Short Communication

Turkish version of the SHARE-Frailty Instrument for primary care: reliability and validity in the nursing home setting

Gülendam Hakverdioğlu Yönt[1], Román Romero Ortuño[2], Fisun Şenuzun Aykar[1], Duygu İlbay[3]

[1]Faculty of Health Sciences, Nursing Department, İzmir Tınaztepe University, İzmir, Turkey;
[2]Discipline of Medical Gerontology, School of Medicine, Trinity College Dublin, Ireland;
[3]Head Nurse, İzmir Tınaztepe Hospital, İzmir, Turkey

Abstract

In Turkey, physical frailty instruments have not been studied in the nursing home setting. We determined the reliability and validity of a Turkish version of the SHARE-Frailty Instrument for primary care (SHARE-FI) in Turkish nursing home residents. Cronbach's alpha reliability analysis was performed to determine internal consistency. Factor analysis was conducted to explore construct validity. Concurrent validity was assessed by correlation with the Care Dependency Scale (CDS). One hundred and fifty-one residents were included (mean age 73 years, 41% women). Fifty (33.1%) were identified as non-frail, 49 (32.5%) as pre-frail, and 52 (34.4%) as frail by SHARE-FI. The overall Cronbach's alpha coefficient was 0.81. Factor analysis identified two components accounting for 69% of the variance, with the first and most important component being handgrip strength. SHARE-FI groups were significantly correlated with CDS scores (p<0.05). The Turkish version of SHARE-FI had good reliability and validity in a nursing home setting.

Keywords: Care dependency, Frailty, Geriatric care, Nursing home, Validation studies

In Turkey, the population of older people is increasing at a higher rate than that of other age groups. According to projections from the Turkish Statistical Institute (TUIK), the proportion of people aged 65 years or over in Turkey will be 11.0% in 2025, 16.3% in 2040, and 25.6% in 2080[1]. Although many older people live independently, with population ageing the prevalence of frailty will also increase, adding pressures to health and social care services.

Frailty is a geriatric syndrome of increased vulnerability to stressors resulting from reduced physiological reserves[2]. The physical frailty phenotype was originally defined by Fried et al. as a pre-disability syndrome composed by self-reported exhaustion, unexplained weight loss, weakness by grip strength, slowness by gait speed, and low physical activity[3,4]. By virtue of capturing a pre-disability state, its use could be important for disability prevention and also to identify nursing home residents with lower dependency levels. However, the implementation of the original Fried's phenotype requires *post-hoc* calculations on a reference sample (e.g. lowest 20th percentiles for grip strength, gait speed and physical activity), making it difficult for

contemporaneous use in the nursing home setting.

The SHARE Frailty Instrument for primary care (SHARE-FI) was designed by Romero-Ortuno et al. to facilitate physical frailty identification in the older population and comes with open access calculators in English that allow to immediately obtain a physical frailty score and category in relation to community-dwelling Europeans aged 50 years and over[5,6]. In Turkey, physical frailty instruments have not been studied in the nursing home setting. We determined the reliability and validity of a Turkish version of the SHARE-

 195

Characteristic	Number	%
Gender		
Male	89	58.9
Female	62	41.1
Education		
Not literate	16	10.6
Primary school	67	44.4
Secondary school	25	16.6
High school	33	21.9
University	10	6.6
Chronic diseases		
Diabetes Mellitus	11	7.3
Hypertension	20	13.2
Chronic Obstructive Pulmonary Disease	7	4.6
Cancer	3	2.0
Heart Failure	21	13.9
More than one chronic disease	89	58.9
Use of medications		
Yes	144	95.4
No	7	4.6
Number of medications /days		
1-3	75	49.7
4-6	59	39.1
7 and above	10	6.6
No	7	4.6
SHARE-FI		
Non-frail	50	33.1
Pre-frail	49	32.5
Frail	52	34.4
Mean SHARE-FI continuous score (SD)	2.19 (1.60)	
Mean CDS score (SD)	78.3 (12.0)	
Mean age (SD), years	73.2 (5.7)	

CDS: Care Dependency Scale; SHARE-FI: SHARE Frailty Instrument for primary care; SD: standard deviation.

Table 1. Characteristics of the 151 residents included in the study.

Frailty Instrument for primary care (SHARE-FI) in Turkish nursing home residents.

This study was conducted in a Turkish nursing home with capacity for 387 residents, located in the Aegean region, province of Izmir, between September and December 2022. Only residents who were able to provide informed consent, as evaluated by the physician, were included in the study. Once informed consent was obtained, the nurses in the facility collected the measures detailed below.

