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Cross-cultural validation of the Falls Efficacy Scale International (FES-I) in Greek community-dwelling older adults

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Abstract

Purpose. The cross-cultural adaptation and validation of Falls Efficacy Scale-International (FES-I) in community-dwelling seniors in Greece.

Method. For cross-cultural adaptation, the back-translation procedure was utilised by four bi-lingual translators. For validation, 89 community-dwellings (50 males, 39 females) aged 61–90 years old (mean: 72.87 ± 6.04) completed four questionnaires adapted into Greek; two instrument specific ones, FES-I and Confidence in Maintaining Balance (CONFbal), and two generic Questionnaires, Short-form Health Survey (SF-36v2) and General Health Questionnaire (GHQ30). Additionally, three functional/balance tests were compared against the FES-I. All questionnaires and measurements were repeated after 7–10 days to explore repeatability.

Results. Content validity was achieved as all participants found the questionnaire appropriate and comprehensible. Validity of the FES-I yielded moderate to strong correlations with CONFbal ($r = 0.694$, $p < 0.01$), three SF-36 subscales (r ranging between 0.560 and 6.55, $p < 0.01$), GHQ30 ($r = 0.584$, $p < 0.01$) and one functional test ($r = 0.638$, $p < 0.01$ for Timed Up and Go test). FES-I's test–retest reliability (ICC:0.951, SEM: 1.79, SDD:20.44%, $r = 0.950$) and internal consistency (Cronbach's $\alpha = 0.925$) were excellent, and responsiveness across fallers and non-fallers yielded a large effect size (0.89), indicating good discriminant validity.

Conclusions. The Greek FES-I was valid, reliable, comprehensible and acceptable for the sample tested and may thus, be used in cross-cultural rehabilitation research and practice.

Keywords: *Falling, FES-I, Greece, community-dwelling, elderly*

Introduction

Fear of falling has been identified as one of the risk factors for first onset and recurrent falling, and one of the compromising factors of physical function and quality of life amongst older people [1–7]. Fear of falling is a remarkably common fear, sometimes referring to an exaggerated concern of falling [2,8] or loss of confidence during mobility tasks [9] and, in its most serious state, an expression of anxiety [10]. Prevalence rates amongst community-dwelling older people with otherwise good health range between 14% and 56% [2,11,12]. In addition, longitudinal studies have estimated that fear of falling is evident in approximately 46–56% of older people at some point in their lives [2,12]. These percentages are reported to be higher in women than in men, are usually increased with age and are also higher in older people who have already sustained a fall. Fear of falling is therefore, considered an important outcome measure for falls prevention and management [1,13,14].

A plethora of different outcomes for measuring fear of falling have been reported across the

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literature, ranging from single categorical questions [2,5,15,16] to more structured questionnaire type measures [1,4,10,17,18], making thorough cross-cultural comparisons difficult across the studies. Over the last decade, there has been a systematic effort by members of the Prevention of Falls Network Europe (ProFaNE) to develop a valid and reliable instrument for measuring fear of falling, which can be used in a wide range of languages and cultural settings [19,20]. Thus, the Falls-Efficacy Scale International (FES-I) was developed by members of the ProFaNE Network, which has excellent psychometric properties [20]. In addition, it has already been adapted into several languages and tested for its reliability and validity across different European countries including UK [20,21], Germany [21,22], The Netherlands [21], Sweden [23], Italy [24] and Norway [25].

FES-I, a 16 item questionnaire, has a number of advantages over other fear of falling measures. Taking into account previous modifications of the Tinetti Falls Efficacy Scale (FES) [9] as well as its subsequent modifications [26–28], its responses and the range of physical activities included in the questionnaire have been revised in order to meet a wider functional range of older adults (i.e. from the frail to the more active and functional). Secondly, the wording of selected items was considerably revised in order to meet the variable needs across different cultural settings. In addition to this, a number of items, with already established face validity across different cultures, were selected from the literature and added to the FES-I [20]. Thirdly, the impact of fear of falling on social life in contrast to the FES [9] and other fear of falling measures [29,30] (which do not include a social component) is evaluated within the FES-I. Social impact from a fall (such as embarrassment, isolation etc.), in addition to physical function, is suggested to contribute to avoidance and loss of confidence in performing physical activities [5,31].

