Cross-Cultural Adaptation, Reliability, and Validity of the Shortened Version of the Falls Efficacy Scale-International to Assess Fear of Falling in the Kurdish Central Dialect

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Abstract

Background: People with vestibular disorders often experience imbalance and fear of falling. The Short Falls Efficacy Scale–International (Short FES-I) is a reliable and valid tool used worldwide to assess concerns about falling, and it has been translated into many languages. However, there is a lack of validated Kurdish tools for measuring fall-related concerns. The Short FES-I has not previously been adapted for Kurdish speakers. **Objectives:** this study translated and culturally adapted the Short FES-I into Central Kurdish (FES-I-CK) and evaluated its reliability and validity among Kurdish-speaking individuals with vestibular disorders using a cross-sectional survey. The aim was to verify the tool's measurement quality and ensure it is suitable for use in the Kurdish context. **Materials and Methods:** The research employed a systematic approach to cross-cultural adaptation to generate a concise iteration of the Falls Efficacy Scale-International tailored for implementation among Kurdish individuals diagnosed with vestibular disorders. The reliability is estimated with intraclass correlation co-efficient (2), and the internal consistency is assessed using Cronbach's alpha coefficient (α) and composite reliability. The discriminating validity was evaluated using the Mann–Whitney U test. To assess convergent validity, Spearman correlation test was used. **Results:** The participants (n = 120) were composed of 90 patients with vestibular symptoms (mean − age 47 ±14.7, range 59 years; 66.7% women) and 30 healthy participants (mean − age 45 ±14.4; range 47 years; 70% women). The Kurdish version fall efficacy scale revel an internal consistency; scale alpha were 0.7. Mann whiteny u test established discriminating validity between healthy and patients. Convergent validity was examined through correlation VSS-SF-CK and short fall efficacy scale. Intraclass correlation coefficients revealed high external reliability. **Conclusion:** This study aimed to assess the reliability and validity of the adapted editions of the Short Falls Efficacy Scale-International within a group of Kurdish- speaking individuals diagnosed with vestibular disorders. The results were promising, as they revealed external consistency and construct validity. The goodness fit indices showed that the Kurdish version of Shortened version of the Falls Efficacy Scale-International is a reliable and validated PROM that can be used by clinicians and researchers in the Kurdish-speaking population.

Keyword: Patient-reported outcome measures, vestibular disorders, vertigo and dizziness, fear of fall.

Introduction

Vertigo (an illusory impression of motion) and imbalance due to abnormalities in gaze and postural stability are common symptoms of vestibular dysfunction [1]. Dysfunction in balance can be debilitating and can result in disastrous events like falls. According to information taken from the National Health and Nutrition Examination Survey, symptomatic vestibular dysfunction patients were 12 times

more likely to have experienced a fall over their lifetime [2]. In order to provide patient-centered care, it is essential to evaluate and recognize each person's risk of falling. Therefore, valid and trustworthy patient self-reports are essential for physical therapists and doctors who treat patients with vestibular problems in order to assess a patient's level of fear about falling [3]. Self-efficacy denotes an individual's self-perception regarding their capabilities within a specific set of activities or domains. The first such scale to be developed was the 'Falls Efficacy Scale' (FES), which measures confidence in performing a range of activities of daily living without falling and that was in 1990. This scale (and its later modifications) has excellent reliability, is correlated with measures of balance and gait, and predicts future falls and decline in functional capacity [4, 5]. With 16 separate tasks, the FES-I is a 16- item tool that asks the patient how concerned they are about falling [6]. The 16-item Falls Efficacy Scale-International (FES-I) has been shown to have excellent reliability and construct validity. However, for practical and clinical purposes, a shortened version of the FES-I would be useful. Accordingly, a shortened version of FES-I was developed. Although the longer and shorter versions of the test show great validity and reliability, the more established FES-I was used for the purpose of the study [7]. The findings of the current investigation suggest that the abbreviated iteration of the Falls Efficacy Scale-International (FES-I), namely the Short FESI, demonstrates significant comparability to the 16-item FES-I in terms of internal consistency, test–retest reliability, and discriminative capacity [8]. Moreover, the tool had been used to assess patients with vestibular disorders, and revealed a reliable and valid tool for measuring an individual's concern of falling in people with vestibular disorders [3]. Update,

there is no validated questionnaire that assess the fear of fall in Kurdish medical community.

