The Relationship between Frailty and Functionality with Late-life Depression of Community-dwelling Elderly

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ABSTRACT

Objectives: The aim of this study is to investigate the relationship between frailty and functionality with late-life depression (LLD) in elderly people.

Methods: A descriptive study was conducted on participants who were community-dwelling, aged 65 and over, followed by the Family Health Center, without cognitive impairment. General questionnaire form, standardized mini-mental state examination, Tilburg frailty indicator (TFI), Katz index of independence in activities of daily living (ADL) and Lawton instrumental ADL (IADL), and geriatric depression scale (GDS-30) were applied.

Results: A total of 150 participants, and the median age of the participants was 71.0 (65.0–93.0) years. LLD was detected in 51 (34.0%) of the participants and the frequency of frailty was 60 (40.0%) of the participants. While 39 (76.5%) of the participants with LLD were fragile, 21 (21.2%) of the participants without LLD were fragile (p<0.001). The GDS-30 score was negatively correlated with Katz ADL and IADL scores and positively correlated with the TFI score (r=−0.269 and p=0.001; r=−0.266 and p=0.001; and r=0.735 and p=0.001, respectively).

Conclusion: While the frequency of frailty is high in participants with LLD, a similar relationship with functionality was not observed.

Keywords: Community-dwelling, depression, frail older adult, functionally impaired elderly

INTRODUCTION

Socioeconomic development in most parts of the world over the past 50 years has been accompanied by a decline in the fertility rate and a significant increase in life expectancy.[1] The risk of various health problems and the possibility of being dependent on other people in daily functions increases with aging. Geriatric syndromes such as frailty, urinary incontinence, falls, delirium, decubitus, and functional disability could be reported frequently in the elderly population.[2]

Healthy elderly people who are functionally independent and who can maintain their own lives without the need for care reduce the social burdens of societies as well.[3] However, the increasing elderly population worldwide and the increase in dependency during aging have led to an increase in the need for care for the dependent elderly in societies.

As a result of frailty, which could be defined as the reduced reserve and response capacity to stressors in the elderly population, negative health outcomes are seen.[4] These negative

outcomes could lead to functional dependency, disability, hospitalization, or death.[2]

Depression is one of the most common mental problems in the elderly as well as one of the most important factors that affect the quality of life.[5] Compared to younger adults, older people have significant depressive symptomatology without meeting the diagnostic criteria for a depressive disorder more frequently.[1]

A two-way relationship between functionality determined by the measurement of activities of daily living (ADL) and late-life depression (LLD) has been demonstrated, and it has been shown that depressive symptoms are more common in the elderly with impaired functionality.[6] Of all risk factors causing LLD, 20% of the total risk is attributed to impaired functionality.[7]

Functional disability and dependence secondary to physical diseases and deterioration in health status are the most important causes of LLD.[8] Frailty and depression are two common conditions among older individuals. Frailty and LLD may also show the same common signs and symptoms.[9] A systematic review showed that 16–35% of frail individuals also have depression, and the prevalence of depression in frail individuals is as high as 46.5% in older adults. In another meta-analysis, frailty was shown to increase the risk of depression by 4.07 times.[10] Physiological changes, which are likely to be the cause of frailty, are an important biological factor that prepares, accelerates, and maintains LLD.[9] However, the relationship between frailty and depression is bidirectional, depression can also cause frailty, and the relationship between them has not been fully elucidated.[10] Tilburg frailty indicator (TFI), the newest tool that seems potentially relevant for primary care frailty screening, was used for the 1st time in our study to assess the relationship between LLD and frailty in primary care.[11]

The aim of this study was to assess the relationship between frailty and functionality with LLD in community-dwelling elderly individuals without cognitive impairment.

METHOD

This descriptive study was conducted among individuals who were community-dwelling, aged 65 and over, who applied to a Family Health Center in Istanbul between May 1 and November 1, 2021.

The sample size was calculated as 159 using the Epi Info v5.5.11 program, with a population size of 699, an expected prevalence of 16.0%, an acceptable margin of error, and a 95.0% of the confidence interval.[12]

The participants with a history or diagnosis of dementia were excluded from this study. In addition, 9 (5.7%) people were excluded from the data analysis as their standardized mini-mental state examination (SMMSE) scores were below 24 despite not having a diagnosis of dementia. As a result, data from a total of 150 participants were included in the study.

