderate ($0.50\text{--}0.75$), good ($0.75\text{--}0.90$), or excellent (> 0.90).²⁰

RESULTS

Sociodemographic and Caregiving Characteristics of Participants

Of the 363 caregivers recruited, 355 completed the questionnaire, giving a response rate of 97.8%. The participants had a mean age of 51.96 ± 15.73 years. Most were female, Malay, Muslim, married, and had tertiary

education. Care was provided mainly by children of PLwD, followed by other family members and spouses. Most caregivers lived in urban areas, and more than half cohabited with the PLwD. Caregiving intensity was high, with the majority providing care for 1–5 years and spending more than 9 hours per day on caregiving. The sociodemographic and caregiving characteristics are summarised in Table I.

Table I: Sociodemographic and Caregiving Characteristics of Participants

Characteristics	Mean (SD)	Range
Age (years)	51.96 (± 15.73)	18–86
Characteristics	n=355	Percentage (%)
Gender		
• Male	87	24.5
• Female	268	75.5
Ethnicity		
• Malay	247	69.6
• Chinese	55	15.5
• Indian	43	12.1
• Others	10	2.8
Religion		
• Islam	254	71.5
• Buddha	38	10.7
• Hindu	34	9.6
• Christian	25	7.0
• Others	4	1.1
Marital status		
• Married	226	63.7
• Single	75	21.1
• Divorced/separated	54	15.2
Educational level		
• Primary education	53	14.9
• Secondary education	140	39.4
• Tertiary education	162	45.7
Working status		
• Working	163	45.9
• Not working/retired	192	54.1
Relationship with PLwD		
• Spouse	45	12.7
• Children	162	45.6
• Others	148	41.7
Co-inhabitant		
• Yes	198	55.8
• No	157	44.2
Housing area		
• Urban	225	63.4
• Rural	130	36.6
Monthly household income (RM)		
• < 2,000	184	51.8
• 2,000 – 5,000	128	36.1
• 5,001 – 10,000	33	9.3
• > 10,000	10	2.8
Financial support		
• Yes	89	25.1
• No	266	74.9
Family/social support		
• Yes	225	63.4
• No	130	36.6

Length of caregiving (years)		
• 1–5 years	283	79.7
• > 5 years	72	20.3
Daily caregiving time (hours)		
• 4–6 hours	115	32.4
• 7–9 hours	24	6.8
• > 9 hours	216	60.8
Dementia severity of PLwD		
• Mild dementia	134	37.7
• Moderate dementia	102	28.7
• Severe dementia	39	11.0
• Unsure	80	22.5

Content and Face Validity

Content validity was evaluated by six experts who assessed the items across four domains: relevance, clarity, simplicity, and ambiguity. The four-point rating scale was dichotomised, with scores of 3 (quite) and 4 (highly) recoded as 1 (acceptable), and scores of 1 (not) and 2 (somewhat) recoded as 0 (unacceptable). All 20 items achieved an item-level I-CVI of 1.00, reflecting undisputed expert agreement. Both the scale-level Content Validity Index based on the average method (S-CVI/Ave) and the universal agreement method (S-CVI/UA) were 1.00.^{30,40}

Face validity was subsequently assessed by 30 raters to determine the linguistic clarity and comprehensibility of the translated items. Nineteen of the 20 items achieved an I-FVI of 1.00. Item 20 recorded an I-FVI of 0.90, which remains above the recommended threshold of 0.80.⁴¹ The S-FVI/Ave was 0.995, and the S-FVI/UA was 0.95. Therefore, all items were retained for subsequent testing.

Construct Validity and Factor Analysis

The construct validity of the Malay version of the DAS-M was evaluated using EFA on responses from 355 participants. The sampling adequacy was confirmed as meritorious, with a Kaiser–Meyer–Olkin (KMO) measure of 0.863 and a statistically significant Bartlett’s Test of Sphericity ($\chi^2=2396.369$, $p<0.001$), indicating that the correlation matrix was well-suited for factor extraction.^{13,17}

Although the Kaiser criterion (eigenvalues >1) initially suggested a five-factor solution, visual inspection of the scree plot (Figure I) supported retention of a two-factor solution, which also represented the most parsimonious and interpretable factor structure.^{10,13} This solution was theoretically consistent with the original Dementia Attitude Scale (DAS), comprising the Social Comfort and Knowledge domains.²⁸

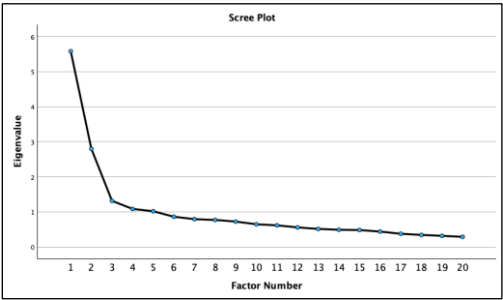


Figure I. Scree plot of the DAS-M.

