Original Article

Internal Consistency of Reliability Assessment of the Persian version of the 'Home Falls and Accident Screening Tool'

Bahareh Maghfouri; Afsoon Hassani Mehraban[1], PhD.; Ghorban Taghizade
Tehran University of Medical Sciences, Tehran, Iran

Gholamreza Aminian
University of Social Welfare and Rehabilitation Sciences, Tehran, Iran

Hassan Jafari, PhD.
Tehran University of Medical Sciences, Tehran, Iran

Introduction: Falling is a common problem among the elderly. Falling indoors and outdoors is highly prevalent among the Iranian elderly. Therefore, identification of the contributing factors at home and their modification can reduce falls and subsequent injuries in the elderly. The goal of this study was to identify the elderly at risk of fall, using the 'Home Falls and Accident Screening Tool' (HOME FAST), and to determine the reliability of this tool.

Method: Sixty old people were selected from five geographical regions of Tehran through the Local Town Councils. Participants were aged 60 to 65 years, and HOME FAST was used to assess inter rater and test- retest reliability.

Results: Test-retest reliability in the study showed that agreement between the items of the Persian version of HOME FAST was over 0.8, which is a very good reliability. The agreement between the domains was 0.65-1.00, indicative of moderate to high reliability. Moreover, the Inter rater reliability of the items was over 0.8, which is also very good. The correlation of each item between the domains was 0.01-1.00, which shows poor to high reliability.

Discussion: This study showed that the reliability of the Persian version of HOME FAST is high. This tool can therefore be used as an appropriate screening tool by professionals to take necessary preventive measures for the Iranian elderly population.

Keywords: Falling, Home FAST, Elderly, Reliability

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Introduction

In a world that is rapidly headed towards aging, the elderly play a crucial and determinant role. be it voluntary activities, transfer of knowledge and experience, helping families who are living with them, taking care of children, or actively earning income, this role-playing can only be strong and fruitful if the elderly enjoy a good level of health.

In 2000, there were about six hundred million people 60 years and older. This figure is expected to double in 2025 (14 percent of the total population) and to reach two billion in 2050 (8.21 percent). Moreover, about two-third of the world's elderly population live in developing countries and this figure will reach 75% in 2025. The increase in elderly population results in high financial burden in terms of healthcare measures in different communities. Reports indicate that about 60 percent of healthcare costs and 35 percent of hospital discharges and 47 percent of hospitalization days have been devoted to the elderly. Given the rapid increase in elderly population, the issues of health, healthcare, and welfare are gaining new and wider dimensions in the contemporary community.

One of the most common health problems in old age is falling. Falling is defined as an unintentional event in which the person accidentally collapses on the ground or to a lower level, and cannot bear weight on the legs (1). Falls and the resultant injuries can be fatal in people aged 65 years and over. The Mortality risk of falling increases with age (2). At least one out of every three people over 65

1- All correspondence to:Afsoon Hassani Mehraban: Email: <a-mehraban@tums.ac.ir>

experiences a fall each year (3), and this figure increases to about 40% in those aged over 80 (4). Half of those with a history of falling experience falling again (5). Overall, 71% of injury crashes and 76% of pelvic fractures occur at home or indoor environments (4). Falls occur as a result of different factors including the use of multiple medications, cognitive deficits, motor deficits, lower extremity problems, chronic illnesses, poor balance, low BMI, reduced physical activity, functional deficits and eyesight problems (6).

In Iran, 12% of every 8000 individuals who have been affected by trauma and are in the hospital are people aged 60 years or above, and 70% of them suffer injuries from falls. Falling at home and outdoors comprise a large proportion of elderly falls in Iran. Severe injuries resulting from falls include: hip fracture, subdural hemorrhage or hematoma, bruising, joint sprains, muscle strains, psychological impacts, fear of falling in 20 percent of cases, loss of confidence, limitations in performance and death (1, 6, 7).

Use of home safety assessment checklists to determine home hazards are documented and applicable. A number of such checklists are used as part of rehabilitation programs to prevent falls and to determine appropriate reforms at home (8). The present study is the first step in localizing HOME FAST for the Iranian elderly population. The reliability of the original version has been determined by Maghfouri in Tehran in 2011 (9, 10). Therefore, the aim of this study was to determine the test re-test and inter-rater reliability of the Persian version of HOME FAST's items.

Methods

In this descriptive cross-sectional analysis, 60 elderly people were recruited from five metropolitan areas of Tehran (North, South, East, West and Downtown Tehran) through the 'Local Health Councils' Elderly Associations' by simple random sampling. Twelve individuals were selected from each area, and informed consent was taken after sampling. Inclusion criteria for this study were: age range (65 years and above), appropriate level of consciousness (attaining the score of at least 21 in MMSE Test), and the ability to understand, repeat and answer sentences. Hospitalized individuals, those using the wheelchair, those with Alzheimer's, dementia and low cognitive level were not included in the research.

