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Original Article

Psychometric Properties of the Persian Version of the Falls Behavioral Scale in Seniors

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Abstract

Background: The identification of the causes of risky behaviors is necessary to prevent the occurrence of injuries and reduce its costs. The present study aimed to translate and evaluate the validity and reliability of the Falls Behavioral (FaB) Scale in Iranian seniors.

Methods: This methodological study was conducted on 300 seniors aged 60 years and older referring to retirement centers. After permission, the recommended forward-backward procedure was adopted to translate the original English version of the questionnaire. Thereafter, the content, face validity, and construct validity of the scale were determined and taken into consideration. In addition, the known-groups comparison (seniors with and without a history of falls), as well as convergent and divergent validity, was used to evaluate construct validity. Finally, internal consistency and the test-retest analysis were performed to assess the reliability of the FaB scale.

Results: The results of the known-groups comparison demonstrated that the mean score of the FaB scale was higher in the seniors with a history of falls as compared to that in their counterparts without such an experience. The obtained scores on FaB scale, Activities-Specific Balance Confidence (ABC) scale ($r=-0.214$, $P<0.01$), and Falls Efficacy Scale-International (FES-I) ($r=0.256$, $P<0.01$) represented a significant correlation, confirming the construct validity of the scale. The Cronbach's alpha of the total scale and test-retest reliability within one week were obtained as 0.71 and 0.91, respectively.

Conclusion: As evidenced by the results of this study, the Persian version of the FaB scale is a valid and reliable instrument; therefore, it can be used to assess the behavioral fall risk factors, as well as fall prevention interventions in older people. It is suggested that in future studies, researchers focus on the assessment of more psychometric properties of this scale, especially sensitivity and specificity.

Keywords: Accidental falls, Aged, Behavior, Validation

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Introduction

Fall is defined as "an unintentional change in position resulting in coming to rest on the ground or at a lower level (on an object or floor). It is a major public health concern and one of the most serious problems presented to people over 60 years old, resulting in reduced functional abilities, admission to nursing homes, high medical costs, and even mortality (1,2). As suggested by statistics, falls are the second leading cause of unintentional fatal injuries in the United States and one of the major reasons for death in the elderly (3). Around one-third of adults over 65 and half of people over 80 will have at least one fall a year. Although most falls do not cause serious damage, approximately 10% of them requires medical interventions due to serious impairments such as fracture, soft tissue injuries, or brain injuries (4).

Falling is the result of multiple risk factors that can be assigned to four biological, socio-economic, environmental, and behavioral groups (5). According to previous evidence, preventive interventions can significantly reduce the incidence of falls (6). In line with such strategies, the multiple factors associated with

the occurrence of falls must be taken into account when evaluating people for fall risk. Although multiple tools have been developed to assess intrinsic (e.g., changes in balance and vision) and environmental (e.g., household hazards) fall risk factors, behavioral risk factors have received less attention in fall prevention research (7,8).

Accordingly, it is necessary to have appropriate tools to identify behavioral fall risk factors in the elderly to identify fall risk factors and provide scientific documentation to design appropriate interventions for the prevention of falls and reduction of associated costs. To the best of our knowledge, the Falls Behavioral (FaB) Scale for Older People is the only valid tool that is used in the studies to assess behavioral fall risk factors in the elderly. The scale was designed by Clemson in 2003 to assess seniors' awareness and behaviors that could potentially protect against falling. This 30-item questionnaire encompasses different dimensions, including cognitive adaptations, protective mobility, avoidance, and awareness. The items are rated on a four-point Likert-type scale ranging from 1 = Never to 4 = Always (9). The results of some studies demonstrated that the FaB scale is a reliable and valid tool for investigating the behavioral fall risk factors in the elderly (10,11). The psychometric properties of the French version of the scale were also evaluated, and it was reported that it is a valid and reliable tool for French- and Spanish-speaking elderly living in Canada and Europe, respectively (10,12). Nonetheless, there is no standardized Persian version of this tool. Due to the importance of falls and associated complications in the elderly and the need to use a reliable and valid tool to predict the behavioral fall risk factors in the elderly, the current study sought to translate and determine the validity and reliability of the Persian version of this questionnaire.