The participants were administered a general questionnaire form, SMMSE, TFI, Katz Index of Independence Index (Katz ADL), Lawton Instrumental ADL Scale (IADL), and geriatric depression scale (GDS-30). All questionnaires were filled in by the researcher in face-to-face interviews according to the answers of the participants.

General Questionnaire Form: In this form, the sociodemographic features, consumption of smoking and alcohol, and chronic diseases of the participants were questioned.

SMMSE: SMMSE was developed in 1975 to evaluate the cognitive functions of patients.[13] It was standardized in 1997, and the guideline for administration has been prepared.[14] SMMSE is standardized and conducted for the Turkish population.[15,16] The cutoff points for both scales are 23/24 for Turkish society, and <24 SMMSE score indicates cognitive impairment.[16]

TFI: TFI has been developed by Gobbens et al.[17] to assess the social and psychological frailty of the elderly in society, along with their physical frailty. Turkish adaptation of the TFI has been conducted, as well as its validity and reliability studies.[18,19] TFI consists of two parts; the first part contains ten questions on determinants of frailty and diseases (multimorbidity), and the second part consists of 15 questions and three domains that question physical, psychological, and social frailty. The first part of TFI was not included in the scoring. The cutoff point for TFI is ≥5 and a higher score indicates higher frailty.[17,18]

Katz Index of Independence in ADL: Katz ADL, which consists of the subcategories including bathing, dressing, toileting, transferring, continence, and feeding, assesses the dependency of the individuals.[20] Turkish adaptation of the scale has been conducted.[21] For each activity, 1 point for independency and 0 points for dependency is given.

The Lawton IADL Scale: IADL evaluates IADL, including the ability to use a telephone, shopping, food preparation, housekeeping, laundry, mode of transportation, ability to handle finances, and responsibility for own medications; the questions are answered as 0 and 1.[22]

The GDS-30: The validity and reliability studies of the Turkish version of GDS-30 consisting of 30 questions were also

conducted.[23,24] The questions are answered as "yes" or "no", and 1 point is given to each response that suggests depression. The highest score that could be obtained from the scale is 30. In this study, the elderly with depressive symptomatology who scored 11 points or higher were accepted as having LLD.

SPSS 21.0 package statistics program was used in the analysis and organization of the data. Kolmogorov–Smirnov test was used in the distribution of normality of the data. Frequency, percentage, median, maximum, and minimum values were used as descriptive statistics. The Chi-square test and Fisher's exact test were used to compare categorical variables. Mann–Whitney U test was used to compare the quantitative values of categorical variables that were not normally distributed. Pearson correlation analysis was used to examine the relationship between the scale data. A p<0.05 value was accepted as significant in all analyses.

RESULTS

A total of 150 participants were included in the study, the median age of the participants was 71.0 (65.0–93.0) years, and 79 (52.7%) participants were females. The median age of female was 71.0 (65.0–90.0) years, and the median age of men was 71.0 (65.0–93.0) years (p=0.879). The socio-demographic features of the participants are summarized in Table 1.

The median score for GDS-30 was 7.0 (0.0–30.0), and LLD was detected in 51 (34.0%) of the participants. While 38 (74.5%) of the participants with LLD had two or more comorbid diseases, 50 (50.5%) of the participants without LLD had two or more comorbid diseases (p=0.005).

The median Katz ADL scores of the participants were 6.0 (4.0–6.0). While 111 (74.0%) of them were fully independent and fully functional in ADL, 39 (26.0%) had partial dependency. The median score of IADL was 7.0 (2.0–8.0). The number of participants with full functional scores in IADL was 72 (48.0%). The median TFI score was 4.0 (0.0–13.0), and the frequency of frailty was 60 (40.0%) of the participants.

Of the participants with LLD, 18 (35.3%) had dependency in at least one activity in Katz ADL, and 21 (21.2%) of the participants without LLD had dependency in at least one activity in Katz ADL (p=0.063). Moreover, 27 (52.9%) of the participants with LLD had dependency in at least one activity in IADL, and 51 (51.5%) of the participants without LLD had dependency in at least one activity in IADL (p=0.868). On the other hand, 39 (76.5%) of participants with LLD were fragile, while 21 (21.2%) of participants without LLD were fragile (p<0.001). The sociodemographic characteristics according to the presence of LLD are summarized in Table 2.