However, there is no Greek version available and, in order to administer this questionnaire to Greek-speaking population as well as enable cross-cultural comparisons in rehabilitation research to take place between Greece and other countries, a rigorous process of cross-cultural adaptation and validation is needed. Thus, the aim of the present study was to translate and culturally adapt the FES-I into the Greek language and cultural setting as well as test its psychometric characteristics; in particular, reliability, validity and responsiveness.

Methods

The current study was performed according to the official guidelines for cross-cultural adaptation of self-report outcome measures [32,33]. In addition, further instructions ('10-step translation protocol of the FES-I' and the 'FES-I's translators'/interviewers' notes' published on the ProFaNE website) were also utilised for the cross-cultural adaptation procedure. The whole process was carried out in three phases; the first was the translation and adaptation of the FES-I into the Greek language and culture, the second was a pilot study to assess the prefinal version and produce the final Greek version, whereas the third phase included the reliability, responsiveness and validity study of the final Greek version. Ethical approval was obtained by the Ethical Committee of Department of Physiotherapy of the Technological Educational Institute (TEI) of Lamia, Greece.

Cross-cultural adaptation

Cross-cultural adaptation of the FES-I included six stages. In the first stage a forward translation from the original English version [20] into Greek was made by three Greek native speakers independently. The translators were heath professionals, familiar with the concept of fear of falling, and their level of English was excellent as they had all undertaken postgraduate studies within UK. They were instructed to aim for conceptual rather than literal translation. In addition, a written report indicating their comments on any difficulties and the rationale for the choices made in case of problematic questions was made. In the second stage, a meeting between the translators was arranged, and the three translations were combined into a uniform one, after resolving for any discrepancies. Furthermore, there was a personal communication with the original FES-I's construction team to clarify any minor misunderstandings. Thus, a provisional Greek version was made (out of the three translations), which combined the more accurate to the original version and the more appropriate to the Greek culture item options. During the third stage, this provisional FES-I was given to nine older seniors (each translator selected three seniors) in order to test for its comprehensibility and appropriateness. Each senior was requested to complete the questionnaire on their own, and afterwards, the translator discussed with them the clarity of each item and the necessity of reformulating any of the items. In the following stage, a second consensus meeting was held in order to improve this preliminary FES-I version, following the older seniors' feedback. During the fifth stage, a backward translation procedure (from Greek into English) of this preliminary FES-I was made by a fourth translator, an official English translator, who was naive to the purpose and outcome of the study. In the sixth stage, the final consensus meeting

between the translators was held in order to review the back translation. In particular, the back translation was compared to the original English one in order to confirm whether the semantic, conceptual and experiential equivalence was met. Finally, and based on the two English versions (original and back-translated one) the pre-final translation was developed.

Pilot study

This pre-final version was piloted in a sample of 20 Greek older people with different levels of education, in order to get an understanding of the items and explore their comprehensibility. The sample consisted of 11 men and 9 women with a mean age of 75.1 ± 7.02 years (range: 65–89 years). The interviewers (two physiotherapists) administered the questionnaires to the sample, and each subject was asked to provide comments to them about each item and identify any words or phrases that were either difficult to comprehend or inappropriate. However, all questions and response options were considered appropriate and comprehensible by the subjects. Thus, this FES-I version was not subjected to any additional modifications and was considered the final Greek version (download at http://www.profane.eu.org/fesi.php).

