Internal Consistency of Persian Version of Falls Efficacy Scale and Activity-Specific Balance Scale

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Abstract

Background: *Falls is worldwide health problem among older adults. Different scales have been introduced related to falls, including Falls Efficacy Scale (FES) and Activity-Specific Balance Scale (ABCS). Persian version of these scales needs to be assessed for internal consistency. The aim of this study was to evaluate the internal consistency of Persian version of FES and ABCS.*

Methods: *In this pilot descriptive cross-sectional study, subjects (n=20) were selected by convenient sampling from elderly community dwellers. Prior to assessing the internal consistency, the original scales were first translated and culturally adapted from English into Persian according to a standardized procedure. Moreover the Cronbach's alpha of the scales was calculated by SPSS software version 21.*

Results: *The Cronbach's alpha of the FES and ABCS were calculated as 0.895 and 0.894, respectively. The inter-item correlation matrix of FES with 10 item and ABCS with 16 items, were positive and acceptable in both scales. Moreover, Cronbach's alpha if item deleted for all items in ABCS were lower than 0.894 and in FES were below 0.895. It suggests that if each item deleted in both scales, the consistency of the test would decline. Therefor all items were necessary for the scales.*

Conclusions: *The unity of the scales and internal consistency of the 16-item ABCS and 10-item of FES were good and comparable to what has been reported for previous versions of the scales in other cultures. FES and ABCS are two scales which can be used in Persian language for further studies on falls among older adults.*

Keywords: Internal consistency, Cronbach's alpha, Falls efficacy scale, Activity-specific balance scale.

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Introduction

One of the major problems among older adults is the increased susceptibility to falling.[1,2] Falling is very common among older people and its incidence increases at elder ages.[3] The rate of at least one fall over a 1-year period varies from 28% to 35% in the community of 65 years old and above, from 32% to 42% among 75 years old and above. A commonly used definition of falling is that used in the most studies proposed by American Geriatrics Society (AGS) and British Geriatrics Society (BGS) falls prevention guidelines.[5,6] They defined falls as an unexpected event in which the participant comes to rest on the ground, floor or lower level without known loss of consciousness.[6]

There are several studies on application of some common scales to assess fear of falling among elderly community dwellers. Activity-specific Balance Scale (ABCS) and Falls Efficacy Scale (FES) are the most common scales related to falling among elderly people. FES is designed to assess fear of falling[7,8] among older adults during daily activities.[9,10] Moreover, activity-specific balance scale measures subjects' confidence for falling. Each test is composed of some items or questions to assess a variable about falling.

In medical sciences, it is essential to check internal consistency of the scales. The items should all measure the same construct, so they should be correlated with each other. Since summated scales are a collection of interrelated items designed to measure underlying constructs, it is very important to know whether the same set of items may elicit the same responses if the same questions are re-administered to the same respondents.[11] A useful coefficient for internal consistency is Cronbach's alpha.[12,13] Alpha was developed by Lee Cronbach in 1951 to provide a measure for the internal consistency of a test or scale expressed as a number between 0 and 1.[14] Internal consistency describes the extent to which all the items of a test measure the same concept or construct ,hence it is connected to the inter-relatedness of the items within the test.[13] Internal consistency should be determined before a test can be employed for research or examination purposes to ensure reliability.[13,14] If the scale shows poor reliability, then individual items within the scale must be re-examined and modified or completely changed as needed.[11]

Falls Efficacy scale is a self- report scale with 10 items, developed to assess confidence in performing daily activities without falling. Each item is rated extreme confidence[1] to no confidence at all.[10] Participants who avoided any activities because of fear of falling, had higher falls efficacy scores, representing lower self-efficacy or confidence than those not reporting fear of falling.[1,3] Tinetti et al.[9] found FES test-retest reliability r=0.71 (four to seven days). Validity of FES was significantly associated with difficulty getting up after a fall, anxiety trait, general fear score and several measures of balance and gait.[4] Usual walking pace, anxiety trait, and depression were independent predictors of FES score (Multiple R^2=0.487).

