Development of Arabic Version of Vestibular Disorders Activities of Daily Living Scale: Cross-Cultural Adaptation and Assessment of Psychometric Properties

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Background: The vestibular disorders activities of daily living (VADL) scale is a valid and reliable scale created 2 decades ago to specifically test the functional problems of patients with vestibular disorders. Since its development, the VADL has been cross-culturally validated and adapted in Spanish, Portuguese, Persian, and Turkish languages. A version is not yet available in Arabic, the primary language of more than 400 million people worldwide. This study aimed to translate the patient-reported VADL into Arabic and test its psychometric properties such as content validity, internal consistency, and test-retest reliability.

Material/Methods: Our study was conducted in 2 parts. In the first part, we translated and adapted the VADL from English into Arabic with expert input. In the second part, we tested the translated scale content validity by consulting 6 experts in the field. We assessed the scale's internal consistency and test-retest reliability by administering it twice to 31 subjects with vestibular disorders with a 1-week interval between the 2 measurements.

Results: Translation, adaptation, and pretesting were successful, and we were able to create the VADL-A, an Arabic version of the VADL. The content validity of the VADL-A was 0.96, internal consistency was 0.96, and the test-retest reliability was 0.93.

Conclusions: We successfully translated, adapted, and created the VADL-A. Our preliminary testing of basic psychometric properties indicated that the scale has excellent content validity, internal consistency, and test-retest reliability.

Keywords: Activities of Daily Living • Cross-Cultural Comparison • Reproducibility of Results • Vestibular Diseases

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Background

Peripheral and central vestibular disorders commonly cause vertigo and balance-related issues, affecting patients' daily life activities to varying extents and compromising their quality of life [1,2]. Interventions for vestibular disorders are analyzed by observing improvements in balance, saccadic eye movements, dizziness, gait, daily life activities, and quality of life [3,4]. Patient-reported outcome measures are a common tool used to assess the subjective feelings of individuals with vestibular disorders. There are many such scales available for vestibular disorders, which usually measure vestibular disorder symptoms and their effect on patients' functioning and quality of life [5].

Of the many patient-reported outcome measures, the vestibular disorders activities of daily living scale (VADL), developed by Cohen et al [6,7], is specifically designed to assess daily life activities. This scale is used to determine the functional limitations and level of disability of subjects with vestibular problems. It assesses functioning, mobility, and instrumental skills [8]. The VADL is a valid and reliable scale with a total of 28 questions; of these, the first 12 assess patients' functioning, the following 9 assess ambulation, and the final 7 evaluate instrumental skills of daily life activities [6,7]. Each question is rated on a 10-point scale, and the scale is sufficiently sensitive to assess changes after vestibular rehabilitation [9,10]. The VADL is widely applied in clinical studies and has been shown to be an excellent measure for assessing functioning, not only for vestibular disorders but also for some neurological conditions, such as multiple sclerosis [11,12].

After the VADL's inception, it was translated from English to Spanish by the authors and later cross-culturally adapted into Portuguese [13], Persian [14], and Turkish [15]. After adaptation, the psychometric properties of the scale were evaluated in various patient populations, and the scale was shown to be a valid and reliable [13-16]. An Arabic version of the scale has not yet been developed or tested. Almost 400 million people worldwide speak the Arabic language, and Arabic is considered an official or co-official language in more than 25 countries. Arabic culture is family centered and differs from the Western world. Vestibular disorders are common in Saudi Arabia [17,18], and Saudis form the largest portion of the Arabic-speaking world. As such, there is a need to adapt this scale into Arabic for the context of Saudi Arabia.

To date, the VADL has not been cross-culturally adapted for the Arabic population. The current study aimed to cross-culturally adapt the English version of the VADL by translating it into Arabic, testing its psychometric properties on patients with vestibular disorders, and making the Arabic version of the VADL (VADL-A) available to the Arabic-speaking population.

Material and Methods

The study was approved by the Research Ethics Committee of King Khalid University (ECM #2019-59-HAPO-06-B-001). The study was divided into 2 sections. In the first part, we cross-culturally adapted the VADL and created the VADL-A; in the second, we assessed the psychometric properties of the VADL-A, including construct validity, test-retest reliability, and internal consistency.

Translation and Cross-cultural Adaptation

In the cross-cultural adaptation and translation process, we followed the guidelines set forth by Beaton et al [19]. The translation and adaptation process was completed in 6 stages.

Stage 1: Initial Translation

The authors wrote to the original creator of the VADL and obtained her permission to adapt the scale for the Arabic language. Two bilingual translators were then identified, both of whom were native Arabic speakers as well as proficient English speakers. Translator 1 was an ear, nose, and throat (ENT) surgeon, and Translator 2 was a native translator (a language expert with a nonmedical background). We explained the aim of the study to both translators and requested their contributions to the adaptation process. Sufficient time was allowed to ensure that the translators understood the scale and could create a translated version.