Materials and Methods
Ethical approval
Approval (number 175) was granted from the ethical committee of the College of medicine /University of Sulaimani, Iraq. The current research began after receiving ethical approval from ethical committee of the college of medicine. Individuals meeting the specified criteria were included in the study following the provision of informed, written consent. Focus group (FG): We formed a focus group in our research allowed for gathering insights, perspective, and opinions from a diverse person of individuals who share common characteristics or experiences relevant to our research topic. The focus group compromise of 8 otolaryngologists, all native speakers of target language with more than 10 years of experience in Vestibular diseases. The moderator of the group was knowledgeable about running the discussion in accordance with the relevant guidelines.

Preparation
The preparation involved three key steps. 1-The corresponding author ensured permission from Professor Lucy Yardley, one of the original developers. 2-A junior otolaryngologist was recruited to oversee the translation process, facilitating communication with focus group members and translators. 3-Clear guidelines regarding clarity, fluency, and unambiguity were established and adhered to during the translation process

Cross-cultural adaptation
Knowledgeable patients experiencing vestibular symptoms for their feedback by rating for each item. After reviewing the CAA process and the

results of the rating, the face and content validity were confirmed. Following proofreading and cognitive debriefing, the final version was established.

Sample size and participants

Based on the guidelines recommending a minimum of 10 participants for each item and previous research on the instrument, we concluded that 90 participants would be sufficient capture covariation among our 7 surfaces attributes. Additionally, we included 30 healthy control participants for comparison purpose. Participants were recruited from 3 well equipped audio- vestibular clinics in Slemani-Iraq, between December 2023 to March 2024. The participants included patients with chief complain of vestibular symptoms who had received an objective diagnosis of vestibular dysfunction. Participants' ages above 18 to 80 years old, ensuring a wide-ranging demographic representation. Within this sample included individuals with varying educational back-ground, employment states, and religions.

Educational level and raters (Interviewers)

The FES-I encompassed participants represent-ting diverse educational backgrounds so participants' educational levels were document-ted. The study was administered by three raters not self-rated, who were medical student (female) at college of medicine in Sulaimani. Their significant contribution involved clarifying questions and facilitating a better understanding for the participants of all questionnaires. Methodologist recommend involving female rater is better to simplify the process, especially considering participants' psychological and social barriers. So, the raters in our research could engage effectively both genders, especially women in conservative or religious families.

Recruitment and randomization

During the period when patients awaited the results of their investigations or rehabilitation protocols, a systemic method was employed daily to choose participants who met the study's criteria and agreed to join. The selection started with a randomly chosen first participant, followed by subsequent selections at regular intervals.

Recording data

The data was gathered in the clinical setting of Ear, Nose, and Throat doctors to interview patients referred for vertigo issues. This took place in a dedicated room to ensure focus and comfort. Each recording sessions lasted 15 to 20 minutes, and over a span of 4 months, all necessary study data was collected.

Inclusion criteria

The inclusion criteria for our comprehensive this study was thoughtfully designed to capture a diverse yet specific group of participants. Participants were required to exhibit a good level of consciousness, ensuring their ability to actively and accurately engage in the study assessments and interviews. They were diagnosed by healthcare professional. The minimum duration of vertigo episodes was established at two weeks, and participants had to report experiencing these episodes at least once a week. Their age must be (18 to 80) years.