The English version of the SHARE-FI was translated into Turkish with inputs from the native Turkish-speaking authors and two independent language experts. Prior to commencement of the study, the nurses in the facility piloted the Turkish version in a sample of 15 residents and they confirmed that it was clear and comprehensible (data from the feasibility study is not shown). The Turkish version of SHARE-FI is shown in Appendix A. Following obtention of the four SHARE-FI self-reported items, handgrip strength
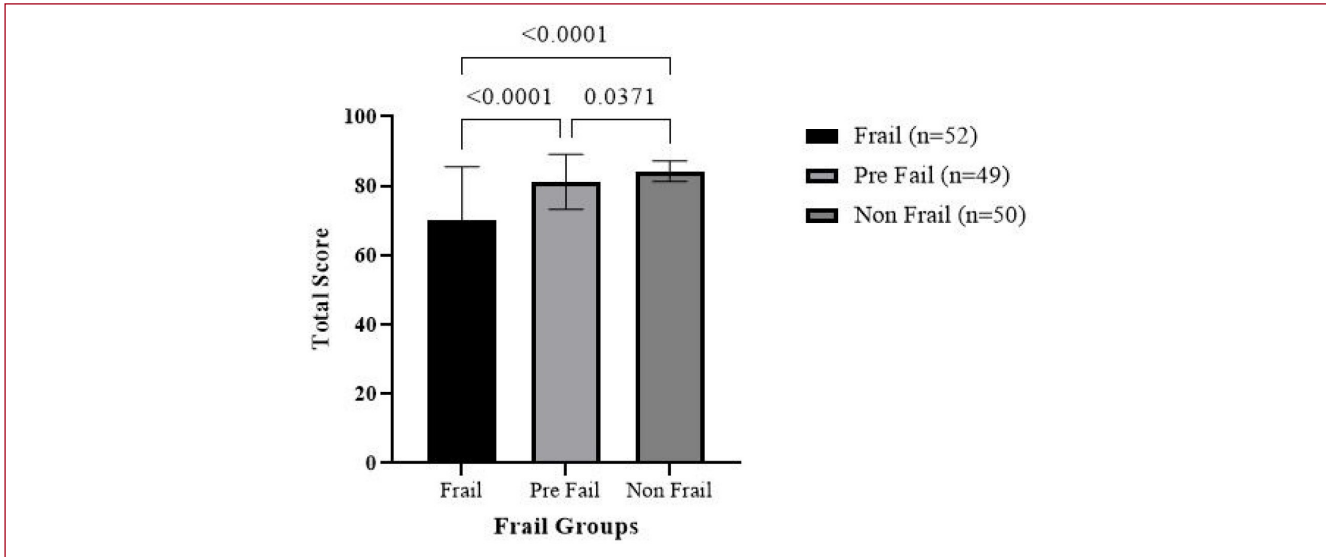
Figure 1. Association between SHARE-FI groups and the total Care Dependency Scale (CDS) score in the included sample of 151 residents. For the non-frail group (n=50), the mean (SD) CDS score was 84.2 (3.0); for the pre-frail (n=49), 81.1 (7.9); and for the frail (n=52), 69.9 (15.6). Higher CDS indicates lower dependency.

was measured with a Saehan Hydraulic Hand Dynamometer in sitting position (shoulder adduction, elbow 90° flexion, wrist 0° extension, and forearm in neutral position). Each resident was encouraged with verbal stimuli to tighten the dynamometer as much as possible in the grip position and to relax at the end of the measurement. A15-second break was given between each measurement. Data obtained were then entered into the original open-access SHARE-FI online calculators[5], to obtain for each resident her/his frailty score and category: non-frail, pre-frail, or frail.

The Care Dependency Scale (CDS) was originally developed in the Netherlands as a measure of nursing care dependency based on physical, psychological, social, and spiritual needs[7,8]. The Turkish validation of the CDS was conducted by HakverdioğluYönt et al. in 2010[9]. The CDS consists of 17 entries graded with Likert type scoring (1=dependent; 5=almost/completely independent). The lowest score (highest dependency) is 17, and the highest (lowest dependency) 85. We correlated the CDS with SHARE-FI so to assess if the latter was able to discriminate degrees of nursing care dependency in this nursing home setting. Additional participant characteristics collected were age, sex, educational attainment, morbidities, and medication use.

Descriptive statistics were given as mean with standard deviation (SD), or count and percentage. Cronbach's alpha reliability analysis was performed to determine the internal consistency of each of the individual SHARE-FI items. Factor analysis (extraction method: Principal Component Analysis; rotation method: Varimax with Kaiser normalization) was

conducted to explore SHARE-FI construct validity. For the measurement of sample adequacy, the Kaiser-Mayer-Olkin Measure of Sampling Adequacy (KMO) and Barlett's Test of Sphericity were used. For good sample adequacy, KMO should be above 0.60. Factors in the scree plot with Eigenvalue >1 were selected and the total variance explained was noted. Concurrent validity was assessed by correlation between the SHARE-FI frailty groups and the CDS score, using one-way ANOVA with Tamhane T2 *post hoc* analysis. Statistical analyses were performed with IBM SPSS 26.0. The level of statistical significance was set at p<0.05.

