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Research Article

Assessment of Frailty in the Elderly

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Abstract

AIM: This study aimed to evaluate frailty in older individuals and to identify factors related to frailty.
METHOD: The descriptive, and cross-sectional study was conducted with 111 elderly patients who received inpatient treatment in a university hospital between January and September 2016. Ethics committee approval, institutional consent, and informed patient consent were obtained for the study. Along with the Edmonton Frail Scale, a data form was used to collect data about the patient's sociodemographics, disease status, and fall incidents. The data were collected through face-to-face interviews.
RESULTS: The prevalence of severe frailty was 19.8%. Significant relationships were found between frailty and advanced age, low education, low income, continuous use of medicines, and a history of falls within the last year.
CONCLUSION: Elderly individuals included in the study were categorized as "vulnerable" (Edmonton Frail Scale score of 6.84±3.83) and were at the borderline for "mild frailty" (Edmonton Frail Scale score of 7-8). The factors associated with frailty were advanced age, low education, and income level, continuous use of medicines, and the history of falls within the last year.
Keywords: Frailty, elderly, nursing

Introduction

The number of elderly people has been increasing worldwide with an increased lifespan (United Nations, 2015). The increase in the elderly population results in an increased frequency of health problems specific to the elderly, including frailty. The concept of frailty indicates a condition or syndrome in which physical, physiological, and cognitive abilities decrease (Clegg et al., 2013). Frail individuals have decreased mobility, weakness, decreased muscle mass, poor nutrition, and decreased cognitive functions, which make them more susceptible to stressors. Although frailty is common in older individuals (Mitnitski & Rockwood, 2016), frailty and aging are not synonymous (Rockwood et al., 2005). It has been reported that frailty is seen in 11%–25% of individuals over the age of 65 and in 50% of individuals over 85 (Hoover et al., 2013), Kapucu and Ünver (2017a) reported that 1% of the elderly women with osteoporosis in Turkey were "not frail," 8.7% were "apparently vulnerable," 16.3% were "moderately frail," and 44.1% were "severely frail" (Kapucu & Ünver, 2017a).

Frailty increases the need of elderly people for help and makes them vulnerable to negative consequences. In another study in Turkey, Çakmur (2015) found that frailty was associated with comorbidity, polypharmacy, falls, and social isolation. It was also found that frailty was associated with negative consequences, such as increased hospitalization in nursing homes (Clegg et al., 2013; Sternberg et al., 2011). In addition, frail older individuals were found to be more likely to die than non-frail older individuals (Joseph et al., 2014; Robinson et al., 2009).

Frailty is a dynamic situation that reflects multi-system failure, where individuals can switch from different levels of frailty to severe frailty. Two different descriptions of frailty are frequently used in the literature. One of these descriptions suggests that frailty is only a physical phenotype and can only be explained by physical states such as weight loss, fatigue, weak-

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ness, sluggishness, and decreased physical activity (Erlen, 2007). Instead, the other description emphasizes the psychological and sociological aspects of frailty in addition to the physical aspect (Heath & Phair, 2011). Frailty is considered in three stages pre-frailty, frailty, and severe-frailty periods. The symptoms of these frailty stages are different from each other (Kapucu & Ünver, 2017b). The transition from the pre-frailty stage to the severe-frailty stage is easy, while the return from the severe-frailty stage to the pre-frailty stage is quite difficult (Erlen, 2007; Heath & Phair, 2011). Additionally, defining frailty is important from a social perspective because it identifies individuals who need additional health care.

Frailty is characterized by the depletion of the reserves in several organ systems in the human body as a result of the disorders associated with the physiological changes, diseases, long-term loss of activity, or malnutrition due to aging. This clinical picture manifests with a decrease in muscle and bone mass, an abnormal function in the inflammatory, immune, and neuroendocrine systems, and impaired energy production and regulation, which ultimately result in insufficient responses to internal and external stimuli to maintain balance and integrity (Eyigör & Kutsal, 2010; Rolfson et al., 2006).

Frailty is a key indicator in determining the condition and health care needs of the elderly. During the care for frail elderly, nurses play a key role in interventions, such as resistance exercises, weight, and nutritional management, preventing falls, and provision of hygiene. Since nurses are the healthcare professionals who spend the most time with the patient, it is critical for nurses to evaluate the elderly with a holistic approach and monitor possible changes closely in order to define frailty. Early identification of the initial signs of frailty, preventive care practices for the elderly, and an effective team communication could prevent the progress of frailty and enable the timely implementation of appropriate interventions (Kapucu & Ünver, 2017b; Erlen, 2007; Fried et al., 2004). This study aimed to evaluate the frailty in older individuals and determine the factors related to frailty.

