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Original Article

Determining Frailty Status in Patients Who Apply for Home Health Care Services Frailty and Home Health Care

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ABSTRACT

Background To examine the relationship between an institutionally prepared standardized patient evaluation form and the Edmonton Frail Scale (EFS) in patients receiving home health care.

Material and Methods Our prospective, observational study included 200 patients over the age of 18 who requested home health care, regardless of gender. The EFS and institutional data collection forms were applied consecutively on the same day to all patients included in the study.

Results Among the 200 individuals recruited for the study, 59% were female and 41% were male; the overall average age was 80 years. According to the EFS results, 4.5% of the patients were classified as non-frail, 6% were vulnerable, and 89.5% had varying degrees of frailty (mild, moderate and severe). There was a significant positive correlation between EFS score and age ($p<0.001$). There was no significant relationship between EFS score and confinement to bed; however, EFS scores were higher in bedridden patients ($p=0.017$). The EFS score was higher in those with chronic disease ($p<0.001$). A >9 threshold for EFS score could identify those in need of home health care services, with a sensitivity of 80.34% and a specificity of 90.91%.

Conclusion Age is an important risk factor for frailty, and the presence of chronic illness and confinement to bed may potentiate its effects. On the contrary, the level of personal care, pain conditions and pressure sores/ulcers were unassociated with frailty. It was determined that the EFS score could be supportive in distinguishing patients in need of home health care services.

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Introduction

Aging can be described as a gradual decrease in physiological reserves that inevitably leads to the emergence of physical limitations. In fragile individuals, the reduction is much more severe, increasing their susceptibility to serious health problems, even when they are exposed to the slightest physical stress. A 10-year cohort study involving elderly individuals identified the most common causes of death as frailty (27.9%), organ failure (21.4%), cancer (19.3%), dementia (13.8%) and other conditions (14.9%).[1] Frailty increases with age[2,3] and is more frequent in women.[4,5]

Pressure injury is the damage that occurs in the skin due to continuous or repeating pressure, usually localized in areas where the bone structure is close to the skin.[6] The frequency of pressure ulcers increases with increased life expectancy and poor performance in daily life. The development of a pressure ulcer after an injury is a common geriatric syndrome that reflects the common pathogenetic process of aging and frailty.[7]

A significant proportion of the vulnerable elderly population consists of people with various medical and geriatric needs who must be tended to at their homes. The most economical and targeted solution for such needs in society is the establishment of home health care services (also known as in-home care or domiciliary care) and ensuring their effectiveness. Today, the need for home health care services and the annual number of applications for these services is increasing. The approach to home health care and the types of assistance provided by caregivers vary from country to country and region to region; however, according to the Regulation on the Provision of Home Health Care Services put forth by the Turkish Ministry of Health and its affiliates, home health care services in Turkey include examination, medical workup, analysis, treatment, medical care, follow-up, rehabilitation and social and psychological counseling services at the residence of the individual.[8] Bedridden patients and dependent individuals fall naturally into the definition of home health care recipients. However, patients other than these are evaluated by the home health care commission, which decides whether they need home health care.

In this study, patients requesting home health care were evaluated using the "home health care patient evaluation form" created by our institution. Applicants were also evaluated using the Edmonton Frail Scale (EFS). Our purpose was to examine the relationships between EFS and the evaluation form to ascertain whether it would be possible to develop the patient evaluation form with input from EFS, thereby increasing the objectivity of the evaluation of home health care requests.

Material and Methods

After obtaining approval from the Clinical Research Ethical Committee of the Health Sciences University, Bursa Yuksek Ihtisas Training and Research Hospital (BYIH) (protocol number 2011-KAEK-25 2019/03-27, dated 13.03.2019), our study was conducted from March 1, 2019 to June 30, 2019 as a prospective observational study among patients who applied, for the first time, to the Home Health Care Unit of Bursa Yuksek Ihtisas Training and Research Hospital.

