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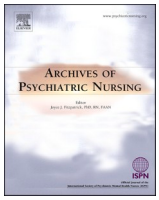

The relationships between frailty and depression, loneliness, and self-neglect in older adults: A cross-sectional study

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ABSTRACT

Background and objectives: The growing older adult population in Türkiye and the rest of the world highlights the health impacts of psychosocial issues. Frailty—associated with falls, disability, and care needs—often coexists with depression and loneliness. This study investigates how frailty relates to depression, loneliness, and self-neglect in older adults.

Methods: This cross-sectional study was conducted at a university hospital in Istanbul. The study was conducted with 259 older adults (≥65 years) between September 2023 and February 2024. A sociodemographic information form, the Tilburg Frailty Indicator, the Geriatric Depression Scale-15, the Loneliness Scale for the Elderly, the Istanbul Medical School Elder Self-Neglect Questionnaire, and the Barthel Index for Activities of Daily Living were used for data collection. Data were analyzed using descriptive statistics, Pearson's correlation analysis, and simple, multiple, and hierarchical multiple linear regression analyses.

Results: The prevalence of frailty among the participants was 60.6 %, whereas depressive symptoms were seen in 28.6 %, loneliness was identified in 53.7 %, and self-neglect was detected in 32.4 %. Depression, loneliness, and self-neglect significantly predicted frailty, explaining 51.9 % of its variance ($p < 0.001$). Furthermore, depression, health perceptions, loneliness, self-neglect, pain, the community where the participants lived the longest, and living with a nuclear family were also significant predictors of frailty. Together, these factors accounted for 65.1 % of the total variance in frailty ($p < 0.001$).

Conclusion: The study found that depression, loneliness, and self-neglect were linked to greater frailty in older adults. Early interventions and psychosocial support may reduce frailty by addressing these issues and promoting social interaction.

Introduction

The world's older adult population continues to grow rapidly. The global population at or over the age of 65 has reached 805 million 167 thousand 113 people (World Bank, 2023). In Türkiye, the adult population aged 65 or older reached 9 million 112 thousand 298 people in 2024, increasing to 10.6 % of the population (Turkish Statistical Institute, 2024a). This rate, which was 9.1 % in 2019, demonstrates a notable increase driven by social and demographic transformations (Turkish Statistical Institute, 2024b). With the aging of the population, the increasing frailty of older adults has become a significant concern (Wang et al., 2022). Frailty is a geriatric syndrome characterized by increased vulnerability and decreased resilience to stressors due to the decline of physiological reserves across multiple systems. It commonly presents with reduced physical activity, mobility limitations, unintentional weight loss, muscle weakness, and depressive symptoms (Akyol Güner, 2022; Marconcin et al., 2022; Zhang et al., 2023). These symptoms lead to dependence in activities of daily living among older adults, thereby increasing their need for hospitalization and care. This situation often necessitates institutionalization or home care, raising overall healthcare costs. Notably, frail older adults face a 1.8 to 2.3 times higher risk of mortality (Gobbens & van der Ploeg, 2021; Marconcin et al., 2022; Pickard, 2024a, 2024b).

Frailty's threat to public health is clearly reflected in the prevalence

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data reported worldwide and in Türkiye. In a 5-year longitudinal study of 25,771 older adults from 17 countries, the prevalence of frailty increased from 4.2 % at baseline to 6.7 % after five years (Marconcin et al., 2022). In the FrailTURK study conducted in Türkiye, 39.2 % of 1126 older adults were identified as frail, and 43.3 % were identified as pre-frail (Eyigör et al., 2015). Predisposing factors that increase susceptibility to frailty include sociodemographic characteristics (e.g., older age, female sex, lower education, and social isolation), clinical characteristics (e.g., low weight, chronic diseases, polypharmacy, malnutrition, cognitive decline, poor sleep quality, and history of falls), lifestyle-related factors (e.g., physical inactivity, smoking, and alcohol consumption), and psychosocial factors such as depression and self-neglect (Cao et al., 2022; Gobbens & van der Ploeg, 2021; Wang et al., 2022; Yu et al., 2021).