Validity, reliability and responsiveness procedure

Subjects.   Community-dwelling older adults over the age of 60, recruited from three public day centres (known as KAPI1) situated in the suburbs of Athens, were invited to participate in the study by signing an informed consent form. All participants had to be native Greek speakers in order to understand and answer the questionnaire. Individuals were excluded from participation if their cognitive and/or mental status was impaired, as stated by the KAPI's geriatrician.

Measures.   The Greek FES-I was explored against three other questionnaires; a falls-related questionnaire, the Confidence in Maintaining Balance (CONFbal) scale, and two generic ones, the Short-Form Health Survey (SF-36v2) and the 30-item General Health Questionnaire (GHQ30). CONFbal scale is a confidence and falls related self-efficacy measure designed to measure older adults' confidence in maintaining balance during predominantly indoor daily activities, consisting of 10 items with three answering options each. It has been found to have excellent reliability and its validity has been established against a number of stability and mobility

measures [1,30]. Although it does not entail a social component, the CONFbal scale has the advantage of possessing a very narrow minimal detectable difference for picking up true change in confidence [30]. The SF-36v2, one of the most popular self-reported generic health instruments worldwide, assessing eight health dimensions (physical function, role physical, bodily pain, general health, vitality, social function, role emotional and mental health) has the advantage of providing apart from the physical component, a social component of the patient's status (which is missing from most fear of falling outcome measures) [34–36]. It has also proven to be valid and practical for measuring quality of life (QOL) in community-based older seniors [37–40]. The GHQ30 refers to a shorter version of the 60-item GHQ developed to assess four health dimensions (somatic symptoms, anxiety and insomnia, social dysfunction and depression) [41]. GHQ30 has been used in community-based older seniors in various different cultural contexts and is considered an appropriate generic outcome measure [42–44]. These three questionnaires had already undergone a cross-cultural adaptation and validation procedure into the Greek language and culture, and were thus, available for use among Greek subjects [45–48].

Apart from the demographic variables obtained from the sample, two additional categorical questions were recorded. One question asked how often they had fallen during the past year and had three answering options ('Never', 'Once', 'Twice or more'), and the other asked each subject how afraid he/she was of falling over, having four answering options ('Not at all', 'A little', 'Quite a bit', and 'Very much'). These two questions have been extensively used in similar research procedures [2,5,15,16,21].

Three functional and dynamic balance tests were also recorded in this sample in order to compare with the Greek FES-I; Functional Reach (FR) [49], Timed Get up and Go (TUG) [50] and 180° turn (TURN180) [51] test. These tests are considered valid and reliable clinical procedures, recommended to be included in studies involving fear of falling with older seniors [50,52–56]. In addition, some studies have previously correlated fear of falling questionnaires against these tests [57,58].

Validation.   Criterion-related validity and *construct validity* were explored for the FES-I. *Criterion-related validity* refers to the extent to which scores on a particular instrument relate to a relevant criterion variable, often being the 'gold standard' one [33,59]. One aspect of criterion validity, which is investigated here is *concurrent validity*, referring to cases, where the instrument to be tested is administered at the same time interval with the existing (criterion) one [59].

Construct validity refers to the extent to which scores on a particular instrument relate to other measures in a manner that is consistent with theoretically derived hypotheses concerning the concepts that they represent [33,59]; for example, the tested instrument may have a strong relationship with certain measured variables examining similar or related constructs, and a weak one with others, which represent different constructs. Criterion (concurrent) validity of the Greek FES-I was explored against the CONFbal. Construct validity of the FES-I was explored against the two generic questionnaires; the SF-36v2 and the GHQ30. Questionnaires were personally administered and completed via structured interviews by two physiotherapists, as previously performed in similar studies [20,24,25,60,61]. In addition, the single categorical question asking each subject how afraid he/she is of falling over was correlated against the FES-I (concurrent validity). Also, the three functional mobility and dynamic balance tests (FR, TUG and TURN180) performed by the sample were compared against the specific instrument (construct validity). The two physiotherapists were sufficiently trained following multiple pilot studies in conducting these tests. The sequence of performing each test was randomised in order to avoid order effects [62] and a short break was provided between the tests for each subject. For each test, three repeated performances following a practice trial and following 1 min break in-between each trial were performed.