The Activities-specific Balance Confidence Scale (ABCS) is a 16-item scale designed to assess client's self confidence in keeping their balance; each item is rated from 0 to 100% in which 0 means no confidence and 100 percent means complete confidence.[15] The ABCS can be self-administered or administered via personal or telephone interview. Regardless of method of administration, each respondent should be queried

concerning their understanding of instructions, and probed regarding difficulty answering specific items.[15,16] The clients were asked to indicate their levels of confidence in doing the activity without losing their balance or becoming unsteady on a 0% to 100% scale. The clients were asked to imagine how much confident they would be if they had to do the activity which they did not do routinely. If the clients normally used a walking aid or hold onto someone, they rated their confidence as if they were using these supports. The clients were assured that they could ask the administrator any question about scales.[15]

Despite extensive application of falls related test, there are still doubt about exact reliability of these scales.[17] Moreover, few Persian language researches focused on the reliability of these tests in Farsi. Therefore, the objective of this study was to evaluate the internal consistency of two most applied test pertaining to falls among Iranian elderly community dwellers.

Materials and Methods

This study is a pilot investigation of a large scale falls prevention program among elderly community population. Sample size of this investigation was 20 subjects from healthy elderly community dwellers recruited by convenient sampling. Subjects of the study were registered based on their recorded files in district health centers (in Iran all high-risk groups such as elderly people have their own medical files in district health centers). The inclusion criteria were being 60 years old or above and able to walk at least 10 meters. The population of this study was urban and rural senior citizens under health services of Shahroud University of Medical Sciences (SUMS), Semnan province, Iran, from August 2012 to March 2013. This study registered in SHMU with ID number of 9020.

To evaluate the validity of the Persian version of the scales forward backward translation of the tools were done and approved by an expert panel. The scales were translated into Farsi by two bilingual translators without prior medical knowledge. Backward translation to English was done by two other bilingual translators without medical background and knowledge of the tests. An expert panel group including a gerontologist, a psychiatrist, a nurse and two English translators evaluated terminology in the scales. Moreover, they agreed on the face and content validity of the Farsi versions of the both scales.

The tools were applied to 20 convenience samples to assess their reliability. FES with 10 items and ABCS with 16 items had r=0.83 and r=0.78, respectively. All data were collected by face to face interview.

In order to achieve reliable scales, it is recommended that one of the reliability or internal consistency tests is conducted.[14,18] The most popular reliability test is Cronbach's Alpha.[13] Calculating Cronbach's alpha has become common practice in medical research when multiple-item measures of a concept or construct are employed.[14] The reason is requirement of only one test administration which makes it easier to use in comparison to other tests such as test-retest reliability estimates.[13,14] There are different reports about the acceptable values of alpha, ranging from 0.70 to 0.95. If alpha is too high it may suggest redundancy of some items as they are testing the

same question in a different guise. A maximum value of 0.90 has been recommended.[13,14,18]

Results

Results showed that Cronbach's Alpha or reliability of FES was 0.895 and based on standardized item was 0.893. The similar values for ABCS were 0.894 and 0.892. Reliability of BBS was 0.885 and based on standardized item was 0.882 which is in the recommended range of 0.8<r<0.9

Table 1. Results of Reliability Statistics for Outcome Variable

Scale	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
FES	0.895	0.893	10
ABCS	0.894	0.892	16

After calculation of Cronbach's alpha, the next step is to calculate the Inter-Item Correlation Matrix of the scales which shows bivariate correlation of items.[14] The results are presented in Table 2 for FES and Table 3 for ABCS.

The calculation of Cronbach's alpha if item deleted for all 16 items in ABCS was lower than 0.894. Moreover, it was lower than 0.895 for FES, indicating that all items in both scales were necessary for scale consistency.

Table 2. Results of inter-item correlation matrix of FES

Items	1	2	3	4	5	6	7	8	9	10
FES 1	1.00	0.46	0.28	0.67	0.55	0.57	0.60	0.45	0.52	0.33
FES 2		1.00	0.40	0.39	0.59	0.55	0.44	0.57	0.69	0.46
FES 3			1.00	0.24	0.50	0.57	0.32	0.22	0.50	0.27
FES 4				1.00	0.36	0.67	0.24	0.57	0.45	0.30
FES 5					1.00	0.33	0.67	0.59	0.59	0.47
FES 6						1.00	0.40	0.61	0.74	0.40
FES 7							1.00	0.42	0.48	0.18
FES 8								1.00	0.46	0.56
FES 9									1.00	0.35
FES 10										1.00