Depression is associated with increased weakness, inactivity, and fatigue and may increase the risk of frailty and mortality (Cao et al., 2022; Maștaleru et al., 2022; Wang et al., 2022). Depression is a common condition among older adults. Systematic reviews and meta-analyses reported a prevalence of depression ranging from 28.4 % to 35.1 % among older adults (Cai et al., 2023; Hu et al., 2022). The co-occurrence of depression and frailty in older adults leads to poor health outcomes, such as disability and cognitive impairment (Cao et al., 2022; Wu et al., 2024; Yu et al., 2021). Therefore, the early detection of frailty and depression would be an active primary prevention strategy to improve the quality of life of older adults and ensure their successful aging (Maștaleru et al., 2022).

Frailty was also reported to be associated with the risk of loneliness (Gale et al., 2018; Herrera-Badilla et al., 2015). Loneliness affects all ages, but older adults are more at risk due to their higher frequencies of losing someone around them such as spouses, relatives, and friends (Herrera-Badilla et al., 2015; Yu et al., 2023). Nearly half of older adults worldwide are at risk of social isolation, and it is estimated that one-third of those aged 60 and above will experience loneliness in later life (Mehrabi & Béland, 2020). High levels of loneliness are associated with an increased risk of being physically frail or pre-frail approximately four years later (Gale et al., 2018; Xu et al., 2022).

Another factor that influences frailty in older adults is self-neglect. Self-neglect is defined as the inability or refusal to meet one's basic needs in accordance with social norms, coupled with a lack of attention to healthcare (Lee et al., 2016; Yu et al., 2021). The results of a systematic review by Yu et al. (2021) indicated that the prevalence of self-neglect among older adults living in the community ranged from 18.4 % to 29.1 %. Self-neglect in older adults can be conceptually explained through Orem's Self-Care Deficit Nursing Theory, which states that when individuals are unable or unwilling to meet their basic self-care needs, professional nursing support becomes necessary (Orem, 2001). Self-neglect reflects a significant decline in the capacity or motivation to perform essential self-care behaviors and can therefore be considered within the concept of "self-care deficit" as described in Orem's theory. Moreover, cultural and societal norms related to aging, dependency, and autonomy may influence how self-neglect manifests and is perceived. This is particularly evident in collectivist societies (where the group is prioritized over the individual) such as Türkiye where family solidarity and community-based relationships play a central role (Bulut Ayaz & Yalçın Gürsoy, 2024; İlhan & Savcı, 2025). However, within these strong social structures, individuals may experience anxiety about becoming dependent on others, particularly later in life (Chonody & Barbra, 2018). This situation may lead older adults to delay or ignore their own care needs rather than seeking support within their social networks. Such behavior is not merely a personal choice, but it also reflects a culturally rooted attitude shaped by societal norms and the meanings attributed to aging. The failure to detect and treat self-neglecting older adults at an early stage may result in the exacerbation of preventable or controllable health issues (Yalçın Gürsoy, 2020; Yu et al., 2021). The devastating medical consequences of self-neglect include fractures, depression, dementia, malnutrition, and ultimately, early mortality (Li et al., 2018; Yalçın Gürsoy, 2020; Yu et al., 2021).

Examining how frailty, depressive symptoms, loneliness, and self-neglect are associated with one another and identifying the factors that contribute to frailty will facilitate the management of these conditions and the development of interventions aimed at promoting healthy aging. Although the literature extensively investigates the relationship between frailty and physical, psychological, or cognitive factors, there is a lack of studies in which the factors of self-neglect, depression, and loneliness have been assessed together. In particular, the relationship between self-neglect and frailty is not fully understood. In this context, this study was conducted to examine the associations between frailty and depression, loneliness, and self-neglect in older adults.

Hypotheses

H1. Depression is a significant predictor of frailty in older adults.

H2. Loneliness is a significant predictor of frailty in older adults.

H3. Self-neglect is a significant predictor of frailty in older adults.

H4. Demographic and health-related characteristics significantly predict frailty in older adults.

