

An effective and practical tool to assess physical frailty in older adults: Turkish validation of the FRAIL Scale

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ABSTRACT

Objective: Practical scales with tested validity and reliability are needed to clinically determine frailty. The aim of this study is to find out whether the Fatigue, Resistance, Ambulation, Illnesses, and Loss of weight (FRAIL) Scale is an effective screening scale to show frailty.

Patients and Methods: The Frail non-Disabled (FIND) scale validated in the Turkish population was applied for FRAIL Scale validation. Comprehensive geriatric assessment and Fried Index were performed on 85 outpatients who were 65 years and older. The patients were examined in terms of comorbidity, number of falls, living environment, number of drugs used, and hospitalization in the last year.

Results: The FRAIL Scale had a high correlation with the FIND scale and Fried Index (correlation coefficients are 0.956 and 0.934, respectively). In addition, it was found to be associated with Activities of Daily Living (ADL), Instrumental Activities of Daily Living (IADL) scales, the Mini-Mental State Examination (MMSE), Yesavage Geriatric Depression Scale (GDS), Mini Nutritional Assessment short-form (MNA-sf), Clock Drawing Test (CDT), handgrip strength, and timed up and go test ($p < 0.05$). The compliance between independent practitioners and test-retest compliance were found to be 100% (full compliance, Cronbach's alpha coefficient is 1.00).

Conclusion: In the Turkish geriatric population, the FRAIL scale was found to be a reliable and valid scale in showing frailty.

Keywords: The FRAIL Scale, Frailty, Comprehensive geriatric assessment

1. INTRODUCTION

Frailty is defined as the state of weakness arising from the decrease in physiological reserves caused by physiological changes, diseases, and/or inadequate nutrition, etc. with advancing age [1]. Frailty is characterized by the impairment in adaptation to stress conditions such as acute disease and trauma depending on the decrease in the reserve in neuromuscular, metabolic, and immune systems [2]. This topic is gaining more and more importance since frail older patients go through mortality, morbidity, and health expenditures when they are exposed to stress factors [3, 4].

As frailty is a dynamic process, it is of great importance to determine the frail population and provide appropriate treatment. According to a consensus involving international communities, all patients 70 years of age and above, those with chronic diseases, and individuals who have lost more than 5% weight over the last year should be screened for frailty [5].

There are many risk factors for frailty in older people [6]. Since frailty is a multifactorial clinical condition, it is quite difficult to measure [7]. Many easily applicable and reliable methods have been developed to determine frailty in geriatric clinics. "The Fatigue, Resistance, Ambulation, Illnesses, and Loss of weight (FRAIL) Scale developed by Morley et al., consists of five items [8]. In many countries, the FRAIL Scale has been validated and proved to be an effective method in determining frailty [9-13]. It allows for evaluation via the investigation of the patient's state of fatigue, resistance, weight loss, and other diseases. When it was first created, the FRAIL Scale was rather for measuring frailty in middle-aged Americans of African origin. However, it has been proved to be a reliable frailty scale in older patients living in many different societies. In the validity and reliability study of the FRAIL Scale on a Mexican population aged 60 and above in 2016, it was found to be a reliable scale in Mexican society, and

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associated with mortality, duration of hospital stay, dependency, and falls [10]. In the validation study of the FRAIL scale in Australia in 2015, it was proved to be a reliable frailty scale [12]. In the study conducted on 1,235 older people in China in 2017, the validity and reliability of the FRAIL Scale was proved [11].

There are no gold standard tests to measure frailty today, and the number of frailty measurement tests is quite high as well. In this study, it was aimed to reveal whether the FRAIL scale was an effective screening scale to show frailty. Frail non-Disabled (FIND) scale was used for FRAIL Scale validation in the Turkish population.