Materials and Methods

The present study was conducted based on a methodological design. After obtaining permission, the recommended forward-backward procedure was adopted to translate the original English version of the questionnaire based on the International Quality of Life Assessment (13). To this end, the questionnaire was submitted to two translators fluent in English to obtain two separate, independently done translations into Persian. The original Persian version of the scale was obtained from the two aforementioned translations taking into account the best translation and correcting the gaps in each question. Next, two English language experts re-translated the final version into English.

Following this step, the research team made a comparison between the original English version and the English version translated by language experts, and finally, the final Persian version was approved after necessary modifications. Face validity was determined to assess participants' understanding of the items. For this purpose, 10 seniors meeting the inclusion criteria were asked for their opinions on the completion of the questionnaire, and finally, the necessary changes were considered according to researchers' viewpoints and patients' feedback. Qualitative and quantitative methods were used to determine content validity.

In the qualitative content analysis, 10 health and nursing education specialists were asked to provide the necessary feedback after a qualitative analysis of the questionnaire based on some criteria such as correct grammar, use of appropriate words, necessity, importance, proper placement of phrases, and good scoring. The content validity ratio (CVR) and content validity index (CVI) were applied for quantitative content analysis. To estimate the CVR, a panel of experts was first asked to examine each item based on a three-point scale (necessary, useful but not necessary, or not necessary). Moreover, to measure CVI, three criteria of simplicity, specificity, and clarity were separately examined by experts on a four-point Likert-type scale.

The CVI was computed as the number of experts giving a rating of 3 or 4 to the relevancy of each item, divided by the total number of experts. Each item with a CVI higher than 0.79 would be considered acceptable (14). The target population of the present study included all retired elderly adults in Qom. Participants were selected via a stratified sampling method from retirement centers in Qom. The proportion of members in each retirement center to the total number of elderly members was determined, and then, according to the mentioned percentage of each center, the participants were included in the research based on simple random sampling.

The sample size was calculated at 300 cases according to the standards of psychometric studies that suggested a ratio of 10 participants per item. The inclusion criteria were being in the age range of ≥ 60 years, living at home, having any mental and cognitive disorders, namely, getting a score of ≥ 6 in the Persian version of the Mini-mental State Examination (15), having a mobile phone, being literate, having the ability to communicate, and showing a willingness to participate in research. After obtaining permission from the Vice-chancellor for the Research and necessary arrangement with educational and medical centers, 300 seniors meeting the inclusion criteria entered the study.

The participants were provided with the aims and process of the research project. They were ensured of the confidentiality of their responses, signed the consent form, and completed the questionnaires within six months. To collect the data, the FaB scale was used to ensure balance in specific activities and demographic and medical information. This scale was developed by Clemson to identify older people's awareness of behaviors that could potentially protect them against falling. This 30-item questionnaire contains different dimensions, including cognitive adaptations, protective mobility, avoidance, and awareness. Respondents are required to rate each item on a four-point Likert-type scale ranging from 1 (never) to 4 (always), and the overall score is calculated by adding the

scores of all items (9).

Activities-Specific Balance Confidence (ABC) scale was developed by Powell and Myers at the University of Waterloo in Ontario, Canada. It is a self-report measure of balance confidence in performing various activities without losing balance or experiencing a sense of unsteadiness (16). In this test, individuals are asked to rate each item on a scale of 0 (uncertainty) to 100 (complete confidence) while performing 16 activities with different levels of difficulty. The validity and reliability of the Persian version were confirmed by Hassan et al (17). A shortened version of the ABC 16-item scale (ABC-16, version 6) was applied in the present. This version was designed to create a simpler and faster scale for the assessment of balance confidence, making it easier and more efficient for application in clinical and research settings (18).

Fear of falling was measured using the 7-item version of the Falls Efficacy Scale-International (FES-I), which was developed and validated by Yardley et al in the UK. This scale contains seven items related to activities in daily life. The respondents rate their concern about falling during an activity on a four-point Likert-type scale ranging from 1 = Not concerned at all to 4 = Very concerned. The higher scores indicate greater fear (19). In Iran, the psychometric properties of the Persian version of this questionnaire were assessed by Khajavi (20).

