ORIGINAL ARTICLE

EPIDEMIOLOGY, CLINICAL PRACTICE AND HEALTH

Validation of the Clinical Frailty Scale version 2.0 in Turkish older patients

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Aim: Frailty is a syndrome that affects certain older adults more than others, and it has physical, cognitive, psychological, social and environmental aspects. The aim of our study was to determine the validity and reliability of the Clinical Frailty Scale (CFS) version 2.0 in Turkish. In total, 204 older adults aged ≥65 years took part in this study.

Methods: The necessary permissions were obtained from Rockwood *et al.* The Turkish version of CFS version 2.0 had been appropriately translated through translation to the back-translation process. A questionnaire was used to investigate certain descriptive features, as well as the newly edited Turkish translation of CFS version 2.0, the Turkish version of the FRAIL Scale and the Turkish version of the Edmonton Frail Scale.

Results: The age range was 65–95 years. In a Pearson correlation analysis, a positive link was discovered between FRAIL and CFS ($r = 0.761$ and $P = 0.000$) as well as CFS and Edmonton ($r = 0.895$ and $P = 0.000$).

Conclusion: The Turkish translation of CFS version 2.0 has been determined to be suitable, valid and reliable for use in frailty screening in outpatient clinics. **Geriatr Gerontol Int 2022; 22: 730–735**.

Introduction

Frailty is a syndrome that affects certain older adults more than others, and it has physical, cognitive, psychological, social and environmental aspects.[1] Advanced age, genetic predisposition, inappropriate lifestyle properties such as smoking addiction, malnutrition, sedentary lifestyle, poor socioeconomic status, geriatric syndrome findings and comorbidities are factors that increase the likelihood of frailty.[1–3]

Hospitalizations are more common among frail older adults, and they fall more frequently resulting in temporary and/or permanent disabilities. Older adults who are frail have a greater mortality rate than those of the same age with less frailty.[2–4]

For all these reasons, clinicians must be aware of the frailty levels of the older patients within their communities. For the detection and monitoring of frailty, various frailty scales have been developed. These scales have strengths and weaknesses.[5–8]

The purpose of our study was to determine the validity and reliability of the Clinical Frailty Scale (CFS) version 2.0 in Turkish, which was developed by Rockwood *et al.* for the detection and follow-up of frailty in the older adults.[9] Another aim of the study is to investigate the fragility of the participants and the factors associated with frailty such as sociodemographic characteristics, chronic diseases and geriatric syndrome findings.

Methods

Study design

In total, 204 participants aged ≥65 years who applied to the SBU, Antalya Training and Research Hospital, Family Medicine units for various reasons, agreed to participate in the study, and then if they did not have a cognitive disorder that prevented them from answering the questions they were included in the study. Face-to-face interviews were conducted, and a questionnaire was used to investigate certain descriptive features, as well as the newly edited Turkish translation of CFS version 2.0, Turkish version of the FRAIL Scale, and Turkish version of the Edmonton Frail Scale. In addition, a second interview with the first 30 individuals was held 2 weeks after the first interview, and this time only CFS version 2 was used, which allowed for a test–retest comparison.

The collected data were analyzed using SPSS version 22.0 (IBM Corp., Armonk, NY, USA). $P < 0.05$ was accepted as the significance level.

Clinical Frailty Scale

The 7-point CFS was first developed by Rockwood *et al.* in 2005.[10] The scale was later revised in 2007 and 2020. The CFS, whose validity and reliability we investigated in our research, is the