Of the 20 items, 17 were retained. Three items were removed from the final model because of poor psychometric performance. Item 3 demonstrated a low factor loading of 0.249 and a communality of 0.066. Item 16 demonstrated a factor loading of 0.290 and a communality of 0.173. Item 20 showed a communality of 0.117 despite a marginal factor loading of 0.361. These findings indicated that the three items contributed weakly to the underlying factor structure and were therefore excluded from the final 17-item DAS-M (see Table II).

The initial 20-item two-factor solution explained 36.7% of the total variance, with Factor 1 accounting for 25.5% and Factor 2 accounting for 11.2%. After removal of Items 3, 16, and 20, the final 17-item two-factor solution explained 40.2% of the total variance, with Factor 1 accounting for 28.2% and Factor 2 accounting for 11.9%, based on the extraction sums of squared loadings. A moderate correlation between factors ($r=0.32$) supported the use of oblique rotation, with interpretation based on the pattern matrix.

The final solution comprised two factors. Factor 1 (Social Comfort) consisted of 10 items (Item 1, 2, 4-6, 8, 9, 13, 17-18), reflecting ease and confidence in interacting with PLwD. Factor loadings ranged from 0.455 to 0.753, with Item 9 contributing the highest loading of 0.753. Communalities ranging from 0.272 to 0.540 indicated good representation of the construct. Factor 2 (Knowledge) included 7 items (Item 7, 10-12, 14, 15, 19), reflecting beliefs and understanding of PLwD. Factor loadings ranged from 0.563 to 0.669, with Item 15 demonstrating the highest loading of 0.669. Communalities ranged from 0.293 to 0.575, indicating adequate shared variance. Overall, the refined 17-item, two-factor DAS-M demonstrated good construct validity and provided a coherent framework for assessing dementia-related attitudes among Malaysian caregivers (see Table II).

Reliability Analysis Item Selection, Internal Consistency, and Test-Retest

Following EFA, internal consistency was assessed using Cronbach's alpha. The 17-item DAS-M showed good reliability ($\alpha=0.825$), comparable to the original DAS ($\alpha=0.83-0.85$). The Social Comfort subscale (10 items) demonstrated acceptable reliability ($\alpha=0.756$), which, although slightly lower than that of the original ($\alpha=0.82$), remained acceptable. Conversely, the Knowledge subscale (7 items) showed strong reliability ($\alpha=0.869$), notably exceeding the originally reported range of 0.75–0.78.²⁷ The removal of Items 3, 16, and 20 did not reduce reliability and improved the overall psychometric performance of the scale (see Table III).

Table III. Internal Consistency of the Items

Construct	N Items	Cronbach's α	Interpretation	Original α
Overall	17	0.825	Good	0.83–0.85
Social Comfort	10	0.756	Acceptable	0.82
Knowledge	7	0.869	Good	0.75–0.78

Test–retest reliability among 30 caregivers over a two-week interval indicated moderate-to-good temporal stability, with item-level ICC values ranging from 0.678 (95% CI: 0.390-0.838) to 0.859 (95% CI: 0.705-0.933), supporting the stability of DAS-M items over time.