Two hundred patients aged 18 years and older were recruited into the study, regardless of sociodemographic characteristics. Within the scope of the Home Health Care Evaluation Form (used for the evaluation of patients whose applications were accepted), the following patient data were recorded: identity and contact information, application characteristics, personal care, income status, assistance/social support status, residency and safety information, social security status, dependency status (whether bedridden or not), appropriateness of personal hygiene and nutrition, habits, presence of chronic diseases (hypertension, diabetes mellitus, chronic obstructive pulmonary disease and asthma, coronary artery disease, cancer, chronic renal disease, gastritis/peptic ulcer, depression, neurological diseases, etc.), allergies and prescribed medications. Detailed information about the study was given to the patients and the consent form was signed. Detailed physical examinations and psychological assessments were performed, and the presence and degree of pain and pressure sores/ulcer was recorded.

Finally, the need for home health care was ascertained, and eligibility for registration for services was determined.

The frailty of the patients was evaluated using the EFS. Those "non-frail" (0-4 points) and "seemingly frail" (5-6 points) patients were grouped as "non-frail patients," and patients that were "mildly frail" (7-8 points), "moderately frail" (9-10 points) and "severely frail" (11 points and above) were grouped as "frail patients." The clock-drawing test was used to evaluate cognitive status in which patients were asked to draw a clock without providing any visual cues and were graded according to the accuracy of the final image. General health conditions and a history of hospitalization in the last year were questioned. Patients were asked about their functional independence and the number of daily activities that they required assistance in performing. Validity and reliability studies for the EFS were conducted by Aygör et al.[9] in our country.

Statistical Analysis

The compatibility of the variables with normal distribution was examined using the Shapiro-Wilk test. Continuous variables are expressed as median (minimum–maximum) values. Categorical variables are expressed as frequencies and percentages. The Mann-Whitney U and Kruskal-Wallis tests were used for the comparison of EFS scores between groups. The relationship of the EFS score with age was analyzed by calculating the Spearman correlation coefficient. ROC (Receiver Operating Characteristics) analysis was performed to examine whether EFS scores could be used to determine the need for confinement to bed and home health care. The relevant cut-off point was determined by applying the Youden J. Index to values obtained from the area under curve (AUC) graph, and the resultant sensitivity, specificity and positive/negative predictive values were reported. The internal consistency of the EFS was examined with the Cronbach's alpha coefficient. The SPSS software (IBM SPSS Statistics for Windows, Version 21.0, Armonk, NY, USA) was used for statistical analysis, and p-values of <0.05 were considered statistically significant.

Results

The median age was 80 (range: 23-102); 59% (n: 118) were females and 41% (n: 82) were males. The EFS score distribution is shown in Figure 1. Accordingly, 4.5% of the cases were classified as non-frail, 6% were classified as vulnerable, and 89.5% had different degrees of frailty (mild, moderate and severe).

It was determined that the EFS score could be used to identify the requirements for home health care services in our subjects. According to the ROC analysis results, the AUC for EFS was 0.932. It was determined that an EFS threshold of >9 points would be able to distinguish those requiring home health care services from those that did not, with a sensitivity of 80.34% and a specificity of 90.91% (*Table 1*). There was a significant positive correlation between EFS score and age (r=0.280, p<0.001). The EFS score was not associated with gender, social security status or income.

