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ORIGINAL ARTICLE

Frailty and Related Factors in Hospitalized Older People in Northern Cyprus

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Abstract

Objective: This study aimed to evaluate frailty in hospitalized older people and to identify the related factors.

Method: The descriptive study was conducted on 60 older people (66–88 years) who received inpatient treatment in geriatric clinics of two hospitals between September and December 2020. Ethics committee approval, institutional consent, and informed patient consent were obtained for the study. Along with the Edmonton Frailty Scale, a data form was used to collect data about the patient's socio-demographic, disease characteristics, and frailty risk factors. The data were collected through face-to-face interviews.

Results: Frailty of various levels mildly 51.6% and moderately 36.6% of the older people hospitalized in geriatric units in Northern Cyprus was detected (Edmonton Frailty Scale score of 9.23 ± 1.49). The older people in the advanced age (85 years and above) group had an even higher frailty level with the score of 10.0 (p = .009). Those who self-rated as "bad" had either a low education level, were living without a partner, had two chronic diseases, had to use four to seven drugs daily, had a health problem within the last 15 days, had to visit the hospital in the last year, or had to be hospitalized, and had higher min-max Edmonton Frailty Scale scores (p > .05).

Conclusion: The frailty levels in older people hospitalized in geriatric units were found to be higher. The older people were classified as frail because of the number of frailty risk factors such as weight loss, weakness, lack of appetite, or had more than three falls.

Keywords: Frailty, geriatric, hospitalized patient, nursing care, older people, risk factors

Introduction

Frailty syndrome in the older people is a clinical condition with a high cost of care, leading to negative health outcomes such as functional decline, disability, dependency, hospitalization, and death (Clegg et al., 2013). Therefore, hospitalization is risky and dangerous for the older people. Frailty and hospitalization have a strong impact on the ability to be independent in their daily lives (Boyd et al., 2008). Frailty is a geriatric syndrome covering adverse health outcomes such as decrease in physiological reserve, stress intolerance, weakness, low physical activity, and decrease in body mass index (Tsuji et al., 2021). Frailty develops as a consequence of age-related decline in many physiological systems, which collectively result in vulnerability to sudden health status changes triggered by minor stressor events (urinary infection, adding new drugs, etc.) (Fried et al., 2003). The most problematic expression of an aging population is the clinical condition of frailty (Clegg et al., 2013).

In 2019, the global population over 65 was 9%. It is estimated that this will increase to 16% by 2050 and that 1 in 6 people will be 65 or over (United Nations, Department of Economic and Social Affairs, 2019). It was reported that the rate of increase in the older people population between 2010 and 2050 will be higher in developing countries (250%) compared to developed countries (71%) (World Health Organization, 2017). The Turkish Republic of Northern Cyprus (TRNC) is the northern part of Cyprus and the third largest island in the Mediterranean. In 2019, the TRNC was included in the "old population" group with 9.4% of its population being 65 years and older (Statistical Institute, 2020). Although there is a preponderance of literature on frailty in developed countries, little is known about frailty in the TRNC.

Depending on the measurement tools for the definition and evaluation of frailty, its prevalence in the society varies widely between 4% and 59.1% (Buckinx et al., 2015). In older hospitalized patients, the frailty prevalence varied

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from 27% to 80% (Purser et al., 2006) and it was found that frailty prevalence rates in the older populations of developing countries are indeed higher than in developed countries (Alvarado et al., 2008). A study examining different ethnic groups in society reported that Turkish seniors had the highest level of frailty (van Assen et al., 2016). The FrailTURK project found that 39.2% of older individuals were frail and that frailty rose to 35%–45% in the older people aged 85 years and more (Eyigor et al., 2015).

Frail older individuals whose health status changes suddenly put a strain on healthcare systems. Due to their predisposition to poor prognosis, they are the target group for geriatrics. To better understand the effects on the functional status of the older people, it is vital to detect frailty and delay its negative consequences. This study aimed to determine the frailty levels of older people hospitalized in geriatric clinics in the TRNC and related risk factors.