2. PATIENTS and METHODS

Participants

Eighty-five individuals, who presented to the Outpatient Clinic of Geriatric Medicine between March and July 2017, were 65 years old and older, agreed to participate in the study, and had the capability of understanding and answering the questions, were included in the study. Criteria of exclusion from the study were determined as follows: (1) Presence of active malignancy, (2) Patients with physical disabilities (extremity amputations, sequelae due to stroke, problems with speaking and hearing), (3) Patients with acute infections, (4) Patients with acute diseases (decompensated congestive heart failure, recent myocardial infarction/stroke, chronic obstructive pulmonary disease exacerbation), (5) Patients who were hospitalized or had an operation in the last month, (6) Patients with dementia at an advanced stage, (7) Patients unable to tell their medical history and not cooperating, (8) Patients with organic psycho-affective disorder and organic degenerative disease.

The patients were examined in terms of education status, gender, height and weight, smoking, alcohol consumption, living environment, number of falls in the last year, hospitalization in the last year, presence and type of urine incontinence, the status of vaccination, the number of drugs used, and presence of comorbidity. Furthermore, gait speeds (4.57 meters) and handgrip strengths (hand-held dynamometer (Takei A5401, Japan) determined during the examination were recorded. Individuals were asked about the hand they use in daily life activities such as eating and writing and in activities requiring power, and the hand they use for these tasks was determined as the dominant hand. The handgrip strength was measured with a Handgrip Dynamometer (Takei A5401, Japan) (measured by grip strength with a hand dynamometer). Measurements were made when the patients were standing, with the elbow and wrist in full extension. Measurements were repeated three times with intervals of five seconds, recorded in kilograms, and then averaged. For the gait speed test, the person was asked to walk a distance of 4.57 meters at a normal speed as in his daily life, and the duration of walking the 4.57 meters distance was calculated in seconds. The test was run 2 times and the best score achieved was recorded. The walking speed was recorded in m / sec by dividing the distance into the recorded times.

The FRAIL Scale

The FRAIL Scale is a test consisting of 5 questions, and an evaluation is made by investigating the patient's state of fatigue, resistance, ambulation, weight loss, and illnesses. To evaluate the state of fatigue of the patient, "How much of the time during the past 4 weeks did you feel tired?" is asked as the first question. The patient chooses one of 1=All of the time, 2=Most of the time, 3=Some of the time, 4=A little of the time, and 5=None of the time; if the patient's answer is 1 or 2, 1 point is given whereas the others get 0. To measure the resistance of the patient, "By yourself and not using aids, do you have any difficulty walking up 10 steps without resting?" is asked as the second question; if the patient says yes, 1 point is given, if no, then 0. To evaluate the ambulation of the patient, "By yourself and not using aids, do you have any difficulty walking several hundred meters?" is asked as the third question; if the patient says yes, 1 point is given, if no, then 0. To evaluate the illnesses of the patient, "Did a doctor ever tell you that you have (illness)?" (Hypertension, diabetes, cancer (except for small skin cancer), chronic lung disease, heart attack, congestive heart failure, angina, asthma, arthritis, stroke, kidney disease). If the patient has 0-4 diseases, 0 point is given; if 5-11 diseases, then 1 point. To evaluate weight loss, "How much do you weigh with your clothes on but without shoes? (current weight)" "One year ago, how much did you weigh without your shoes and with your clothes on?" (Weight one year ago) are asked, and the percentage of weight change is calculated. If the weight change is above 5%, 1 point is given. In the FRAIL Scale, which consists of 5 items, 0 point is considered non-frail, 1-2 points pre-frail, and >2 points frail [8]. Patients participating in the study were evaluated as blind in terms of comprehensive geriatric assessment (CGA) and FRAIL Scale.

Reference Tools

Various screening and assessment tests are used for an objective, comprehensive geriatric assessment. As part of the comprehensive geriatric assessment, history, physical examination, geriatric syndrome questioning, and tests related to geriatric syndromes were performed. These include the Katz Activities of Daily Living (ADL) scale [14, 15], Instrumental Activities of Daily Living (IADL) scale [16], the Mini-Mental State Examination (MMSE)[17, 18], Mini Nutritional Assessment short-form (MNA-sf) [19, 20], Yesavage Geriatric Depression Scale (GDS) [21], 4.57-meters walking test and clock-drawing test (CDT) [22]. The patient's age, demographic characteristics, comorbid diseases, social status, cognition, mood, functionality, nutritional status, and geriatric syndromes were evaluated and recorded. A researcher who participated in the study recorded whether the patients were clinically frail or not according to the comprehensive geriatric assessment. These tests were applied to the patients by a geriatrician in the geriatrics outpatient clinic. Verbal responses were obtained from the patients.