Methods

Study design and participants

In this cross-sectional study, the STROBE checklist was used to report the results. This study was conducted with older adults aged 65 or older who had presented to the internal medicine outpatient clinics of a foundation university hospital in Istanbul between September 2023 and February 2024. The population of the study consisted of 1400 older adults aged 65 years or over who presented to the outpatient clinic in one month. A sample calculation formula with a known population was used to determine the sample size required for the study (Sümbüloğlu & Sümbüloğlu, 2002). The sample size was calculated to be a minimum of 257 older adults in a 95 % confidence interval ($p = 0.287$; $q = 0.713$; $t = 1.96$; $d = 0.05$; $\alpha = 0.05$) (Akyol Güner, 2022). The study was conducted with 259 older adults who met the pre-established inclusion criteria. The convenience sampling method was used in the study. A post hoc power analysis was conducted using G*Power 3.1.9.2. The analysis revealed an achieved power ($1 - \beta$) of 1.00 ($\alpha = 0.05$, $R^2 = 0.651$, effect size = 1.87, number of predictors = 9, $N = 259$), indicating that the sample size was sufficient for the analysis. The inclusion criteria were defined as follows: being 65 years old or older, having a score of 24 or above on the Mini Mental State Examination (MMSE), not having any communication difficulties that would prevent answering questions, and agreeing to participate in the study. The first and second researchers collected the data in face-to-face interviews lasting an average of 20 min. To ensure data quality, two researchers double-checked the data, reviewed missing data immediately, and randomly re-verified records.

Ethical considerations

Ethical approval was obtained from the Non-Invasive Research Ethics Committee of a University (Date: 31.08.2023, Decision No: 2023/248). Written permission was obtained from the institution where the study was to be conducted before the study began. Older adults who agreed to participate in the study were informed of the purpose of the study and that participation in the study was voluntary, and their written consent was obtained. The identifying information of the participants was not collected.

Instruments

Data were collected using a Sociodemographic Information Form,

the Tilburg Frailty Indicator, the Geriatric Depression Scale-15, the Loneliness Scale for the Elderly, the Istanbul Medical School Elder Self-Neglect Questionnaire, and the Barthel Index of Activities of Daily Living.

Sociodemographic Information Form

The form developed by the researchers consisted of 16 questions about age, sex, education status, income status, marital status, presence/number of children, cohabitants, place of residence, presence of chronic diseases, number of medications taken, smoking and alcohol consumption status, presence of pain, and health perceptions.

Tilburg Frailty Indicator (TFI)

The TFI was developed by Gobbens et al. (2010), and Turkish validity and reliability studies for the scale were conducted by Arslan et al. (2018) (Cronbach's alpha = 0.75). Part A of the TFI includes ten determinants of frailty (sex, age, marital status, education, income, ethnicity, lifestyle, life events, multimorbidity, and living environment), while part B includes 15 components of frailty. These 15 components relate to physical frailty (eight), psychological frailty (four), and social frailty (three). Eleven items have a binary response category of 'yes' and 'no', and four items have a three-point response category of 'yes', 'sometimes', and 'no'. The score range of the TFI is from 0 to 15, and a score of five or higher is considered to indicate frailty (Arslan et al., 2018). In this study the Cronbach's alpha internal consistency coefficient of the scale was found to be 0.746.

Geriatric Depression Scale-15 (Short form) (GDS-15)

The validity and reliability of the 15-item short form of the Geriatric Depression Scale (GDS), developed by Yesavage et al. (1983), were tested by Burke et al. (1991). The Turkish validity and reliability study of the GDS-15 was conducted by Durmaz et al. (2018), who reported a Cronbach's alpha coefficient of 0.804. The response options of the scale items are 'yes' and 'no.' The scoring system is based on the characteristics of each question, with one point awarded for each correct answer. The total score is then calculated. The maximum score that can be attained on the scale is 15. A total score below five indicates the absence of depressive symptoms, whereas a score higher than five suggests the presence of depression (Durmaz et al., 2018). In this study, the Cronbach's alpha internal consistency coefficient of the scale was 0.807.

Loneliness Scale for the Elderly (LSE)

The LSE was developed by de Jong Gierveld and Kamphuis (1985) to measure loneliness. The Turkish validity and reliability study of the scale was conducted by Akgül and Yeşilyaprak (2015) (Cronbach's alpha = 0.85). The scale consists of 11 items with a three-point Likert-type scoring system. The lowest and highest scores that can be obtained from the scale are 0 and 22. Higher scores indicate higher levels of loneliness level. In this context, a score in the range of 0–4 means that the individual is not lonely/does not feel lonely, scores in the range of 5–14 mean they have an acceptable level of loneliness, those in the range of 15–18 mean they are very lonely, and those in the range of 19–22 mean they experience very intense loneliness (Akgül & Yeşilyaprak, 2015). In this study, the Cronbach's alpha internal consistency coefficient of the scale was calculated as 0.836.