Stage 2: Synthesis of the Translations

The authors of the study held a meeting with the 2 translators and synthesized the results of their translations. The medical expert's translation was titled "T1," and the language expert's translation was titled "T2." During the translation process, the title of the study was improperly translated by the naïve translator due to their lack of medical knowledge. As the word "vestibular" had no direct equivalent in the Arabic language, a suitable translation was found through discussions. The scale subdivisions – function, ambulation, and instrumental – were listed as F, A, and I, respectively, before the question numbers in the scale. These were translated by the language expert directly into Arabic letters; however, a discussion panel later suggested translating the function, ambulation, and instrumental headings into Arabic and classifying them by their first Arabic letter to improve raters' understandings. After the panel discussion between the authors and translators, all parties reached a consensus and formed a single scale based on the T1 and T2 Arabic versions of the VADL.

Stage 3: Back-translation

At this stage, we needed to back-translate the T1 and T2 Arabic versions of the VADL into English. For this purpose, we identified 2 language translators other than the initial translators, who were also bilingual in both Arabic and English; however, these translators' first language was English. These translators were contacted individually, and their work was carried out separately. Their back-translated versions were referred to as BT1 and BT2.

Stage 4: Expert Committee

The authors, their colleagues, and the 4 translators next engaged in a panel discussion, in which they discussed the process of translation and back-translation. During the back-translation process, some words were assigned multiple meanings, including "independence" in the instruction section of the questionnaire, the word "laying down" in question 1, and "reaching down" in question 10. These were corrected in the discussion process until the committee members reached a consensus. Some questions were considered overly harsh for Arabic culture, such as those related to upper body dressing, lower body dressing, and intimate activity. These questions were carefully discussed to ensure a high-quality translation. After the meetings, the authors formulated a single, pre-final version of the VADL-A for testing.

Stage 5: Test of the Pre-final Version

In the final stage of the adaptation process, the pre-final version of the VADL-A was administered to 30 patients with vestibular, vertigo, or balance issues. We carefully selected participants who spoke both Arabic and English. First, we asked patients to read and fill out the complete Arabic version of the VADL. Later, we provided them with the original English version for comparison purposes. All patients felt that both forms had the same meaning and were satisfied with our translation and adaptation process. Data from these patients were not used in the psychometric analysis of the VADL-A.

Stage 6: Submission of the Final Version

After completing the process of developing the VADL-A, the translation committee approved the final version of the scale. The VADL-A instrument with all the stages of information was sent to the developer of the original VADL.

Psychometric Property Analysis

Content Validity Process

The final approved VADL-A was sent to 6 bilingual ENT surgeons, who assessed the content validity of the scale. We created a consent form for their participation and asked them to complete a validity assessment form for the scale. The validity assessment form was completed by comparing the original English VADL with the VADL-A. Each item on the validity form was rated on a 5-point Likert scale, ranging from 1 (not acceptable) to 5 (excellent). The raters evaluated the following components of the scale: title; instructions for filling out the scale; independent rating; each question; each overall section (function, ambulation, instrument); explanation of the independent rating; and overall translation of the scale. Sufficient time was allowed for raters to understand, evaluate, and rate the scale. The answers obtained were used to assess the content validity of the scale.

Test-retest Reliability and Internal Consistency

A total of 31 patients with vestibular disorders were chosen for the assessment process. Participants' ages ranged from 30 to 70 years, and both men and women were included. Patients who were not able to read, write, or comprehend Arabic were excluded from the study. Written informed consent was obtained from all participants. Patients were given a brief explanation of the VADL-A, and any issues raised were rectified by the evaluator. While the patient filled out the scale, the evaluator was available to answer any queries. The same evaluator was present for all 31 patients during the questionnaire process. To obtain test-retest reliability, the patients filled out the scale a second time 1 week after the pretest without being shown the form they had previously completed.

Data Analysis

Data analysis was performed using SPSS version 22. The mean and standard deviations for age, VADL-A subsection, and total score were calculated by univariate analysis using descriptive statistics. The normality of variables was measured using the Shapiro-Wilk test. The scale's content validity was measured using the content validity index. The test-retest reliability for VADL-A scores was analyzed using the intraclass correlation coefficient. The scale's internal consistency was measured with Cronbach's alpha.

Results

Translation

While preparing the VADL-A, some questions were difficult to understand if they were translated exactly from English to Arabic. To create the same meaning but enable a better understanding, we used different words in certain questions. In question F-1, the original English statement included the phrase "sitting from lying down"; in the Arabic version of this question, we replaced "lying down" with "sleeping position." In questions

Table 1. Mean and standard deviations for the age and VADL-A scores.

Variable	Mean±standard deviation
Age	52.64±7.00
First rating VADL-A total score	3.17±1.65
First rating VADL-A functional components score	2.71±1.30
First rating VADL-A ambulation components score	3.25±1.88
First rating VADL-A instrumental components score	3.92±2.44
Second rating VADL-A total score	3.55±1.61
Second rating VADL-A functional components score	3.07±1.31
Second rating VADL-A ambulation components score	3.58±1.73
Second rating VADL-A instrumental components score	4.19±2.20

VADL-A – vestibular disorders activities of daily living scale, Arabic version.