Reliability. For evaluating *test–retest reliability*, the above procedure of administration of the FES-I was repeated 7–10 days following initial testing. The same process (utilising similar time intervals) was followed by Yardley et al. in the original work for the development and validation of the FES-I [20] and in the test–retest reliability procedure of other falls related questionnaires [30].

Responsiveness. *Responsiveness* concerns the ability of a questionnaire to detect clinically important changes [33]. However, in the absence of any intervention undertaken, responsiveness was assessed by statistical means (see below) following a sub-classification of the sample into fallers and non-fallers; where fallers had sustained one or more unexplained falls over the last year, and non-fallers had not experienced a fall. This discrimination between fallers and non-fallers has been utilised in previous studies [24,29,63].

Data analysis

There were no missing values and all data were tested for normal distribution using Kolmogorov-Smirnov test and accordingly, parametric tests were

used. *Criterion (concurrent) validity* was tested by examining the correlation of the FES-I with the CONFbal questionnaire and the single fear of falling categorical question, and *construct validity* by examining the correlation of the FES-I with the SF-36v, the GHQ30, and the three functional tests utilised. All scores were taken from initial visit (baseline measurements) and an average of three repeated performances for each functional test was used for the analysis. Pearson's Product Moment Correlation Coefficient (r) was utilised for all these correlations. Correlations between 0.51 and 0.75 indicate a moderate to strong degree of association and over 0.76 indicate a very strong degree of association [64]. *Test–retest reliability* was estimated as the degree of concordance between the two repeated administrations of the FES-I. Intraclass Correlation Coefficient ($ICC_{1,1}$) and Pearson's Correlation Coefficient (r) were recorded. Additionally, the smallest detectable difference (SDD) and the standard error of measurement (SEM) were also calculated. *Internal consistency* was assessed with Cronbach's alpha (α), which indicates the strength of the relationship between all items within the testing instrument; thus, evaluating whether all included items are measuring the same construct. Values between 0.70 and 0.80 demonstrate good internal consistency, whereas values above 0.80 are considered very good [62]. *Responsiveness* of the FES-I was calculated by means of the effect size between fallers and non-fallers, where effect size was calculated as the ratio of the mean change of the total FES-I score divided by the standard deviation of the baseline score [62,65]. Effect sizes of 0.2 or less are considered small, of 0.5 medium and greater than 0.80 are considered large [65]. For all comparisons, statistical significance was set at $p < 0.05$ level. The analysis was performed in SPSS (version 15.0) for Windows (Lead Technologies Inc. SPSS Inc., Chicago, Illinois, USA).

Results

Eighty-nine community-dwelling older seniors (50 men, 39 women), aged 61–90 year old (mean: 72.9, SD: 6.04) participated in the study. Two thirds of the sample (64%) was over 71 years old. Over half of the sample (55.1%) reported to be fearful of falling in the single categorical question, whereas just under half (43.8%) had sustained at least one fall during the last year. The sample's characteristics are presented in Table I.

The mean FES-I scores and standard deviations (SD) on initial and repeated visits were 24.09 ± 7.93 and 24.58 ± 8.31, respectively. Table II illustrates FES-I scores according to sex, age, number of falls over last year and fear of falling based to the single

Table I. Characteristics of the Greek sample (*n* = 89).