Table 1. Sociodemographic features of the participants

	Total (n=150)	Male (n=71)	Female (n=79)
Age group			
65–74 years	112 (74.7)	52 (73.3)	60 (75.9)
75–84 years	34 (22.7)	16 (22.5)	18 (22.8)
85 years and older	4 (2.6)	3 (4.2)	1 (1.3)
Marital status			
Married	98 (65.3)	63 (88.7)	35 (44.3)
Widowed/divorced	52 (34.7)	8 (11.3)	44 (55.7)
Birth country			
Türkiye	145 (96.7)	69 (97.2)	76 (96.2)
Iraq	2 (1.3)	1 (1.4)	1 (1.3)
Syria	3 (2.0)	1 (1.4)	2 (2.5)
Education level			
Illiterate	43 (28.7)	8 (11.3)	35 (44.3)
Literate	107 (71.3)	63 (88.7)	44 (55.7)
Monthly income			
<2000 TL	56 (37.3)	13 (18.3)	43 (54.5)
2000–3000 TL	70 (46.7)	39 (54.9)	31 (39.2)
More than 3000 TL	24 (16.0)	19 (26.8)	5 (6.3)
Retirement income			
Yes	93 (62.0)	62 (87.3)	31 (39.2)
No	57 (38.0)	9 (12.7)	48 (60.8)
Active work			
Yes	7 (4.7)	6 (8.5)	1 (1.3)
No	143 (95.3)	65 (91.5)	78 (98.7)
Have child			
Yes	149 (99.3)	71 (100.0)	78 (98.7)
No	1 (0.7)	0 (0.0)	1 (1.3)
Live with alone			
Yes	25 (16.7)	4 (5.6)	21 (26.6)
No	125 (83.3)	67 (94.4)	58 (73.4)
Smoking			
Never	74 (49.4)	11 (15.5)	63 (79.7)
Former	56 (37.3)	46 (64.8)	10 (12.7)
Current	20 (13.3)	14 (19.7)	6 (7.6)
Consumption of alcohol			
Never	38 (53.5)	38 (53.5)	79 (100.0)
Former	29 (40.8)	29 (40.8)	0 (0.0)
Current	4 (5.7)	4 (5.7)	0 (0.0)

TL: Turkish liras.
Data are presented as n (%).

The GDS-30 score was negatively correlated with Katz ADL and IADL scores and positively correlated with the TFI score (r=−0.269 and p=0.001; r=−0.266 and p=0.001; and r=0.735 and p=0.001, respectively). Frailty and ADL scores according to the presence of LLD are summarized in Table 3.

Table 2. Sociodemographic characteristics according to the presence of late life depression

	Normal (n=99)	LLD (n=51)	p
Age group			0.419*
65–74 years	77 (77.8)	35 (68.6)	
75–84 years	20 (20.2)	14 (27.5)	
85 years and older	2 (2.0)	2 (3.9)	
Gender			0.014[†]
Female	45 (45.5)	34 (66.7)	
Male	54 (54.5)	17 (33.3)	
Marital status			0.118[†]
Married	69 (69.7)	29 (56.9)	
Widowed/divorced	30 (30.3)	22 (43.1)	
Education			0.007[†]
Illiterate	41 (20.2)	33 (45.1)	
Literate	58 (79.8)	18 (54.9)	
Monthly income			0.742[†]
<2000 TL	35 (35.4)	21 (41.2)	
2000-3000 TL	47 (47.5)	23 (45.1)	
More than 3000 TL	17 (17.1)	7 (13.7)	
Chronic disorders			0.015[†]
No	18 (18.2)	2 (3.9)	
Yes	81 (81.8)	49 (96.1)	
Self-rated health status			<0.001[†]
Healthy	83 (83.9)	22 (43.1)	
Not healthy/unhealthy	13 (13.1)	21 (41.2)	
Unhealthy	3 (3.0)	8 (15.7)	
Adverse life event during past year			0.150[†]
No	41 (41.4)	15 (29.4)	
Yes	58 (58.6)	36 (70.6)	
Satisfied home living environment			<0.001[†]
No	0 (0.0)	7 (13.7)	
Yes	99 (100.0)	44 (86.3)	

IADL: Lawton instrumental activities of daily living scale; Katz ADL: Katz index of independence in activities of daily living; LLD: Late-life depression; TL: Turkish liras.

Data are presented as n (%).

*Fisher's Exact test; [†]Chi-square test.

