Frailty and Quality of Life in the Elderly Living in Nursing Home

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ABSTRACT

Objective: This work was designed to determine the association between the level of frailty and quality of life in nursing home residents.

Materials and Methods: This descriptive and correlational study was conducted in a nursing home in Turkey that is affiliated with the Ministry of Family and Social Policy. Between May 2016 and August 2016, we included 126 elderly individuals who satisfied the inclusion criteria and who agreed to participate in the study.

Results: The mean age of the participants was 78.2±10.7 years. The scores achieved in the Edmonton Frail Scale showed moderate and severe frailty in 33.4% of the elderly individuals. There was a linear correlation between frailty and life quality scores (r=−0.323, p<0.001). In the regression analysis, it was determined that as the age increased, the frailty total score increased significantly (F=9.567, p<0.05, R=0.60, R^2=0.36). It was observed that as the number of chronic diseases increased, the frailty total score increased.

Conclusion: According to the results of the study, it was determined that fragility affected the quality of life in elderly individuals. It is recommended for healthcare personnel in the nursing home to evaluate the elderly in terms of frailty and to know risk factors for the frail elders.

Keywords: Frailty, nursing home issues, quality of life

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INTRODUCTION

Aging occurs at different rates and in various ways. Elderly patients are susceptible to unexpected circumstances and they generally have a poor prognosis for most diseases. Healthy elderly individuals are those who can sustain their lives by themselves, whereas frail elderly individuals are those who mostly reside in residential homes, hospitals, or nursing homes. Frailty in people aged >65 years is approximately 7%, whereas individuals aged >80 years have frailty levels of 30–40% (1, 2). Frailty is characterized by the depletion of reserves in many systems of the human body, which is caused by dysregulation associated with physiological changes such as aging, diseases, long-term loss of activity, or malnutrition (3). Frail elderly patients are more at risk than their healthy peers in terms of disability, nursing home admission, and adverse health outcomes, such as death. Therefore, evaluating the functional status of the elderly is of high importance. The benefit of these assessments is the determination of the living conditions of the elderly. Determination of the level of frailty is important with respect to sustaining health and the quality of life of an individual in an aging population.

As aging is related to chronic diseases, increased disability, and dependence on others, the quality of life should be evaluated alongside frailty. Quality of life is defined as the "perception of individuals about positions in life from the perspectives of their objectives, expectations, standards, and concerns within the cultural and value systems in which they live" (4, 5). When studies that focused on the quality of life of the elderly were reviewed, some characteristics such as age, sex, education level, chronic diseases, medication use, poor physical condition, physical activity, leisure time activities, social security, economic status, and cohabitation status were determined to be factors that influenced the quality of life in elderly individuals (6, 7).

It is an important step to plan the care of the elderly to determine their frailty level and their quality of life. This is because this planned care enables the elderly to become self-sufficient, live with their disabilities, maintain an active life, and see themselves as valuable members of the society (8, 9). The studies that indicate the relationship between the fragility and the quality of life have shown different results and have been conducted mostly on the elderly in hospitals or in the society (10–13). In the literature, there is a vague association between the elderly living in the institution with the components between the frailty and quality of life. Given that the environment and socio-economic level of the elderly affect their quality of lives and frailty, it becomes important that these studies should be conducted on the elderly living in developing countries and residing in nursing homes, especially as it is known that the quality of

Table 1. Multiple linear regression analyses of EFS total scores

	Model statistics **F=9.567; p<0.001; R=0.602; R²=0.362**						
	Unstandardized coefficients			**Collinearity statistics**			
	Dummy coding	β	Std. error	t	p	Tolerance	VIF
Constant		3.558	0.669	5.317	**<0.001**		
Number of chronic diseases							
No disease	(0 0 0)	1.000					
A chronic disease	(1 0 0)	0.533	0.653	0.816	0.416	0.720	1.388
Two chronic diseases	(0 1 0)	1.902	0.754	2.522	**0.013**	0.746	1.340
Three or more chronic diseases	(0 0 1)	3.164	0.873	3.623	**<0.001**	0.798	1.253
Gender							
Male	(0)	1.000					
Female	(1)	2.407	0.560	4.300	**<0.001**	0.863	1.158
Age							
60–69 years	(0 0 0)	1.000					
70–79 years	(1 0 0)	0.828	0.761	1.088	0.279	0.513	1.948
80–89 years	(0 1 0)	1.891	0.778	2.432	**0.017**	0.486	2.057
90–100 years	(0 0 1)	3.590	1.015	3.536	**0.001**	0.708	1.413