Characteristics	Percentage (number)
Sex	
Male	56.2% (50)
Female	43.8% (39)
Age	
61–70	36% (32)
71–80	56.1% (50)
81–90	7.9% (7)
Family status	
Married	66.3% (59)
Single /divorced /widowed	33.6% (30)
Living arrangements	
Living with spouse /relative	75.3% (67)
Living alone	24.7% (22)
Mobility	
Walking with stick(s)	7.9% (7)
Visit to the doctor over last month	48.3% (43)
Fear of falling	
No fear	44.9% (40)
Somewhat fearful	32.6% (29)
Quite a bit fearful	19.1% (17)
Very fearful	3.4% (3)
Falls over last year	
0	56.2% (50)
1	18.0% (16)
>2	25.8% (23)
Trauma following a fall	49.4% (44)
Difficulty in rising from a fall	24.7% (22)

Table II. Mean Greek FES-I scores and standard deviations (SD) according to background variables (*n* = 89).

Characteristics	Mean (SD)
Sex	
Male	25.76 (8.20)
Female	22.00 (7.15)
Age	
61–70	23.31 (7.04)
71–80	24.71 (8.92)
81–90	23.17 (3.87)
Falls over last year	
0	20.82 (4.41)
1	24.75 (5.30)
≥2	31.05 (10.90)
Fear of falling	
No fear	18.65 (2.47)
Somewhat fearful	25.29 (5.03)
Quite a bit fearful	31.41 (6.70)
Very fearful	44.00 (16.00)

Table III. Validity results of the Greek FES-I (*n* = 89).

Measures	Pearson's *r*
CONFbal	0.694*
Fear of falling	0.769*
GHQ30	0.584*
Functional tests	
Functional reach	−0.390*
Timed Up and Go	0.638*
TURN180	0.416*
SF-36 subscales	
Physical function	−0.655*
Role physical	−0.560*
Bodily pain	−0.363*
General health	−0.579*
Vitality	−0.495*
Social function	−0.413*
Role emotional	−0.310*
Mental health	−0.502*

*Correlation is significant at the level of 0.01.

between 0.560 and 0.655, $p < 0.01$) with three out of eight subscales (Physical Function, Role Physical and General Health), the GHQ30 and the Timed Up and Go functional test. All other correlations yielded a low degree of association. Correlations on FES-I's validity are illustrated in Table III.

Test–retest reliability yielded an $ICC_{1,1}$ value of 0.951 with SEM and SDD values of 1.79 and 20.44%, respectively and a Pearson's *r* of 0.950. *Internal consistency* with Cronbach's α was 0.925.

Responsiveness of the FES-I across fallers and non-fallers yielded a large effect size value of 0.89, indicating good discriminant validity between these subgroups.

Discussion

In the present study, the cross-cultural adaptation of the FES-I [20] (http://www.profane.eu.org/fesi.php) into the Greek language and cultural setting was performed utilising official guidelines on the back translation approach [32,33]. One of the advantages of the FES-I, apart from its excellent psychometric properties, is the accurate and well thought transla-tion guidelines, which have assisted its applicability in various cultural contexts including UK [20], Sweden [23], Italy [24], Norway [25], Germany [22] and The Netherlands [21]. This, together with the multi-stage adaptation procedure undertaken in this study ensured the content validity of the Greek FES-I, thus being comprehensible, understandable and appropriate for the participating community-dwelling older sample. The 89 participating com-munity-based seniors (56.2% male), covered a wide spectrum of old age and a broad range of demographic and fear of falling characteristics

categorical question. There were no floor or ceiling effects at the baseline's or repeated visit's sessions' scores.

Criterion-related validity of the Greek FES-I com-pared to the CONFbal demonstrated a moderate to strong correlation ($r = 0.694$, $p < 0.01$). A strong association was also found between FES-I and the single fear of falling categorical question ($r = 0.769$, $p < 0.01$). *Construct validity* of the FES-I demon-strated moderate to strong correlations (*r* ranging

similar to other European studies [20,21,23–25]. However, the percentage of men was higher in the present study and mean age slightly lower compared to other European studies of the FES-I, attributable to recruitment through KAPIs.

