ORIGINAL RESEARCH

Frailty and Factors Affecting It Among Older People Living in Nursing Home: A Cross-sectional Study

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Abstract

Objective: The aim of this study was to examine the relationship between frailty and activities of daily living (ADLs), nutrition, pain, falling, and fear of falling in older people living in a nursing home.

Materials and Methods: The study was descriptive and cross-sectional design. Data were collected from older people who were aged ≥65 years using a socio-demographic characteristics form, the comorbidity index, the Edmonton frail scale, the Katz index of independence in activities of daily living, the visual analogue scale, nutritional risk screening, and the fear of falling scale.

Results: The mean age of the 183 older people participating in the study was 74.64±7.58, and prevalence of frailty among older people living in the nursing home was 47.6%. As a result of the multiple linear regression analysis, dependency levels for ADLs (β=-0.240, p<0.001), age (β=0.121, p=0.043), being single (β=-0.148, p=0.028), having undergone surgery in the past year (β=-0.207, p=0.005), feeling exhausted (β=-0.214, p=0.005), pain scores (β=0.152, p=0.035), and having had a fracture associated with a fall (β=0.164, p=0.030) were statistically significant predictors of frailty.

Conclusion: It was determined that the frailty levels of the older people living in the nursing home were associated with their dependency levels for ADLs, age, being single, feeling exhausted, having undergone surgery in the past year, pain levels, and fractures due to falling.

Keywords: Aging, frailty, activities of daily living, nutrition, pain, falling, fear of falling

Introduction

The population of the elderly is increasing rapidly worldwide. It is estimated that this population will reach 1.97 billion (17.6%) in 2050 globally (1). According to the 2018 statistics of the Turkey Statistical Institute (TURKSTAT), the proportion of the older population to the total population has increased from 8.2% to 9.5% in the last five years in Turkey. It is predicted that the proportion of the older population will be 12.9% in 2030, and 16.3% in 2040 (2). Old age is characterized by the emergence of various complex health problems. Nursing homes are institutions that allow individuals to live somewhere they can continue their daily lives while receiving more care (3). In developed countries, 1.5% to 8% of older adults aged ≥65 years live in nursing homes (4). However, due to the increasing

functional, cognitive, and economic problems of older adults, their need for nursing homes is increasing (5). It is known that older adults living in nursing homes have difficulty in carrying out activities of daily living (ADLs), and their independence and activity levels and nutritional status are lower than those of the individuals in the community (5). Staying in a nursing home can lead to negative psychological effects in older adults in addition to a decrease in independence and quality of life (6,7). The frailty levels of older adults living in nursing homes are also higher than the levels of those in the community (4).

Frailty is characterized by a syndrome that causes loss of dynamic homeostasis, decreased physiological reserve, increased morbidity, and mortality. It is composed of five physical components, namely, weight loss, exhaustion, weakness, a slower walking speed, and limited physical activity (8). It has also

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been defined as a condition in which difficulty in performing ADLs, prolonged hospital stays, weakness, decrease in muscle mass, malnutrition, and decrease in cognitive functions co-exist (9). Frailty in older adults in the community is associated with falls, hospitalizations, and mortality (10). The incidence of frailty among older adults living in the community is approximately 10% (11). However, it is seen in more than half of those residing in nursing homes (4). Older adults may tend to have co-existing risk factors for frailty (12,13). Therefore prevention, and management of frailty in nursing homes may be more difficult. To slow or prevent it in nursing homes, it is important to identify how frailty develops, and the factors that affect it. Studies on factors related to frailty in older adults living in nursing homes are limited (4,14). The aim of this study was to examine the relationship between frailty, ADLs, nutrition, pain, frequency of falling, and fear of falling among older adults living in nursing homes.

Materials and Methods

Design

The study was conducted using a descriptive and cross-sectional research design. It was carried out in a nursing home located in western Turkey between May and August 2022.

Sample

The research sample consisted of 183 older adults who lived in a nursing home. The inclusion criteria for the research sample were an age ≥65 years, the ability to understand and speak Turkish, voluntary participation in the study, and having no hearing or speech impairment that would prevent them from answering the questionnaires. Patients who had a score of <24 on the mini-mental state examination or were diagnosed with neurological (e.g., dementia/Alzheimer's) or psychiatric (e.g., schizophrenia) diseases were excluded from the study. In this study, G*Power version 3.1 was used for calculating the sample size. After the study, the power was calculated as 0.92 based on an effect size of 0.25, a p-value of 0.05, and a sample size of 183.

