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Cross-cultural adaptation, validity and reliability of the Tamil version of the Falls-Efficacy Scale – International in Indian elderly population

Adaptacja międzykulturowa, walidacja i rzetelność tamilskiej wersji Międzynarodowej Skali Oceny Skuteczności Zapobiegania Upadkom

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Abstract

Background. Fall Efficacy Scale - International (FES-I) is a valid and reliable measure used to assess fear of fall. However, it is worth noting that FES-I is currently not available in the Tamil language. Therefore, the objective of this particular study was to cross-culturally adapt the measure into Tamil and subsequently test the validity and reliability of the translated version.

Methods. The original English version of FES-I was translated according to the protocol set by ProFaNE. The Tamil version, FES-I (T), was given to 81 elderly Tamil-speaking participants. Statistical analyses were done to compare groups based on age, gender, fear of falling, and fall history. The validity of FES-I (T) was assessed by comparing its scores with the TUG test and SPPB. The reliability of FES-I (T) was evaluated using the Intraclass correlation coefficient.

Results. The total scores obtained from FES-I (T) exhibited a positive correlation with the scores obtained from the TUG test ($r_s = 0.584$), while displaying a negative correlation with the scores obtained from the SPPB ($r_s = -0.619$, p -value < 0.001). Furthermore, the test-retest reliability of FES-I (T) was found to be excellent, with the Intraclass correlation coefficient for the total score recording a value of 0.99.

Conclusion. Based on the findings of this study, it can be concluded that the FES-I (T) is a valuable tool that can be effectively utilized in both clinical practice and research settings to assess fear of falling in elderly individuals who speak Tamil.

Keywords

fall efficacy, elderly, Tamil language

Streszczenie

Wprowadzenie. Międzynarodowa Skala Oceny Skuteczności Zapobiegania Upadkom (FES-I) jest narzędziem o potwierdzonej walidacji i rzetelności, służącym do oceny strachu przed upadkiem. Należy jednak zauważyć, że obecnie FES-I nie jest dostępna w języku tamilskim. W związku z tym celem niniejszego badania była adaptacja międzykulturowa narzędzia na język tamilski oraz następne testowanie walidacji i rzetelności przetłumaczonej wersji.

Metody. Oryginalna angielska wersja FES-I została przetłumaczona zgodnie z protokołem ustalonym przez ProFaNE. Wersja tamilskiej FES-I (T) została podana 81 starszym uczestnikom mówiącym w języku tamilskim. Analizy statystyczne przeprowadzono w celu porównania grup na podstawie wieku, płci, strachu przed upadkiem oraz historii upadków.

Walidacja FES-I (T) została oceniona poprzez porównanie jej wyników z testem TUG oraz SPPB. Rzetelność FES-I (T) oceniono za pomocą współczynnika korelacji wewnątrzklasowej.

Wyniki. Całkowite wyniki uzyskane z FES-I (T) wykazały dodatnią korelację z wynikami uzyskanymi z testu TUG ($r_s = 0.584$), a także negatywną korelację z wynikami uzyskanymi z SPPB ($r_s = -0.619$, $p < 0.001$). Ponadto rzetelność testu-retestu FES-I (T) okazała się doskonała, ze współczynnikiem korelacji wewnątrzklasowej dla całkowitego wyniku na poziomie 0.99.

Wnioski. Na podstawie wyników tego badania można stwierdzić, że FES-I (T) jest cennym narzędziem, które może być skutecznie wykorzystane zarówno w praktyce klinicznej, jak i w badaniach naukowych do oceny strachu przed upadkiem u starszych osób mówiących po tamilsku.

Słowa kluczowe

skuteczność zapobiegania upadkom, osoby starsze, język tamilski

Introduction

In recent years, falls have become a pressing health concern for the elderly population in India, significantly contributing to increased mortality and morbidity rates [1]. According to the World Health Organization (WHO), a fall is defined as an unintentional event resulting in a person coming to rest on the ground, floor, or a lower level [2]. India is home to the second-largest elderly population globally, surpassed only by China. The elderly population in India is growing at a faster rate than the general population, and it is projected to reach 323 million by 2050 [1].

The fear of falling (FOF) is an ongoing apprehension about experiencing a fall, which ultimately hinders the performance of daily activities [3]. FOF is the primary cause of falls among the elderly population in India [1]. It detrimentally affects their quality of life, overall well-being, mobility, and social interaction [3]. The World Health Organization has developed an awareness, assessment, and intervention model for fall prevention [4].