Material and Methods

Study Design and Study Population

This study was designed as a descriptive study. In the TRNC, the provision of health and social services for the older people is carried out by the state. This study was conducted on older people who are being treated in geriatric clinics in two state-owned hospitals. Totally 35 out of 50 older people who received inpatient treatment in one of these hospitals and 25 out of 40 older people in the other hospital met the criteria for inclusion. A total of 60 patients who met the following inclusion criteria were included: being 65 years and older, having manual dexterity to measure cognitive performance with the Edmonton Vulnerability Scale, being able to communicate, and volunteering to participate. Informed consent was obtained from all patients after giving information about the study in line with the Declaration of Helsinki. Exclusion criteria were being under the age of 65, being immobilized, having a terminal illness, and having a neurological deficit or any cognitive dysfunction. Individuals who showed decreased cognitive function (Mini-Mental State Examination score <24) were excluded.

Data Collection

The data of the study were collected using a structured information form and The Edmonton Frailty Scale (EFS). Data were collected from September 2020 to December 2020 through individual face-to-face interviews that lasted for about half an hour. The structured information form consists of a total of 32 questions about demographic characteristics (age, gender, education level, marital status, income rate), disease characteristics (chronic disease, number of drugs used, health complaints, hospital admission, hospitalization), and some frailty risk factors (weight loss, weakness, lack of appetite, malnourishment, decubitus ulcer, falls, care needs).

The EFS is concise, reliable, and easy to use by both clinicians and non-clinicians to assess the frailty of the older people (Rolfson et al., 2006). The Cronbach alpha coefficient of the original scale was .62. The Turkish validity and reliability were conducted by Aygör in 2013. Cronbach's alpha coefficient was found to be .75 in determining internal consistency (Aygör et al., 2013). The scale in the original version evaluates nine domains; two domains are tested using performance-based items: the Clock Drawing Test for cognitive impairment and the "Timed Up and Go" test for balance and mobility. The other domains are cognition, general health, functional independence, social support, medications, nutrition, mood, continence, and self-reported performance. The maximum score possible is 17 points, which determines a high level of frailty. The authors of the questionnaire took the following score for the evaluation of FS: 0–4 indicates a lack of frailty, 5–6 denotes vulnerable individuals, 7–8 indicates mild frailty, 9–10 moderate frailty, and 11 or more denotes severe frailty. The Cronbach's alpha for the EFS was determined as $\alpha = .609$ in the current study.

Ethical Aspects

All procedures performed in this study involving human participants were conducted in accordance with the ethical standards and according to the principles of the Helsinki Declaration. The study was approved by the TRNC Health Ministry Ethics Committee at a state hospital (no. 047/20). The survey commenced after an oral/written explanation of the study objectives, methods, and expected outcomes were provided to the participants. All participants provided written informed consent. To use the EFS, permission was obtained from the authors who conducted the validity and reliability study of the scale.

Statistical Analysis

The data were analyzed using descriptive tests. Categorical variables are represented by numbers and percentages. For normality tests, the Kolmogorov–Smirnov test was used when the number of data on the basis of group subclasses was $n > 50$, and Shapiro–Wilks test statistics were used when $n \leq 50$. Non-parametric methods were used for measurement values that did not conform to normal

Main Points

- Frailty syndrome in the older people is a clinical condition with a high cost of care, leading to negative health outcomes.
- Frail older individuals whose health status changes suddenly put a strain on healthcare systems.
- People with frailty have a substantially increased risk of falls, disability, hospitalization, long-term care, and death.

Table 1.
Levels of Edmonton Frailty Scale (n = 60)

Points		*n*	%
0–4	Fit	1	1.6
5–6	Vulnerable	4	6.6
7–8	Mildly frail	31	51.6
9–10	Moderately frail	22	36.6
>11	Severely frail	2	3.3

Table 2.
Some Demographic Characteristics of Older People and Comparison of Edmonton Frailty Scale (n = 60)

Demographic Characteristics	n (%)	Edmonton Frailty Scale M	Edmonton Frailty Scale [Min-Max]	Z/X^2	*p*
Age group					
65–74 years	25 (41.7)	9.0	[4.0–12.0]	11.590	.009*
75–84 years	28 (46.7)	10.0	[8.0–11.0]		
85 years above	7 (11.7)	10.0	[9.0–12.0]		
Mean age (76.75 ± 6.49)	60 (100.0)		[66.0–88.0]		
Gender					
Female	21 (35.0)	9.0	[4.0–12.0]	–.740	.459
Male	39 (65.0)	9.0	[6.0–12.0]		
Educational level					
Illiterate	7 (11.7)	10.0	[8.0–11.0]	4.471	.215
Elementary school	40 (66.7)	9.0	[4.0–12.0]		
Secondary school	3 (5.0)	8.0	[8.0–9.0]		
High school	10 (16.7)	9.0	[6.0–11.0]		
Marital status					
Married	16 (26.7)	8.5	[4.0–11.0]	3.362	.186
Widowed	12 (20.0)	9.5	[7.0–12.0]		
Divorced/seperated	32 (53.3)	9.0	[7.0–12.0]		
Income rate					
Middle	57 (95.0)	9.0	[4.0–12.0]	–.017	.986
Upper	3 (5.0)	9.0	[8.0–11.0]		