CLINICAL FRAILTY SCALE - TURKISH

1	2	3	4	5	6	7	8	9
ÇOK DİNÇ	**DİNÇ**	**İYİ YÖNETİLEBİLEN**	**ÇOK HAFİF KIRILGANLIKLA YAŞAYAN**	**KIRILGANLIKLA YAŞAYAN**	**ORTA KIRILGANLIKLA YAŞAYAN**	**ŞİDDETLİ KIRILGANLIKLA YAŞAYAN**	**ÇOK ŞİDDETLİ KIRILGANLIKLA YAŞAYAN**	**TERMİNAL HASTA**
Sağlam, aktif, enerjik ve motive olmuş insanlardır. Düzenli egzersiz yapma eğilimindedirler ve yaşlarına göre en formda olanlar arasındadırlar.	Aktif hastalık semptomu bulunmayan kişilerdir, fakat kategori 1'den daha az dinçtirler. Sık sık egzersiz yaparlar veya ara sıra, örneğin mevsimsel olarak, çok aktif olurlar.	Ara sıra semptomatik olsalar bile, sağlık problemleri iyi kontrol edilebilen kişilerdir, fakat rutin yürüyüş dışında sıklıkla aktif değildirler.	Önceden "incinebilir" şeklinde adlandırılırdı, bu kategori tam bağımsızlıktan erken geçişi işaret eder. Bu kişiler günlük işler için başkalarına bağımlı olmamakla birlikte, genellikle semptomları aktivitelerini sınırlamaktadır. Yaygın şikayet "yavaş olmak" ve/veya gün içinde yorgun olmaktır.	Sıklıkla çok belirgin şekilde yavaşlayan ve üst düzey enstrümental günlük yaşam aktivitelerinde (mali işler, ulaşım, ağır ev işleri) yardıma ihtiyaç duyan kişilerdir. Tipik olarak hafif kırılganlık; alış veriş yapmayı, dışarıda yalnız yürümeyi, yemek hazırlamayı, ilaç kullanmayı ve hafif ev işlerini yapmayı ilerleyici şekilde bozar.	Tüm dış faaliyetlerinde ve ev işlerinde yardıma ihtiyaç duyan kişilerdir. İçeride, sıklıkla merdivenlerle sorun yaşarlar, yıkanırken yardıma ihtiyaç duyarlar ve giyinirken minimal yardıma ihtiyaç duyabilirler.	Nedeni ne olursa olsun (fiziksel veya bilişsel) kişisel bakımlarında tamamen bağımlıdırlar. Buna rağmen stabildirler ve yüksek ölüm riski taşımazlar (6 ay içinde).	Kişisel bakımlarında ve yaklaşan yaşam sonu bakımlarında tamamen bağımlıdırlar. Tipik olarak, küçük bir hastalıktan bile iyileşemezler.	Yaşam sonu yaklaşmıştır. Bu kategori yaşam beklentisi 6 aydan az olan ve başka türlü şiddetli kırılganlık yaşamayan kişiler için geçerlidir. (Pek çok terminal dönemdeki insan, ölüme çok yakın oluncaya kadar egzersiz yapabilir.)

DEMANSLI HASTALARDA KIRILGANLIK SKORLAMASI

Kırılganlık derecesi genellikle demans derecesine karşılık gelir. Hafif demansın yaygın semptomları yakın tarihli bir olayın ayrıntılarını unutma ancak olayı hatırlama, aynı soruyu/hikayeyi tekrarlamayı ve sosyal geri çekilmeyi içerir.

Orta demansta, yakın hafıza çok bozulmuştur, buna rağmen geçmişi zamanda yaşanan olayları iyi hatırlarlar. Telkinle kişisel bakımlarını yapabilirler.

Ciddi demansta, yardım almadan kişisel bakımlarını yapamazlar.

Çok ciddi demansta sıklıkla yatalaktırlar. Çoğu neredeyse sessizdir.

Rockwood K et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005:173;489-495.

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Figure 1 Clinical Frailty Scale, Turkish translated final version.
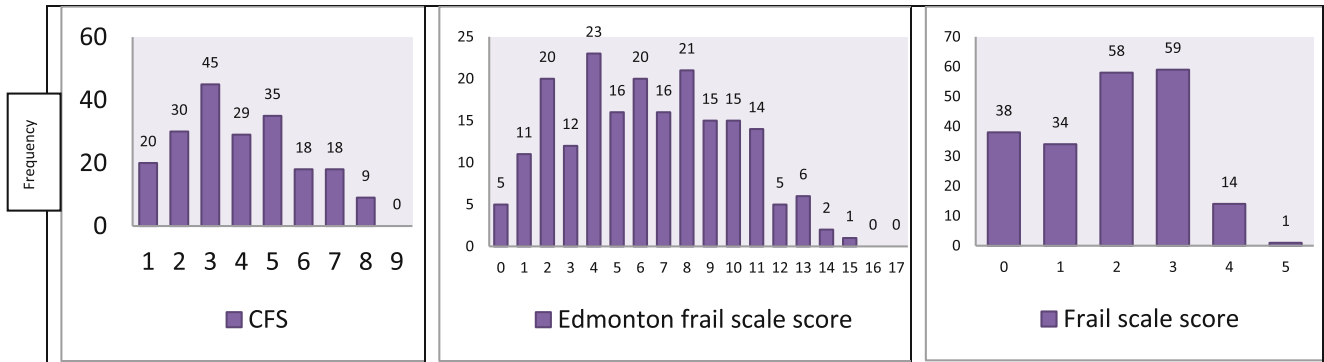

Figure 2 Population distributions of the Clinical Frailty Scale (CFS), the Edmonton Frail Scale, and the FRAIL Scale score in the study population.