The demographic characteristics form questions on age, gender, level of education, monthly income, housing status, history of falls, and falls leading to injury. The known-groups comparison method was employed to assess construct validity in this study. This method can be used to evaluate the extent to which the instrument can discriminate between subgroups. In other words, this type of validity determines the capability of an instrument in differentiating respondents according to the set criteria and assumptions. In this study, the applied parameter was the history of falls in the last six months. For this purpose, the independent t-test was utilized to compare the scores of the two groups of patients with and without a history of falls.

It was expected that people having a history of falls in the last six months would score higher on the behavioral scale and demonstrate higher levels of protective behaviors as compared to those without a history of falls. The Pearson correlation coefficient of the FaB scale was measured to evaluate convergent validity. Moreover, the correlation between the scores of FaB and ABC scales was calculated to assess divergent validity. The internal consistency reliability of the scale was computed by Cronbach's alpha coefficient.

Furthermore, the test-retest method was used to evaluate reliability. In this regard, 30 participants completed the questionnaire in two stages at a one-week interval. Thereafter, the obtained scores in these two stages were compared using the intracluster correlation coefficient. Finally, the obtained data were analyzed in SPSS software (version 23) at a significance level of 0.05.

Results

The mean age of the subjects was reported as 64.34 ± 5.3 years, and 63% of them were in the age group of 60-64 years. The majority (77.3%) of subjects were males, and 58% of them had elementary education. Additionally, 88.7% and 91.6% of subjects were married and owned a house, respectively. Furthermore, 21% of cases reported a history of falls in the past, 6.7% of which had resulted in injuries. Table 1 provides the frequency percentage, as well as the demographic and medical characteristics of subjects. The validity of the questionnaire was confirmed, rendering a CVI and CVR of 0.90 and > 0.8 in all items, respectively. The reliability of the questionnaire was also acceptable with a Cronbach's alpha coefficient of 0.71.

An independent t-test (mean difference) was employed to evaluate the ability to differentiate different subgroups by the Persian version of the questionnaire based on the presence or absence of a history of falls (Table 2). The test results demonstrated that the mean score of the FaB scale was higher in the elderly with a history of falls in the last six months in comparison to their counterparts who did not have such an experience ($P = 0.044$). Table 3 presents the correlation coefficient of the obtained scores on three scales of FaB, ABC, and FES-I, as well as the convergent validity of the test. The correlation coefficient of the two questionnaires was statistically significant. In calculating the internal consistency, Cronbach's alpha coefficient of the scale and the test-retest reliability were obtained as 0.71 and 0.91, respectively (Table 4).

Table 1. Demographic Characteristics of the Study Sample (N = 300)

Factor	No.	%[a]
Age (year)		
60-64	188	62.7
65-69	66	22.0
≥70	46	15.3
Gender		
Male	232	77.3
Female	68	22.7
Marital status		
Married	266	88.7
Widow & divorced	34	11.3
Educational level		
Illiterate	83	27.7
Primary school	91	30.3
Secondary school	12	4.0
High school	44	14.7
University	70	23.3
Income (million rials)		
≥20	211	70.3
<20	89	29.7
Body mass index (kg/m^2)		
Under weight (<18.5)	36	12.0
Normal weight (18.5-24.9)	188	62.6
Overweight (≥25.0)	59	19.6
Use of aids and equipment	21	7.0
Falls in the past 6 months	52	21.0
Falls lead to injury	20	6.7

[a] Percentages may not total 100% because of missing values.

Table 2. The Known-Group Comparison: Mean score of the falls Behavioral Scale in Seniors With and Without a History of Falls

Variable	With a History of Falls (n = 58) Overweight (≥ 25.0) (± SD)	Without a History of Falls (n = 242) Mean (± SD)	*P* Value
Falls behavioral scale	84.68 (± 9.67)	81.79 (± 9.11)	0.044

Note. SD: Standard deviation.

Table 3. The Correlation Between the Falls Behavioral Scale, Fear of Falling, and Confidence in Balance

Variable	Falls Behavioral Scale	Fear of Falling	Confidence in Balance
Falls behavioral scale	1	0.256**	-0.214**
Fear of falling		1	-0.482**
Confidence in balance			1

Note. **Correlation is significant at the 0.01 level; *Correlation is significant at the 0.05 level.

Table 4. Reliability of the Falls Behavioral Scale

Variable	Mean (± SD)	Cronbach's Alpha Coefficient	ICC	*P* Value
Falls behavioral scale	51.09 (± 0.97)	0.71	0.91	0.001

Note. SD: Standard deviation; ICC: Intraclass correlation coefficient.