Table 2. Content validity, test-retest reliability and internal consistency scores for VADL-A total scores and their subcomponents.

Psychometric properties	VADL-A function	VADL-A ambulation	VADL-A instrumental	VADL-A total
Content validity (coefficient of variation of an individual)	0.92	0.92	0.96	0.96
Test-retest reliability (interclass correlation)	0.86	0.91	0.95	0.93
Internal consistency (α)	0.91	0.94	0.86	0.96

VADL-A – vestibular disorders activities of daily living scale, Arabic version.

I-24 and I-25, which both included the phrase "light and heavy household chores" in English, the word "chore" was replaced with the word "work" in the Arabic translation. Similarly, the Brazilian and Persian versions of the VADL also modified a few words of the scale to improve understanding. Similar to Brazilian study [13], we also had difficulty adapting question A13 (walking on level surfaces) and question A14 (walking on uneven surfaces). The words "level surfaces" and "uneven surfaces" were debated by the translators and a conclusion was made regarding suitable words. Question F12 (intimate activity) also had an inappropriate raw translation, and researchers struggled to get the ideal wording. To provide more details related to the translated questionnaire we have attached the final Arabic translation in the Appendix.

Psychometric Properties

In this cross-cultural adaptation study, the successfully translated VADL-A was administered to 31 subjects with vestibular disorders. Of the 31 total participants, 17 had peripheral vestibular disorders and 14 had central vestibular disorders. In addition, 16 were men and 15 were women. The mean and standard deviations for age; functional, ambulation, and instrumental subsections of the VADL-A; and total scores for the 2 testing periods are provided in **Table 1**.

The content validity of the VADL-A was assessed using the content validity index and found to be excellent, both for the overall score and the subcomponents. The VADL-A was rated twice within a 24-hour period by 31 subjects with vestibular dysfunctions to assess test-retest reliability. Patients' scores were also used to measure internal consistency. Detailed validity, test-retest reliability, and internal consistency scores are provided in **Table 2**.

Discussion

In this study, we aimed to cross-culturally adapt the VADL for the Arabic language and test its psychometric properties. Without any major difficulties, we were able to translate and cross-culturally adapt the scale to Arabic with excellent internal consistency, content validity, and test-retest reliability.

Aratani et al [13] created the Brazilian version of the VADL in Portuguese. They recruited 80 elderly subjects with vestibular disorders who were experiencing chronic dizziness. Of these, 40 participants were used for the pretest and the remaining 40 for reliability analysis. In the pretest, subjects did not understand 2 activities: "sitting up from lying down" and "walking on level surfaces." The scale's internal consistency was

0.92, and the test-retest reliability was 0.79 [13]. In our study, we recruited 61 patients with vestibular disorders. Of these, 30 patients participated in the pretest and found no issues in the scale. Keeping in mind the previous authors' experiences, we took extra precautions in making our scale. In our study, we obtained similar internal consistency (0.96), although the VADL-A had better test-retest reliability (0.93).

Mehran et al [14] conducted a similar study to create a Persian version of the VADL. That study was completed in 2 parts. In the first part, the authors translated and adapted the English language VADL to Persian and tested the translated scale's content validity. In the second stage, they recruited 34 patients with vestibular impairments and tested the Persian language VADL's internal consistency, test-retest reliability, and applicability for patient populations with and without treatment. That study achieved a content validity score of 0.99, an internal consistency score of 0.94, and a test-retest reliability score of 0.95. Our study was also conducted in 2 parts. In the first part, we translated the VADL following the method suggested by Beaton et al [19], which is more systematic than the method followed for the Persian version [14]. In the second part of our study, the values we obtained for psychometric properties were very similar to those found for the Persian version (content validity=0.96; internal consistency=0.96; test-retest reliability=0.93).

Similarly, Çiçek Çinar et al [15] tested the validity and reliability of the Turkish language VADL on a group of 233 patients with vestibular disorders. They also tested various psychometric properties of the scale and found an internal consistency of 0.96 and test-retest reliability of 0.93. Surprisingly, we obtained very similar results for the VADL-A scale (internal consistency=0.96; test-retest reliability=0.93).

All these studies have shown that the VADL can be easily converted and adapted for many cultures without much difficulty. As such, careful translations and adaptations will not encounter many problems. We were unable to test some other psychometric properties of the scale, including interrater reliability, concurrent validity, sensitivity, specificity, and effect of treatment on scale outcomes. Future studies should focus on testing these other psychometric properties among patients at different stages with different diagnoses.

Conclusions

In the current study, we translated and adapted the VADL and created an Arabic version, the VADL-A. In our preliminary testing of several basic psychometric properties, we found that the VADL-A was a valid and reliable scale, with content validity of 0.96, internal consistency of 0.96, and test-retest reliability of 0.93.

Acknowledgment

Conflicts of Interest

None.

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