The approval of the nursing home and the Non-Invasive Clinical Research Ethics Committee of a Dokuz Eylül University was obtained to conduct the study (no: 22/32-07, date: 12.10.2022). Finally, the older people who agreed to participate in the study were asked for their verbal consent.

Data Collection

Questionnaires were completed by the researcher during in-person interviews with the patients who met the inclusion criteria.

The researchers prepared the descriptive characteristics form according to the relevant literature. The form included questions related to socio-demographic (the individuals' age, gender, marital status, education) and other factors (chronic disease, presence of a caregiver, fall history (for the last year), history of falls at the nursing home, and the number of falls, operating status, smoking status, status of using alcohol, experiencing dizziness, experiencing a decrease in walking speed in the past year, having a stated problem with balance, having a decreased appetite, feeling exhausted).

The visual analog scale (VAS) was developed by Price et al. (15). The VAS starts at the low end with a score of 0 for "no pain" and ends at the high end with a score of 10 for "severe pain."

The modified Charlson comorbidity index (MCCI) was created by Charlson et al. (16) to estimate mortality by classifying comorbid disease status. The reason for using the modified CCI in our study was that in the MCCI, one comorbidity point is added to the scores of individuals aged ≥40 for every 10 years of age, and our study was conducted with individuals aged ≥65. The comorbidity classification according to the scores is as follows: Low (≤3), moderate (4 and 5), high (6 and 7), and very high (≥8) comorbidity.

The Edmonton frail scale was developed by Rolfson et al. (17) to assess frailty in older adults. The scale consists of 11 items, and nine frailty sub-dimensions, namely cognitive status, general health status, functional independence, social support, medication use, nutrition, mood, continence, and functional status. The "clock test" is used to assess cognitive status, and the "timed get up and go test" is used to assess functional performance (17,18). Scores on the scale range between 0, and 17. Scores on the total scale between 0 and 4 are interpreted as no presence of frailty; 5-6 as apparent vulnerability to frailty; 7-8 as mild frailty; 9-10 as moderate frailty; and ≥11 as severe frailty. In this study, the dependent variable results were split into two levels for the analysis of data: Without frailty (final score ≤6), and with frailty (final score >6). The Turkish validity and reliability study of the scale was performed by Aygör et al. (18).

The Nutritional Risk Screening-2002 (NRS) tool was developed by Kondrup et al. (19). This screening tool is used to evaluate the malnutrition levels and malnutrition risk of individuals. Irregularity in nutritional status, and disease severity is evaluated by the percentage of weight loss as follows: None (0 points); mild (1 point); moderate (2 points); severe (3 points). If the total score is ≥3, the patient is classified as at risk of malnutrition. If the total score is <3, the screening test is repeated at specific intervals.

The Likert-type fear of falling scale consists of a one-item Likert question that asks participants to rate the level of their fear of falling on a five-point scale: "Are you afraid of falling?". The scores are interpreted as follows: 0= not afraid; 1= slightly

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afraid; 2= moderately afraid; 3= very afraid; 4= extremely afraid.

The Katz index of Independence in ADLs was developed by Katz et al. The scale assesses the degree of dependence on others in self-care activities such as feeding, dressing, bathing, transferring, continence, and toileting. The scale score is calculated by adding up the scores of all items, and the score range is between 6 and 18. Scores on the scale are interpreted as follows: 0-6= dependent; 7-12= semi-dependent; 13-18= independent. The Katz index measures six self-care tasks using a dichotomous rating [dependent (0) and independent (1)] in hierarchical order of decreasing difficulty as listed: Bathing, dressing, toileting, transferring to and from a chair, maintaining continence, and feeding. Those with a score of 6 points are considered independent, while those with 0 points are considered fully dependent. The Turkish validity and reliability study of the scale was conducted by Arik et al. (20).

Statistics

The IBM SPSS Statistics 23 software was used to analyze the research data. Descriptive statistics of frequency, percentage, mean, and standard deviation were used for the descriptive information about older adults. In the study, all independent variables related to frailty were evaluated using Spearman's correlation analysis. Independent variables having a significant relationship with frailty were included in the regression model. Before the regression model was established, standardized residual was examined for the dependent variables and multicollinearity was examined for the independent variables. The presence of multicollinearity was evaluated by calculating the tolerance (<0.20), and variance inflation factors (>5) for all independent variables in the regression model. The level of statistical significance was accepted as p<0.05 to include the variables in the regression equation.