Exclusion criteria

This study excluded individuals who used medications known to affect vestibular function or balance like (antipsychotics, anticonvulsants, etc…), Pregnancy as hormonal changes during pregnancy can affect vestibular symptoms, or exhibiting a compromised level of conscious-

sness, severe neurological disorders, recent significant head trauma, substance abuse history, or psychiatric conditions that might affect accurate reporting of vertigo symptoms. These criteria aimed to ensure a specific study group and Modifying research for diverse cultures involves adjusting study materials, methods, and communication to align with varying cultural contexts, ensuring the study remains relevant and valid in different settings. We took measures to guarantee the clarity of translated questions, replacing unfamiliar words or expressions with the most suitable alternatives while preserving their meaning. The translation of the FES-I into central Kurdish involved two stages: firstly, by medical student (T1) and secondly, by a licensed professional translator (T2). The focus group (FG) compared and resolved differences between T1 and T2, resulting in the creation of T12 version of VSS-SF-CK. The synthesized version (T12) clarified vague terms and made formal expressions more accessible. Notable changes included replacing (club meeting). To assess clarity of the item, we asked feedback from Focus group and 12 linguistically minimize factors that could complicate result interpret-tation.
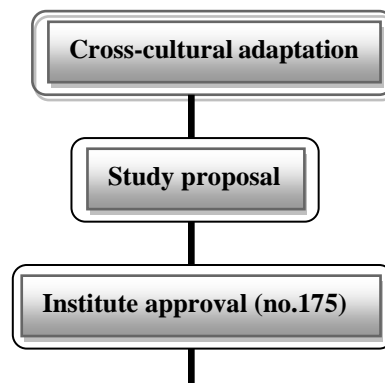
Comparators

To our understanding, there are no Patient-Reported outcomes Measures (PROMs) avai-lable in Kurdish that assess the specific area of interest. Therefore, we utilized two comparative measures, each employing different method-logies to assess a similar construct. In the first approach, patients used a Visual Analogue Scale (VAS) to rate their overall perception of vestibular symptoms. The scale ranged from zero, indicating no symptoms, to 100 representing the worst possible symptoms subjectively rated by the patient. The second

approach involved utilizing a 15-item questionnaire from a previous study on vertigo, which had been established to have both reliability and validity.

External relatability

The reliability assessments and reporting adhered to Kottner and colleagues' recommended steps [9]. A subset of 40 patients in the reliability group received ratings on two distinct occasions, with the timing of the second rating organized around the availability of the patients. Efforts were made to decrease measurement errors using the following strategies.

1. Items in the second rating were spaced apart by a period of one to five days, to prevent recall bias
2. All patients were subjected to the same conditions: ratings were conducted in a noise-free environment to remove distractions.
3. The ratters were given instructions to refrain from prompting patients for particular or specific answers during the assessment process. This approach aimed to maintain the integrity of the assessment by allowing patients to provide responses naturally, without any external influence or guidance from the rafters.
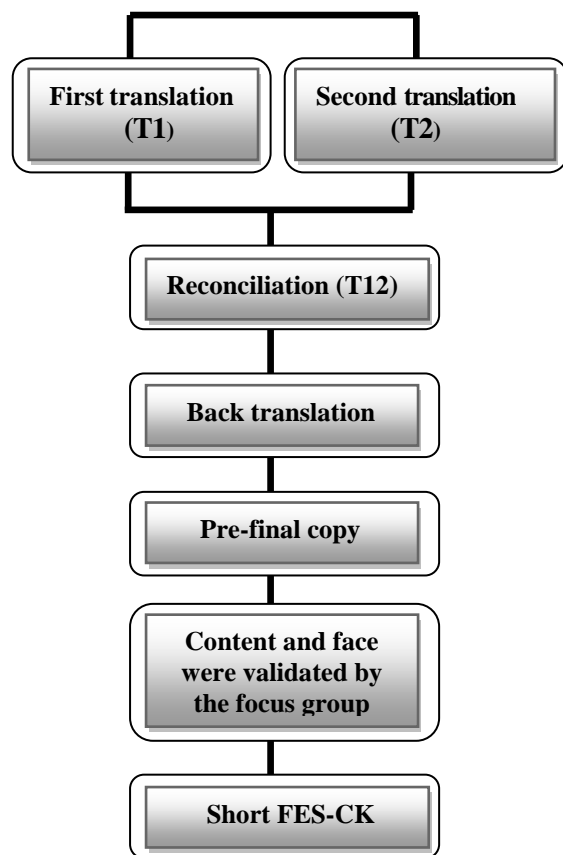
Figure 1: The sequential order of the study, abbreviations: FES-I-CK, Central-Kurdish version of the Short Falls Efficacy Scale-International.
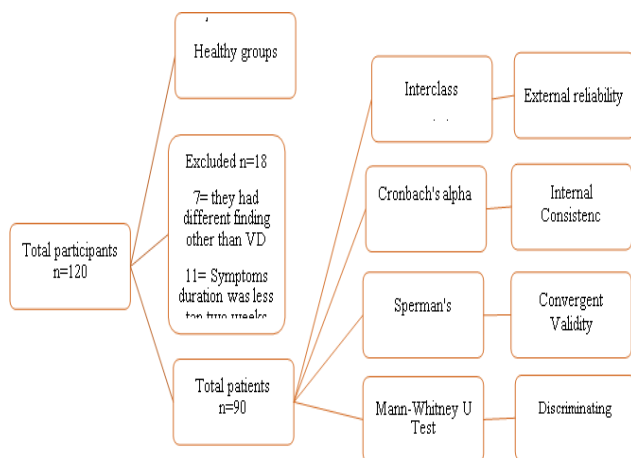