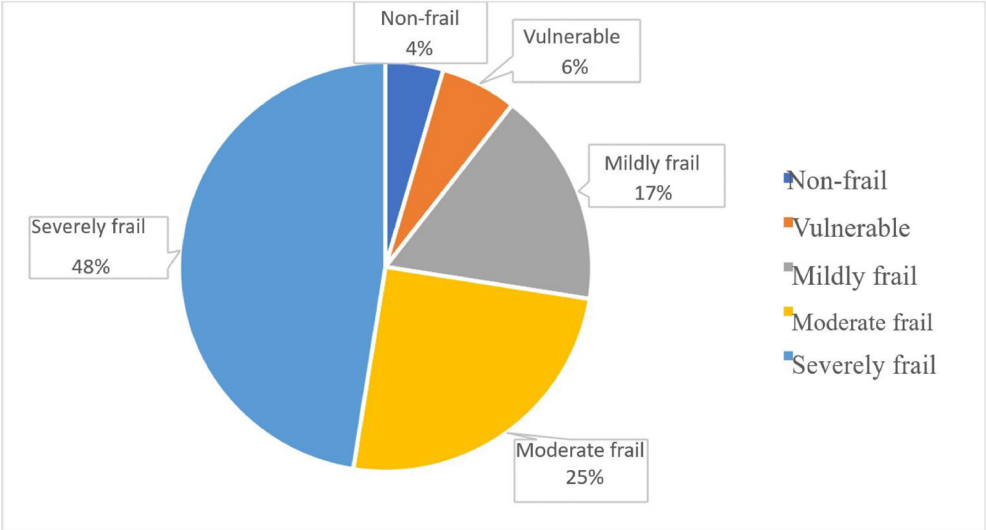

Figure 1. Edmonton Frail Scale score.

Table 1. Edmonton Frail Scale score distribution and ROC analysis.

Total score	11 (3–16); 10.85±2.83
Non-frail	9 (4.50%)
Vulnerable	12 (6%)
Mildly frail	34 (17%)
Moderate frail	50 (25%)
Severely frail	95 (47.50%)
Cronbach alpha	0.650
Criterion Value	>9
Sensitivity (95% CI)	80.34 (73.70-85.90)
Specificity (95% CI)	90.91 (70.80-98.90)
Youden J Index	0.71
AUC	0.932
PPV (95% CI)	98.60 (95-99.60)
NPV (95% CI)	36.40 (29.20-44.20)

EFS: Edmonton Frail Scale, CI: confidence interval, AUC: area under the curve, PPV: positive predictive value, NPV: negative predictive value.

There was no difference between those with pressure sores/ulcers and those without in terms of EFS scores; however, EFS scores differed among those with and without bed confinement, and significantly higher scores were observed in bedridden individuals. Interestingly, the EFS score was not associated with the use of auxiliary devices. There was no difference in EFS scores between individuals who were able to tend to their personal care and those who could not. Finally, it was also observed that the EFS scores were higher in the group with chronic disease (*Table 2*).

Discussion

As expected, age was associated with frailty, and we found a significant relationship between frailty and the presence of chronic illness and confinement to bed. However, we did not find a significant relationship between frailty and gender, social security status, income, personal care, pressure sores/ulcers and pain levels. The results of our ROC analysis showed that an EFS cut-off value of >9 could identify patients in need of home health care services-even though the negative predictive value was rather low.

In a study assessing the frequency of frailty in the United States, Bandeen et al.[10] found that, among the 7,439 people between the ages of 65 and 90 years, 15.3% were identified as frail, 45.5% were prefrail and 39.2% were non-frail. In terms of gender, they found that 17.2% of women were frail and 47.2% were prefrail, whereas 12.9% of men were frail and 43.3% were prefrail. When the participants were evaluated in terms of age groups, they detected that the frequency of frailty was 8.9% in the 65-69 age group and 33.3% in the 8-89 age group. They reported that frailty increased with increasing age.[10] In a Turkish study, Akin et al.[11] included 906 individuals aged 60 and above in their cross-sectional study based on two different frailty scales. In this study, frailty frequency was identified as 10% to 27.8% while the frequency of prefrail individuals was 34.8% to 45.6%.[11] The present study reports that 4.5% of the cases were in the non-frail group, 6% were in the prefrail(vulnerable) group, and 89.5% were in the frail group. The higher frailty frequency in our study compared to other similar studies may be because the study was conducted among patients who applied for home health care, meaning that these individuals were drawn from a sub-population that was already in need. We also determined a significant positive correlation between EFS score and age; however, various other factors, including gender, social security status and income levels, were not associated with EFS scores.