Results

The mean age of the 183 older adults participating in the study was 74.64±7.58 (min=60, max=90). 53% were female, 84.2% were single; and 62.3% were primary or secondary school graduates. Of the participants, 61.2% had an income equal to their expenditure, 38.3% did not smoke, and 14.2% of them did not use alcohol. It was determined that 31.1% of the older adults living in the nursing home had undergone surgery in the past year, 23.5% had fallen, 4.9% had experienced fractures due to falling, and 9.8% had been hospitalized for some reason in the past year. The older adults in the study had a moderate (31.7%) to severe fear of falling (14.8%). According to the results of the MCCI, 39.9% of the older adults were at intermediate risk and 31.1% at high risk. In addition, 89.7% of participants were independent, while 21.9% were at risk of malnutrition. In the study, 29% of older adults obtained 0-4 points on the Edmonton

frail scale and were therefore classified as "not frail", 23.5% got 5-6 points, and were classified as "vulnerable", and 10.4% got ≥11 points and were classified as "severely frail". The clinical and socio-demographic characteristics of the older adults are given in Table 1.

A statistically significant positive correlation was found between the frailty index score of the older adults, the MCCI (r=0.259), the NRS score (r=0.150), age (r=0.234), smoking (r=0.197), alcohol use (r=0.257), the status of doing regular sports (r=0.257), fatigue level (r=0.218), pain level (r=412), and fractures due to falling (r=0.163) (p<.05). A statistically significant negative correlation was found between the frailty index score of the older adults staying in the nursing home and difficulty with ADLs (r=-0.502), being female (r=-0.173), weight (r=-0.237), being single (r=-0.305), the status of having undergone surgery in the past year (r=-0.363), a slower walking speed (r=-0.273), and feeling exhausted (r=-0.240) (p<0.05) (Table 2).

Multiple linear regression analysis was performed to determine the contribution of factors associated with the frailty index. Variables that were found to have a moderate and severe correlation with the frailty index score of the older adults were included in the regression model. It was found that difficulty with ADLs (β=-0.240, p<0.001), age (β=0.121, p=0.043), being single (β=-0.148, p=0.028), having had surgery in the past year (β=-0.207, p=0.005), feeling exhausted (β=-0.214, p=0.005), pain scores (β=0.152, p=0.035), and fall-related fractures (β=0.164, p=0.030) were statistically significant predictors of the frailty level of the older adults. These variables explained 40% of the variances (Table 3).

Discussion

In the present study, the prevalence of frailty among the older adults living in the nursing home was 47.6%. Kojima (4) stated in a meta-analysis and systematic review that approximately half of older adults living in nursing homes were frail. However, due to the variety of scales used, the prevalence of frailty among older adults living in nursing homes varies between 3.76%, and 70.1% (21). The prevalence of frailty in the present study was lower than the frailty of older adults living in nursing homes in Brazil (68.8%) (22), but higher than in Egypt (19%) (23) and in Spain (36.3%) (24) in those without cognitive impairment according to the mini-mental state examinations (MMSE >24) (25). These findings are consistent with previous research showing a higher prevalence of frailty and vulnerability in low- to middle-income countries compared to high-income regions (26,27). This is thought to stem from the fact that negative socio-economic conditions often cause inequalities in access to healthcare services, poor diet, physical inactivity, and multiple diseases and disabilities (28). The high prevalence of frailty among older adults living in nursing homes