Istanbul Medical School Elder Self-Neglect Questionnaire (IMSelf-neglect)

IMSelf-neglect was developed by İlhan et al. (2020) as a screening tool for self-neglect in community-dwelling older adults, with an alpha coefficient of 0.708 for internal consistency. IMSelf-neglect comprises 11 items about personal hygiene, health habits, and social functioning. The total test score is the sum of the number of affirmative responses, each assigned a value of 1. The total score on the test can range from 0 to 11 points. Lower test scores are indicative of an increased probability of self-neglect. A score of 7 or below indicates self-neglect (İlhan et al., 2020). In this study, the Cronbach's alpha internal consistency coefficient of the scale was found to be 0.703.

Barthel Index for Activities of Daily Living (BI)

The Barthel Index (BI) was initially developed by Mahoney and Barthel (1965) and subsequently modified by Shah et al. (1989). The Turkish validity and reliability study of the index was conducted by Küçükdeveci et al. The BI is a scale that evaluates all steps of activities of daily living and determines the independence levels of individuals. BI scores range from 0 to 100, with 0–20 points indicating complete dependence, 21–61 points indicating severe dependence, 62–90 points indicating moderate dependence, 91–99 points indicating mild dependence, and 100 points indicating independence. In studies employing the BI, a score of 60 or above has been identified as an indicator of the capacity to function independently (Kücükdeveci et al., 2000).

Statistical analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS 25.0, IBM, Armonk, NY, U.S.A.). The conformity of the variables to normal distribution was evaluated based on skewness and kurtosis values. The skewness and kurtosis values were found to be between −1.5 and +1.5, indicating that the data fit normal distribution assumptions according to the literature (Tabachnick & Fidell, 2013). Descriptive statistics, including frequency, percentage, mean, standard deviation, minimum, and maximum values, were calculated. Pearson's correlation analysis was conducted to examine the relationships between the scale scores of the participants. To identify variables significantly associated with frailty, an independent-samples *t*-test and one-way analysis of variance (ANOVA) were performed. Simple and multiple linear regression analyses were performed to determine the effects of depression, loneliness, and self-neglect on frailty. A hierarchical multiple linear regression analysis was conducted to identify the factors influencing frailty. This approach allowed for the evaluation of the incremental contribution of psychosocial variables after controlling for demographic and health-related factors. All regression analyses were performed using the Enter method. In the first step, demographic and health-related variables that were significantly associated with frailty in bivariate analyses were included in Model I. In the second step, depression, loneliness, and self-neglect were added to Model II. To assess multicollinearity among the variables, Variance Inflation Factor (VIF) and Tolerance values were examined. The VIF values were found to be below the commonly accepted thresholds of 5 to 10, and the Tolerance values were above 0.1 to 0.2, indicating no multicollinearity, in line with the literature (Kim, 2019). The results were evaluated within a 95 % confidence interval, and statistical significance was accepted when $p < 0.05$.

Results

Baseline characteristics

The mean age of the participants was 71.29 ± 6.68 years, 56.8 % were female, 50.2 % had completed primary education (primary and secondary school), and 66 % had medium levels of income. Most participants lived either with their spouse (41.3 %) or with their spouse and children (30.1 %), and the majority (71.4 %) had spent most of their lives in urban areas. Additional sociodemographic and health-related characteristics of the participants are presented in Table 1.

TFI, GDS-15, LSE, and IMSelf-neglect scores and their correlations

The participants had a mean TFI score of 5.66 ± 3.16, a mean GDS-15 score of 3.49 ± 3.08, a mean LSE score of 6.39 ± 4.96, and a mean IMSelf-neglect score of 7.94 ± 1.96. Overall, 60.6 % of the participants were classified as frail, 43.2 % were classified as lonely, 28.1 % showed signs of depression, and 32.4 % reported self-neglect (Table 2). The TFI

Table 1
Sociodemographic and health-related characteristics of older adults.