The Falls Efficacy Scale - International (FES-I) is a widely used tool for evaluating the fear of falling (FOF) [5]. The Prevention of Falls Network Europe (ProFaNE) developed the FES-I, comprising 16 items that pertain to basic activities. It has proven to be a reliable and valid measure of FOF across diverse elderly populations globally [4]. The FES-I has been extensively utilized in clinical practice and rehabilitation for fall prevention among the elderly [6].

Although the FES-I is a self-reported questionnaire, it has been administered through face-to-face interviews in some studies, while in others, the method of administration has not been specified. Furthermore, there is no validated version of the questionnaire available in the local languages at the testing locations [6–8]. Linguistic validation and cross-cultural adaptation are essential in the administration of a self-reported measure. Cross-cultural adaptation not only conserves resources but also provides a standardized assessment tool, enabling comparison across national and cultural groups, while also reducing bias when administered through face-to-face interviews. Participants can relate better to the adapted version as it is in their native language and aligns with their lifestyle [9]. As the FES-I is not currently available in the Tamil language, the validation of a translated version of the FES-I in Tamil is warranted in the absence of a valid instrument to assess FOF in Tamil.

Materials & methods

The study was approved by the institutional ethics committee - CSP/21/AUG/98/435

Participants

The inclusion criteria 1) participants of age 60 and above; 2) participants who can read and understand the Tamil language. The exclusion criteria 1) participants who have a serious illness where the investigation is not possible; 2) participants who are bedridden and not ambulant; 3) participants who could not understand the concept of fear of fall and able to respond to FES-I. Participants meeting the inclusion criteria were included in the study after giving informed consent.

Sample size and recruitment

In order to ensure accuracy and reliability, five participants per scale item were selected [10]. Given that the scale consisted of a total of 16 items, a total of 80 participants were necessary. Subjects were recruited from the community in Chennai, Tamilnadu. A total of 81 subjects of both genders, aged 60 years and above, were included in the study.

Measures

Fall Efficacy Scale-International

The Falls Efficacy Scale International (FES-I), a self-reported questionnaire, is widely utilized in both research and clinical practice to assess the "fear of falling". Developed by the Prevention of Falls Network Europe (ProFaNE) project, the FES-I consists of 16 items, including the original 10 items from the FES. Additionally, it incorporates 6 more challenging items that evaluate activities such as walking on slippery or uneven surfaces, visiting friends or relatives, attending social events, or going to crowded places. Each activity is rated on a 4-point scale, ranging from "not at all concerned" to "very concerned". The total score on the FES-I can vary between 16 to 19 (indicating low concern about falling), 20 to 27 (representing moderate concern about falling), and 28 to 64 (indicating high concern about falling).

Timed Up and Go Test (TUG)

In the study, the Timed Up and Go Test (TUG) was administered to all participants. The test involved placing a stable chair and marking a distance of 3 meters from the front edge of the chair's seat. The participant was instructed to start ("Go") and their time was measured as they stood up from the chair, walked the designated distance, turned around, walked back to the chair, and sat down. A TUG score exceeding 13.5 seconds was considered indicative of a higher risk for falling. This specific duration served as a cutoff point to evaluate the discriminatory ability of the FES-I in identifying individuals with an elevated risk of falling.

Short Physical Performance Battery (SPPB)

The Short Physical Performance Battery (SPPB) comprises three components: a balance test, a 4-meter gait speed test, and a single chair stand test (involving rising from a chair once). All participants were instructed to perform these tests, and each component was assessed on a scale of 0-4 points. The total scores on the SPPB range from 0 (indicating the poorest performance) to 12 (indicating the best performance). The SPPB has demonstrated predictive validity, exhibiting a gradient of risk for falls. Moreover, it is considered a valid measure for evaluating physical performance in elderly individuals [11].