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Table 1. Descriptive information about the older people living in nursing home							
		Total	Not frail (n=53)	Apparent frailty (n=43)	Mild frailty (n=41)	Moderate frailty (n=27)	Severe frailty (n=19)
		N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	p
Age	65-74	91 (49.7)	29 (54.7)	26 (60.5)	21 (51.2)	11 (40.7)	4 (21.1)	0.024*
	75-84	66 (36.1)	20 (37.7)	14 (32.6)	15 (36.6)	7 (25.9)	10 (52.6)	
	85 and over	26 (14.2)	4 (7.5)	3 (7)	5 (12.2)	9 (33.3)	5 (26.3)	
Sex	Female	97 (53)	20 (37.7)	25 (58.1)	25 (61)	14 (51.9)	13 (68.4)	0.082
	Male	86 (47)	33 (62.3)	18 (41.9)	16 (39)	13 (48.1)	6 (31.6)	
Marital status	Married	29 (15.8)	3 (5.7)	4 (9.3)	6 (14.6)	5 (18.5)	11 (57.9)	0.000*
	Single	125 (84.2)	50 (94.3)	39 (90.7)	35 (85.4)	22 (81.5)	8 (42.1)	
Education	Literate	7 (3.8)	34 (64.2)	30 (69.8)	27 (65.9)	19 (70.4)	11 (57.9)	0.908
	Primary school	114 (62.3)	15 (28.3)	11 (25.6)	12 (29.3)	6 (22.2)	6 (31.6)	
	High school	50 (27.3)	4 (7.5)	1 (2.3)	2 (4.9)	2 (7.4)	2 (10.5)	
	University	12 (6.5)	0 (0)	1 (2.3)	0 (0)	0 (0)	0 (0)	
Level of income	Income<expenses	61 (33.3)	10 (18.9)	12 (27.9)	18 (43.9)	12 (44.4)	9 (47.4)	0.025*
	Income=expenses	112 (61.2)	40 (75.5)	29 (67.4)	18 (43.9)	15 (55.6)	10 (52.6)	
	Income>expenses	10 (5.5)	3 (5.7)	2 (4.7)	5 (12.22)	0 (0)	0 (0)	
Status of smoking	Yes	70 (38.3)	24 (45.3)	17 (39.5)	16 (39)	8 (29.6)	5 (6.3)	0.534
	No	113 (61.7)	29 (54.7)	26 (60.5)	25 (61)	19 (70.4)	14 (73.7)	
Status of using alcohol	Yes	26 (14.2)	12 (22.6)	7 (16.3)	6 (14.6)	1 (3.7)	0 (0)	
	No	157 (85.8)	41 (77.4)	36 (83.7)	35 (85.4)	26 (96.3)	19 (100)	0.065
Having undergone surgery in the past year	Yes	57 (31.1)	9 (17)	9 (20.9)	14 (34.1)	15 (55.6)	10 (52.6)	0.001*
	No	126 (68.9)	44 (83)	34 (79.1)	27 (65.9)	12 (44.4)	9 (47.4)	
Experiencing dizziness	Yes	83 (45.4)	22 (41.5)	16 (37.2)	22 (53.7)	14 (51.9)	9 (47.4)	0.541
	No	100 (54.6)	31 (58.5)	27 (62.8)	19 (46.3)	13 (48.1)	10 (52.6)	
Slower walking speed	Yes	133 (72.7)	30 (56.6)	28 (65.1)	39 (95.1)	21 (77.8)	15 (78.9)	0.001*
	No	50 (27.3)	23 (43.4)	15 (34.9)	2 (4.9)	6 (22.2)	4 (21.1)	
Balance problem	Yes	107 (58.5)	22 (41.5)	18 (41.9)	31 (75.6)	19 (70.4)	17 (89.5)	0.000*
	No	76 (41.5)	31 (58.5)	25 (58.1)	10 (24.4)	8 (29.6)	2 (10.5)	
Decreased appetite	Yes	67 (36.6)	21 (39.6)	15 (34.9)	17 (41.5)	11 (40.7)	3 (15.8)	0.351
	No	116 (63.4)	32 (60.4)	28 (65.1)	24 (58.5)	16 (59.3)	16 (84.2)	
Feeling exhausted	Yes	75 (41)	19 (35.8)	12 (27.9)	13 (31.7)	18 (66.7)	13 (68.4)	0.0001*
	No	108 (59)	34 (64.2)	31 (72.1)	28 (68.3)	9 (33.3)	6 (31.6)	
Status of doing regular exercise	Yes	39 (21.3)	14 (26.4)	17 (39.5)	7 (17.1)	1 (3.7)	0	0.001*
	No	144 (78.7)	39 (73.6)	26 (60.5)	34 (82.9)	26 (96.3)	19 (100)	
Fall history (in the past year)	Yes	43 (23.5)	9 (17)	21 (48.8)	6 (14.6)	9 (33.3)	3 (15.8)	0.001*
	No	140 (76.5)	44 (83)	22 (51.2)	35 (85.4)	19 (66.7)	16 (84.2)	
Fractures due to falling	Yes	9 (4.9)	0 (0)	5 (11.6)	0 (0)	0 (0)	4 (7.5)	0.052
	No	174 (95.1)	19 (100)	38 (88.4)	41 (100)	27 (100)	49 (92.5)	
Hospitalization in the past year	Yes	18 (9.8)	7 (13.2)	2 (4.7)	3 (7.3)	6 (22.2)	4 (22.1)	0.061
	No	165 (90.2)	46 (86.8)	41 (95.3)	38 (92.7)	21 (77.8)	15 (78.9)	