Table II. Exploratory Factor Analysis (EFA) of the Items

No. of Item	Items	Mean (SD)	Factor 1 (Social Comfort)	Factor 2 (Knowledge)	Communalities	Interpretation
1	It is rewarding to work with people who have ADRD. Bekerjasama dengan penghidap demensia dapat memberikan kepuasan.	4.85 (1.674)	0.594	0.137	0.425	Retained
2	I am afraid of people with ADRD. Saya berasa takut dengan penghidap demensia.	4.92 (1.719)	0.650	0.116	0.484	Retained
3	People with ADRD can be creative. Penghidap demensia boleh menjadi kreatif.	4.17 (1.625)	0.249	0.023	0.066	Removed
4	I feel confident around people with ADRD. Saya berasa yakin berada dalam kalangan penghidap demensia.	4.29 (1.536)	0.455	0.312	0.396	Retained
5	I am comfortable touching people with ADRD. Saya berasa selesa menyentuh penghidap demensia.	4.81 (1.543)	0.481	0.233	0.358	Retained
6	I feel uncomfortable being around people with ADRD. Saya berasa kurang selesa berada dalam kalangan penghidap demensia.	4.96 (1.605)	0.651	0.022	0.434	Retained
8	I am not very familiar with ADRD. Saya tidak begitu biasa dengan penyakit demensia.	4.27 (1.710)	0.671	-0.100	0.417	Retained
9	I would avoid an agitated person with ADRD. Saya akan mengelak daripada penghidap demensia yang resah gelisah.	4.58 (1.708)	0.753	-0.065	0.540	Retained
13	I feel relaxed around people with ADRD. Saya berasa tenang berada di samping penghidap demensia.	4.56 (1.519)	0.588	0.086	0.385	Retained
16	I feel frustrated because I do not know how to help people with ADRD. Saya berasa kecewa apabila saya tidak tahu cara untuk membantu penghidap demensia.	2.85 (1.601)	0.290	-0.046	0.173	Removed

17	I cannot imagine taking care of someone with ADRD. Saya tidak dapat membayangkan n diri saya menjaga penghidap demensia.	3.79 (1.730)	0.546	-0.242	0.272	Retained
18	I admire the coping skills of people with ADRD. Saya mengagumi kemampuan yang dimiliki penghidap demensia dalam menghadapi cabaran.	5.15 (1.455)	0.563	0.034	0.330	Retained
7	Every person with ADRD has different needs. Setiap penghidap demensia mempunyai keperluan berbeza.	5.53 (1.367)	-0.205	0.604	0.327	Retained
10	People with ADRD like having familiar things nearby. Penghidap demensia berasa selesa jika barang-barang mereka berada dekat dengan mereka.	5.39 (1.449)	-0.232	0.569	0.293	Retained
11	It is important to know the past history of people with ADRD. Adalah penting untuk mengetahui sejarah hidup penghidap demensia.	5.68 (1.301)	-0.196	0.661	0.392	Retained
12	It is possible to enjoy interacting with people with ADRD. Saya masih boleh berasa seronok bergaul dengan penghidap demensia.	4.98 (1.486)	0.238	0.647	0.575	Retained
14	People with ADRD can enjoy life. Penghidap demensia boleh menikmati kehidupan.	5.29 (1.487)	0.033	0.615	0.392	Retained
15	People with ADRD can feel when others are kind to them. Penghidap demensia boleh merasai kebaikan orang lain terhadap mereka.	5.21 (1.539)	-0.040	0.669	0.432	Retained

19	We can do a lot now to improve the lives of people with ADRD. Banyak yang boleh kita lakukan untuk menambah baik kehidupan penghidap demensia.	5.63 (1.298)	0.026	0.601	0.372	Retained
20	Difficult behaviors may be a form of communication for people with ADRD. Tingkah laku yang sukar (seperti kerap lupa dan agresif), mungkin merupakan satu bentuk komunikasi bagi penghidap demensia.	5.40 (1.333)	-0.137	0.361	0.117	Removed

DISCUSSION

The present study demonstrates that the DAS-M retains the core two-factor structure of Social Comfort and Knowledge, consistent with the original Dementia Attitude Scale and several cross-cultural validations.^{9,15,27,28} This structural stability reinforces the DAS's theoretical robustness across diverse populations. However, important cross-cultural variations were observed at both the factor and item levels.

The two-factor structure of the DAS-M is consistent with validations in Greece, Croatia, and Indonesia, where the original domains of Social Comfort and Dementia Knowledge were preserved.^{9,15,27} In contrast, several studies reported deviations from the original structure. The Turkish validation identified a three-factor model comprising supporting, accepting, and exclusionary attitudes, whereas a European multi-country analysis showed a three-factor structure comprising social comfort, social discomfort, and knowledge.^{6,7} Similarly, validation in Mandarin Chinese populations revealed three components, comprising cognitive, affective, and experiential.⁴³ These findings suggest that while the DAS demonstrates core structural stability, cultural variation exists in how attitudes are conceptualised.