9-level (version 2.0) form revised in 2020. The frailest older adults can receive 9 points, while the healthiest older adults can receive 1 point according to CFS version 2.0.

Edmonton Frail Scale

This scale was developed by Rolfson et al. in Canada in 2006 to assess the frailty of the older adults.[11] The frailest older adults could get 17 points while the most vigorous older adults could get 0 points. Scores obtained are defined as 0–4 non-frail, 5–6 apparent

vulnerability, 7–8 mild frailty, 9–10 moderate frailty and ≥11 severe frailty. Aygör et al. conducted a Turkish validity and reliability study in 2018, and this version has been used in several studies in Turkey.[12]

FRAIL Scale

Morley et al. developed and published the FRAIL Scale in the United States in 2012.[13] It investigates the fatigue, resistance, movement, illness and weight loss of individuals. The healthiest older adults can get 0 points, and the frailest older adults can get

5 points. The scores are defined as 0 being healthy, 1–2 pre-frail and 3–5 frail. Hymabaccus Muradi conducted the Turkish validity and reliability study as part of his medical specialization thesis in 2017.[14]

Statistical analysis

Descriptive statistics were given with number, percentage, mean, standard deviation, minimum and maximum in the study. Compliance with the normal distribution was checked using the Shapiro–Wilk test. Numerical data were analyzed using the Mann–Whitney U- and Kruskal–Wallis tests, while categorical data were analyzed using Fisher's chi-squared test.

The sample size was calculated as 251 with the sample size with a known population using calculation formula with 95% confidence interval and 5% sampling error. Owing to the pandemic conditions, 204 people were reached (84.64% of the target).

Correlation between the CFS test and the re-test, the correlation between CFS, Edmonton Frail Scale, and FRAIL Scale was evaluated using Pearson's correlation analysis.

Ethics

The study was carried out in line with the Helsinki Declaration. Permission from the Clinical Research Ethics Committee of SBU Antalya Training and Research Hospital (March 11, 2021, no. 2/39) was obtained for the study.

Translation

The CFS translation began when the necessary permissions were received from Dr. Rockwood and his team, the team that developed the CFS. One of the authors translated CFS into Turkish first. Then the Turkish translation was translated into English by another author. The mother tongue of both translators is Turkish, and they are medical doctors with a good command of English. These translations were then checked by a native speaker and some adjustments were made. Next, the authors revised the Turkish version, made the necessary arrangements and then finalized the translation. The researchers that developed the CFS were given the final version of the Turkish translation (Fig. 1).

Results

The mean age was 73.5 ± 7.3 years, and the age range was 65–95 years: 38.7% ($n = 79$) of the participants were men and 61.3% ($n = 125$) were women; 58.5% ($n = 120$) were married, 41.2% ($n = 84$) were single; 52.5% ($n = 107$) were living with their spouse, 33.4% with their spouse and children ($n = 68$), 11.3% ($n = 11$) were living alone, 1% ($n = 2$) were living with a caregiver; 87.7% ($n = 179$) had at least one chronic disease. Of these, 59.3% ($n = 121$) had hypertension (HT), 34.8% diabetes mellitus (DM; $n = 71$), 6.4% cancer ($n = 13$), 20.6% coronary artery disease ($n = 42$) and 10.8% had asthma and/or chronic obstructive respiratory disease (COPD; $n = 22$).