During the study period, of a total of 387 residents in the facility, 242 were assessed by the physician for possible participation, of whom 151 (62%) were suitable and provided informed consent to be included in the study. The most common reasons for non-inclusion were severe problems with hearing, communication, cognition or mood, and not being able to perform the handgrip strength test due to upper limb pain or weakness from previous stroke. Table 1 summarises the characteristics of the included sample. The overall Cronbach's alpha coefficient was 0.81. By individual SHARE-FI items, the Cronbach's alpha increased to 0.82 if the following single items were removed: exhaustion, loss of appetite, walking difficulties, and climbing one flight of stairs without resting. Removing any other single items resulted in a Cronbach's alpha ≤0.81. Factor analysis identified two components with Eigenvalue ≥1 accounting for 68.6% of the variance, with the first component (composed by the four handgrip strength items) being the most important (Eigenvalue >4). The second component had an Eigenvalue

<2 and included walking difficulties, climbing one flight of stairs without resting, low physical activity, exhaustion, and loss of appetite. KMO value was 0.75 and Bartlett's Test of Sphericity p<0.001 (df=36, $\chi 2$=1013.910). Appendix 2 shows the loadings on these two factors. For the non-frail group (n=50), the mean (SD) CDS score was 84.2 (3.0); for the pre-frail (n=49), 81.1 (7.9); and for the frail (n=52), 69.9 (15.6). As shown in Figure 1, the three SHARE-FI groups were significantly correlated with CDS scores after *post hoc* analyses (all p<0.05).

In this study, we determined the reliability and validity of a Turkish version of the SHARE-Frailty Instrument for primary care (SHARE-FI) for the first time in Turkish nursing home residents. In our included sample, the average CDS was 78, which is in keeping with a generally low level of dependency[10]. This is consistent with the fact that SHARE-FI is a measure of physical frailty and as such, is not intended to capture high levels of disability[4]. However, although our participants stated that they could meet their basic care needs, many reported that they had walking difficulties, poor balance, could not climb stairs or engage in physical activity, and needed mobility aids and assistive technologies. Multimorbidity (and as a consequence, polypharmacy) was high in our sample, in keeping with morbidities being drivers of physical frailty[11]. As per Cronbach's alpha, the internal consistency of the Turkish version of the SHARE-FI was good (0.81)[12]. In a study conducted in Poland, the SHARE-FI Cronbach's alpha was 0.79 for primary care patients and 0.80 for hospital patients[13]. In our study, the items with the highest item-total score correlation in the reliability analysis were the four grip strength items, which was mirrored in the first principal component of the factor analysis. This is in keeping with grip strength being a key marker of sarcopenia[14], and sarcopenia being a key driver of the physical frailty phenotype[3]. Our study showed, for the first time in Turkey, that the SHARE-FI was feasible for administration by trained nurses in the nursing home setting. The identification of physical frailty in the nursing home may be helpful to plan preventative, therapeutic or rehabilitative interventions to help maintain independence and quality of life for as long as possible. Indeed, physical frailty can be delayed and even reversed with appropriate person-centered interventions[15], even in the nursing home setting. However, the findings of this study should be interpreted by considering its limitations. Firstly, SHARE-FI was not feasible in nursing home residents with high dependency levels who could not perform the handgrip strength test, or did not have the cognitive ability to reliably self-report. In addition, the research was conducted in one institution, which limits generalizability. In conclusion, the Turkish version of the SHARE-FI had good reliability and validity in a nursing home setting, and can add value to research and clinical care in this setting.

Ethics approval

Ethical approval for this study was obtained from the University of İzmir Tınaztepe Non-Intervention Clinical Research Ethics Committee (No.: 41/27.12.2021). All included participants provided written informed consent to partake in the study. All study procedures adhered to the Declaration of Helsinki.