In one study, the effect of frailty on adverse health outcomes was investigated using the fragility index, and it was determined that 42 out of the 1,418 patients (3.2%) included developed pressure ulcers during their hospitalization. The study reported that each 0.1-point increase in frailty index increased the risk of pressure ulcer development by 1.51-fold.[12] Unlike similar studies, in our study, no significant difference was found between those with and without pressure ulcers in terms of EFS scores. This situation may arise from various factors, including the characteristics of the population studied. However, as per the sociocultural structure in Turkey, the care of the elderly is almost always undertaken by a close-

Table 2. EFS score distribution according to clinical and demographic variables.

		EFS score	P-value
Age	r	0.280	
	p	<0.001	
Gender	Female (n: 118)	11 (4-16)	0.609[a]
	Male (n: 82)	11 (3-16)	
Social security status	GHI (n: 154)	11 (3-16)	
	Others (n: 33)	12 (7-14)	0.593[a]
	Green card (n: 13)	11 (3-15)	
Income status	Salaried (n: 174)	11 (3-16)	0.736[a]
	Non-salaried (n: 26)	12 (4-14)	
Pressure ulcer	Exist (n: 28)	11.50 (9-16)	0.226[a]
	Non-exist (n: 172)	11 (3-16)	
Confinement to bed	Full (n: 103)	12 (4-16)	0.017[a]
	Partial (n: 97)	11 (3-15)	
Personal care	Self (n: 11)	11 (5-14)	0.907[a]
	Others (n: 189)	11 (3-16)	
Auxiliary tool	Exist (n: 96)	11 (3-15)	0.108[a]
	Non-exist (n: 104)	12 (4-16)	
Chronic disease	Exist (n: 187)	12 (4-16)	<0.001[a]
	Non-exist (n: 13)	7 (3-12)	

EFS: Edmonton Frail Scale. GHI: General Health Insurance, Green card: Health card for uninsured people in Turkey.
[a] Mann-Whitney U test.
Data were given as median (minimum: maximum).

often a first-degree relative. Therefore, it can be thought that the caregiver of the patients in our study was mostly a first-degree relative, which may have reduced the prevalence of pressure ulcers due to effective care provided by caregivers.

When we evaluated patients who applied for home health care services in terms of bed confinement, 51.5% of the patients were found to be bedridden and 48% were semi-bedridden. Although there was no significant relationship between confinement to bed and the EFS score, it was determined that the EFS score was higher among bedridden patients. In a study conducted with patients who applied to the health board recently, it was reported that the frailty score was higher in the group with severe disabilities (completely dependent disabled individuals).[13]

With aging, the number of chronic diseases increases and the quality of life decreases at a similar rate. Symptoms and findings that occur with a decrease in physiological reserve, which are also affected by chronic diseases, are important in terms of frailty. In our study, it was observed that frailty score was higher in the group with chronic disease, similar to previous studies.[5,14]

In our study, physical examinations were performed on the patients in accordance with the home health care patient evaluation form, and the resultant examination findings were compared with the EFS score. The EFS score was found to vary due to the presence of an abnormal gastrointestinal system (dyspepsia gastroesophageal reflux, diarrhea and constipation) and nervous system findings (abnormal neurological examination

and/or abnormal findings on neuroimaging), whereas there were no differences in other analyses. Our literature review did not reveal any studies evaluating these relationships.

Epidemiological studies have shown that pain caused by activity, especially in old age, increases with advancing age. Generally, it is known that the prevalence of some type of pain is in the range of 45-80% in elderly patients.[15] Studies have reported that chronic pain is associated with frailty and that patients with chronic pain are more likely to develop frailty.[16-18] In a study of 2,736 male patients between the ages of 40 and 79, it was found that chronic widespread pain was associated with frailty.[19] Similarly, Coelho et al.[20] examined the relationship between pain and frailty in 252 elderly patients and reported that frailty was associated with pain; additionally, pain treatment contributed to reducing frailty and mortality. Unlike other studies, our study found no significant correlation between pain and EFS scores.[8]

The reasons for this may be the patients' level of consciousness or inability to express their pain. In addition, since these patients often used analgesics, they may have had less pain.