While the overall two-factor structure of the original instrument was preserved, the DAS-M exhibited specific item-level deviations. In the original scale, Item 3 and Item 18 were associated with the Knowledge factor; however, in the present analysis, these items aligned more closely with the Social Comfort domain. Item 18 demonstrated a stronger loading on Social Comfort (loading = 0.563; communality = 0.330) and was consequently retained under this factor. In contrast, Item 3 exhibited poor psychometric performance (loading = 0.249; communality = 0.066) and was excluded from the final 17-item model. Similar findings have been reported in Croatian, European, and Mandarin Chinese validations, in which several items exhibited different loading patterns or failed to align with the original domains, reflecting cultural differences in the interpretation of dementia-related attitudes.^{6,9,43}

Item-level variability is commonly reported in cross-cultural studies.^{6,7,9,43} The poor performance of Items 3, 16, and 20 may reflect differences in how dementia-related attitudes are understood within the Malaysian caregiving context. Item 3, which states that PLwD can be creative, may be less intuitive to caregivers who primarily associate dementia with memory loss, cognitive decline, dependency, and functional deterioration. In local caregiving settings, the concept of creativity among PLwD may be less commonly recognised, particularly when caregivers' daily experiences are centred on supervision, safety, and assistance with daily activities.^{22,38,39}

Item 16, which refers to feeling frustrated because of not knowing how to help PLwD, may reflect caregiver self-efficacy, emotional strain, or caregiving burden rather than attitude alone.^{35,42} Among Malaysian families, caregiving is often shaped by family obligation, filial responsibility, and religious or moral expectations.²² As a result, caregivers may interpret frustration differently, either as a personal emotional response, a lack of caregiving skill, or a sensitive feeling that may not be openly acknowledged.^{22,35,42}

Item 20, which describes difficult behaviours as a form of communication, may require a more specific understanding of behavioural and psychological symptoms of dementia.^{35,38} Caregivers with limited dementia education may interpret agitation, aggression, or repetitive behaviour as part of disease severity, personality change, or intentional behaviour rather than as unmet needs or communication.^{35,38} Therefore, this item may depend more on dementia literacy and caregiving experience than on the general attitude domains measured by the DAS-M.^{35,38}

The expert panel reviewed the retained factor structure and agreed that removal of these three items did not compromise the conceptual representation of the Social Comfort and Knowledge domains. The retained 17-item DAS-M continued to adequately capture the core constructs measured by the original instrument while remaining culturally appropriate for use among Malaysian caregivers.

The reduction from 20 to 17 items has both advantages and limitations. A shorter questionnaire reduces respondent burden, shortens completion time, and may improve feasibility in both clinical practice and research. However, removing items may reduce the breadth of content covered by the original instrument and may limit comparability with studies using the full 20-item DAS. Nevertheless, because the retained items continued to represent both the Social Comfort and Knowledge domains and demonstrated satisfactory validity and reliability, the 17-item DAS-M remains a comprehensive and culturally appropriate instrument for assessing dementia-related attitudes among Malaysian caregivers.

The DAS-M demonstrated good internal consistency ($\alpha=0.825$), comparable to the original and versions from other countries. Similar reliability was reported in the Turkish ($\alpha=0.84$), Indonesian ($\alpha=0.779$), and Greek ($\alpha\approx0.74$) validations.^{7,15,27} These findings suggest that despite structural differences and item removal, the DAS maintains stable internal coherence across cultures,

supporting its use as a global measure of dementia-related attitudes.

During cross-cultural adaptation, one notable change was replacing the term “ADRD” with “dementia” in the Malay version. This decision was made because “dementia” is more commonly understood by Malaysian informal caregivers, whereas “ADRD” may be less familiar outside academic or specialist clinical settings. This modification aimed to improve comprehensibility while maintaining conceptual equivalence with the original DAS.

The observed cross-cultural differences reflect broader sociocultural influences on perceptions of dementia. Studies from Europe and China show that attitudes are shaped by knowledge, exposure, education, and healthcare systems.^{6,43} In Malaysia, attitudes may be more influenced by family responsibility, religious beliefs, and social norms. These cultural factors may shape the distinction between cognitive (knowledge) and affective and behavioural (comfort) domains, as reflected in item reallocation within the DAS-M. In contrast, Western populations may show clearer distinctions between positive and negative attitudes or between comfort and discomfort dimensions.