*Note: *p <.05. M = Median; Z = Mann–Whitney U test; X^2 = Kruskal–Wallis H test.*

distribution. Non-parametric Mann–Whitney *U* test (Z-table value) and Kruskal–Wallis H test (χ^2 table value) were used. Non-parametric methods were shown as "Median [min.-max.]". The empirical analysis was carried out using the Statistical Software Package of Social Sciences (SPSS 22.0; IBM Corporation, Armonk, NY, USA), and a *p* value <.05 for statistical significance was used.

Results

Most of the older people were mildly (51.6%) and moderately (36.6%) frail according to the mean EFS score of 9.23 ± 1.49 (range: 4–12) (Table 1). The mean age of the patients included in the study was 76.75 ± 6.49 (66–88 years), 65.0% of them were men, 66.7% of them were literate or primary school

Table 3.
Some Disease Characteristics and Comparison of Edmonton Frailty Scale (n = 60)

Disease Characteristics	n (%)	Edmonton Frailty Scale M	Edmonton Frailty Scale [Min-Max]	Z/X^2	*p*
Chronic disease					
One	3 (5.0)	8.0	[8.0–9.0]	3.146	.207
Two	20 (31.7)	10.0	[8.0–11.0]		
Three and above	37 (63.3)	9.0	[4.0–12.0]		
Number of drugs used					
1–3	3 (5.0)	8.0	[8.0–9.0]	3.390	.184
4–7	49 (81.7)	9.0	[6.0–12.0]		
8 and above	8 (13.3)	9.0	[4.0–11.0]		
Complaint in last 15 days					
No	24 (40.0)	9.0	[4.0–12.0]	–1.883	.060
Yes	36 (60.0)	9.0	[7.0–12.0]		
Hospital admission within 1 year					
No	30 (50.0)	9.0	[4.0–12.0]	–1.504	.133
Yes	30 (50.0)	9.0	[7.0–12.0]		
Hospitalization within 1 year					
No	56 (93.3)	9.0	[4.0–12.0]	–.868	.413
Yes	4 (6.7)	10.0	[7.0–12.0]		

Note: p<.05.M = Median; Z = Mann–Whitney U test; X^2 = Kruskal–Wallis H test.

Table 4.
Some Frailty Risk Factors and Comparison of Edmonton Frailty Scale (n = 60)

		Edmonton Frailty Scale			
	n (%)	M	[Min-Max]	Z	p
Weight loss					
No	44 (73.3)	9.0	[4.0–11.0]	−2.310	.021*
Yes	16 (26.7)	10.0	[8.0–12.0]		
Weakness					
No	7 (11.7)	8.0	[4.0–10.0]	−2.632	.008*
Yes	53 (88.3)	9.0	[7.0–12.0]		
Lack of appetite					
No	25 (41.7)	8.0	[4.0–12.0]	−3.569	.000*
Yes	35 (58.3)	10.0	[7.0–12.0]		
Malnourishment					
No	21 (35.0)	9.0	[4.0–12.0]	−0.740	.459
Yes	39 (65.0)	9.0	[6.0–12.0]		
Decubitis ulcer					
No	43 (71.7)	9.0	[4.0–12.0]	−1.845	.065
Yes	17 (28.3)	10.0	[7.0–12.0]		
Falls					
No	17 (28.3)	9.0	[4.0–11.0]	−2.452	.014*
Yes	43 (71.7)	9.0	[7.0–12.0]		
Care need					
No	12 (20.0)	9.0	[4.0–11.0]	−0.598	.550
Yes	48 (80.0)	9.0	[8.0–12.0]		

*Note: *p < .05. M = median; Z = Mann–Whitney U test; X^2 = Kruskal–Wallis H test.*

graduates, 53.3% of them were divorced/separated, and 95.0% of them had a middle-income level (Table 2). The frailty level was higher (10.0) ($p = .009$) in the advanced age group (75–84 age group and 85+ years), and other demographic characteristics were insignificant in terms of frailty ($p > .05$).