Mean FES-I scores on initial and repeated visits were 24.09 ± 7.93 and 24.58 ± 8.31, respectively. In accordance with previous validation studies, FES-I scores were increased in fallers (especially those sustaining more than two falls) compared to non-fallers, and were also increased the more fearful the subjects were, as indicated by the fear of falling categorical question answers [20,21,24,25]. There were no floor or ceiling effects at any points in time, thus, indicating that the FES-I is appropriate for older seniors with both, increased and minimal fear of falling. The distribution of the mean scores across these subgroups (fallers *versus* non-fallers, and fearful *versus* non-fearful) were again comparable with the previously mentioned studies. However, it is interesting to note that FES-I scores according to sex and age in this study were slightly different; Greek older men scored marginally higher compared to women and there were no big differences in scores across the different age groups. In contrast, validation studies performed in Norway [25], Germany, The Netherlands and UK [21] yielded marginally higher scores amongst women compared to men (indicating increased fear of falling in women), and showed an increase in score with age. These differences could be attributed to the recruited sample as far as age is concerned. As independent and functional community-dwelling older adults are usually registered in the KAPIs, fear of falling amongst them may not necessarily be associated with their age. However, given that these differences are only minor, bigger scale studies are needed in order to provide normative data amongst Greek community-dwellings, and investigate the relationships of FES-I with age and sex in more depth.

Criterion-related (concurrent) validity was measured by comparing the FES-I with the CONFbal scale. This confidence and falls related self-efficacy measure has been found to have good psychometric properties and has the advantage of possessing a very narrow minimal detectable difference for picking up true change in confidence (rather than due to i.e. physical instability) [1,30,34]. A moderate to strong Pearson's correlation was yielded, indicating satisfactory validity results. Although previous studies have not correlated FES-I with CONFbal as they were restricted in comparing it either with the FES [21] or with the short FES-I [24,25], it appears that these two are well correlated. In this study, it felt more appropriate to correlate an altogether different fear of falling outcome measure with the FES-I rather than correlate it against one of its modifications. Perhaps though, the absence of a social

component and/or the limitation in items describing outdoor activities of the CONFbal, could have precluded a stronger association between the two adapted measures. Further work investigating the associations between FES-I and CONFbal within Greece and in other cultural contexts would be enlightening. Criterion-related validity was also measured by comparing the FES-I with the single fear of falling question, and, as expected and as previously shown [21], yielded a strong association.

Construct validity was measured by comparing the FES-I against the SF-36v2 and the GHQ30. Moderate to strong correlations were reported with three SF-36 subscales; Physical Function, Role Physical and General Health, indicating that FES-I related well with these aspects of QOL amongst the sample. Again, it is reasonable for the two physical subscales and the general health one to correlate better with the FES-I (compared to the social and mental dimensions), since they represent related constructs and thus, their content lies more within this domain. A low to moderate degree of association was reported on the remaining five subscales, where more distinct constructs were being measured. Compared to previous work, only one study investigated the association of the 10-item revised FES (rFES) with SF-36 in community-dwelling seniors [10], and moderate to strong correlations were reported only with the Physical and Social Function subscales, whereas the remaining six subscales demonstrated low degrees of association. Similar to our study correlations have been reported in the Swedish FES-I study [23] with the SF-12. A moderate to strong association was also yielded between the FES-I and the GHQ30, thus again indicating an association of the FES-I with a generic questionnaire which has a bias in symptom somatisation, anxiety and social dysfunction. The strong associations of the FES-I with the two generic measures suggest the better the sample perceived its health, the less concerned and fearful they were about falling.