The validated DAS-M has several practical implications. First, in clinical settings, it may be used as a brief screening tool to identify caregivers with less favourable dementia-related attitudes, particularly those who may feel uncomfortable, fearful, or uncertain when interacting with PLwD. This may help healthcare providers identify caregivers who could benefit from additional counselling, psychoeducation, or referral to caregiver support services.

Second, in caregiver education, the DAS-M can help identify specific attitudinal gaps before training and guide the development of culturally appropriate educational modules. For example, low scores in the Knowledge domain may indicate the need for education on dementia symptoms, communication strategies, and

behavioural management, whereas lower Social Comfort scores may indicate the need for practical exposure, communication skills training, and stigma reduction.

Third, in future intervention studies, the DAS-M can be used as an outcome measure to evaluate whether caregiver education, psychosocial interventions, or dementia awareness programmes improve attitudes over time. Its use may also support the assessment of programme effectiveness across clinical, community, and public health settings in Malaysia.

This study has several strengths. It involved a relatively large sample ($n=355$), exceeding recommended requirements for factor analysis, and involved multi-centre recruitment from two tertiary referral hospitals, enhancing representativeness. A comprehensive validation process, including content validity, face validity, construct validity, and reliability testing, further supports the DAS-M's psychometric robustness.

However, some limitations should be acknowledged. Convenience sampling may introduce selection bias and limit generalisability. Additionally, confirmatory factor analysis (CFA) was not conducted, which could have further strengthened validation of the factor structure.

CONCLUSION

The DAS-M demonstrated acceptable validity and reliability for assessing dementia-related attitudes among Malaysian informal caregivers. The findings support its potential use in research, caregiver training programmes, and public health interventions within similar clinical and caregiving contexts. However, further studies using confirmatory factor analysis and validation in larger, more diverse community-based samples, including caregivers from different regions and care settings, are recommended to strengthen its generalisability and confirm its factor structure.

The DAS-M demonstrated acceptable validity and reliability for assessing dementia-related attitudes among Malaysian informal caregivers. The findings support its potential use in research, caregiver training programmes, and public health interventions within similar clinical and caregiving contexts. However, further external validation in larger and more diverse community-based populations is recommended. In particular, confirmatory factor analysis should be conducted in an independent sample to verify the factor structure identified in the present study. Future validation should also include caregivers from different geographical regions and care settings to further establish the generalisability and robustness of the DAS-M.

DECLARATION OF AI USE

Generative AI tools (ChatGPT and Gemini) were used solely for language editing and improving clarity.

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CONFLICT OF INTEREST

The authors declared no conflict of interest.

INSTITUTIONAL REVIEW BOARD (ETHICAL COMMITTEE)

The study adhered to the Declaration of Helsinki and received ethical approval from multiple boards. Primary approval was obtained from the UiTM Faculty Ethics Research Committee (7 November 2024; Ref: REC/11/2024 [PG/MR/549]), followed by the Ministry of Health Malaysia Medical Research and Ethics Committee (16 December 2024; NMRR ID: 24-03494-W6I [IIR]) and the UMMC Medical Research Ethics Committee (21 May 2025; Ref: 2025122-14637). Operational permissions were granted by HKL and UMMC, and formal authorisation to use the study instruments was obtained from the original developers and copyright holders.