VIF: Variance inflammation factor

life of those staying in nursing homes is affected and these patients are at a higher risk of being frail. Therefore, the aim of this study is to determine to frailty and the quality of life levels of the elderly residing in nursing homes and to explain their correlation with some independent variables that may affect the patients' health.

MATERIALS and METHODS

Study Design
This study is descriptive, correlational, and was designed to determine the association between the level of frailty and quality of life in elderly patients in a nursing home, thereby obtaining data that would guide the planning of nursing care.

Sample and Setting
The study was performed in a nursing home that is affiliated with the Ministry of Family and Social Policy. The study population comprised elderly nursing home residents. Between May 2016 and August 2016, we included 126 elderly individuals who satisfied the inclusion criteria and who agreed to participate in the study. The inclusion criteria were: patient age of ≥65 years, the ability to communicate effectively, the absence of hearing impairment or dementia, the ability to use manual skills, and the patient's agreement to participate in the study.

Data Collection
The study questionnaire and scales were administered via a face-to-face interview technique and measurements were obtained. The data were collected by the researchers between May 2016 and August 2016. The data collection instruments used were: a personal information form, the Edmonton Frail Scale Turkish (EFS-TR), the WHOQOL-OLD module.

Personal Information Form
The datasheet is composed of questions on the sociodemographic characteristics of the elderly.

World Health Organization Quality of Life Instrument-Older Adults Module (WHOQOL-OLD)
The World Health Organization Quality of Life Instrument-Older Adults Module (WHOQOL-OLD) is a 24-item Likert-type questionnaire. Items of the WHOQOL-OLD module are rated on a five-point scale. This scale contains six sub-dimensions: "autonomy," "sensory abilities," "social participation," "past, present, and future activities," "intimacy," and "death and dying." The possible sub-dimension scores range between 4 and 20. A high score signifies an enhanced quality of life. Eser et al. (8) evaluated the validity and reliability of the Turkish version of the WHOQOL-OLD module in 2004. The scale yielded an alpha value of 0.85.

The Edmonton Frail Scale (EFS)
The EFS was developed by Rolfson et al. (9) from the University of Alberta in Canada. The EFS is an 11-item scale that was developed to evaluate the level of frailty in the elderly. The scale covers nine frailty domains that are included in Comprehensive Geriatric Assessment and considers determining frailty. These frailty domains are functional independence, health status, cognition, medication use, social support, nutrition, functional performance, mood and, continence. Aygör et al. (14) evaluated the validity and reliability of the Turkish version of this scale in 2013.

Data Analysis
Data were analyzed using the Statistical Package of Social Sciences software (SPSS version 25.0, IBM Corp., Armonk, New York, USA). Multiple linear regression analysis assumptions are

Table 2. Characteristics of elderly participants

Variable	n	%
Age, mean (SD)	78.2	10.7
Sex		
Female	60	47.6
Male	66	52.4
Educational background		
Illiterate	53	42.1
Literate	24	19.0
Primary school	47	37.3
University	2	1.6
Chronic disease*		
Cardiovascular diseases (hypertension, CAD)	56	64.3
Endocrine diseases (diabetes, hyperthyroidism)	23	26.4
respiratory diseases (COPD, asthma, bronchitis)	9	10.3
Urinary tract (prostate, CRF)	10	11.4
Joint-connective tissue diseases (rheumatism, osteoporosis)	21	24.1
Other (cancer, glaucoma, epilepsy, CVA)	13	14.8
Meeting relatives**		
Common	20	23.5
Rare	41	48.2
No	24	28.3
Reason for hospitalization		
Inability to perform self-care	30	23.8
Having no relatives	41	32.5
Not being cared for by the family	35	27.8
Unwillingness to impose on the family	20	15.9
Length of stay at the institution		
<1 year	34	27.0
1–3 years	40	31.7
4–6 years	29	23.0
≥7 years	23	18.3