The HOME FAST instrument contains 25 items covering home performance safety concerns and environment. Each item is scored as "existence of risk", "no risk" and "not applicable" by the elderly (11). HOME FAST is used as a screening tool to identify elderly people exposed to increased risk of falls at home (11). The reliability and validity of this tool were examined by Mackenzie et al (2001 and 2002) in Great Britain and Australia. The tool includes items that determine safety hazards commonly found in the homes of the elderly and how functional the tool was (12). The tool consists of several parts, such as the evaluation of home flooring, furniture, lighting, bathroom, mobility, storages and stairs. So far, no test has been performed to assess home risks. Moreover, the availability of the tool and its applicability made it a good option for our study. SPSS 12 was used for data analysis.

Results

In this study, 60 old individuals aged above 65 years were studied for whom the background information are shown in Table (1).

Table 1. Background Information of the elderly participating in the HOME FAST study

Demographic variables (n=60)	
Mean age	70.23 (SD 5.92)
Falling inside Home	0.06 (SD 0.25)
Falling outside Home 0.16 MMSE	0.16 (SD 0.71)
	27.25 (SD 3.66)

According to the information and statistical results obtained Table (2). the Kappa coefficient ranged from 0.65 to 1.00 with a mean of 93.0 except for items '5' (easy and safe entry and exit of the bed), '15' (adjacency of the bathroom to the bedroom), '18' (solid bars are available around the stairs inside the house), and item '21' (easy step edge detection) kappa was greater than 0.75 in the other items. On the whole, a high inter-rater agreement was observed in the test re-test and items 5,15,18 and 21 also showed average to good agreement.

Table 2. Test-retest scores and items of the Persian version of HOME FAST among the Iranian elderly

Items	Kappa score	P value	Items	Kappa score	P value	Items	Kappa score	P value	Items	Kappa score	P value
1	1.00	0.00	8	0.96	0.00	15	0.74	0.00	21	1.00	0.00
2	1.00	0.00	9	1.00	0.00	16	1.00	0.00	22	1.00	0.00
3	0.93	0.00	10	1.00	0.00	17	1.00	0.00	23	0.89	0.00
4	0.80	0.00	11	1.00	0.00	18	0.65	0.00	24	1.00	0.00
5	.65٠	0.00	12	1.00	0.00	19	0.93	0.00	25	1.00	0.00
6	1.00	0.00	13	1.00	0.00	19	1.00	0.00			
7	1.00	0.00	14	1.00	0.00	20	0.73	0.00			
Mean											0.9312

According to table (3), the kappa coefficient ranged between 0.01 and 1.00 with a mean of 0.85. Except for items number '4' (Loose mats), '5' (Difficulty with bed transfers), '14' (No slip resistance mat in bathroom), and '18' (Inadequate/absent inside step/stair-rails), the kappa was greater than 0.75, indicating high agreement across the testers. Items '4' (Loose mats) and '19' (Inadequate/absent outside step/stair-rails) also show average to good agreement. Items number '5', '14' and '18' showed poor agreement because they were lower than 0.4.

Table 3. Inter-rater reliability of items of the Persian version of the Home FAST study

Items	Kappa score	P value	Items	Kappa score	P value	Items	Kappa score	P value	Items	Kappa score	P value
1	1.00	0.00	8	0.78	0.00	15	0.92	0.00	21	1.00	0.00
2	1.00	0.00	9	1.00	0.00	16	1.00	0.00	22	1.00	0.00
3	0.86	0.00	10	1.00	0.00	17	1.00	0.00	23	0.83	0.00
4	0.75	0.00	11	1.00	0.00	18	0.06	0.63	24	1.00	0.00
5	0.30	0.01	12	1.00	0.00	19	0.68	0.00	25	1.00	0.00
6	1.00	0.00	13	1.00	0.00	19	1.00	0.00			
7	1.00	0.00	14	0.01	0.89	20	1.00	0.00			
Mean											0.8512

Discussion

Test results obtained on test-retest reliability showed that the internal consistency of the items of the tool was above 0.8, indicating a desirable level of reliability. Moreover, the internal consistency of the items ranged from 0.65-1.00, indicating moderate to high reliability. Accurate analysis of each of the items also indicates that items 5 (Difficulty with bed transfers), 15 (Toilet not close to the bedroom), 18 (Inadequate/absent inside step/stair rails) and 21 (Undefined stair edges) had moderate to good reliability (0.4-0.75).