Our study is single-centered, and the power of studies to represent all patients is weak. The obtained results cannot be generalized. As can be seen from our findings, most of our participants were elderly. Therefore, there were difficulties in cooperation and the negative attitudes of the individuals they receive care at home have caused some difficulties.

Conclusions

As a result, with the increase in the elderly population all over the world, the need and number of applications for home health services are increasing. In our country, home care services are typically carried out jointly by family medicine practitioners, hospitals and municipalities, and its scope has not been clearly revealed. Patients may request that daily injections and simple dressings be made by home care services. Some patients may also keep their home care workers busy with the renewal of their chronic disease reports. In addition, bedridden patients who have had a stroke or cancer patients in their terminal period expect to be cared for through the same system. We think that frailty may be an important indicator for the evaluation of priority patients in service planning for home care service practice, whose job definition lines are not yet clear. Our study revealed that an EFS score of >9 can be a rational indication criterion for home care service. Although many studies have examined the effects of frailty on the health of the elderly, few studies have evaluated frailty in patients receiving home health services. The cut-off point we determined is an additional contribution to the literature.

Conflict of interest

The authors declare that they have no conflict of interest.

Funding Sources

There are no funding sources to declare.

Ethical Approval

For this study, approval was obtained local ethics committee.

Authors' Contribution

Study Conception, Literature Review, Critical Review, Data Collection and/or Processing, Statistical Analysis and/or Data Interpretation, Manuscript preparing held by all authors.

References

1. Gill TM, Gahbauer EA, Han L, Allore, HG. Trajectories of disability in the last year of life. N Engl J Med. 2010;362:1173-1180. doi: 10.1056/NEJMoa0909087.
2. Carneiro JA, Cardoso RR, Durães MS, Guedes MCA, Santos FL, Costa FMD, Caldeira AP. Frailty in the elderly: Prevalence and associated factors. Revista Brasileira de Enfermagem. 2017;70(4):747-52. doi: 10.1590/0034-7167-2016-0633.
3. Düzgün G, Üstündag S, Karadakovan A. Assessment of frailty in the elderly. Florence Nightingale Journal of Nursing. 2021;29(1):2-8. doi: 10.5152/FNJN.2021.414736.
4. Rivas-Ruiz F, Machón M, Contreras-Fernández E, Vrotsou K, Padilla-Ruiz M, Díez Ruiz A, Group GIFE. Prevalence of frailty among community-dwelling elderly persons in Spain and factors associated with it. Eur J Gen Pract. 2019;25:190-6. doi: 10.1080/13814788.2019.1635113.
5. Menéndez-González L, Izaguirre-Riesgo A, Tranche-Iparraguirre S, Montero-Rodríguez Á, Orts-Cortés MI. Prevalencia y factores asociados de fragilidad en adultos mayores de 70 años en la comunidad [Prevalence and associated factors of frailty in adults over 70 years in the community]. Aten Primaria. 2021 Dec;53(10):102128. (in Spanish). doi: 10.1016/j.aprim.2021.102128.