*More than one answer was given; **Evaluated on 85 elderly patients; SD: Standard deviation; CAD: Coronary artery disease; COPD: Chronic obstructive pulmonary disease; CRF: Chronic renal failure; CVA: Cerebrovascular accident

Table 3. WHOQOL-OLD Scale and Edmonton Frail Scale (EFS-TR) Scores in the elderly

WHOQOL-OLD	Mean±SD	Min.–Max.
Subscales		
Sensory abilities	10.96±2.71	4.0–17.0
Autonomy	12.36±3.05	6.0–30.0
Past, present, and future activities	11.56±3.06	4.0–20.0
Social participation	10.84±3.35	4.0–20.0
Death and dying	11.14±3.60	6.0–19.0
Intimacy	12.92±3.22	4.0–20.0
Total score	69.80±9.11	43.0–103
Edmonton Frail Scale	**n**	**%**
Not frail	30	23.8
Vulnerable	25	19.8
Mild frailty	29	23.0
Moderate frailty	19	15.1
Severe frailty	23	18.3
Total	126	100.0

WHOQOL-OLD: World Health Organization Quality of Life Instrument-Older Adults Module; EFS-TR: Edmonton Frail Scale Turkish; SD: Standard deviation; Min.: Minimum; Max.: Maximum

there was no autocorrelation. Tolerance values were above 0.2 and VIF values were less than 10, so there was no multicollinearity (Table 1). Multiple linear regression analysis was performed to determine the effects of gender, age, and a number of chronic diseases on the frailty scores. For the model statistics in the regression analysis tables; F, p, and adjusted R^2 values, as well as the t statistics and p values of beta coefficients, were given. The descriptive statistics were expressed in units (n) and percentage (%). The correlation between numerical variables was assessed by the Spearman test. The statistical significance level was accepted as $p < 0.05$.

RESULTS

The characteristics of the elderly are shown in Table 2. The mean age of the participants was 78.2±10.7 years. A total of 52.4% were males and 32.5% were living in the nursing home, as they did not have any relatives.

Table 3 shows the mean scores of the elderly individuals on the subscales of the WHOQOL-OLD module and EFS. When the mean scores of the domains of the WHOQOL-OLD module were evaluated, the individuals achieved the highest score in the intimacy domain (12.92±3.22) and the lowest score in the social participation domain (10.84±3.35). The scores achieved in the EFS showed moderate and severe frailty in 33.4% of the elderly individuals.

There was a significantly positive linear correlation between frailty and quality of life scores in the "death and dying" and "sensory abilities" domains of the quality of life scale. There was a significantly negative linear correlation between frailty and the quality of life scores in the "social participation," "autonomy," "intimacy," and

based on the relevant literature (15–17). To evaluate the normal distribution of numerical variance data, the Shapiro–Wilk normality test was used. According to this test (Statistic=0.992; df=126; p=0.731), the residuals were normally distributed. The data showed homoscedasticity relative to the scatter plot. According to a normal P-P Plot of Regression and a Scotter plot of the regression tests, linearity was achieved. Since the Durbin-Watson value (1,981) obtained from the study was between 1.5 and 2.5,

Table 4. Correlation between frailty scores and life quality domains in the elderly