Table 1. Continued

		Total	Not frail (n=53)	Apparent frailty (n=43)	Mild frailty (n=41)	Moderate frailty (n=27)	Severe frailty (n=19)	
		N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	p
Fear of falling	Not afraid	36 (19.7)	18 (34)	9 (20.9)	6 (14.6)	0 (0)	3 (15.8)	0.000*
	Slightly afraid	25 (3.7)	5 (9.4)	6 (14)	10 (24.4)	4 (14.8)	0 (0)	
	Moderately afraid	58 (31.7)	9 (17)	7 (16.3)	7 (16.3)	15 (55.6)	13 (68.4)	
	Very afraid	37 (20.2)	13 (24.5)	13 (30.2)	13 (30.2)	3 (11.1)	3 (15.8)	
	Strongly afraid	27 (14.8)	8 (15.1)	8 (16.6)	8 (18.6)	5 (18.5)	0 (0)	
Modified Charlson comorbidity index	0	12 (6.6)	8 (15.19)	0 (0)	2 (4.9)	2 (7.4)	0 (0)	0.005*
	1-3	73 (39.9)	19 (35.8)	26 (60.5)	16 (39)	8 (29.6)	4 (21.1)	
	≥4	98 (53.5)	26 (49.1)	17 (39.5)	23 (56.1)	17 (63)	15 (78.9)	
KATZ *	Semi-dependent	19 (10.3)	1 (1.9)	1 (2.3)	1 (2.4)	5 (18.5)	1 (5.3)	0.012*
	Independent	164 (89.7)	52 (98.1)	42 (97.7)	40 (97.6)	22 (81.5)	18 (94.7)	
NRS*	No risk of malnutrition	143 (78.1)	40 (75.5)	38 (88.4)	29 (70.7)	18 (66.7)	15 (78.9)	0.54
	Risk of malnutrition	40 (21.9)	13 (24.5)	5 (11.6)	12 (29.3)	9 (33.3)	4 (22.1)	

* Katz index of independence in activities of daily living, * Nutritional risk screening (NRS-2002)

compared to older adults in the community is because many of the factors affecting the development of geriatric syndromes and frailty are more common in this population. Older adults living in nursing homes may be more likely to be vulnerable due to their being away from their families, having to change their lifestyle, feeling lonely, and experiencing a loss of appetite (13,29). In addition, it has been stated that the frailty of older adults living in nursing homes is a reflection of their cognitive decline and disabilities (4,30). More studies are needed to find the most effective practices to prevent and reduce vulnerability in nursing homes.

In the present study, the frailty levels of older adults were associated with advanced age, difficulty with ADLs, being single, the status of having undergone surgery in the past year, fractures due to falling, and pain scores. Similar to the literature, it was determined that the prevalence of frailty increased with increasing age (13). It is known that there is a higher probability of frailty in older adults with advancing age (4,31). People of advanced age are more vulnerable, and it is more difficult for them to maintain homeostasis. This suggests that the higher the chronological age is, the higher the tendency to frailty is (31). Living alone and being single affect frailty. In the present study, it was determined that being single was associated with frailty among the older adults living in the nursing home. The absence of a spouse, and being single, widowed, or divorced are also associated with vulnerability (32). Older adults living in a nursing home with their spouses are less vulnerable because they have better social relationships and mental status than those who live alone or have to share a room with a stranger (33).

Increasing the participation of older adults in social activities in nursing homes is important to reduce frailty, and the correlation between social relationships and frailty needs to be investigated in more detail. In the current study, it was determined that the frailty levels of older adults who had difficulty in fulfilling ADLs were higher. Frailty has a negative impact on ability to perform ADLs and instrumental ADLs (IADLs). About 60% of those with frailty are adversely affected, compared to about 14% of older adults who are not frail (34). It is known that the frail older people have lower functional levels and poor fulfillment of ADLs independently (35).