Construct validity of the FES-I was also tested against the FR, TUG and TURN180 tests. The incentive for undertaking this process derived from the initial validation of the FES-I, where, Yardley et al. [20] suggested the exploration of correlations of the FES-I against a range of measures including objective measures of balance and functional capacity. These particular measures were selected because they measure related to fear of falling constructs, they present with good validity and reliability amongst older seniors as well as they are extensively used in studies investigating fear of falling [24,50,52–58,66]. Moderate to strong correlation was obtained only with the TUG test, whereas the other two tests yielded low to moderate degrees of association with the FES-I. It is the TUG which has

been found to have the best discriminative ability (from the three tests) for identifying community-dwellings who are at risk of falling [50,56]. Thus, these results support the appropriateness of this test. However, as these findings are only considered to be preliminary, further work in this area is needed.

Test–retest reliability was examined by comparing the scores between the first and second administration of the FES-I. This process has the risk of patient recall due to the small time interval (7–10 days) between the two administrations. For practical reasons it was difficult to chose a different time interval. However, the same time interval for reliability testing has been followed in the original validation of the FES-I [20]. FES-I's test–retest reliability was excellent. This study's results are comparable with those found in the original version [20], the Italian [24] and the German version [22] but were higher than the Dutch FES-I version [21]. The SDD value obtained indicated that in order for the questionnaire to be capable of detecting with confidence differences in status the score should differ by at least 20.44% [67]. Unfortunately, none of the previous studies have calculated either SEM or SDD values, so further comparisons cannot be made. Internal consistency in the current study being calculated with Cronbach's alpha was very good, which again agrees with all previous FES-I studies [20–25], thus suggesting an excellent and coherent association between all items in the FES-I.

As far as responsiveness is concerned, the FES-I was able to detect changes in scores between older seniors who had sustained at least one fall over last year and the ones who had never fallen. This study's effect size value indicated that the Greek FES-I had good discriminant validity in detecting fallers from non-fallers. This finding again is in agreement with the original FES-I study [20] and cultural/language adaptations [25,21]. It would however be appropriate for future studies to investigate FES-I's sensitivity to change following falls-related interventions, as no published studies have so far explored this area.

Based on these results, it becomes evident that the Greek FES-I has good reliability, validity and responsiveness in a sample of Greek community-dwelling older people. The clinical significance of this finding is that this instrument can safely be used for cross-cultural comparisons in research and clinical rehabilitation between Greece and other countries, where a similar process has been undertaken. It would therefore, be enlightening to design cross-cultural studies amongst older seniors utilising the FES-I as primary outcome measure.

In terms of the limitations, it must be acknowledged that this study was restricted to a convenience sample of community-based older seniors. It would be desirable to conduct a larger scale study within Greece,

utilising a representative stratified (not restricted to community-dwellings) elderly sample, in order to provide normative data on fear of falling issues and investigate correlations and associations with a wider range of personal, cultural, falls- and health-related factors. Furthermore, falls history (collected by the sample) was based on self-reported information provided by each senior; despite the fact that this is acceptable and commonly used collective method in most previous reports [21–23], it could potentially compromise part of this study's findings. Finally, the FES-I was not validated for older cognitively impaired people; it would however, be helpful for future studies to validate it against this subgroup.

In conclusion, the Greek version of the FES-I was found to be comprehensible, reliable, valid and appropriate for use in the Greek community-dwelling sample utilised. In addition, it discriminates between fallers and non-fallers. Thus, this version forms the official cross-cultural adaptation of the FES-I Greek (available to download at the ProFaNE site http://www.profane.eu.org/fesi.php) and can be used for cross-cultural comparisons in research and clinical rehabilitation.

Acknowledgements

Declaration of interest

Note

1. KAPI in Greek is an acronym for Centres for Open Protection of the Elderly. They were established in 1979 for community-dwelling older people in Greece. Their aims are (i) to prevent biological, psychological and social problems in order to maintain their autonomy and independence as well as encourage them to continue to be active members of society, (ii) to inform them on the availability of specialized services for them, and also to inform the involved health professionals on

their particular problems and needs, so that they can work together to overcome them and (iii) to promote research in older people.

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