Discussion

The present study aimed to evaluate the psychometric properties of the FaB scale in the elderly. In general, the findings of this psychometric study confirmed that the FaB scale is a valid and reliable tool for the assessment of fall behaviors in the elderly. Considering that falls in this age group are multifactorial, the investigation of behavioral fall risk factors is of great importance for the prevention of falls. In the current study, the questionnaire was carefully translated by fluent and knowledgeable people based on the principles of translation and close attention to cultural adaptation.

One of the strengths of the study is the observance of the main recommended steps, according to reliable sources, for the translation process and ensuring the cultural adaptation of the scales (21). In this study, the known-groups comparison method was used to evaluate the construct validity of the questionnaire. Based on the results of the analysis, seniors with a history of falls in the last six months obtained better-than-expected scores on the FaB scale. In the original version, Clemson et al found a significant correlation between the history of falls and the obtained scores on the FaB scale. Moreover, the older people reporting falls over the past year were more likely to adopt many types of safety practices compared to those who did not experience such an incident (9).

Nevertheless, in a study by Filiatrault et al, this difference was not significant, which can be ascribed to the relatively small sample size (N = 64) compared to other studies (10). The scores obtained on three scales of FaB, ABC, and FES-I to examine convergent and divergent validity showed a higher-than-expected correlation. Consistent with the results of Filiatrault et al (10), in the present research, protective behaviors were associated with increased fear of falling and lower balance confidence scores.

The results of the convergent validity of the Spanish version of both FaB and ABC questionnaires were negative. In this regard, participants scoring higher on the FaB scale had lower levels of balance confidence (12). In the present study, Cronbach's alpha coefficient pointed to the acceptable internal consistency of the scale items (9). The results of Filiatrault et al revealed that Cronbach's alpha coefficient was 0.91. Furthermore, test-retest reliability coefficients for a two-week interval represented the high reliability of this questionnaire. In a similar vein, Filiatrault et al referred to the favorable test-retest reliability of the Spanish version of this scale (10).

Among the notable limitations, we can refer to the fact that all participants dwelled in nursing homes; therefore, the obtained results may not be generalizable to all seniors. Further, self-report tools were applied to gather some of the information, thus temporal and environmental factors, as well as a large number of questions, may have affected the responses. Eventually, recall bias may have exerted an impact on data collection.

Conclusion

Based on the results of this study, the FaB scale is a valid and reliable instrument; hence, it can be used as a complementary tool for health care providers and researchers in the diagnosis of behavioral factors in seniors who are at risk of falls. This tool can be of great help in fall prevention interventions (e.g., talking with seniors about their high-risk behaviors and raising their awareness about fall prevention strategies) and assessment of the impact of these interventions on seniors' behaviors. More studies are needed to investigate further psychometric properties of the instrument, especially its sensitivity and specificity.

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Authors' Contribution

ZT, MB, and RH participated in the study design. ZT collected the required data. ZT, MB, and JP contributed to the data analysis. ZT, MB, and SB wrote the manuscript. The manuscript was read and approved by all authors.

Conflict of Interests
The authors report no conflict of interests in this work.

Ethical Permissions
This study was approved by the Research Ethics Committee of Hamadan University of Medical Sciences with IR ethics (IR.UMSHA.REC.1396.911).