It is known that older adults with frailty have more chronic diseases and are less independent. Therefore, frail older adults may experience conditions that require more surgical procedures. In the present study, it was determined that the status of the older adults who had undergone surgery in the past year was associated with frailty. The fact that the prevalence of frailty in older adults undergoing surgery is more than 10% compared to those living in the community highlights the vulnerability of this patient group (36). Frailty was determined as an independent risk factor for complications in older adults who had undergone surgery, and the rate of complication was found to be higher (10,37). It was found that the risk of complications increased in older patients with frailty treated for traumatic periprosthetic fractures, and that there was a significant difference between frail and non-frail patients in terms of both major and minor complications. It has also been stated that there is a relationship between frailty and postoperative mortality (38). In addition, major surgeries affect frail patients more than minor

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Table 2. The relationship between frailty and activities of daily living, pain, nutritional status, and affecting factors

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1. Frailty	1																					
2. Activities of daily living (KATZ)[a]	-0.502**	1																				
3. Charlson comorbidity index	0.259**	-0.179*	1																			
4. Nutritional risk screening	0.150*	0.052	0.412**	1																		
5. Age	0.234**	-0.097	0.221**	0.015	1																	
6. Gender	-0.173*	0.110	-0.096	-0.025	-0.033	1																
7. Weight	-0.237**	0.142	-0.076	-0.097	-0.134	0.241**	1															
8. Marital status	-0.305**	0.200*	-0.154*	-0.063	-0.186*	0.169*	0.172*	1														
9. Education	-0.014	0.028	-0.057	-0.026	-0.144*	0.017	0.309**	-0.079	1													
10. Smoking[a]	0.197*	-0.177	0.149	-0.105	0.262	-0.385	-0.169	-0.157	-0.008	1												
11. Alcoholuse[a]	0.257**	-0.091	0.278**	0.035	0.173*	-0.305**	-0.212**	-0.240**	-0.035	0.338**	1											
12. Status of having undergone surgery in the past year[a]	-0.322**	0.243**	-0.164*	-0.016	0.022	0.019	0.291**	0.257**	0.193*	-0.068	-0.207**	1										
13. Are you experiencing dizziness?[b]	-0.168*	0.062	-0.362**	-0.226**	-0.017	0.242**	-0.024	0.086	-0.122	-0.198**	-0.194*	0.146*	1									
14. Have you had any balance problems in the last year?[a]	-0.363**	0.271**	-0.247**	-0.235**	-0.093	0.317**	0.112*	0.092	0.101	-0.204**	-0.140	0.256**	0.478**	1								
15. Have you had a decrease in walking speed in the past year?[a]	-0.273**	0.160*	-0.195	-0.220**	-0.096	0.209*	0.096	0.031	0.103	-0.199**	-0.129	0.068	0.288**	0.479**	1							
16. Have you felt burnout in the last year?[a]	-0.240**	0.142	-0.129	-0.202**	-0.003	0.095	-0.141	-0.027	-0.086	-0.130*	-0.094	-0.153*	0.156*	0.184*	0.087	1						
17. Doing regular sports[a]	0.257**	-0.349**	0.139*	-0.058	0.130	0.009	-0.049	0.030	0.095	-0.080	0.055	-0.120	-0.179**	-0.157*	-0.280**	0.170*	1					
18. Fatigue level	0.218**	-0.057	0.087	0.112*	0.056	-0.112	-0.045	-0.195	0.070	0.240**	0.230	-0.078	-0.101	-0.093	-0.120	-0.091	-0.388**	1				
19. Pain level	0.412**	-0.284**	0.293**	0.193*	0.067	-0.164*	-0.076	-0.176*	0.060	0.098	0.267**	-0.204**	-0.146	-0.177*	-0.237**	-0.177	-0.297**	0.260**	1			
20. History of falling in the past year[a]	0.055	-0.190*	-0.077	-0.131*	-0.017	0.185*	0.070	-0.165*	0.052	-0.056	-0.226**	-0.004	-0.017	-0.084	0.072	-0.185*	0.058	0.049	-0.083	1		
21. Fractures due to fall[a]	0.163*	-0.184	-0.026	-0.006	0.212	0.062	0.131	-0.099	0.173	0.029	-0.074	0.174	-0.207	-0.167	0.026	-0.028	0.067	0.190	0.025	0.394	1	
22. Fear of falling	0.034	0.073	-0.019	0.084	-0.019	-0.155	-0.081	-0.061	-0.041	0.097	0.014	-0.082	-0.122	-0.148	-0.193*	-0.074	-0.097	0.043	0.196	-0.036	-0.229**	1