The FIND scale was developed by Cesari et al. in 2014 [23, 24]. The FIND scale consists of 5 questions: 2 questions are about disability (walking 400 meters and climbing up one floor) and 3 questions are about frailty assessment (weight loss, fatigue, and physical activity). It ranges between 0-5 points, and the state

of disability and frailty is determined according to the score received. If the patient gets 1 point from the first 2 questions, it is considered to be a disability, and if the patient scores zero, the other 3 questions are asked. If the patient gets 1 point from these questions, it is considered as frail.

The patients were subjected to the Fried Index. In the Fried Index, involuntary weight loss, fatigue stated by the individual, weakness, slow gait speed, and low physical activity are assessed [25]. Weight loss (1): The patient has an unintentional weight loss of 4.5 kg or more compared to the previous year, or a weight loss of 5% or more in body weight at follow-up compared to the previous year. The state of exhaustion (2) was determined by 2 questions on the Center for Epidemiological Research – Depression (CES-D) scale: How often in the last week you felt that everything you did was an effort? and 'How often in the last week you felt that you could not go out? Participants who answered these questions 3-4 days a week or more were accepted as meeting the exhaustion criterion. Low physical activity (3) was assessed using the Minnesota Leisure Physical Activity Questionnaire [26]. Weekly calories spent on activities are calculated using a standard algorithm. This variable is classified according to gender. Men: Those who show physical activity less than 383 Kcal per week are considered frail for this criterion. Women: Those who show physical activity less than 270 Kcal per week were considered frail for this criterion. Slow gait speed (4) was calculated by looking at the walking speed at 4.57 meters. Weakness (5): According to the measurement made with Jamar hand dynamometer (Takei A5401, Japan), it was interpreted according to body mass index. According to these criteria, patients with 3 or higher points are reported as 'frail', those with 1 or 2 points as 'pre-frail', and those with 0 point as 'non-frail'.

Translation

Firstly, the FRAIL Scale, consisting of 5 questions, was translated from English to Turkish. To ensure the language validity of the scale, a group of specialists checked the Turkish translation after it was completed. After the translation was checked, the Turkish version was translated to English, its original language, by a translator who did know the original form of the test. Specialists and translators came together and decided upon the final version of the Turkish FRAIL scale. Accordingly, language validation was provided with the method of "forward-backward translation". The compliance between and within the independent observers were tested. The FRAIL Scale was implemented on 21 patients by a second researcher who did not know the outcome of the scale on the same day to test the compliance between the independent practitioners. To examine the test-retest compliance, the FRAIL Scale was re-implemented on 27 patients between 7-15 days by the first researcher with similar outpatient clinic conditions to examine the test-retest compliance, and the received scores were recorded. FIND and Fried Index were performed by another researcher.

Ethics

After the permission of J. E. Morley who developed the FRAIL Scale was obtained [8], the study protocol was evaluated and approved by the local Ethics Committee (Hacettepe University,

GO 17/91-37, 28.02.2017). Informed consent was obtained from all the patients.

Statistical Analyses

Statistical analysis was performed using the IBM SPSS Statistics 22.0 software. The number of patients included in the study was decided by power analysis. The conformity of the numeric variables, whose descriptive statistics was given first, to a normal distribution was examined by using visual (histograms and probability graphs) and analytical methods (Kolmogorov-Smirnov/Shapiro-Wilk tests). Descriptive statistics were given for the variables with a normal distribution by using mean and standard deviation (mean±SD) values, and for the variables without a normal distribution by using median and minimum-maximum values. Categorical variables were stated as numbers and percentages (%). Cronbach's alpha coefficient was used to test the internal consistency of the FRAIL Scale. The correlations between the FRAIL Scale, FIND Scale, Fried Index, MMSE, and other numeric variables were checked with the Spearman correlation coefficient. Test-retest and interrater reliability were examined with the intraclass correlation coefficient. The difference in quantitative variables (gender, education status, etc.) according to the FRAIL groups (robust-non-frail, pre-frail and frail) was investigated with the Chi-Square or Fisher's Exact tests. The variables with a normal distribution between the Frail groups were compared via the one-way analysis of variance, and those without a normal distribution via the Kruskal-Wallis test. The significance of the differences was tested by the Student T-test (for one-way analysis of variance) and Mann-Whitney U test (for Kruskal-Wallis) with a Bonferroni correction for multiple comparisons (significance level $\alpha = 0.05/m$, with $m =$ number of multihypotheses tested). Since there were three different groups (robust, pre-frail, frail), three different pairwise comparisons were performed and the adjusted P-value was found to be $0.05 / 3 = 0.016$.