Procedure

Cross-Cultural Adaptation of FES-I

As an initial step, authorization was acquired for the translation of FES-I into the Tamil language from ProFaNE. The cross-cultural adaptation was conducted in accordance with the ProFaNE 10-step translation protocol. Two proficient health professionals, well-versed in the English language and familiar

with the concept of FOF, independently translated the English version of FES-I into Tamil. A preliminary meeting was held with the translators to generate a provisional local rendition of FES-I(T). Within the provisional version of FES-I(T), the term "concern" corresponds to Tamil words that possess an English meaning of worry or anxious. Since the translator's note stipulated the avoidance of emotionally attached words, the response "Not at all concerned" in the English version was modified to a Tamil statement that resulted in the phrase "No chances of falling" upon back-translation to English. Likewise, the following statements were altered: "There are slight chances of falling; there are some chances of falling; there are high chances of falling." These modifications were communicated to ProFaNE and received their approval. Each translator independently selected 2 elderly participants to assess the feasibility of the provisional local version of FES-I(T). During this process, the English FES-I version included terms such as "neighbourhood," which was translated to convey the meaning of "walking outside," suitable for the Indian context, and the term "club meeting," which was also translated as "family gatherings," representing a similar scenario. Similarly, the term "icy" was translated to "watery" to align with the Indian context and convey similar scenario when translated into Tamil. A second meeting was held with the translators to discuss and reach a consensus on the aforementioned items, ultimately leading to a preliminary version of FES-I(T). The back-translation from Tamil to English was carried out by a professional translator, and a third meeting was convened with the initial translators to reach a consensus on the back-translation.

Pilot testing

The provisional version of FES-I(T) underwent pilot testing with five elderly participants who were able to read Tamil, aiming to assess the scale's comprehensibility. This was done to obtain feedback regarding any difficulties in understanding the scale's items and response categories. Since the participants comprehended all items and wording, the piloted version was deemed the final version of FES-I(T) without any alterations.

Assessment of psychometric properties

The developed FES-I (T) was administered as a self-reported measure. Demographic descriptive information regarding age, gender, and a history of falling within the previous year was

documented during the initial session. To evaluate the participants' level of apprehension regarding falling during their daily activities, they were asked, 'Are you afraid of falling during your daily activities?' and were provided with four response options: (a) not at all afraid, (b) a little afraid, (c) afraid, and (d) very afraid. The participants' answers were duly recorded. Additionally, during the first session, the participants were assessed with the Timed Up and Go Test and SPPB. A re-administration of the FES-I (T) was conducted 5 days later in order to assess the test-retest reliability.

Statistical analysis

Descriptive statistics were used to characterize the sample. The FES-I (T) score differences were tested across gender, age category (<65 years vs 65 years and above) and history of fall in the last year using the Mann-Whitney U test. The Kruskal-Wallis test was used to test the difference in FES-I (T) scores among the group based on "Afraid of falling" categories. The discriminative ability of FES-I (T) was tested with cut-off scores for TUG.

Convergent validity

To test construct validity, Spearman's rank correlation coefficient was calculated between the first score of FES -I (T) and TUG, as well as SPPB scores [13].

Reliability

Test-retest reliability was assessed using the intraclass correlation coefficient.

Results

FES-I (T) was found to be a cross-culturally validated comprehensible measure (Ref: <https://sites.manchester.ac.uk/fes-i/>). The mean age of participants was 67.5 (SD 6.6) years. Sixty-one percent (50) were male and 39 percent were female. Ninety-three percent (76) were ambulant without any walking aid. Fifty-one percent (42) had a history of falls in the last year. The demographic and clinical characteristics of the participants are presented in Table1. When the FES-I (T) scores were divided into subgroups based on age category, gender, fear of falling (FOF) category, and history of falling, significant differences were observed in fear of falling (FOF) and history of falling categorization (table 1).

Table 1. Demographic and clinical characteristics of the participants and comparison of the FES-I scores according to

Variable N = 81	n (%)	FES-I (T) score mean (SD)	FES-I (T) score Median (Range)	P value
Age#				
Below 65#	30 (36.14)	29.36 (8.5)	29(16-44)	0.484
65 and above	51 (61.446)	30.98 (8.8)	32(17-56)	
Gender*				
Male	50 (60.976)	29.42 (9.19)	28.5 (16-56)	0.139
Female	31 (37.805)	31.93 (7.71)	34 (17-43)	

Variable N = 81	n (%)	FES-I (T) score mean (SD)	FES-I (T) score Median (Range)	P value
Usage of walking aids				
No aids	76 (93.827)	29.51 (8.07)	29.5 (16-43)	
Cane	4 (4.938)	40.5 (3.31)	41.5 (36 -43)	
Walker	1 (1.235)	56	56	
Afraid of falling *				
Not at all	14 (17.284)	18.5 (1.454)	18.5 (16-23)	
A little afraid	21 (25.92)	24.857 (3.692)	25 (18-32)	
Afraid	26 (32.09)	33.808 (3.533)	34 (27-39)	< 0.001
Very afraid	20 (24.69)	40.05 (5.808)	41.5 (30-56)	
Falls history in the last year#				
Yes	42 (50.6)	34.238 (34.238)	34 (18-56)	
No	39 (46.98)	26.231 (7.90)	26 (16-44)	< 0.001