Of the older individuals, 86.7% define their own health as "moderate." Of them, 63.3% had three or more chronic diseases [2.63 ±.71 [range: 1–5]), and 81.7% used four to seven different drugs (number of drugs 5.93 ±1.43 [range: 2–10]). It was determined that 60% of the older people had health-related complaints in the last 15 days, that 50% had visited a hospital/doctor within the last year, and that 6.7% had been hospitalized in the last year. Those who had two chronic diseases, had to use 4–7 drugs daily, had a health problem within the last 15 days, had to visit the hospital/doctor in the last year, or had to be hospitalized had higher min-max EFS scores ($p > .05$) (Table 3).

Frailty risk factors were weight loss at 26.7% [4.31 ± [range:1–8 kg], weakness at 88.3% [6.85 ± 1.59 [range: 0–9], lack of appetite at 58.3%, malnourishment at 65.0%, decubitus ulcer at 28.3%, falls at 71.7%, and needing help from others at 80%. Weight loss, weakness, lack of appetite, and falls were found to be statistically significant as frailty risk factors in the older people ($p < .05$) (Table 4).

Discussion

According to the EFS, frailty of various levels was detected in older people hospitalized in geriatric units; however, the most prevalent frailty level was determined as moderate (9.23 ± 1.49). A study evaluating the frailty of hospitalized older people (Düzgün et al., 2021) found that 65% were frail and "apparently vulnerable" (6.84 ± 3.83); however, studies showed different results in terms of frailty levels in the older people (Aygör et al., 2013; Düzgün et al., 2021). It is thought that the difference in fragility percentage and levels is not only due to the effects of aging but also due to different characteristics of frailty according to the study sample (polypharmacy, comorbidities, disability, cognitive impairment, and malnutrition) (Boyle et al., 2010).

Frailty is defined not only as a biological state but also as a multidimensional concept in which many interrelated factors can disrupt the physiological balance of the older people. Identifying and measuring frailty is one of the biggest difficulties in geriatrics (Carneiro et al., 2017). This makes it difficult to compare and interpret different research results on frailty. Therefore, definitions of frailty levels should be evaluated holistically based on the environment the older people live in and their characteristics.

In the current study, frailty levels were found to be higher in individuals aged 75–84 years and 85 years and older ($p < .05$). Similar data havebeen found in other studies (Carneiro et al., 2017; de Albuquerque Sousa et al., 2012). During the aging process, there is a gradual decrease in physiological reserve and a consequent decline in several physiological systems, which result in frailty (Clegg et al., 2013). Many studies have demonstrated that the prevalence of frailty increases with age (Fried et al., 2003; Gale et al., 2014). The prevalence for

the most older people was 15.7% (aged 80–84) and 26.1% (≥85) (Collard et al., 2012). Hospitalization/institutionali zation of frail older people leads to an increase in healthcare costs (Fassbender et al., 2009). In terms of frailty, older people form the group that requires the most attention in the determination of healthcare policies.

The current study did not find any differences in frailty levels according to gender ($p > .05$). There are studies in the literature that found that frailty levels were higher in women compared to men (Carneiro et al., 2017; Walston & Fried, 1999). However, there are also studies reporting that gender had no effect on frailty levels (Aygör et al., 2013; Rolfson et al., 2006). A study conducted in Europe found that older women lived longer with frailty compared to men, that they were affected by both biological and socio-economic factors, and that they may experience worse health due to the effects of environmental factors (low physical activity, malnutrition, etc.) on frailty (Hubbard, 2015). On the other hand, it is suggested that men can be protected from physical frailty due to having more muscle mass and to neuroendocrine and hormonal factors (Walston & Fried, 1999).

In this study, the frailty level of those with a low level of education was higher but there was no statistically significant difference ($p > .05$). The literature states that a low education level is related to frailty. In a Dutch study, the effect of the level of education on frailty was reduced by 76% due to factors such as mental, biomedical, social, and behavioral factors, as well as material resources (Hoogendijk et al., 2014). These findings highlight the need of a multidimensional approach in developing and carrying out interventions aimed at reducing frailty, especially in people with a low level of education.