Research Questions

1. What is the level of frailty in the elderly?
2. What are the factors that affect frailty in the elderly?
3. Is there a difference between the frailty and the factors affecting the elderly?

Method

Study Design

This study is a descriptive and cross-sectional study.

Sample

This study was conducted between January and September 2016 with inpatients in the department of internal medicine at a university hospital. Before the study, the questionnaires were pre-applied to 10 patients to determine the clarity of forms. The sample size was determined so as to have the number of individuals included in the study 10 times the number of items in the questionnaire. The study included 111 elderly individuals aged 65 and over. Those who were not able to read and write, had visual or hearing impairment, did not have the skills to measure the cognitive performance included in the Edmonton Frail Scale (EFS), and did not consent to participate in the study were not included.

Data Collection

The data were collected between January and September 2016 by the researchers through face-to-face interviews with volunteer individuals. Data collection took an average of 20 minutes for each elderly individual.

Data Collection Tools

Socio-demographic Characteristics Form

This form consisted of 20 questions, which recorded the data related to the factors reported to affect frailty in previous studies: sociodemographics (ten questions about age, gender, educational status) and the individual's disease status and history of falls (ten questions) (Aygör et al., 2013; Heath & Phair, 2011; Hoover et al., 2013; Rolfson et al., 2006).

The Edmonton Frail Scale (EFS)

The EFS was developed by Rolfson et al. (2006) at the University of Alberta in Canada to evaluate frailty in the elderly. Aygör et al. performed the validity and reliability study of the Turkish version in 2013 (Aygör et al., 2013; Rolfson et al., 2006). The EFS consists of a total of 11 items that cover 9 frailty dimensions, which were considered as indicative of frailty and included in the Comprehensive Geriatric Assessment (CGA). These dimensions address the individual's cognitive status, general health status, functional independence, social support, nutrition, mood, continence, functional status, and use of medication. The clock drawing test

(CDT) was used to evaluate the cognitive status and the timed "up and go" (TUG) test was used to evaluate functional performance (Aygör et al., 2013; Rolfson et al., 2006). The highest total score that can be obtained from the 11 items in the EFS is 17, and the lowest score is 0. Higher scores indicate increased severity of frailty. Aygör et al. reported a Cronbach's alpha coefficient of 0.75 for the internal consistency of the Turkish version of EFS (Aygör et al., 2013). In this study, Cronbach's alpha coefficient for the EFS was 0.777.

Statistical Analysis

Statistical analyses were performed with the SPSS program (SPSS Statistics version 20, IBM Inc., USA). Frequency tables and descriptive statistics were used to interpret the findings. The Kolmogorov-Smirnov test was used to test normality in cases, where the number of data points was >50 for subgroups. The Shapiro-Wilks test was used when the number of data points was ≤50. Independent Samples t test was used to compare two independent groups for continuous variables with a normal distribution. The analysis of variance (ANOVA) test was used to compare three or more independent groups with a normal distribution. Continuous variables with normal distribution were presented as mean±standard deviation (SD). Mann-Whitney U test was used to compare two groups for variables without normal distribution. Kruskal-Wallis H test was used to compare three or more independent groups without normal distribution. For the paired comparison of these groups, Bonferroni correction was applied. Variables without normal distribution were presented as median [minimum-maximum].

Ethical Considerations

The study was approved by the Scientific Ethics Committee of Ege University School of Nursing [Approval Number: 273344949-84-506]. Institutional permission and informed consent of participants were obtained as well as the authors of the validity and reliability study of the Turkish version of the EFS.

Results

Of the participants, 63.1% were women, 62.2% were in the 65–75 age group, and 84.7% were married. Half of the participants had elementary education or below. More than half of them have a balanced budget, and almost all of them relied on pensions for income. Of the participants, 30.6% stated that they felt old, and 29.7% perceived old age as the normal (Table 1).

Table 1
Distribution of the Elderly According to their Socio-Demographic Characteristics (n=111)

Variables	n	%
Gender		
Female	70	63.1
Male	41	36.9
Age groups		
65-75	69	62.2
76-86	35	31.5
≥87	7	6.3
Marital status		
Married	94	84.7
Single	16	14.4
Divorced	1	0.9
Educational status		
Literate	39	35.1
Elementary	35	31.6
Middle	9	8.1
High school	15	13.5
College/University	13	11.7
Income/Expense status		
Balanced	67	60.4
Deficit	18	16.2
Surplus	26	23.4
Income source		
Pensions	94	84.7
Investments/interest/rent	7	6.3
Help from family	6	5.4
Old-age pension	4	3.6
Perceived age		
Very old	22	19.8
Old	34	30.6
Middle age	31	27.9
Young	24	21.6
Opinions about aging		
Not considering oneself old	15	13.6
Perceived as a bad thing	26	23.4
Perceived as uselessness	10	9.0
Perceived as sickness	21	18.9
Perceived as normal	33	29.7
Perceived as a good thing	6	5.4
Pastime activities		
Exercise	12	10.8
Watching TV or reading	18	16.2
Rest	25	22.5
Travel	25	22.5
Handcrafts	9	8.2
Worship	22	19.8