	EFS total score	Sensory abilities	Autonomy	Past, present, and future activities	Social participation	Death and dying	Intimacy	Total score
EFS total score	rho=1.000 .							
Sensory abilities	rho=0.273** p<0.001	rho=1.000 .						
Autonomy	rho=-0.524** p<0.001	rho=-0.426** p<0.001	rho=1.000 .					
Past, present, and future activities	rho=-0.419** p<0.001	rho=-0.360** p<0.001	rho=0.614** p<0.001	rho=1.000 .				
Social participation	rho=-0.402** p<0.001	rho=-0.374** p<0.001	rho=0.534** p<0.001	rho=0.595** p<0.001	rho=1.000 .			
Death and dying	rho=0.518** p<0.001	rho=0.472** p<0.001	rho=-0.293** p<0.001	rho=-0.284** p<0.001	rho=-0.311** p<0.001	rho=1.000 .		
Intimacy	rho=-0.397** p<0.001	rho=-0.183* p<0.05	rho=0.384** p<0.001	rho=0.474** p<0.001	rho=0.455** p<0.001	rho=-0.158 p=0.077	rho=1.000 .	
Total score	rho=-0.323** p<0.001	rho=-0.013 p=0.886	rho=0.598** p<0.001	rho=0.713** p<0.001	rho=0.666** p<0.001	rho=0.126 p=0.161	rho=0.682** p<0.001	rho=1.000 .

EFS: Edmonton Frail Scale; Spearman's test; **Correlation is significant at p=0.01; *Correlation is significant at p=0.05

"past, present and future activities" domains and the total score in the quality of life scale. The frailty score of the elderly individuals decreased with an increase in the quality of life (Table 4) (Fig, 1).

Table 1 shows some characteristics of the elderly in the regression analysis of the total score of the EFS. In the regression model, the predictive effect of gender, age, and the number of chronic diseases on the total score of frailty were examined. The gender, age, and the number of chronic diseases of the elderly explain 36% of the total frailty (F=9.567, p<0.05, R=0.60, R^2=0.36). In this model, having an age of 90 years or more and having two or more chronic diseases showed significance in the total score of frailty (p<0.05).

DISCUSSION

Society has been faced with two important facts within the past century: aging of populations and sustaining a healthy course of aging in the populations. During aging, healthy behaviors of an individual, independence level, social participation, creativity, and interpersonal relations are influenced by many factors (gender, age, and chronic disease). These factors reduce the quality of life total score of elderly individuals and influence frailty (14, 18). In this scoping review, it was determined that among the 204 articles measuring fragility, geriatrics is the most common discipline and in 74% of the cases, frailty typically results in mortality (19).

In the present study, a significantly positive linear correlation was found between the level of frailty and scores in terms of the "sensory abilities" and "death and dying" domains on the quality of life scale. There was also a significantly negative linear correlation between the level of frailty and scores in the "autonomy,"
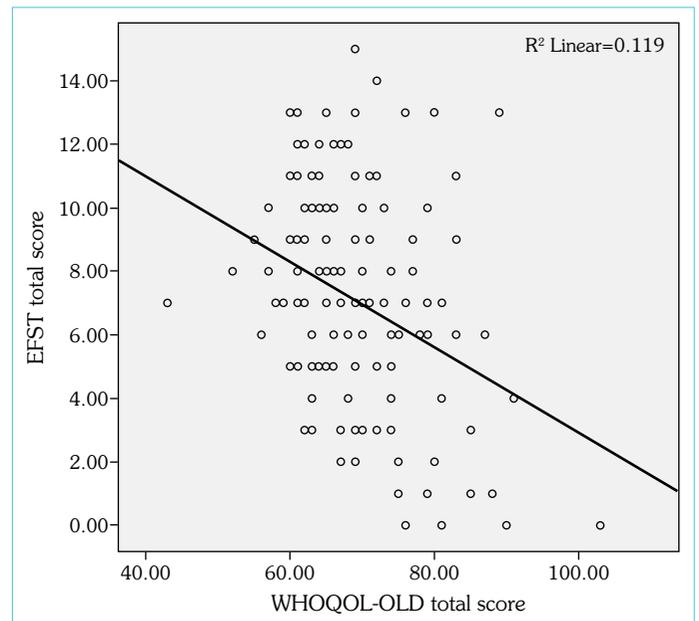