References

1. TUIK. İstatistiklerle Yaşlılar, 2021. Available online: https://data.tuik.gov.tr/Bulten/Index?p=Istatistiklerle-Yaslilar-2021-45636 (accessed 18 Feburary 2023), 2022.
2. Clegg A, Young J, Iliffe S, et al. Frailty in elderly people. Lancet 2013; 381:752-762.
3. Fried LP, Tangen CM, Walston J, et al. Frailty in older adults: Evidence for a phenotype. J Gerontol a-Biol 2001;56:M146-M156.
4. Fried LP, Ferrucci L, Darer J, et al. Untangling the concepts of disability, frailty, and comorbidity: Implications for improved targeting and care. J Gerontol a-Biol 2004;59:255-263.
5. Romero-Ortuno R, Walsh CD, Lawlor BA, et al. A Frailty Instrument for primary care: findings from the Survey of Health, Ageing and Retirement in Europe (SHARE). Bmc Geriatr 2010;10.
6. Romero-Ortuno R. The frailty instrument of the survey of health, ageing and retirement in Europe (SHARE-F1) predicts mortality beyond age, comorbidities, disability, self-rated health, education and depression. Eur Geriatr Med 2011;2:323-326.
7. Dijkstra A, Buist G, Moorer P, et al. Construct validity of the Nursing Care Dependency Scale. J Clin Nurs 1999;8:380-388.
8. Dijkstra A, Yont GH, Korhan EA, et al. The Care Dependency Scale for measuring basic human needs: an international comparison. J Adv Nurs 2012;68:2341-2348.
9. GH Y, E AK, L K, et al. Bakım Bağımlılığı Ölçeğinin (Care Dependency Scale) Yaşlı Bireylerde Geçerlik ve Güvenirliğinin İncelenmesi. Turkish Journal of Geriatrics Özel Sayı 2010;13:71.
10. Doroszkiewicz H, Sierakowska M and Muszalik M. Utility of the Care Dependency Scale in predicting care needs and health risks of elderly patients admitted to a geriatric unit: a cross-sectional study of 200 consecutive patients. Clin Interv Aging 2018;13:887-894.
11. Castellana F, Lampignano L, Bortone I, et al. Physical Frailty, Multimorbidity, and All-Cause Mortality in an Older Population From Southern Italy: Results from the Salus in Apulia Study. J Am Med Dir Assoc 2021;22:598-605.
12. Taber KS. The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. Res Sci Educ 2018;48:1273-1296.
13. Muszalik M, Borowiak E, Kotarba A, et al. Adaptation and reliability testing of the SHARE-FI instrument for the assessment of risk of frailty syndrome among older Polish patients. Fam Med Prim Care Re 2018;20:36-40.
14. Schaap LA, Fox B, Henwood T, et al. Grip strength measurement: Towards a standardized approach in sarcopenia research and practice. Eur Geriatr Med 2016;7:247-255.
15. Dent E, Martin FC, Bergman H, et al. Management of frailty: opportunities, challenges, and future directions. Lancet 2019;394: 1376-1386.

Appendix 1.
Turkish version of the SHARE-FI (original English items are also shown).

1. **Tükenmişlik:** Son bir ayda, yapmak istediğin şeyleri yapmak için çok mu az enerjin oldu?
2. **İştah kaybı:** İştahınız nasıldı?
3. **Güçsüzlük:** Kilogram cinsinden maksimum kavrama gücü: Sağ el, Sol El; Deneme 1, Deneme 2
4. **Yürüme güçlüğü:** Sağlık ya da fiziksel sorunlardan dolayı belirtilen günlük aktivitelerden herhangi birini yapmakta zorluk çekiyor musunuz? (3 aydan daha kısa sürmesini beklediğiniz zorluklar dışında): 100 metre yürümek; Dinlenmeden bir kat merdiven çıkmak.
5. **Düşük fizik aktivite:** Bahçe işleri, araba temizleme veya yürüyüşe çıkma gibi düşük veya orta düzeyde enerji gerektiren faaliyetlerle ne sıklıkla meşgul olursunuz?

1. Exhaustion – In the last month, have you had too little energy to do the things you wanted to do?
2. Loss of appetite – What has your appetite been like?
3. Weakness – Maximum grip strength in kilograms: Right hand, Left hand; Attempt 1, Attempt 2
4. Walking difficulties – Because of a health or physical problems, do you have any difficulty doing any of the following everyday activities? (Exclude any difficulties that you expect to last less than 3 months): Walking 100 meters; Climbing one flight of stairs without resting.
5. Low physical activity – How often do you engage in activities that require a low or moderate level of energy, such as gardening, cleaning the car or going on a walk?

Appendix 2.
Factor Structure of the SHARE-FI.

Rotated Component Matrix		
Variables	**Component**	
	1	**2**
Exhaustion		0.57
Loss of appetite		0.43
Weakness: Right-hand Attempt 1	0.89	
Weakness: Right-hand Attempt 2	0.86	
Weakness: Left-hand Attempt 1	0.89	
Weakness: Left-hand Attempt 2	0.89	
Walking difficulties		0.91
Climbing one flight of stairs without resting		0.86
Low physical activity		0.77

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.