Table 2.
Disease Status of the Elderly and the Falls Experienced by them (n=111)

Variables	n	%
Chronic conditions		
Present	99	89.2
Not present	12	10.8
Continuous use of medications		
Yes	95	85.6
No	16	14.4
Experienced falls in the last year		
Yes	53	47.7
No	58	52.3
Number of falls in the last year		
1	28	52.8
2	19	35.8
3	4	7.6
≥5	2	3.8
Reason for hospitalizations		
Malnutrition	53	47.8
Hypertension	18	16.2
Osteoarthritis	2	1.8
Pneumonia	4	3.6
Surgery	5	4.5
Infection	9	8.1
Respiratory distress	4	3.6
Fall	3	2.7
Diabetes regulation	3	2.7
Kidney failure	5	4.5
Cancer treatment	5	4.5
History of hospitalization		
Yes	99	89.2
No	12	10.8
Reason for previous hospitalizations		
Surgery	32	32.4
Fall	15	15.2
Disease	49	49.4
Disease and surgery	2	2.0
Other	1	1.0

Table 3.
Comparison of the EFS Scores for Various Groups (n=111)

Groups by (n=111)	n	EFS Score	Statistical Analysis
Gender			
Female	70	7.19±3.78	t=1.220
Male	41	6.27±3.90	p=0.225
Age			
65–75	69	6.20±3.78	F=4.935
			p=0.009
76–86	35	7.37±3.69	
≥87	7	10.57±2.82	
Education level			
Literate	39	9.0 [2.0–15.0]	<0.001
Elementary	35	4.0 [0.0–14.0]	χ2=31.969
			p=0.000
Middle	9	8.0 [1.0–11.0]	
High school	15	5.0 [1.0–12.0]	
College/University	13	6.0 [0.0–9.0]	
Income/Expense			
Balanced	67	6.0 [0.0–14.0]	
Deficit	18	8.5 [1.0–15.0]	χ2=6.644
			p=0.036
Surplus	26	4.5 [0.0–14.0]	
Leisure activity			
Exercise	12	3.0 [0.0–9.0]	<0.001
Watching TV or reading	18	7.0 [2.0–12.0]	
Rest	25	10.0 [2.0–15.0]	χ2=28.659
			p=0.000
Travel	25	5.0 [1.0–13.0]	
Handcrafts	9	8.0 [1.0–12.0]	
Worship	22	7.0 [0.0–14.0]	
Routine medications			
Yes	95	8.0 [0.0–15.0]	0.001
			Z=-3.419
			p=0.001
No	16	3.0 [1.0–13.0]	
History of falls in the last year			
Yes	53	8.0 [0.0–15.0]	Z=-2.769
			p=0.006
No	58	6.0 [0.0–14.0]	

Table 4
The Distribution of the EFS Scores of the Elderly (n=111)

EFS Score (n=111)	n	%
0-4 points (not frail)	35	31.6
5-6 points (apparently vulnerable)	18	16.2
7-8 points (mildly frail)	18	16.2
9-10 points (moderately frail)	18	16.2
11 points or above (severely frail)	22	19.8

Of the participants, 89.2% had at least one chronic disease, 85.6% had a regularly used medicine, 47.7% experienced at least a fall in the last year, and 47.2% experienced at least two falls in the last year. Almost half of the elderly individuals who participated in the study were hospitalized with the diagnosis of malnutrition (Table 2).

The comparison of some socio-demographic groups in terms of their EFS scores is shown in Table 3. There was no significant difference between the two genders in terms of their EFS scores ($p>0.05$). The EFS score of the 87–97 age group was significantly higher than that of the 65–75 age group ($p<0.05$) (Table 3). A significant difference was found between the educational groups in terms of their EFS scores ($p<0.001$). The EFS scores of elderly individuals with low education level were significantly higher. The EFS scores were significantly higher for those with a budget deficit ($p<0.05$) for those who exercised ($p<0.05$), and for those who had routinely used medication ($p<0.05$) (Table 3).

Of the participants, 35% scored 0–4 points (not frailty), 22% scored 5–6 points (apparently vulnerable), and 19.8% scored 11 points or above (severely frail). The average EFS score was 6.84±3.83; on average the participants were apparently vulnerable (Table 4).