Characteristics	Mean ± SD (min–max)
Age (years)	71.27 ± 6.60 (65–92)
Number of children	2.99 ± 2.18 (0–21)
Number of medications	3.65 ± 2.85 (0–18)

	n	%
Age group		
65–74	189	73
75–84	57	22
85 or older	13	5
Sex		
Female	147	56.8
Male	112	43.2
Education status		
Illiterate	30	11.6
Literate with no formal degree	26	10
Primary school	130	50.2
Secondary school	29	11.2
High school	26	10
University and above	18	6.9
Income status		
Very bad	2	0.8
Bad	28	10.8
Medium	171	66
Good	55	21.2
Very good	3	1.2
Marital status		
Married	196	75.7
Single	6	2.3
Widowed/Divorced	57	22
Has children		
Yes	244	94.2
No	15	5.8
Living		
With partner	107	41.3
With partner and children	78	30.1
Alone	30	11.6
Other (with relatives)	5	1.9
Has spent the longest part of one's life in		
City	185	71.4
Village and district	74	28.6
Has a chronic disease		
Yes	224	86.5
No	35	13.5
Has pain		
Yes	104	40.2
No	155	59.8
Smoking		
Yes	39	15.1
No	220	84.9
Alcohol consumption		
Yes	16	6.2
No	243	93.8
Self-perceived health status		
Very poor	4	1.5
Poor	32	12.4
Moderate	103	39.8
Good	102	39.4
Very good	18	6.9
Dependency status according to Barthel		
Highly dependent	14	5.4
Moderately dependent	35	13.5
Mildly dependent	16	6.2
Totally independent	194	74.9

(*continued on next page*)

Table 1 (*continued*)

Table 2
TFI, GDS-15, LSE, and IMSelf-Neglect mean scores and frailty, depression, loneliness, and self-neglect levels of older adults.

Scales	Min–max	Mean ± SD
TFI	0–14	5.66 ± 3.16
GDS-15	0–14	3.49 ± 3.08
LSE	0–22	6.39 ± 4.96
IMSelf-neglect	0–11	7.94 ± 1.96

	n	Percentage
Frailty status		
Frail	157	60.6
Non-frail	102	39.4
Depression status		
No depression	185	71.4
Depression	74	28.6
Loneliness status		
Not lonely	120	46.3
Lonely	112	43.2
Very lonely	21	8.1
Very severely lonely	6	2.3
Displays self-neglect		
Yes	84	32.4
No	175	67.6

TFI = Tilburg Frailty Indicator.
GDS-15 = Geriatric Depression Scale-15.
LSE = Loneliness Scale for the Elderly.
IMSelf-neglect = Istanbul Medical School Elder Self-Neglect Questionnaire.

scores of the participants were moderately and positively correlated with their GDS-15 scores ($r = 0.657$) and LSE scores ($r = 0.527$), while these scores were weakly and negatively correlated with their IMSelf-neglect scores ($r = -0.471$) and BI scores ($r = -0.335$) (all $p < 0.001$). Other correlations are presented in Table 3.

Regression analyses

Simple linear regression analyses revealed that depression was the strongest individual predictor of frailty, accounting for 43.2 % of the total variance in this variable ($p < 0.001$). Loneliness and self-neglect were also significant predictors, explaining 27.8 % and 22.2 % of the total variance in frailty, respectively ($p < 0.001$). In the multiple regression model, all three of the psychosocial variables (depression, loneliness, and self-neglect) were identified as statistically significant predictors, jointly explaining 51.9 % of the total variance in frailty ($p < 0.001$) (Table 4).

In the hierarchical regression analysis, the demographic and health-related variables that were entered in the first step explained 46.8 % of

Table 3
Correlations between TFI scores and GDS-15, LSE, IMSelf-neglect, and BI scores.

Variables	1	2	3	4
TFI (1)				
GDS-15 (2)	0.657***			
LSE (3)	0.527***	0.483***		
IM Self-Neglect Questionnaire (4)	0.471***	−0.382***	−0.433***	
BI (5)	−0.335***	−0.379***	−0.144*	0.234***

TFI = Tilburg Frailty Indicator.
GDS-15 = Geriatric Depression Scale-15.
LSE = Loneliness Scale for Elderly.
IMSelf-neglect = Istanbul Medical School Elder Self-Neglect Questionnaire.
BI: Barthel Index for Activities of Daily Living.
* $p < 0.05$.
*** $p < 0.001$.

the total variance in frailty ($p < 0.001$). The inclusion of psychosocial variables in the second step significantly improved the model, increasing the rate of explained variance to 65.1 % ($p < 0.001$). While education status lost its predictive power in the final model, depression, health perceptions, loneliness, pain, self-neglect, living with a nuclear family, and the community in which one had lived the longest remained significant predictors (Table 5).