Frailty scores of older people who were married or living with a partner were found to be lower ($p > .05$). Previous studies found that being single, widowed, or divorced/separated had higher frailty scores related to living alone (Fried et al., 2003). Due to the multifaceted nature of frailty, it can be said that there is a need for a better understanding of the social factors associated with frailty in old age.

The current study did not find any difference between frailty scores of the older people in terms of income level ($p > .05$). However, previous studies reported that income has a negative linear relationship with frailty, that a low income level may negatively affect older individuals' access to health services and healthy lifestyle behaviors, and therefore possibly reducing the availability of financial resources which has a negative impact on frailty (Hubbard et al., 2014).

In the current study, the frailty scores of those who had two or more chronic diseases were higher ($p > .05$). Although the presence of non-communicable disease or its consequences does not always come with frailty, its cumulative effects during the aging process lead to an increased risk of adverse effects to health, resulting in frailty in the older people and, consequently, adverse clinical outcomes such as hospitalization (Clegg et al., 2013).

The older people hospitalized in geriatric clinics used 5.93 ± 1.43 [range: 2–10] drugs per day, and no difference was found in terms of frailty ($p > .05$). Another study found a relationship between the number of prescribed drugs and frailty prevalence. It was found that frail patients take more drugs than non-fragile patients. In addition, each additional drug was reported to be closely associated with frailty, increasing the odds ratio >1 (Ferrer et al., 2013). The increase in drug–drug interactions and side effects with each added drug may explain the effect of multiple drug intake on frailty. Severe adverse drug reactions was associated with a risk of hospitalization, advanced age, and frailty.

The current study found higher frailty scores in patients who had visited a physician/hospital or were hospitalized within the last year ($p > .05$). According to different frailty scales, the prevalence of frailty in hospitalized older people patients was found to be higher with 63.1–91.2% (Özdemir et al., 2017). Other studies reported that there was a relationship between frailty and hospitalization. Along with the need for hospitalization in the older people, the length of stay and the risk of complications due to treatments increase. It was reported that some older people are at an increased risk for an unscheduled hospitalization within 30 days and at least 3 days of extra stay during hospitalization (Carneiro et al., 2017; de Bruijne et al., 2013).

In the current study, weight loss, weakness, lack of appetite, and falls were found to be statistically significant frailty risk factors in the older people ($p < .05$). Weakness, weight loss, and fatigue are common symptoms in the older people and are at the center of frailty. Frailty is an independent predictor of recurrent falls in older women (Ensrud et al., 2007). In addition, falls are associated with risks of adverse health outcomes such as fractures and death. People with frailty have a substantially increased risk of falls, disability, hospitalization, long-term care, and death (Morley et al., 2013). In addition, discussions continue whether frailty develops as a result of the cumulative effect of risk factors or whether there is a chain of events necessary for frailty.

The current study found that older individuals who need help had higher frailty scores ($p > .05$). The need for help and support of frail older people increases due to diseases, loss of family and friends, and similar events. Illness-related hospitalizations exacerbate difficulties in performing activities of daily life (ADL). Older people who have lost their self-care abilities and are dependent regarding ADL cannot survive at home without the help of caregivers. (Boyd et al., 2008). The EFS addresses multidimensional aspects of frailty. This approach is not only a physical assessment regarding health and care needs of the older people but also points to aspects related to spiritual, cognitive, and social support needs. These evaluations should also include necessary recommendations to be extended to include the needed home care of the older people, to understand the care of the older people within the family, and to fulfill any care-related arrangements.

The present study had several limitations: This study presents some limitations related to the small sample size and limited duration of observation. It is derived from a descriptive study, in such a way that it is not possible to conclude the existence of causal association between frailty in the older people.

In conclusion, the frailty levels in the older people hospitalized in geriatric units were found to be high. This study found that advanced-age older people who had a low level of educational, lived without a partner, had two or more chronic diseases, used several drugs, had visited the hospital, or were hospitalized within the last year, or who needed help for care had higher frailty scores. It is recommended to determine the needs of the hospitalized older people in terms of frailty levels and risk factors (weight loss, weakness, lack of appetite, falls, etc) and to establish appropriate nursing care protocols.

Ethics Committee Approval: The study was approved by the TRNC Health Ministry Ethics Committee at a state hospital (no. 047/20).

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

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