Discussion

This study aimed to evaluate the frailty and determine the related factors in elderly individuals. In this study, it was found that the mean of frailty (EFS) score of women was higher (7.19±3.78) than that in men, but this difference was not statistically significant ($p>0.05$). The relationship between gender and frailty is contentious. Although some of the previous studies reported no relationship between gender and the level of frailty (Jankowska Polanska et al., 2019; Aygör et al., 2013; Rolfson et al., 2006), some other studies with older individuals found higher levels of frailty in women (Carneiro et al., 2017; Lahousse et al., 2014).

Some of the previous studies reported a relationship between age and frailty, with higher levels of frailty in older age groups (Carneiro et al., 2017; De Albuquerque Sousa et al., 2012; Fabricio-Wehbe et al., 2009), although the study by Çakmur (2015) indicated no relationship between age and frailty. Our study found higher levels of frailty in the older age groups ($p=0.009$). Chang et al. (2011) found that frailty increases with age, the ages of 69–73 indicating the pre-frailty period and the ages of 74–79 indicating the frailty period. The variations among the studies might be due to the smaller sample sizes for the older age groups in some studies.

It was found that older individuals with lower education ($p<0.001$) and lower income levels ($p<0.05$) had higher EFS scores. Several previous studies have found higher frailty in individuals with lower education levels (Kapucu & Ünver, 2017a; Chang et al., 2011; Chen et al., 2010). Harttgen et al. (2013) compared the frailty levels of elderly individuals in high-income and low-income countries and found that, in both higher and lower income countries, individuals with lower education and income had higher frailty levels. In this regard, the results of our study show similarities with previous studies. Low education and income levels may contribute to the development of frailty by making it difficult for older individuals to access health services and by influencing their lifestyle. In addition, higher education levels may have a significant effect on cognitive functions and be a key factor in preventing frailty.

In our study, the EFS score of those who exercise regularly was significantly lower compared with those who enjoy other activities ($p<0.001$). In a systematic review, Theou et al. (2011) indicated that 45–60 minutes of exercise three times a week has positive effects on frail elderly individuals and can be used in frailty management. In a study that included 610 frail individuals, Yamada et al. (2012) reported that the community-based exercise program was a cost-effective method to prevent the progress of frailty levels and the development of disability. Singh et al. (2012) found that one-year resistance training reduces hospitalizations in individuals with high frailty after hip fracture. Exercise is expected to affect frailty positively, given its physiological benefits.

It was found that the individuals who used routine medications had significantly higher levels of frailty than those who did not (p=0.001). Perna et al. (2017) and Hilmer et al. (2009) also reported a relationship between frailty and routine use of medicine.

In a meta-analysis study, Cheng & Chang (2017) examined the relationship between the level of frailty and the incidence of falls and found that older individuals were likely to experience recurrent falls. In our study, individuals who experienced a fall in the last year were significantly frailer than those who did not ($p<0.05$) Several previous studies obtained similar findings (Lahousse et al., 2014; Aygör et al., 2013; De Albuquerque Sousa et al., 2012; Chang et al., 2011). Exercise and preventing injuries with interventions to prevent falls are an effective means to manage frailty.

Based on the average EFS score, elderly individuals in this study were apparently vulnerable (6.84±3.83). Jankowska Polanska et al. (2019) found a similar mean EFS score (6.33±3.3) in their study. In our study, it was found that 19.8% of the elderly individuals were severely frail (EFS score of ≥11), 16.2% were mildly frail, and 16.2% were moderately frail. Another study in Turkey (Duru Aşiret & Çetinkaya, 2018) found that 27.4% of elderly individuals were severely frail, 19.9% were mildly frail, and 19.4% moderately frail. In the studies by Chang et al. (2011) and Perna et al. (2017), 14.9% and 13.9% were classified as frail, respectively. Our results were similar to those of previous studies in this regard.

Study Limitations

The results of this study cannot be generalized since this was across-sectional and single-center study.

Conclusion and Recommendations

It was found that the prevalence of severe frailty was 19.8% based on EFS scores. Advanced age, low education, low income, continuous use of medicine, and the history of fall within the last year were among the factors related to frailty. The level of frailty was lower in individuals who exercised regularly compared with those who did not. In light of these findings, planning nursing interventions specific for certain age groups and individuals to improve frailty and prevent possible clinical complications will increase the quality of nursing care.

Ethics Committee Approval: This study was approved by Ethics committee of Ege University Nursing Faculty (Approval No: 273344949-84-506).
Informed Consent: Written informed consent was obtained from the patients who agreed to take part in the study.

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