Discussion

Evaluation of Fear of falling and self-confidence for keeping balance during activities are two crucial tests among elderly people. So this study aimed to evaluate the Persian version of the scales for the first time. According to the results of this study, the Persian version of these scales had internal consistency similar to other lingual versions. A Canadian study found that both the FES and ABC scales were internally consistent and demonstrated good test-retest reliability, convergent and criterion validity.[15] Moreover, Hill et al. found high internal consistency of Turkish version of the modified FES.[19] Also the unity of the scale and internal consistency of the 16 item FES was good and comparable to previous versions of the scale.

Findings of this study showed that all inter-item correlations were positive and acceptable in both scales. Inter-Item Correlation Matrix provides curtail information about internal consistency of a given test to improve the scale. In an ideal condition, all items have high correlation with each other. In other words, every single item is related to every other. In the case of lack of correlation, the specific item can be omitted without any decline in reliability.

In contrast to previous studies, participants in our study were recruited from the healthy community dwellers. However,

interestingly, mean of FES scores was different in our sample compared with the Norwegian, English and the Dutch samples.[20] The results indicated that the same score may have a different meaning in different languages and cultures. In addition, seen differences cannot be explained only by health or fall risk. It may be rooted in different interpretations of falling concepts among different languages and ethnicities.

Table 3. Results of inter-item correlation matrix of ABCS

Items	ABCS 1	ABCS 2	ABCS 3	ABCS 4	ABCS 5	ABCS 6	ABCS 7	ABCS 8	ABCS 9	ABCS 10	ABCS 11	ABCS 12	ABCS 13	ABCS 14	ABCS 15	ABCS 16
ABCS 1	1.00	0.12	0.36	0.20	0.35	0.39	0.24	0.57	0.56	0.16	0.35	0.19	0.52	0.44	0.41	0.57
ABCS 2		1.00	0.13	0.26	0.26	0.30	0.43	0.39	0.09	0.43	0.42	0.47	0.18	0.40	0.30	0.23
ABCS 3			1.00	0.49	0.39	0.35	0.21	0.05	0.49	0.14	0.37	0.42	0.39	0.42	0.28	0.49
ABCS 4				1.00	0.47	0.26	0.17	0.30	0.55	0.06	0.28	0.64	0.47	0.16	0.58	0.51
ABCS 5					1.00	0.22	0.19	0.41	0.62	0.11	0.29	0.38	0.49	0.30	0.44	0.25
ABCS 6						1.00	0.76	0.20	0.47	0.22	0.66	0.49	0.38	0.24	0.29	0.19
ABCS 7							1.00	0.09	0.41	0.38	0.70	0.39	0.47	0.48	0.20	0.26
ABCS 8								1.00	0.51	0.17	0.13	0.28	0.43	0.23	0.56	0.42
ABCS 9									1.00	0.27	0.11	0.55	0.95	0.44	0.69	0.32
ABCS 10										1.00	0.16	0.30	0.38	0.61	0.04	0.30
ABCS11											1.00	0.25	0.37	0.36	0.38	0.35
ABCS12												1.00	0.50	0.41	0.67	0.19
ABCS13													1.00	0.55	0.62	0.30
ABCS14														1.00	0.16	0.21
ABCS15															1.00	0.35
ABCS16																1.00

The advantage of current study was heterogeneous sample from elderly people in a community with different risks of falling. In the majority of studies, the researchers focused on more homogeneous subjects. Findings of this study are applicable in researches with Persian language subjects. However, there is a drawback for this study. Fear of falling and falls self-confidence were measured by a self-reported questionnaire which makes the underestimation of all variables possible.

FES and ABCS are two commonly used scales among elderly people in in many lingual versions.[21] Persian versions of these scales are equally applicable for older adults in other lingual versions. Assessment of senior citizens' fear of falling and falls self-efficacy can be applicable in both clinical and community settings. Moreover, these scales are commonly used regarding to predict falling[22] among elderly people. More researches on falling are recommended to assess elderly subjects' fear of falling, which is a covariate of falls in last decade of life[2,21,23] and decline their well-being.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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