Figure 2: The course order and connections between the fields. Abbreviations: VD, vestibular

External reliability

The study evaluated external reliability using the Intraclass Correlation Coefficient (ICC). Reliability was categorized into four levels: poor if ICC was less than 0.5, moderate for ICC

between 0.5 and 0.75, good for ICC between 0.75 and 0.9, and excellent for ICC above 0.9. Internal consistency reliability: looks at how consistently items in a scale or test measure the same thing. Here are seven ways we check this:

1. Cronbach's alpha (α) should be at least 0.7.
2. Average Inter-item correlation (AIC) should be between 0.2 and 0.5.
3. Corrected Item-total correlation (CI − TC) should be 0.4 or higher.
4. Alpha if item deleted (AIID) shouldn't make alpha shoot up if any item is removed.

Hypothesis: The following hypotheses were formed:

1. The positive correlation between the total score of Short FES-I-CK and the FES-VAS would be adequate, because they measure similar constructs with similar approaches.
2. The relationship between the Short Falls Efficacy Scale-International Kurdish version (Short FES-I-CK) and Visual analogue Scale for Fear of Falling Short Form Kurdish version (VSS-SF-CK) scores is expected to be moderate, as they assess comparable concepts using distinct methodologies.

Rank coefficient (Spearman) was used to estimate the correlations.

The study classified values from assorted regulations as follows: < 0.3 ─weak, $\geq 0.3 < 0.58$─moderate, $\geq 0.5 < 0.7$─adequate, and ≥ 0.7 ─high correlations

Discriminating validity:

it is tool's ability to tell different groups apart, including patients and healthy people. The study used the Mann-Whitney U test with a 5% significance level to double-check this ability.

Software

The software employed was IBM SPSS Statistics Version 21 from IBM in Armonk, NY, USA, Microsoft word, Microsoft excel.

Results

The device and the comparison tools demonstrated reliable to highly reliable performance in test-retest ICC is more than 0.8 spearman's correlations were utilized to display the associations among FES-T, VSS-SF score, and VAS. The results regarding the internal consistency of variables were acceptable, showing satisfactory levels across various methods and measurement scales. Specifically concerning AIID, the resulting alpha (a measure of internal consistency) did not show improvement even when individual items were removed from consideration. This indicates that the overall reliability of the measure remained consistent regardless of which items were included or excluded.