Receiver operating characteristic (ROC) evaluation was made by grouping frail and non-frail and the Kappa coefficient was calculated. A Kappa coefficient of 0.80 and above was interpreted as a perfect fit. If the area under the ROC curve (AUC) was close to 1, it was considered to have excellent diagnostic accuracy, and sensitivity and specificity values were determined. A 5% type I error level was used to infer statistical significance.

3. RESULTS

The mean age of the patients participating in the study was 75.45 ± 5.20 , and 69.4% were women. According to the FRAIL Scale, 42.4% of the patients were robust (n:36), 24.7% were pre-frail (n:21), and 32.9% were frail (n:28). When the mean age of groups of the patients were reviewed, frailty was shown to increase as the age advanced, which was found statistically significant ($p=0.008$). Women were seen to be more frail than men ($p=0.015$). From the robust group to the frail group ADL, IADL, MMSE, MNA sf, CDT score, and influenza strength decreased and were found to be statistically significant ($p < 0.001$). As the degree of frailty increased, the score of the

Yesavage GDS was observed to increase ($p=0.001$). Patients' demographic characteristics and results of the comprehensive geriatric assessment are given in Table I.

Table I. Demographic characteristics of the patients and results of the comprehensive geriatric assessment

	Robust (n:36)	Pre-frail (n:21)	Frail (n:28)	P
Age, year, mean±SD	72.8±6.05	75.95±7.40	79.79±6.06	<0.001
Female gender, n (%)	18 (32.2)	19 (30.5)	22 (37.3)	0.015
Education level, n (%)				0.856
Illiterate	5 (13.9)	7 (33.3)	7 (25.0)	
Primary School	18 (46.2)	9 (42.9)	12 (42.9)	
Secondary school	4 (11.1)	2 (9.5)	12 (7.1)	
High school	5 (13.9)	1 (4.8)	3 (10.7)	
University	4 (11.1)	2 (9.5)	4 (14.3)	
Living environment, n (%)				0.293
Alone	6 (16.7)	2 (9.5)	2 (7.1)	
With Spouse	17 (47.2)	9 (42.9)	9 (32.1)	
Other	13 (36.1)	10 (47.6)	13 (46.4)	
With Spouse	0 (0)	0 (0)	4 (14.3)	
BMI, kg/m ² , mean±SD	29.46±5.67	28.0±6.19	28.09±6.91	0.812
Smoking status, n (%)				0.99
Never used	26 (72.2)	16 (76.2)	20 (71.4)	
Ex-smoker	8 (22.2)	4 (19.0)	7 (25.0)	
Active smoker	2 (5.6)	1 (4.8)	1 (3.6)	
Drinking alcohol, n (%)	2 (5.6)	0 (0.00)	0 (0.00)	0.99
Number of drugs, mean±SD	4.17±2.69	5.05±2.62	7.07±4.03	0.014
Number of comorbidities (%)	3 (0-8)	3 (1-8)	6 (1-9)	<0.001
Number of hospitalizations in the last year, n (%)	4 (11.1)	3 (14.3)	10 (35.7)	0.038
Number of falls, n (%)	6 (16.7)	5 (23.8)	22 (76.8)	<0.001
Urinary incontinence, n (%)	8 (22.29)	10 (47.6)	23 (82.1)	<0.001
Vaccination, n (%)				
Influenza vaccine	10 (27.8)	6(28.6)	11(39.3)	0.803
Pneumococcal vaccine	4(11.1)	2(9.5)	8(28.6)	0.119
Katz ADL score, mean±SD	5.81±1.01	5.81±0.60	4.04±1.87	<0.001
Lawton-Brody IADL score, mean±SD	7.75±0.69	6.57±2.09	3.21±2.82	<0.001
MNA-SF score, mean±SD	13.22±1.78	11.62±3.01	8.50±3.01	<0.001
MMSE score, mean±SD	28.08±2.9	25.90±4.74	20.11±6.50	<0.001
CDT score, mean±SD	4.72±1.91	4.10±1.95	2.11±0.18	<0.001
Yesavage GDS score, mean±SD	2.50±3.08	4.24±3.39	6.33±4.19	0.001
Handgrip, kg, mean±SD	25.67±6.1	20.02±5.89	14.65±5.94	<0.001