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References
1. Ku YC, Liu ME, Tsai YF, Liu WC, Lin SL, Tsai SJ. Associated factors for falls, recurrent falls, and injurious falls in aged men living in Taiwan veterans homes. Int J Gerontol. 2013;7(2):80-4. doi: 10.1016/j.ijge.2012.07.004.
2. Pfortmueller CA, Lindner G, Exadaktylos AK. Reducing fall risk in the elderly: risk factors and fall prevention, a systematic review. Minerva Med. 2014;105(4):275-81.
3. van Dieen JH, Pijnappels MA. Falls in older people. J Electromyogr Kinesiol. 2008;18(2):169-71. doi: 10.1016/j.jelekin.2007.06.001.
4. Blank WA, Freiberger E, Siegrist M, Landendoerfer P, Linde K, Schuster T, et al. An interdisciplinary intervention to prevent falls in community-dwelling elderly persons: protocol of a cluster-randomized trial [PreFalls]. BMC Geriatr. 2011;11:7. doi: 10.1186/1471-2318-11-7.
5. Taheri-Kharameh Z, Poorolajal J, Bashirian S, Heydari Moghadam R, Parham M, Barati M, et al. Risk factors for falls in Iranian older adults: a case-control study. Int J Inj Contr Saf Promot. 2019;26(4):354-9. doi: 10.1080/17457300.2019.1615958.
6. Kruschke C, Butcher HK. Evidence-based practice guideline: fall prevention for older adults. J Gerontol Nurs. 2017;43(11):15-21. doi: 10.3928/00989134-20171016-01.
7. Stinchcombe A, Kuran N, Powell S. Report summary. Seniors' falls in Canada: second report: key highlights. Chronic Dis Inj Can. 2014;34(2-3):171-4.
8. Taheri-Kharameh Z, Bashirian S, Heidarimoghadam R, Poorolajal J, Barati M, Rásky É. Predictors of fall protective behaviors among Iranian community-dwelling older adults: an application of the protection motivation theory. Clin Interv Aging. 2020;15:123-9. doi: 10.2147/cia.s224224.
9. Clemson L, Bundy AC, Cumming RG, Kay L, Luckett T. Validating the Falls Behavioural (FaB) scale for older people: a Rasch analysis. Disabil Rehabil. 2008;30(7):498-06. doi: 10.1080/09638280701355546.
10. Filiatrault J, Demers L, Parisien M, Lorthios-Guilledroit A, Kaegi C, Ménard I, et al. Development and validation of a French Canadian version of the Falls Behavioral (FaB) Scale. Disabil Rehabil. 2014;36(21):1798-803. doi: 10.3109/09638288.2013.871073.
11. Bilik O, Damar HT, Karayurt O. Fall behaviors and risk factors among elderly patients with hip fractures. Acta Paul Enferm. 2017;30(4):420-7. doi: 10.1590/1982-0194201700062.
12. Alonso-Casado J, Gallego-Izquierdo T, Pecos-Martín D. Transcultural adaptation and psychometric validation of a European Spanish language version of the Falls Behavioral Scale. J Geriatr Phys Ther. 2020;43(4):E65-E70. doi: 10.1519/jpt.0000000000000252.
13. Ware JE Jr, Gandek B. Methods for testing data quality, scaling assumptions, and reliability: the IQOLA Project approach. International Quality of Life Assessment. J Clin Epidemiol. 1998;51(11):945-52. doi: 10.1016/s0895-4356(98)00085-7.
14. Lawshe CH. A quantitative approach to content validity. Pers Psychol. 1975;28(4):563-75.
15. Bakhtiyari F, Foroughan M, Fakhrzadeh H, Nazari N, Najafi B, Alizadeh M, et al. validation of the Persian version of Abbreviated Mental Test (AMT) in elderly residents of Kahrizak Charity Foundation. Iranian Journal of Diabetes and Metabolism. 2014;13(6):487-94. [Persian].
16. Powell LE, Myers AM. The activities-specific balance confidence (ABC) scale. J Gerontol A Biol Sci Med Sci. 1995;50A(1):M28-34. doi: 10.1093/gerona/50a.1.m28.
17. Hassan H, Zarrinkoob H, Jafarzadeh S, Akbarzadeh Baghban A. Psychometric evaluation of Persian version of activities-specific balance confidence scale for elderly Persians. Auditory and Vestibular Research. 2015;24(2):54-63.
18. Azizi F, Zarrinkoob H. A review of the role of the shortened activities-specific balance confidence questionnaire in predicting the risk of falling in the elderly. Sci J Rehab Med. 2017;6(1):288-97. [Persian].
19. 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. doi: 10.1093/ageing/afi196.
20. Khajavi D. Validation and reliability of Persian version of Fall Efficacy Scale-International (FES-I) in community-dwelling older adults. Iran J Ageing. 2013;8(2):39-47. [Persian].
21. Ware JE Jr, Gandek B. Overview of the SF-36 health survey and the International Quality of Life Assessment (IQOLA) Project. J Clin Epidemiol. 1998;51(11):903-12. doi: 10.1016/s0895-4356(98)00081-x