6. Campbell KE. A new model to identify shared risk factors for pressure ulcers and frailty in older adults. Rehabil Nurs. Nov-Dec 2009;34(6):242-7. doi: 10.1002/j.2048-7940.2009.tb00258.x.
7. Jaul E, Calderon-Margalit R. Systemic factors and mortality in elderly patients with pressure ulcers. Int Wound J. 2015 Jun;12(3):254-9. doi: 10.1111/iwj.12086.
8. Sağlık bakanlığı ve bağlı kuruluşları tarafından evde sağlık hizmetlerinin sunulmasına dair yönetmelik. Resmî Gazete. 27 Şubat 2015, Sayı: 29280. Available at: https://www.resmigazete.gov.tr/eskiler/2015/02/20150227-14.htm. Accessed August 01, 2021.
9. Aygör HE, Fadıloğlu Ç, Aykar FŞ, Akçiçek F. Testing the reliability and validity of the "Edmonton Frail Scale" in Turkish population. European Geriatric Medicine. 2013 Sep 18;4(Suppl.1):S76. doi: 10.1016/j.eurger.2013.07.252.
10. Bandeen-Roche K, Seplaki CL, Huang J, Buta B, Kalyani RR, Varadhan R, Xue QL, Walston JD, Kasper JD. Frailty in older adults: A nationally representative profile in the United States. J Gerontol A Biol Sci Med Sci. 2015 Nov;70(11):1427-34. doi: 10.1093/gerona/glv133.
11. Akın S, Mazıcıoglu MM, Mucuk S, Gocer S, Deniz Safak E, Arguvanlı S, Ozturk A. The prevalence of frailty and related factors in community-dwelling Turkish elderly according to modified Fried Frailty Index and FRAIL scales. Aging Clin Exp Res. 2015;27:703-9. doi: 10.1007/s40520-015-0337-0.
12. Hubbard RE, Peel NM, Samanta M, Gray LC, Mitnitski A, Rockwood K. Frailty status at admission to hospital predicts multiple adverse outcomes. Age Ageing. 2017 Sep 1;46(5):801-6. doi: 10.1093/ageing/afx081.
13. Hakı C, Demirci H. The role of frailty in physicians' decisions for severe disability. Turkish Journal of Geriatrics. 2020;23(4):492-500. doi: 10.31086/tjgeri.2020.187.
14. Alqahtani BA, Alenazi AM, Alshehri MM, Osailan AM, Alsubaie SF, Alqahtani MA. Prevalence of frailty and associated factors among Saudi community-dwelling older adults: a cross-sectional study. BMC Geriatr. 2021 Mar 17;21(1):185. doi: 10.1186/s12877-021-02142-9.
15. Andrade DC, Faria JW, Caramelli P, Alvarenga L, Galhardoni R, Siqueira SR, Yeng LT, Teixeira MJ. The assessment and management of pain in the demented and non-demented elderly patient. Arq Neuropsiquiatr. 2011;69(2B):387-94. doi: 10.1590/s0004-282x2011000300023.
16. Otones Reyes P, García Perea E, Pedraz Marcos A. Chronic pain and frailty in community-dwelling older adults: A systematic review. Pain Manag Nurs. 2019 Aug;20(4):309-15. doi: 10.1016/j.pmn.2019.01.003.
17. Saraiva MD, Suzuki GS, Lin SM, Ciampi de Andrade D, Jacob-Filho W, Suemoto CK. Persistent pain is a risk factor for frailty: a systematic review and meta-analysis from prospective longitudinal studies. Age Ageing. 2018;47:785-93. doi: 10.1093/ageing/afy104.
18. Ardoino I, Franchi C, Nobili A, Mannucci PM, Corli O; REPOSI Investigators. Pain and frailty in hospitalized older adults. Pain Ther. 2020 Dec;9(2):727-740. doi: 10.1007/s40122-020-00202-3.
19. Wade KF, Lee DM, McBeth J, Ravindrarajah R, Gielen E, Pye SR, Vanderschueren D, Pendleton N, Finn JD, Bartfai G, Casanueva FF, Forti G, Giwercman A, Huhtaniemi IT, Kula K, Punab M, Wu FC, O'Neill TW. Chronic widespread pain is associated with worsening frailty in European men. Age Ageing. 2016;45:268-74. doi: 10.1093/ageing/afv170.
20. Coelho T, Paúl C, Gobbens RJJ, Fernandes L. Multidimensional frailty and pain in community dwelling elderly. Pain Med. 2017;18:693-701. doi: 10.1111/pme.12746.