Discussion

This study investigated the relationships between frailty and depression, loneliness, and self-neglect in older adults. The results revealed that approximately two-thirds of the participants were frail, and over half experienced loneliness. Substantial levels of depressive symptoms and self-neglect were also observed. Depression, loneliness, and self-neglect were found to be significant predictors of frailty, where an increase in these conditions corresponded to higher frailty levels. Conversely, higher levels of education and more positive health perceptions were associated with reduced frailty. Additionally, the absence of pain, living in a nuclear family (with a spouse/partner and children), and residing primarily in urban areas were found to be protective factors against frailty. Given the global prevalence of similar challenges among older adults, the findings provide valuable insights into frailty and its associated factors.

The prevalence of frailty in this sample (60.6 %) was higher than previously reported rates in both international and Turkish studies. Tel Aydın and Başer Akın (2023) reported that only 26 % of older adults were not frail. While a meta-analysis identified rates of 18.8 % in the community and 47.3 % in hospitals (Zhang et al., 2023), in Türkiye, frailty was found to be 20–30 % in people aged 75 years or older and 35–40 % in those aged 85 or over (Özdemir et al., 2017). This higher prevalence in our study may be attributed to the low education levels of the participants and their high burden of chronic conditions.

The finding that 28.6 % of the participants experienced depressive symptoms was consistent with previous research reporting prevalence values between 28.4 % and 35.1 % (Cai et al., 2023; Hu et al., 2022). Depression was a significant predictor of frailty in our study, and frailty increased as depressive symptoms increased, supporting hypothesis H1.

Table 4
Regression table of the relationships between frailty and depression, loneliness, and self-neglect in older adults.

Frailty	R^2	*Adjusted* R^2	*F*	*p*	*B*	*β*	*t*	*p*	*Tolerance*	*VIF*
Constant	0.432	0.430	195.262**	0.001***	3.307		14.720	0.001***		
Depression					0.674	0.657	13.974	0.001***	1	1
Constant	0.278	0.275	98.857	0.001***	3.511		12.836	0.001***		
Loneliness					0.336	0.527	9.943	0.001***	1	1
Constant	0.222	0.219	73.460	0.001***	11.713		16.104	0.001***		
Self-neglect					−0.762	−0.471	−8.571	0.001***	1	1
Constant	0.519	0.514	91.817	0.001***	5.619		7.242	0.001***		
Depression					0.493	0.480	9.455	0.001***	0.774	1.292
Loneliness					0.134	0.210	4.024	0.001***	0.695	1.440
Self-neglect					−0.319	−0.197	−4.000	0.001***	0.730	1.370

** $p < 0.01$.
*** $p < 0.001$.

Table 5
Regression analysis of factors associated with frailty in older adults.

Variables	Model I			Tolerance	VIF	Model II			Tolerance	VIF
	β	t	p			β	t	p		
(Constant)		18.416	0.001***				10.963	0.001***		
Sex	−0.055	−1.097	0.274	0.830	1.205	−0.014	−0.327	0.744	0.801	1.248
Education status	−0.120	−2.445	0.015*	0.882	1.133	−0.046	−1.136	0.257	0.846	1.182
Living with nuclear family	−0.152	−3.142	0.002**	0.905	1.105	−0.098	−2.462	0.014*	0.891	1.122
Place where the longest part of life is spent	−0.172	−3.618	0.001***	0.930	1.075	−0.111	−2.795	0.006**	0.892	1.121
Having pain	0.214	4.455	0.001***	0.917	1.090	0.157	3.958	0.001***	0.895	1.118
Health perceptions	−0.454	−9.444	0.001***	0.915	1.093	−0.280	−6.626	0.001***	0.787	1.271
Depression						0.308	6.410	0.001***	0.709	1.410
Loneliness						0.182	4.032	0.001***	0.689	1.450
Self-neglect						−0.134	−3.005	0.003**	0.606	1.649
R^2	0.468					0.651				
Adjusted R^2	0.455					0.638				
F	36.947					51.502				
p	0.001***					0.001***				

Note. Sex was coded as 1 = male and 0 = female. Living with a nuclear family was coded as 1 = yes and 0 = no. Presence of pain was coded as 1 = yes and 0 = no. Spending the longest part of one's life in a city was coded as 1 = yes and 0 = no. Education levels and health perceptions were treated as continuous variables.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