* SD: Standard deviation, BMI: Body mass index, ADL: Activities of Daily Living, IADL: Instrumental Activities of Daily Living, MNA-sf: Mini Nutritional Assessment short-form, MMSE: Mini-Mental State Examination, CDT: clock-drawing test, GDS: Geriatric Depression Scale

The FRAIL Scale used in our study was found to have an extremely high correlation with the FIND Scale (Spearman 0.956, $p<0.001$), Fried Index (Spearman 0.934, $p0.001$), and clinical frailty score (Spearman 0.877, $p0.001$) (Table II). A significant correlation was observed between the FRAIL Scale, age, and comprehensive geriatric assessment components ($p<0.001$) (Table III).

Table II. The correlation between the frailty parameters and the FRAIL Scale

	The FRAIL Scale and the correlation coefficient	p
The FIND Scale	0.976	<0.001
Fried Frailty Index	0.934	<0.001
The Comprehensive Geriatric Assessment and the Clinical Frailty Score	0.877	<0.001

Table III. The correlation between the FRAIL Scale, demographic characteristics and comprehensive geriatric assessment components

	The FRAIL Scale and the correlation coefficient	P
Age	0.444	<0.001
BMI	-0.138	0.212
Number of comorbidities	0.50	<0.001
ADL	-0.615	<0.001
IADL	-0.753	<0.001
MMSE score	-0.644	<0.001
MNA-SF score	-0.722	<0.001
Yesavage GDS score	0.472	<0.001
CDT score	-0.49	<0.001
Handgrip	-0.650	<0.001
Number of falls	0.544	<0.001

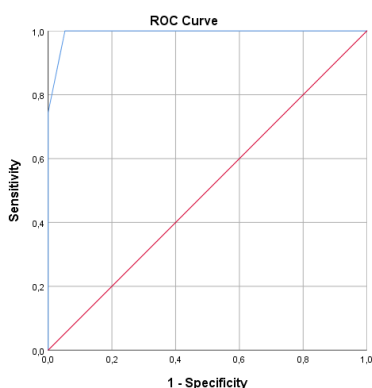
*BMI: Body mass index, ADL: Activities of Daily Living, IADL: Instrumental Activities of Daily Living, MMSE: Mini-Mental State Examination, MNA-sf: Mini Nutritional Assessment short-form, GDS: Geriatric Depression Scale, CDT: clock-drawing test

The FRAIL Scale consists of 5 sub-groups: fatigue, resistance, ambulation, weight loss, and illnesses. When all the sub-sections of the FRAIL Scale were evaluated separately and together, they were found to exhibit high reliability (Internal Consistency coefficient >0.60) (Table IV). The intraclass correlation coefficient was calculated for the reliability of the interrater test and found to be 1.00 (100% compliant). Test results performed by two independent practitioners were found to be similar. The intraclass correlation coefficient calculated for the test-retest was 1.00 (100% compliant). The test scores revealed by the same practitioner in two different time slots were completely similar. Thus, the scale was highly stable over time.

Table IV. Cronbach's alpha internal consistency coefficients of the FRAIL Scale sub-headings

The FRAIL Scale sub-headings	Internal Consistency coefficient
Fatigue	0.727
Resistance	0.682
Ambulation	0.677
Illnesses	0.787
Weight loss	0.822
Total	0.787

The result of the ROC analysis performed for the FRAIL scale is shown in Figure 1. The Kappa agreement coefficient was found to be 0.952. According to the FIND scale, the specificity of the FRAIL Scale was 94.7% and the specificity was 100%.