Table 1: Demographic attributes of groups

	Total patients N=90		Reliability subgroup (n=40)		Healthy group (n=30)	
	n	%	n	%	n	%
Females	60	66.7	28	70	16	53.3
Age (years)[b]	47.022	±14.7618	45.675	14.4974	39.967	±14.995
Duration [bc]	19.0894	±39.70897	23.9188	±50.91337		
Educational level						
No or primary [d]	44	48.9	17	42.5	6	20
Secondary [d]	15	16.7	5	12.5	8	26.7
Graduate & post graduate	31	34.4	18	45	16	53.3
Diagnosis						
MD	6	6.7	3	7.5		
BPPV	22	24.4	14	35		
VM	18	20	8	20		
VN	14	15.6	2	5		
CPV	10	11.1	6	15		
SD	4	4.4	1	2.5		
Others	16	17.8	6	15		

Note: [b] = Mean and standard deviation; [c] = Duration in month; [d] = School, others=others vestibular disorders Abbreviations: MD, Meniere's Disease; BPPV, Benign Paroxysmal positional vertigo; VM, vestibular Migraine; VN, Vestibular neuritis; CPV, Chronic positional vertigo; SD, Somatosensory dizziness.

Table 2: Spearman's correlations of the scales with comparators. Abbreviations: FES-I-CK, Central-Kurdish version of the Short Falls; VSS-T, Vertigo Symptom Scale– Total; VAS, Visual Analogue Scale

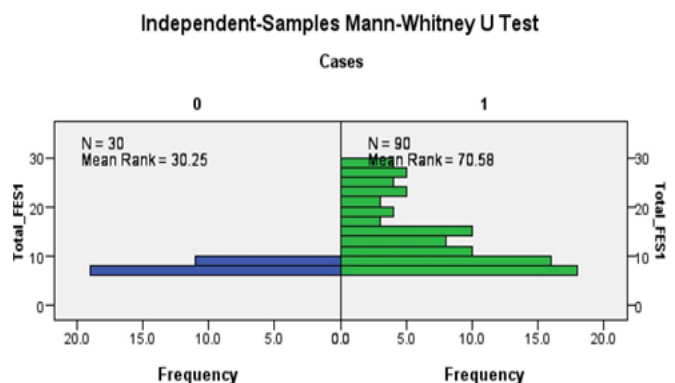| Spearman correlation N=90		
	VSS-T	VAS
Short FES-I-CK	0.58	0.82

Figure 3: Distribution of the scores between healthy and patient groups. Codes: (0=healthy), (1=Patient). Abbreviation: Total_FES1=total fall efficacy scale occasion 1

The pie chart presents the gender distribution of the sample. The female group represents 66.7% of the participants, shown by the larger green section of the chart. The remaining portion, shown in blue, represents male participants (33.3%). The legend below the chart uses green for females and blue for males, and the title "Gender" is displayed above the pie chart.

Figure 4: Gender distribution among study participants.

Discussion

The study effectively employed a regulated process of cross-cultural adaptation; resulting in the development of a (Short FES-I-CK). The methodology was easily aligned with relevant guidelines, ensuring a straightforward and thorough application of the outlined steps. We had to adapt our approach due to the characteristics of the people they were studying, requiring them to use interviewers and modify the assessment method from self-administered to interviewer-administered when dealing with participants who lacked motivation or were illiterate. These changes improved the reliability of the assessment tools. Pervious researches did not have dimensions for this scale so we let it to be that way. The hypotheses regarding convergent validity were supported. An adequate positive correlation was found between short FES-T and FES-VAS as well as a moderate positive correlation between the short FES-T and VSS-T. Our findings indicate that fear of falling is a significant concern in the patient with vertigo. Interestingly, we found that fear of falling was significantly associated with both the severity of vertigo symptoms and self-reported balance impairment. This suggests that individuals experiencing more severe vertigo symptoms may be more prone to developing fear of falling due to perceived instability and decreased confidence in their balance abilities.