The study employed the CFS, Edmonton Frail Scale and FRAIL Scale. The mean and standard deviations were 3.98 ± 1.932 for CFS, 6.37 ± 3.51 for the Edmonton Frail Scale, 1.9 ± 1.23 for the FRAIL Scale. Participants scored: minimum of 0, maximum of 15 points in the Edmonton Frail Scale; minimum of 0 and maximum of 5 points in the FRAIL Scale; and minimum of 1 and maximum of 8 points in the CFS. There were no CFS level 9, terminal ill participants in the study because our participants were selected from people who applied to the hospital

Table 1 Average score and standard deviation values of the participants on the frailty scales

		Edmonton Frail Scale	FRAIL Scale
		Mean ± SD	Mean ± SD
Gender	Female	6.7 ± 3.3	2.0 ± 1.1
	Male	5.7 ± 3.6	1.7 ± 1.2
Marital status	Married	5.4 ± 3.4	1.6 ± 1.2
	Single	4.8 ± 2.8	1.5 ± 1.2
	Widow	8.4 ± 2.9	2.5 ± 1.0
Education	Illiterate	8.3 ± 3.3	2.2 ± 1.3
	Literate but not finishing school	9.0 ± 3.2	2.5 ± 1.0
	Primary school	7.2 ± 3.1	2.2 ± 1.1
	Secondary school	4.5 ± 2.7	1.1 ± 0.9
	High school	4.1 ± 2.4	1.3 ± 1.1
	University	2.0 ± 1.5	0.7 ± 0.8
Lives with	Alone	6.0 ± 2.5	1.7 ± 1.2
	Their partner	5.1 ± 3.2	1.5 ± 1.2
	Their partner and children	8.1 ± 3.0	2.0 ± 0.9
	One of the children	8.4 ± 3.1	2.6 ± 0.9
	Relative	6.0 ± 4.5	2.0 ± 1.4
	Caregiver	13.0 ± .	4.0 ± .
	Family members in rotation	3.00 ± .	0.00 ± .
Chronic disease	No	2.5 ± 1.9	0.6 ± 0.9
	Yes	6.8 ± 3.3	2.0 ± 1.1
Hypertension	No	5.3 ± 3.7	1.6 ± 1.3
	Yes	7.0 ± 3.1	2.0 ± 1.1
DM	Non-existent	6.0 ± 3.5	1.8 ± 1.2
	Existent	6.9 ± 3,2	2.0 ± 1.1
Cancer	Non-existent	6.2 ± 3.5	1.8 ± 1.2
	Existent	7.9 ± 2.3	2.2 ± 1.2
Asthma/ COPD	Non-existent	6.3 ± 3.5	1.8 ± 1.2
	Existent	6.2 ± 3.2	2.0 ± 1.3
Forgetfulness	Non-existent	4.0 ± 2.4	1.2 ± 1.0
	Existent	8.8 ± 2.6	2.5 ± 1.0
Immobilization	Non-existent	4.9 ± 2.7	1.4 ± 1.1
	Existent	10.2 ± 2.3	3.0 ± 0.7
Incontinence	Non-existent	5.0 ± 2.8	1.5 ± 1.1
	Existent	9.2 ± 2.9	2.6 ± 1.0
Falling	Non-existent	5.7 ± 3.4	1.7 ± 1.2
	Existent	8.2 ± 2.9	2.5 ± 0.8
Pressure sore	Non-existent	5.9 ± 3.2	1.7 ± 1.1
	Existent	11.6 ± 1.4	3.3 ± 0.5
Visual impairment	Non-existent	4.5 ± 3.2	1.0 ± 0.9
	Existent	6.5 ± 3.4	1.9 ± 1.2
Depression	Non-existent	5.2 ± 3.4	1.5 ± 1.2
	Existent	8.4 ± 2.6	2.5 ± 0.9
Pain	Non-existent	2.5 ± 1.9	0.8 ± 0.9
	Existent	7.2 ± 3.2	2.1 ± 1.1
Insomnia	Non-existent	4.7 ± 3.1	1.3 ± 1.2
	Existent	7.4 ± 3.3	2.2 ± 1.0

COPD, chronic obstructive respiratory disease; DM, diabetes mellitus.

polyclinic and were able to answer the questions they were asked. Figure 2 shows the distribution of scores achieved in the research scales based on the number of participants.

In a Pearson correlation analysis, a positive link was discovered between the FRAIL Scale and CFS ($r = 0.761$ and $P = 0.000$) as well as the CFS and the Edmonton Frail Scale ($r = 0.895$ and $P = 0.000$).

The CFS test was performed again 2 weeks after the administration of the questionnaires to the first 30 patients included in the study. When the correlation between test–retest was evaluated, a positive correlation was determined ($r = 0.946$ and $P = 0.000$).

Table 1 shows the average score and standard deviation values of the participants on the frailty scales based on some descriptive characteristics. However, the CFS is an ordinal scale, and because of this we did not use the average score and standard deviation values of the CFS.