*p<0.05, ** p<0.01, [a]Spearman's correlation [a]1=yes, 2= no

Table 3. Factors affecting the frailty levels of older people living nursing home			
	Beta	**t**	**p**
Frailty			
Daily living activities	-0.240	-3.389	0.001*
Charlson comorbidity index	0.029	0.410	0.683
NRS nutrition	0.010	0.144	0.886
Gender	-0.029	-0.400	0.690
Age	0.121	1.984	0.043*
Weight	-0.048	-0.726	0.469
Marital status	-0.148	-2.212	0.028*
Smoking	0.003	0.039	0.969
Alcohol use	0.072	1.049	0.296
Status of having undergone surgery in the past year	-0.207	-2.815	0.005*
Experiencing dizziness	0.049	0.663	0.509
Have you had any balance problems in the last year?	-0.084	-1.030	0.305
Have you had a decrease in walking speed in the past year?	-0.092	-1.234	0.219
Have you felt burnout in the last year?	-0.214	-2.817	0.005*
Doing regular sports	0.032	0.456	0.649
Fatigue level	-0.023	-0.324	0.747
VAS	0.152	2.125	0.035*
History of falling	-0.013	-0.194	0.846
Fractures due to falling	0.164	2.196	0.030*
Fear of falling	0.050	0.767	0.444
Model R²: 0.469, Adjusted R²:0.404, F:7.164, p<0.001			

surgeries (39). It is important to determine the frailty level of all older adults who have and have not undergone surgery (40). Diagnosing and following up the frailty of older adults living in nursing homes may help in terms of taking the necessary precautions for post-operative care.

In the present study, it was determined that older adults with fractures had higher levels of frailty, and that there was a significant positive correlation between frailty and age, which supports the results of previous studies (41,42). Frailty reduces the ability to perform ADLs and the quality of life in older adults and increases the likelihood of fractures (41). In addition to older people who are frail, the older people in the "pre-frail" stage are also at risk for fractures (42). The healing process may also be longer for older adults after fractures.

The pain experienced by the older adults was found to be one of the predictors of frailty in the present study. One in five of the older adults living in the nursing home stated that they had experienced pain but had not been treated (43). In studies conducted with older adults in the community, a relationship has been found between pain and frailty (44). Pain has a serious impact on the physical, psychological, and social aspects of older people's lives (26). Fried et al. (8) stated that pain was closely associated with each of the five criteria of frailty in the vulnerability phenotype. Chronic pain can cause fatigue

and decreased physical activity (44). Pain was associated with decreased physical performance (grip strength and normal walking speed) in older adults in the United States. Pain-related anorexia and loss of appetite are also common in older adults. The cognitive, behavioral, and social limitations caused by pain can also increase frailty.

Study Limitations

The limitation of the study is that patients whose mini mental test scores were <24 were not included in the study. Cognitive dysfunction is also considered one of the indicators of frailty. It is necessary to conduct studies on the frailty level of older adults with cognitive impairment, and the factors that affect it.

Conclusion

It was determined in the present study that approximately half of the older adults living in the nursing home were frail. With the increase in the older population, the need for nursing homes is increasing, and of those who apply to enter nursing homes, those older adults requiring more healthcare tend to be most admitted. This highlights the importance of informing nursing home workers about frailty, as it may cause more older adults with frailty to look to nursing homes in the future. The predictors of frailty in older adults were found to be advanced age, difficulty with ADLs, being single, having undergone

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surgery in the past year, fractures due to falling, and pain scores. It is recommended that future studies be conducted comparing the status of frail older adults with fractures before and after surgery. In addition, it is recommended that interventional and longitudinal studies be conducted to determine the effect of social participation and physical exercise on older adults living in nursing homes. More well-designed researches are needed to determine the effects of nutritional supplements, exercise, and their combination for nursing home residents.

Ethics

Ethics Committee Approval: The approval of the nursing home and the Non-Invasive Clinical Research Ethics Committee of a Dokuz Eylül University was obtained to conduct the study (no: 22/32-07, date: 12.10.2022).

Informed Consent: The older people who agreed to participate in the study were asked for their verbal consent.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: H.T.D., A.Ö.G., Design: H.T.D., Data Collection or Processing: H.T.D., Ö.B., A.Ö.G., Analysis or Interpretation: H.T.D., Ö.B., A.Ö.G., Literature Search: H.T.D., Ö.B., Writing: H.T.D., Ö.B.

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