Limitation strengthens

One limitation of our study was the short interval between data collection on the first and second occasions, which may have impacted the reliability of our measurements. The decision to collect data before and after patients' clinical consultations was made because patients were unable to contribute due to distance from the clinic and a reluctance to participate in phone interviews. This constraint resulted in a shorter interval between data collection occasions than ideal, potentially impacting the reliability of our measurements. One strength point is that watching patients closely was important to keep them interested in rating themselves.

Conclusion

The Short FES-I-CK was cross-culturally adapted to Kurdish. It revealed high external Reliabilities and internal consistency Kurdish researchers and clinicians can then use Short FES-I-CK, a consistent and validated PROM, to measure vestibular symptoms prior to and/or following treatment protocols.

List of abbreviations

PROMS, Patient-Reported Outcome Measures; FES-I, Short Fall Efficacy Scale International; Short FES-I, Short Fall Efficacy Scale International; FES- I-CK, Central-Kurdish version of the Short Falls Efficacy Scale-International; FES_VAS1. Falls Efficacy Scale-Visual Analog Scale In the First Occasion; FES_VAS2, Falls Efficacy scale-Visual Analogue Scale in the Second occasion; Total_FES1, Total falls efficacy scale one; Total_FES2, Total falls efficacy scale two; FAS, Falls efficacy scale; MD, Meniere's Disease; BPPV, Benign Paroxysmal positional vertigo; VM, vestibular Migraine; VN, Vestibular neuritis; CPV, Chronic positional vertigo; SD, Somatosensory dizziness; VSS- SF-KC/V/AA/T, Vertigo Symptom Scale– Short Form-Kurdish Central/vestibular/Autonomic-Anxiety/Total; VD, Vestibular Disorders; VAS-T, Visual Analogue Scale-Total; ICC, Intraclass Correlation Coefficient; AIC, Average Inter-item Correlation; CI-TC, Corrected Item-Total Correlation; α. Cronbach's alpha; AIID, Alpha If Item Deleted.

References

[1] Tian JR, Shubayev I, Baloh RW, Demer JL. Impairments in the initial horizontal vestibulo-ocular reflex of older humans. Exp Brain Res. 2001;137(3):309–22.

[2] Agrawal Y, Carey JP, Della Santina CC, Schubert MC, Minor LB. Disorders of balance and vestibular function in US adults: data from the National Health and Nutrition Examination Survey, 2001–2004. Arch Intern Med. 2009;169(10):938–44.

[3] Ahmad HA, Murad AM, Gregory FM, Susan LW. Cross-cultural adaptation and measure-ement properties of the Arabic version of the Fall Efficacy Scale-International. Neurosciences (Riyadh). 2015;20(3):230–6.

[4] Tinetti ME, Richman D, Powell L. Falls efficacy as a measure of fear of falling. J Gerontol. 1990;45(6):P239–43.

[5] Yardley L, Beyer N, Hauer K, Kempen G, Piot-Ziegler C, Todd C. Development and initial validation of the Falls Efficacy Scale-International (FES-I). Age Ageing. 2005; 34(6):614–9.

[6] Hill H, McMeekin P, Parry SW. Does the Falls Efficacy Scale International version measure fear of falling? A reassessment of internal validity using a factor analytic approach. Age Ageing. 2014;43(4):559–62.

[7] Morgan MT, Friscia LA, Whitney SL, Furman JM, Sparto PJ. Reliability and validity of the Falls Efficacy Scale-International (FES-I) in individuals with dizziness and imbalance. Otol Neurotol. 2013;34(6):1104–8.

[8] Kempen GIJM, Yardley L, Van Haastregt JCM, Zijlstra GAR, Beyer N, Hauer K, et al. The Short FES-I: a shortened version of the Falls Efficacy Scale-International to assess fear of falling. Age Ageing. 2008;37(1):45–50.

[9] Kottner J, Audigé L, Brorson S, Donner A, Gajewski BJ, Hróbjartsson A, et al. Guidelines for Reporting Reliability and Agreement Studies (GRRAS). J Clin Epidemiol. 2011;64(1):96–106.