Mann Whitney test# and Kruskal Wallis test*; Significance at $P \leq 0.05$; FES-I (T) – Fall Efficacy Scale International (Tamil)

A significant difference was observed in the FES-I (T) scores when the groups were categorized based on the TUG cut-off value. The subjects who took longer than 13.5 seconds ($n = 42$) to complete the TUG test exhibited significantly higher mean FES-I (T) scores (25.66 ± 7.42 Vs 34.76 ± 7.45). This finding suggests that the FES-I (T) is capable of distinguishing individuals at a higher risk of falling.

Convergent validity

A strong positive correlation ($r_s = 0.893$, $p < 0.001$) was observed between the total score of the FES-I (T) and the response to the question regarding fear of falling (FOF). Additionally, the total scores of the FES-I (T) were positively correlated with the TUG ($r_s = 0.584$, $p < 0.001$) and negatively correlated with SPPB ($r_s = -0.619$, $p < 0.001$).

Test-retest reliability

The intraclass correlation coefficient for test-retest reliability of the FES-I (T) total score was found to be 0.99. During the initial assessment and the assessment after 5 days, the mean scores for the FES-I (T) were recorded as 30.38 (SD 8.69) and 30.37 (SD 8.62), respectively.

Discussion

The findings of the cross-cultural adaptation of the FES-I (T) demonstrated that the participants perceived the FES-I (T) as a comprehensible and suitable tool for evaluating fear of falling. In this study, the FES-I (T) was administered as a self-report measure. The study, which employed face-to-face interviews, revealed higher average FES-I scores compared to the studies that utilized it as a self-report measure [7]. The elevated mean FES-I scores in this study could potentially be attributed to in-

terviewer bias. Therefore, in this study, we chose to administer the FES-I (T) as a self-report measure.

The overall mean score of the FES-I (T) among females was significantly higher than that of males, aligning with previous studies [12–14]. Moreover, the mean scores of the FES-I (T) were higher among participants who reported experiencing a fall in the previous year, and among those who utilized walking aids, such as canes. This finding was also observed in previous cross-cultural validation studies of the FES-I [12–14]. The FES-I (T) demonstrated good convergent validity, as evidenced by the strong positive correlation between the total FES-I (T) score and the response to the question regarding fear of falling. This correlation is similar to the correlations found in studies conducted to validate the Arabic, Greek, Turkish, and other versions of the FES-I [6,12,13,15,16]. Additionally, a positive correlation was found between the FES-I (T) score and the Timed Up and Go Test (TUG), consistent with findings from previous studies [6, 12, 13, 15, 16]. In the current study, a TUG score of ≥ 13.5 seconds was employed to identify individuals at a higher risk of falling, as indicated by a systematic review that suggests that individuals who take longer than 13.5 seconds to complete the TUG are more prone to falling compared to others [17]. In this study, participants who obtained higher scores on the FES-I (T) required more than 13.5 seconds to complete the TUG test. Previous studies have employed a cut-off score of 14 for the TUG test [6]. In this study, the Short Physical Performance Battery (SPPB) was used as a valid measure for assessing lower extremity function and mobility in elderly individuals. This assessment evaluates limitations in lower extremity mobility that are linked to balance, gait, and strength. The SPPB possesses excellent psychometric properties and is predictive of a wide range

of adverse outcomes, including falls. The total score of the SPPB has been independently associated with reported falls [18]. Within this study, a negative correlation was observed between the FES-I (T) scores and the SPPB, indicating that the FES-I (T) can reflect the fear of falling associated with postural control and impaired mobility.

The results obtained from this study conclude that the FES-I (T) is considered valid, reliable, understandable, and suitable for use in clinical practice and rehabilitation among the Tamil-speaking elderly population.

Limitations

Since the research methodology involved self-reported data, individuals lacking literacy skills were not included in the study cohort. Consequently, a selection bias was introduced into the study, potentially impacting the generalizability of the fin-

dings. In order to enhance the practicality of the FES-I (T) instrument within an illiterate population, it is possible to examine the instrument's validity by means of conducting face-to-face interviews.

Conclusions

In this study, the Tamil version of the FES-I was a comprehensible, valid, and reliable instrument capable of evaluating the fear of falling among elderly individuals who speak Tamil.

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Piśmiennictwo/ References

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