DISCUSSION

In this study, 66.7% of the females and 33.3% of the males had LLD, and LLD was higher in females. In a study conducted in the Adalar district of Istanbul, it was found that LLD was more frequent in females compared to males.[25] In a community-based study conducted in Istanbul by Kulaksızoğlu et al.,[12] being a female was found to be a risk factor for LLD. The fact that LLD is seen more frequently in

Table 3. Frailty and activities of daily living scores according to the presence of LLD

	Normal (n=99)	LLD (n=51)	p
TFI total score	2.0 (0.0–9.0)	7.0 (1.0–13.0)	<0.001
Physical score	1.0 (0.0–6.0)	4.0 (0.0–7.0)	<0.001
Psychological score	0.0 (0.0–3.0)	2.0 (0.0–4.0)	<0.001
Social score	1.0 (0.0–3.0)	1.0 (0.0–3.0)	0.121
Katz ADL score	6.0 (5.0–6.0)	6.0 (4.0–6.0)	0.060
IADL score	7.0 (3.0–8.0)	7.0 (2.0–8.0)	0.330

IADL: Lawton instrumental activities of daily living scale; Katz ADL: Katz index of independence in activities of daily living; LLD: Late-life depression; TFI: Tilburg frailty indicator.

Data are presented as median (minimum-maximum).

Mann–Whitney U test.

females in this study was an expected result as well as a result that is similar to the results in the literature.

According to our study, LLD is significantly more frequent in illiterate participants. In the meta-analysis conducted, it was seen that a low level of education was a risk factor for LLD.[26]

Chronic disease was seen in 96.1% of our participants with LLD, and LLD is higher in participants with a chronic disease. Of participants with LDL, 74.5% had two or more chronic diseases. In a cohort study, LLD was found to be 1.46 times more frequent in participants with a chronic disease.[27]

When self-rated health status was evaluated in this study, the frequency of perceiving themselves as unhealthy was higher among participants with LLD. In a study, although LLD was seen more frequently in the participants who felt physically unhealthy, no significant effect was found in the regression analysis.[28] In a meta-analysis, it was found that LLD was 4.08 times more frequent in people who felt physically unhealthy.[29] In another meta-analysis, feeling physically unhealthy was found to be a risk factor for LLD.[30] Similarly, feeling physically unhealthy was found to be a risk factor for LLD in this study.

One of the significant results of this study was that 86.3% of those with LLD were satisfied with their home environment, while 100% of those without LLD were satisfied. In a cross-sectional study, an inconvenient home living environment was found to be a risk factor for LLD.[31] In another cross-sectional study that was conducted in Japan about the relationship with neighbors, it was found that an inconvenient home living environment increases LLD by 1.4 times.[32]

In our study, contrary to the literature, a significant difference between Katz ADL and IADL scores according to the

presence of LLD was not observed. In the literature, it is reported that decreasing functionality indicated a higher risk of LLD.[6,33] In this study, 35.3% of the participants with LLD had dependency in at least one activity in Katz ADL, and 52.9% of the participants with LLD had dependency in at least one activity in IADL. Another study was conducted in Turkey, with a rate of 22.6% for dependency in at least one activity in Katz ADL and a rate of 47.2% for dependency in at least one activity in IADL.[34] On the other hand, most of the participants in this study were highly functional. In the literature, 20.0% of all risks for LLD are attributed to impaired functionality.[7]

Frail participants in our analysis had more frequent LLD. While the scores of the physical and psychological domains of TFI were higher in participants with LLD than without LLD, no significant difference was found in terms of the social domain of the TFI. There are studies in the literature that examine frailty with TFI that shows the correlation between frailty and LLD.[35,36] However, no study has been found in the literature examining the predictive effect of frailty measured by TFI on LLD. In a cohort study conducted in Brazil, frailty measured with FRAIL Questionnaire was shown to increase depression by 3.1.[37] On the other hand, in the systematic review conducted by Buigues et al.,[9] it was stated that frailty correlates with LLD development.

There are some limitations. Although it was planned to reach 159 people representing the research target group in this study, this sample size could not be reached. This is an important limitation of the study. The high functionality of the participants might be due to the inhomogeneity of the sample. This situation is regarded as another limitation of this study. Due to the presence of illiterate volunteers, one of our limitations is that the researcher fills out the self-report scales for standardization based on the volunteers' responses.

CONCLUSION

A relationship between functionality and LLD could not be detected in this study. However, the frequency of frailty is higher in the presence of LLD. In primary care, it is essential to recognize, screen for, and not overlook frailty that might be associated with LLD. Since frail elderly individuals are identified, screening for LLD should be conducted. However, frailty should not be overlooked in the case of LLD.

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