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REFERENCES

1. Abdullah JM, Ismail A, Yusoff MSB. Healthy ageing in Malaysia by 2030: needs, challenges and future directions. *Malays J Med Sci*. 2024;31(4):1-13. doi:10.21315/mjms2024.31.4.1
2. Akyol MA, Söylemez BA, Küçükçüçlü Ö, et al. Positive aspects of caregiving questionnaire for family caregivers of people with dementia: psychometric properties of the Turkish version. *Eur J Geriatr Gerontol*. 2024;6(1):46-52. doi:10.4274/ejgg.galenos.2023.2023-8-7
3. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine (Phila Pa 1976)*. 2000;25(24):3186-3191.
4. Brodaty H, Donkin M. Family caregivers of people with dementia. *Dialogues Clin Neurosci*. 2009;11(2):217-228.
5. Bujang MA, Hon YK, Lee KY. A step-by-step guide to questionnaire validation research. Shah Alam (MY): Institute for Clinical Research, National Institutes of Health Malaysia; 2022. doi:10.5281/zenodo.6801209
6. Cesana BM, Poptsi E, Tsolaki M, et al. A confirmatory factor analysis of the Dementia Attitude Scale (DAS) in a European case series of caregivers of people with dementia enrolled in the RECage study. *NeuroSci*. 2025;6(2):45. doi:10.3390/neurosci6020045
7. Çetinkaya A, Elbi H, Altan S, et al. Adaptation of the Dementia Attitudes Scale into Turkish. *Arch Neuropsychiatry*. 2019;57(4):325-332. doi:10.29399/npa.24705
8. Clark LA, Watson D. Constructing validity: basic issues in objective scale development. *Psychol Assess*. 1995;7(3):309-319.
9. Ćoso B, Mavrinac S. Validation of Croatian version of Dementia Attitudes Scale (DAS). *Suvremena Psihol*. 2016;19(1):5-22.
10. Costello AB, Osborne JW. Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. *Pract Assess Res Eval*. 2005;10(7):1-9.
11. Creten S, Heynderickx P. Dementia literacy and its link to public attitudes towards dementia in Flanders: a cross-sectional survey among health professionals, family caregivers, and the general public. *Open J Soc Sci*. 2024;12(2):84-99. doi:10.4236/jss.2024.122006
12. Dementia Singapore. Measures on dementia attitudes and knowledge [Internet]. Singapore: Dementia Singapore; 2021 [cited 2026 Jul 7]. Available from: https://www.dementiahub.sg/wp-content/uploads/2022/10/Measures-on-Dementia-Attitudes-_-Knowledge.pdf
13. DeVon HA, Block ME, Moyle-Wright P, et al. A psychometric toolbox for testing validity and reliability. *J Nurs Scholarsh*. 2007;39(2):155-164. doi:10.1111/j.1547-5069.2007.00161.x
14. Fritz CO, Morris PE, Richler JJ. Effect size estimates: current use, calculations, and

- interpretation. *J Exp Psychol Gen.* 2012;141(1):2-18. doi:10.1037/a0024338
15. Gkioka M, Tsolaki M, Papagianopoulos S, et al. Psychometric properties of Dementia Attitudes Scale, Dementia Knowledge Assessment Tool 2 and Confidence in Dementia Scale in a Greek sample. *Nurs Open.* 2020;7(5):1623-1633. doi:10.1002/nop.2.537
 16. Guilin L, Qingran L, Ruiying H, et al. An investigation of the knowledge, attitude and practice of family caregivers of patients with Alzheimer's disease. *Int J Psychol Brain Sci.* 2019;4(1):1-6. doi:10.11648/j.ijpbs.20190401.11
 17. Hajar ST. Statistical analysis: internal-consistency reliability and construct validity. *Int J Quant Qual Res Methods.* 2018;6(1):27-38.
 18. Institute for Public Health. National Health and Morbidity Survey 2018: elderly health fact sheet [Internet]. Kuala Lumpur: Institute for Public Health, Ministry of Health Malaysia; 2018 [cited 2026 Jul 7]. Available from: <https://iku.gov.my/images/IKU/Document/REPORT/NHMS2018/FactsheetElderlyAged60year sorMorefinal.pdf>
 19. Keogh B, Ting To W, Daly L, et al. Acute hospital staff's attitudes towards dementia and perceived dementia knowledge: a cross-sectional survey in Ireland. *BMC Geriatr.* 2020;20(1):376. doi:10.1186/s12877-020-01805-1
 20. Koo TK, Li MY. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *J Chiropr Med.* 2016;15(2):155-163. doi:10.1016/j.jcm.2016.02.012
 21. Kyriazos TA. Applied psychometrics: sample size and sample power considerations in factor analysis and SEM. *Psychology.* 2018;9(8):2207-2230. doi:10.4236/psych.2018.98126
 22. Loh KJ, Ng ALO, Chia YC, et al. Caring for people living with dementia and their informal caregivers: current perspectives in Malaysia. *Malays Fam Physician.* 2024;19:69.
 23. Ministry of Health Malaysia. The dementia action plan 2023-2030 [Internet]. Putrajaya: Ministry of Health Malaysia; 2024 [cited 2026 Jul 7]. Available from: https://www2.moh.gov.my/moh/modules_resou rces/bookshelf/Buku_A4_THE_DEMENTIA_MEI_ebook/index.html
 24. Mokkink LB, Prinsen CAC, Patrick DL, et al. COSMIN Study Design checklist for Patient-reported outcome measurement instruments [Internet]. Version July 2019. Amsterdam: Amsterdam University Medical Centers; 2019 [cited 2026 Jul 7]. Available from: <https://www.cosmin.nl>
 25. Moore DS, McCabe GP, Craig BA. Introduction to the practice of statistics. 9th ed. New York: W. H. Freeman; 2017.
 26. Mulyani S, Mitchell G, Carter G, et al. Validity and reliability of the Approaches to Dementia Questionnaire (ADQ) in Indonesian health students. *BMC Med Educ.* 2025;25(1):798. doi:10.1186/s12909-025-07332-2
 27. Mulyani S, Saifullah AD, Cahyani KD, et al. Validity and reliability of dementia knowledge assessment scale and dementia attitude scale in the Indonesian language among nursing students. *Open Access Maced J Med Sci.* 2023;11(B):671-677. doi:10.3889/oamjms.2023.11452
 28. O'Connor ML, McFadden SH. Development and psychometric validation of the Dementia Attitudes Scale. *Int J Alzheimers Dis.* 2010;2010:454218. doi:10.4061/2010/454218
 29. Pallant J. SPSS survival manual. 7th ed. London: Routledge; 2020.
 30. Polit DF, Beck CT. The content validity index: are you sure you know what's being reported? *Res Nurs Health.* 2006;29(5):489-497. doi:10.1002/nur.20147
 31. Rejab N, Muhammad NA, Tohid H, et al. A Malay version of the Attitude to Ageing Questionnaire: its adaptation, validation, and reliability in the Malaysian older adult population.