The CFS, Edmonton Scale and FRAIL scales were used to compare some of the secondary outcome variables we investigated. Scales were grouped as frail and not frail. For this, 1–3 points range was not frail, 4–9 points range frail for CFS; 0–6 points range not frail, 7–17 points range frail for the Edmonton Frail Scale; and 0–2 points were grouped as not frail and 3–5 points were grouped as frail for the FRAIL Scale. The results are shown in Table 2.

Table 2 Results of frailty scales according to some sociodemographic and clinical data

		CFS			Edmonton Frail Scale			FRAIL Scale		
		Frail ($n = 109$)	Not frail ($n = 95$)	p	Frail ($n = 97$)	Not frail ($n = 107$)	p	Frail ($n = 74$)	Not frail ($n = 130$)	P
Gender	Female	72	53	0.087	63	62	0.189	49	76	0.298
	Male	37	42		34	45		25	54	
Marital status	Married	50	70	0.000	46	74	0.000	28	92	0.000
	Single	7	11		6	12		5	13	
	Widow	52	14		45	21		41	25	
Education	Illiterate	8	2	0.000	6	4	0.000	5	5	0.000
	Literate but not finishing school	19	3		15	7		13	9	
	Primary school	69	39		67	41		50	58	
	Secondary school	8	19		7	20		1	26	
	High school	4	14		2	16		4	14	
	University	1	18		0	19		1	18	
Lives with	Alone	9	14	0.000	8	15	0.000	6	17	0.000
	His/her partner	42	65		38	69		24	83	
	His/her partner and children	8	4		8	4		4	8	
	One of the children	46	10		40	16		37	19	
	Relative	3	1		2	2		2	2	
	Caregiver	1	0		1	0		1	0	
	Family members in order	0	1		0	1		0	1	
Chronic disease	No	2	23	0.000	1	24	0.000	1	24	0.000
	Yes	107	72		96	83		73	106	
Forgetfulness	No	30	76	0.000	16	90	0.000	15	91	0.000
	Yes	79	19		81	17		59	39	
Immobilization	No	57	93	0.000	48	102	0.000	30	120	0.000
	Yes	52	2		49	5		44	10	
Incontinence	No	56	84	0.000	43	97	0.000	31	109	0.000
	Yes	53	11		54	10		43	21	
Falling	No	75	81	0.004	63	93	0.000	50	106	0.027
	Yes	34	14		34	14		24	24	
Pressure sore	No	93	95	0.000	81	107	0.000	58	130	0.000
	Yes	16	0		16	0		16	0	
Visual impairment	No	6	14	0.024	4	16	0.008	2	18	0.013
	Yes	103	81		93	91		72	112	
Depression	No	53	80	0.000	43	90	0.000	35	98	0.000
	Yes	56	15		54	17		39	32	
Pain	No	4	33	0.000	1	36	0.000	4	33	0.000
	Yes	105	62		96	71		70	97	
Insomnia	No	28	54	0.000	21	61	0.000	21	61	0.011
	Yes	81	41		76	46		53	69	

Discussion

CFS correlates positively with the retest, the Edmonton Frail Scale and the FRAIL Scale according to our study, and the results are statistically significant. In a CFS validity study conducted in Korea, the CFS Cardiovascular Health Study frailty scale and the comprehensive geriatric assessments frailty index were compared, and a correlation was found between the scales.[15] In Australia, similar to our study, the English versions of the CFS and Edmonton scales were compared, and correlation was found again.[16] Correlation between the CFS and the Barthel index was found in the CFS Greek validity study in Greece.[17] In the CFS French validity study in France, similar to our study, CFS was applied twice with an interval of 2 weeks, and a correlation was found between test and retest.[18]

CFS appears to be more favorable than Edmonton in that it can produce outcomes in less time and does not require patients to conduct activities such as clocking or walking. Besides, CFS is an assessment tool and the FRAIL scale is screening tool. Therefore, in addition, the comparison of CFS with the FRAIL scale is not recommended.

Several studies on the validity and reliability of CFS have been conducted around the world. In these studies, comparisons were made with Cardiovascular Health Study frailty scale, comprehensive geriatric assessments frailty index, Edmonton Scale, Barthel index, Fried Frailty Phenotype, electronic Frailty Index, Tilburg Frailty Indicator and SHARE Frailty Index scales.[16–20] The results of all studies are similar to our study; therefore, we have performed a study compatible with the literature.