Figure 1. **EFS total score and WHOQOL-OLD total score correlation scatter plot**
EFS: Edmonton Frail Scale; WHOQOL-OLD: World Health Organization Quality of Life Instrument-Older Adults Module

"past, present, and future activities," "social participation," and "intimacy" domains and the total score in the quality of life scale (Table 4). In the study conducted by Aygör et al. (14), the quality of life was found to be lower in frail elderly people than in the elderly patients with no frailty, and this difference was significant. In a study conducted by Purser et al., an association was reported

between the decrease in walking and the poor quality of life in elderly individuals (20). In the study by Masel et al. (21), a significant association was reported between the pre-fragility period, fragility period, and poor quality of life. In some studies, it was determined that there was a significant relationship between the quality of life and the fragility of the elderly (22, 23). When data obtained from the present study are compared with those in the previous literature, the present results seem to be consistent with the literature. Based on these data, it can be suggested that the level of frailty decreases with the increasing quality of life in the elderly.

According to a systematic review, it was reported that the prevalence of fragility varied between 4.0% and 59.1%. The prevalence of fragility was 10.7% (10). In the study, the scores obtained in the EFS showed moderate and severe frailty in 33.4% of elderly individuals. When compared with the literature, the frailty rate was found to be high in this study. In developing countries like Turkey, there is no social security and less number of support systems and traditional family support, which lead to elderly care problems. This lack of adequate support systems and a limited number of age-friendly practices direct the elderly to instituitional care. Those patients who cannot take care of themselves, are ignored by their families, and are living alone generally consider nursing homes their only solution and prefer to live there (24). For this reason, the frailty rates of the elderly in the present study are higher as compared to the literature. Frailty is currently defined as a clinical syndrome that progresses with increasing age. It is an indicator of the biological age and is correlated with the consequences of biological age independent of age, sex, marital status, and accompanying diseases (25, 26).

Previous studies that evaluated the association between frailty and age and sex were reviewed. In the study by Runzer-Colmenares et al. (27) from Peru, aging and marital status were reported as factors that increased frailty. In another study conducted by Changa et al. (28), a significant association was reported between the mean EFS score and sex. The level of frailty was found to be significantly higher in females. Another study evaluated the mean EFS scores in different age groups and reported an increased level of frailty with increasing age (29). In the study by Masel et al. (2010) a significant association was reported between the level of frailty and marital status. In the study by Collard et al. (10) increasing age and female sex were found to be significantly associated with frailty and the regression analysis determined that the total frailty score increased significantly as the age increased. Also, it was found that the frailty scores of women were higher, but was not significantly correlated with the quality of life (Table 1). Previous studies suggest that frailty is more common in females than in males, however, the reason for this difference has not been elucidated, and female sex was included among the criteria for successful description of frailty (30, 31). These results have indicated that the necessity of determining frailty in female elderly individuals and planning the care by considering risk factors is important. When the frailty and life quality were reviewed according to the chronic disease status of the elderly, it was determined that the frailty total score increased as the number of the chronic disease increased (p<0.05) (Table 1). The drug use of the elderly, especially in those who have more than two chronic diseases, increases and the possibility of developing a complication and accordingly, increases the risk of disability. When these situ-

ations are taken into consideration, the frailty levels of the elderly may have increased. However, no significant correlation was determined between the life quality and the number of chronic diseases. It is considered that there are different factors that can affect the life quality, and qualitative studies should be conducted in addition to the current quantitative studies.

CONCLUSION

Consequently, it can be asserted that there is a correlation between frailty and quality of life in the elderly, and age, female sex, and chronic disease are important risk factors that determine the level of frailty. In the regression analysis, it was determined that age, sex, and number of chronic diseases was significant variables in the total score of frailty. Further, the nursing home staff evaluates the elderly for frailty during the admission stage and plan their care according to this evaluation, which becomes an important focal point to prevent frailty, provide the required care when it develops, and enhance the patients' quality of life. Also, it is recommended that the health policy providers make adjustements to nursing home policies in developing countries by taking this important issue into consideration.

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