-
- Ann Geriatr Med Res. 2022;26(3):225-232. doi:10.4235/agmr.22.0025
32. Streiner DL, Norman GR, Cairney J. Health measurement scales. 5th ed. Oxford: Oxford University Press; 2015.
 33. Superior Y. Assessment of the knowledge, attitudes and practices of caregivers of elderly with Alzheimer's disease. IOSR J Nurs Health Sci. 2020;9(5):56-63.
 34. Tavakol M, Dennick R. Making sense of Cronbach's alpha. Int J Med Educ. 2011;2:53-55. doi:10.5116/ijme.4dfb.8dfd
 35. Teichmann B, Gkioka M, Kruse A, et al. Informal caregivers' attitude toward dementia. J Alzheimers Dis. 2022;88(3):971-984. doi:10.3233/JAD-215731
 36. Terwee CB, Bot SD, de Boer MR, et al. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol. 2007;60(1):34-42. doi:10.1016/j.jclinepi.2006.03.012
 37. World Health Organization. Global action plan on the public health response to dementia 2017-2025 [Internet]. Geneva: World Health Organization; 2017 [cited 2026 Jul 7]. Available from: <https://www.who.int/publications/i/item/9789241513487>
 38. World Health Organization. iSupport for dementia: training and support manual for carers of people with dementia [Internet]. Geneva: World Health Organization; 2019 [cited 2026 Jul 7]. Available from: <https://www.who.int/publications/i/item/9789241515863>
 39. World Health Organization. Dementia [Internet]. Geneva: World Health Organization; 2026 [cited 2026 Jul 7]. Available from: <https://www.who.int/news-room/fact-sheets/detail/dementia>
 40. Yusoff MSB. ABC of content validation and content validity index calculation. Educ Med J. 2019;11(2):49-54. doi:10.21315/eimj2019.11.2.6
 41. Yusoff MSB. ABC of response process validation and face validity index calculation. Educ Med J. 2019;11(1):40-48. doi:10.21315/eimj2019.11.1.5
 42. Zawadzki L, Mondon K, Peru N, et al. Attitudes towards Alzheimer's disease as a risk factor for caregiver burden. Int Psychogeriatr. 2011;23(9):1451-1461. doi:10.1017/S1041610211000891
 43. Zhu L, Schall A, Paulitsch M, et al. Attitudes toward people with dementia in Germany and China. GeroPsych. 2023;36(3):123-134. doi:10.1024/1662-9647/a000303