The second aim of our study was to reveal the frailty of the participants. All the investigated characteristics of the participants gave parallel results in all three frailty tests (Table-2).

Women were found to be more frail than men in our study, although the difference was not statistically significant. In a similar study, Gobbens *et al.* discovered that social frailty is common, particularly among women who live alone.[21] Contrary to these results, in a meta-analysis conducted in Japan investigating frailty, it was found that men living alone were frailer than women, but this was associated with living alone rather than gender, no statistically significant difference was found.[22] In a review written in Australia, it is stated that frailty increases particularly in older men. Here, it is explained that testosterone may have a frailty-enhancing effect, estrogen may have a protective effect, and therefore, women have less risk of death and frailty. Again, according to this review, it is said that men benefit less from health services, they are more affected by social isolation and therefore, they are frailer.[23] There are different results between studies. In our study, the reasons for the high frailty of women may be the more patriarchal society in Turkey; the high number of births, the fact that women generally do housework, are less educated and are generally at a lower economic level than men. Although there are regional, socioeconomic and educational differences in Turkey, there are still patriarchal society features. Similar to our research, there are studies that link the poor health status of women to the characteristics of a patriarchal society.[24] We think that this group, which is disadvantaged in the field of education and economy, may also face difficulties in accessing health services.

The widowed and single older adults in our study were found to be frailer than the married ones when we examined them based on their marital status. In a study conducted with 3079 participants in China, frailty was found to be higher in widowed, divorced or separated men for some reason.[25]

According to our study, it was found that frailty is less in the older adults who live alone and with their spouse, regardless of marital status, and more frailty in the older adults who live with their children, caregiver or a relative. Similar to our study, in a study investigating frailty and investigating 484 older adults aged ≥75 years, frailty was found to be high particularly in those living alone.[21] In a meta-analysis, a significant relationship was found between frailty and living alone.[22] Our study result differs from the literature. As stated in many studies, loneliness and social isolation are reasons that increase the frailty. However, the reason for the difference in our study may be that the older adults, who cannot live alone, prefer to live with their children, relatives or caregivers, particularly those whose general condition is worse. In short, this situation may be the result of frailty, not the cause.

According to our results, frailty decreases as the level of education increases. In our study, frailty is at the lowest level in the older adults who have received university education. In a study conducted in Istanbul, a statistically significant relationship was found between low education level and frailty, similar to our study.[26] According to a study published in the Netherlands in 2014 that investigated the relationship between frailty and education level, the risk of frailty decreases as education increases.[27] Again, in a study with a large number of participants in Europe, the relationship between education and frailty was explained.[28] Our results are compatible with the literature.

The presence of chronic disease has an impact on frailty. Frailty was found to be higher in the older adults with chronic disease, regardless of the disease; this finding is statistically significant. When some diseases were examined individually, frailty was higher in the older adults with HT, DM, cancer, asthma, COPD and depression compared with those without these diseases. In a frailty study conducted in Singapore, frailty was found to be higher in people with chronic diseases, such as dementia, DM and cancer, in parallel with our study.[29] According to the results of a study of 14 082 people aged ≥55 years living in Europe, people with at least one chronic disease are frailer than those without chronic disease.[28] Various complications may occur in the long term with chronic diseases such as hypertension, DM and COPD. Fatigue, weakness, limitation of movement and amputation are among these complications and these make it difficult for older adults to perform activities of daily living. Because of this, frailty appears to be associated with the presence of chronic diseases, while some chronic diseases appear to be associated with frailty.

Geriatric syndrome findings are symptoms such as forgetfulness, inactivity, urinary incontinence, falls, pressure sores, visual impairment, depression, pain and insomnia, which occur due to multiple etiological reasons in the older adults.[30] In our study, it was found that frailty was statistically higher in the presence of all these findings individually. However, in our study, it was not investigated whether these findings were due to geriatric syndrome or another organic disease. Studies into the cause-and-effect link between frailty and all geriatric syndrome findings are needed.

Conclusion

The Turkish translation of CFS version 2.0 and the two frailty scales, whose Turkish validity and reliability were previously evaluated, were shown to have a high correlation in our study. As a result, the Turkish translation of CFS version 2.0 has been determined to be suitable, valid and reliable for use in frailty screening in outpatient clinics.

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Disclosure statement

The authors declare no conflict of interest.

Data availability statement

Data openly available in a public repository that issues datasets with DOIs

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