Item numbers 1 (Walkways cluttered), 2 (suitable flooring conditions), 3 (slippery floor surfaces), 4 (Loose mats), 6 (Difficulty getting up from a chair), 7 (Poor lighting) , 8 (No access to bedside light), 9 (Poor lighting on outdoor paths), 10 (Difficulty with toilet transfers), 11 (Difficulty with bath transfers), 12 (Difficulty with shower transfers), 13 (No access to grab rails in the bathroom), 14 (No slip resistance mat in the bathroom), 16 (Difficulty reaching items in the kitchen), 17 (Difficulty carrying meals), 19 (Inadequate/absent outside step/stair rails), 20 (Difficulty using steps/stairs), 22 (Difficulty with entrance doors), 23 (Hazardous outside paths), 24 (Inadequate footwear) and 25 (Hazardous pets) have good reliability (greater than 0.75). Also, item numbers 1, 2, 6, 7, 9, 10, 11, 12, 13, 14, 20, 22, 23 and 25 had equal reliability.

The internal consistency of the items in the overall test was higher than 0.8, which represents a desirable level of reliability. Also the results indicate that the internal consistency of the items, in the whole test range from 0.01-1.00, indicating poor to very good reliability. A more accurate study of each item shows that the reliability in item numbers 5 (easy and safe entry and exit of the bed), 14 (No slip resistance mat in bathroom) and 18 (Inadequate/absent inside step/stair rails) have a poor reliability, and that items 4 (Loose mats) and 19 (Inadequate/absent outside step/stair rails) have moderate to desirable stability. Reliability of the other items was highly desirable.

One factor that can affect the reliability of an instrument is the presence of multiple conditions in that instrument. A survey conducted in 1995 by Rodriguez et al, showed that the items that covered multiple conditions had a low reliability. Hence it was suggested to avoid this situation. It is better not to have a variety of items so that evaluators do not face difficulty in detection. In this study, furniture and absence of firm and available fences in the bathroom and toilet had high risk and low reliability (13). For example, in item numbers 15 (Toilet not close to the bedroom) and 18 (Inadequate/absent inside step/stair rails), the shape and structure of stairs like its height and distance and high working support when going up or down the stairs using railings on one hand, and the toilet architecture on the other hand, form totally different situations which the rater must take into account, and this may reduce the reliability of the test-retest among raters.

The influence of environmental factors can be considered as predisposing factors in falls, which depend on the ability of the elderly individual. And in the present study, the elderly had experienced different diseases and had apparently indicated different abilities. These may have influenced the raters momentarily.

Another factor that can affect reliability is the assessment of sight in terms of size, height and distance. Because meter is not used in these assessments, differences may occur in diagnoses. For example it is mentioned in item 15 that there shouldn't be over two doors between the toilet and the bedroom, but this gap may be large in Iranian homes and there is no standard in this regard. Another factor that can affect the reliability between raters is likeness and unlikeness in judgment on sight and quality of works. Where risks or factors influencing falls have obvious differences in terms of sight with other risk factors in the environment, they can be easily distinguished. But in cases where such differences are not obvious, they can be difficult to realize, and in items which cannot be easily realized, reliability may be lower. For example, in item 5 (Difficulty with bed transfers) different visual interpretations between the raters in determining how the elderly get up and sit down from the bed may influence the reliability of this item.

Another reason that may increase the reliability of the test-retest, is the one-week interval considered between the two tests. It seems that in this interval not much changes at home. Hence, in this study a one-week interval was considered for the re-assessment. Another factor that can increase the reliability of the test is compliance with the standard conditions of the questionnaire in executing the test during two assessment sessions.

Also factors that can decrease test-retest reliability and between raters in some of the items such as 'easy and safe entry and exit from the bed', 'adjacency of bathroom to bedroom', 'existence of firm and accessible railing across the steps' inside the house and 'simple detection of step edge', is the placement of evaluators in two sessions of item assessment. The elderly Person's position , and his/her distance with the considered item and maybe assurance of this issue that in the last session the assessment has been done and there is no need in the present session to more exact investigations leads to differences in two test-retest sessions. Also the manner of judgment in scaling the risks can be influenced by the change in interpretation of elderly behavior from risk avoidance or use of risk specifications, namely affecting their performance. Therefore, maybe this difference in interpretations in test-retest (even between raters) has led to this result. In a survey conducted by Mackenzie et al in 2012, on the reliability and validity of HOME FAST, only the 'unclear edge of the stairs' and 'loose floor cover' had low reliabilities (14). the manner of judgment of the scaling risks has been reported as an influential factor in the difference of opinion (8).

In a research done by Clemson et al in 1996, this factor, i.e. the elderly ability has been reported by raters as a factor in error diagnosis. Also descriptive information such as the number of falls can affect the fall risk assessment. For example, the type of ground cover forms greater risks in older people who have had a stroke, than for other people who have not. Therefore, if patients are categorized and studied separately, reliability may increase (13, 15). So in general it can be concluded that this tool is a useful tool in identifying environmental home risks influencing falls in the elderly. It can be used by professionals, clinics and researchers and needs more extensive studies to be used in research studies.

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