AUC: 0.993, $p < 0.001$

AUC, Area under the curve; ROC, receiver operating characteristic curve

Figure 1. ROC analyses of the FRAIL Scale

4. DISCUSSION

In this study, the Turkish version of the FRAIL Scale was examined for its reliability and validity in the Turkish geriatric population. As a result of the study, the FRAIL Scale was found to have high internal consistency and reliability in test-retest and interrater administration. In our study, the FRAIL Scale was revealed to be valid and reliable in screening frailty in the geriatric age group in our country.

The FRAIL scale was developed by Morley, et al., in 2012 [8]. The validity and reliability of the FRAIL Scale, which is an effective and reliable scale to measure frailty, in Turkish society had not been tested before. There are many scales being used to measure frailty. None of these scales have been considered gold standard scales. Determination of frailty according to the results of the comprehensive geriatric assessment can be accepted as the most appropriate diagnostic method. Besides, using an easily applicable, effective, and reliable scale will facilitate determining frailty. For this reason, we planned to study the FRAIL Scale, which is a practical scale, for validity and reliability. In our practice in the outpatient clinic of geriatrics, patients are noted

as non-frail, pre-frail, and frail by the doctor as a result of their general examinations and comprehensive geriatric assessments. In our study, the correlation between the result of the clinical frailty assessment and the FRAIL Scale was checked, and it was found extremely high. In our clinic, patients are followed up by experienced geriatricians, and it can be determined after anamnesis and examination whether patients are clinically frail or not. It is not possible to determine the level of the frailty of patients only clinically and with anamnesis in other centers where there are no geriatricians available; objective tests should be used. The FRAIL Scale can be used as a screening test due to its advantages such as being short and easily applicable characteristics.

Comprehensive geriatric assessment is considered a gold standard method for frailty screening in many sources [27]. In our study, the correlation between the FRAIL scale and the Comprehensive geriatric assessment tests was checked, and significant correlations were observed in the results. In its reliability and validity studies in Korea, Italy, and Mexico, the FRAIL scale was shown to be associated with IADL [9, 10, 28]. According to the FRAIL Scale, as the level of frailty increases, patients become more dependent, go into cognitive remission, and have poorer nutrition. The FRAIL scale and the Yesavage GDS were observed to be correlated at a moderate level. Our study supports the literature data, and a positive relationship was demonstrated between frailty and depression [29]. As the FRAIL Scale score increased, the score received from CDT and MMSE score decreased. In light of these results, it is seen that frailty does not only remain in the dimension of physical frailty but also interacts with all the other geriatric syndromes. In this respect, its determination via appropriate assessment and scales is of great importance.

In many studies conducted in different parts of the world, the female gender has been found to be associated with frailty. In our study, it was found that 23.1% of men were frail, while 37.3% of women were frail, and the difference between both genders was found to be significant. Similar results were obtained in other studies in which FRAIL Scale validation was performed [8-10]. Similar to the literature data, in our study, it was found that the degree of frailty increased with increasing age. In the validity and reliability study of the FRAIL Scale conducted in Mexico, the patients were grouped as 60-69 years old, 70-79 years old, and 80 years old and above, and it was found that the frailty increased as the age increased [10]. Italian and Korean studies observed that the relationship between frailty and age was not statistically significant [9, 28]. In our study, it was observed that the relationship between education level and frailty was not statistically significant, similar, in a study conducted in Italy. But it was shown in other studies that as the level of education increased, frailty decreased [8-10]. It was observed that the education levels of the patients participating in our study were generally low and it was thought that this factor might have affected the results.

The FIND scale and the Fried index have been proven in previous studies to be valid and reliable screening scales for showing vulnerability in Turkish society. In our study, its relations with

the FRAIL Scale was examined. It was found that the FRAIL Scale correlated very highly with the FIND scale and the Fried index and was statistically significant. Its use is more practical because it can be evaluated in a short time in comparison with the Fried index. This correlation shows that the FRAIL scale can be used easily and reliably as a frailty test.

In our study, the internal consistency coefficient of the FRAIL Scale was found to be high; high homogeneity was observed when all its sub-sections were evaluated separately and together. In the reliability of the interrater test, the test results revealed by the two independent practitioners were found completely similar. The test scores obtained by the same practitioner in two different time slots were found completely similar; hence, the scale was observed to exhibit high consistency over time. In a previous study on validity and reliability in Korea, Italy, and Mexico, the internal consistency coefficient, interrater and test-retest were not calculated [9, 10, 28].

This study had some limitations. Firstly, the patient group included in the study may not represent the general geriatric population. Conducting the study in different centers and different settings, such as institutionalized older adults and inpatients will increase reliability and validity. Secondly, the reliability study on test-retest and interrater could be carried out with a low number of patients. The stability of the test can be ensured when it is repeated with more people over time. In the study, independent evaluators evaluated the FRAIL Scale in different environments, unaware of each other. Interrater reliability of 1.00 is one of the surprising results of the study. Evaluation of a small group may have been the reason for this situation.

Conclusion

Since frailty is a multifactorial clinical condition, it is quite difficult to measure. Many easily applicable and reliable methods have been developed to determine frailty in geriatric clinics. There is a need for scales tested for Turkish validity and reliability, which can be used practically to clinically determine frailty. The FRAIL scale developed by Morley et al. has been proved to be a valid and reliable scale to measure frailty in many countries. In this study, the Turkish version of the FRAIL Scale was examined for its reliability and validity in the Turkish older population. As a result of the study, the Turkish version of the FRAIL scale has been found to have high internal consistency, and test-retest and independent practitioner reliability.

Compliance with Ethical Standards

Ethical Approval: After the permission of J. E. Morley who developed the FRAIL Scale was obtained the study protocol was evaluated and approved by the local Ethics Committee (Hacettepe University, GO 17/91-37, 28.02.2017). Informed consent was obtained from all the patients.

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Supplementary file: Turkish version of the FRAIL Scale

FRAİL ÖLÇEĞİ	1	0
Yorgunluk: “Son 4 haftanın ne kadarında kendinizi yorgun hissettiniz?” 1=Her zaman 2=Çoğu zaman 3=Bazı zamanlarda 4=Çok az zaman 5=Hiçbir zaman (cevap 1 veya 2 ise 1 puan verilir, diğerlerinin hepsine 0 puan verilir)	1 veya 2	3 veya 4 veya 5
Direnç: “Kendi başınıza ve yardımcı cihaz kullanmadan, 10 basamak merdiveni dinlenmeden çıkmakta zorluk çeker misiniz?”	Evet	Hayır
Dolaşma: “Kendi başınıza ve yardımcı cihaz kullanmadan, birkaç yüz metreyi yürümekte zorluk çeker misiniz?”	Evet	Hayır
Hastalık: “Bir doktor size hiç şu hastalıklarınızın olduğunu söyledi mi?” (Hipertansiyon, diyabet, kanser (küçük cilt kanseri dışında), kronik akciğer hastalığı, kalp krizi, konjestif kalp yetmezliği, anjina, astım, artrit, inme, böbrek hastalığı) (0-4 hastalık=0 puan, 5-11 hastalık=1 puan)	5-11 hastalık	0-4 hastalık
Kilo kaybı: “Kıyafetleriniz üzerinizdeyken ama ayakkabısızken kaç kilosunuz? (şu andaki ağırlık)” “Bir yıl önce ... yılının... ayında kıyafetleriniz üzerinizdeyken ama ayakkabısızken kaç kiloydunuz? (bir yıl önceki ağırlık)” Ağırlık değişikliği yüzdesi şu formül ile hesaplanır: ((bir yıl önceki ağırlık-şu andaki ağırlık)/bir yıl önceki ağırlık)x100 Ağırlık değişikliği yüzdesi >5 ise (%5 kilo kaybını temsil eder) 1 puan verilir, <5 ise 0 puan verilir)	≥%5 kilo kaybı	<%5 kilo kaybı
TOPLAM		