This association has also been demonstrated in several other studies (Cao et al., 2022; Maştaleru et al., 2022; Wang et al., 2022; Yuan et al., 2023). Cognitive, emotional, and social impairments associated with depression may explain its role in increasing vulnerability to frailty. Healthcare professionals should monitor mental health closely and refer older adults to geropsychiatric services when needed, especially through community-based assessments. Kenwright et al. (2024) reported that within the integrated primary mental health care model, community mental health and psychiatric nurses provided person-centered interventions for issues such as depression, anxiety, and emotional dysregulation, and these interventions significantly reduced symptoms of depression and anxiety. Similarly, a scoping review highlighted that this service model was effective in improving access to care for frail populations, particularly those living in rural areas or experiencing social isolation (Hurley et al., 2022). According to the International Council of Nurses (ICN), mental health nurses significantly contribute to the psychological well-being of vulnerable populations through person-centered and holistic psychosocial interventions delivered within integrated models of care (ICN, 2024).

In this study, 53.7 % of the participants were found to experience loneliness. This rate was higher than those reported in global systematic reviews (22.9–35 %) (Su et al., 2023) and similar to those reported in studies conducted in Türkiye (Öztürk Haney et al., 2017; Özvurmaz, 2018). Loneliness was a significant predictor of frailty in our study, and frailty increased as loneliness increased, supporting hypothesis H2. Prior research has consistently shown that loneliness impairs both physical and mental health and increases the risk of frailty and mortality (Gale et al., 2018; Herrera-Badilla et al., 2015; Mehrabi & Béland, 2020). Considering the situation in Türkiye, loneliness in later life may be driven by rapid social transformations. Traditional extended family structures have been increasingly replaced by nuclear or single-person households due to urbanization and migration (Ilgaz & Gözüm, 2020; Yanartaş et al., 2023). Culturally, older adults may be hesitant to express emotional needs, which complicates the identification and management of loneliness in these individuals (Zhang et al., 2020). Therefore, older individuals who live alone should be closely monitored through regular follow-ups and assessments to detect and address loneliness-related risks early. Addressing loneliness in Türkiye requires culturally sensitive strategies that integrate family, community, and technology-based solutions. Interventions should aim to enhance the social participation of older adults and reduce isolation.

The prevalence of self-neglect in older adults was found to be 32.4 % in this study. Yu et al. (2019) found that 23.2 % of older adults neglected themselves. The prevalence of self-neglect in older adults living in the community was reported to range from 18.4 % to 29.1 % (Yu et al., 2021). As a result of self-neglect, older adults may experience problems such as malnutrition, dehydration, infections due to poor personal hygiene, ineffective management of chronic diseases and treatment regimens, falls and injuries, depression, anxiety, cognitive decline, and social isolation (Li et al., 2018; Yalçın Gürsoy, 2020; Yu et al., 2021). Therefore, the early identification of self-neglect among older adults and the implementation of appropriate interventions are essential to prevent its adverse consequences (Yalçın Gürsoy, 2020).

In this study, we found that self-neglect was a significant predictor of frailty, where frailty increased as self-neglect increased, supporting hypothesis H3. This association has been supported by studies conducted in various parts of the world which have revealed that self-neglect contributes to frailty (Lee et al., 2016; Li et al., 2018; Yu et al., 2019; Zhao et al., 2017). Studies have shown that self-neglect outcomes and behaviors such as malnutrition, irregular medication use, delayed medical appointments, and lack of regular exercise are associated with an increased risk of frailty (İlhan et al., 2020; Yalçın Gürsoy, 2020). Although a recent study by Yu et al. (2023) showed no significant association between self-neglect and frailty, the weight of current evidence supports this relationship. In this study, frailty was associated with depression, loneliness, and self-neglect. However, the cross-sectional design limits causal inferences, and self-reported data may be affected by social desirability bias. Further longitudinal research is needed to clarify these relationships and develop strategies to mitigate psychosocial risk factors.

In addition to psychosocial predictors, several demographic and health-related factors (education status, living in a nuclear family, place where the longest part of life is spent, having pain, and health perceptions) significantly predicted frailty, supporting hypothesis H4. Education status was initially identified as a significant predictor of frailty in Model I, indicating that higher education levels were associated with lower levels of frailty among the participants. This aligned with research suggesting that education contributes to resilience by enhancing health literacy and access to resources (Wang et al., 2022; Yeşil & Karakaş, 2023; Yuan et al., 2023). Training and intervention programs should prioritize improving health management skills and access to social and economic resources among older adults with low education levels. However, when depression, loneliness, and self-neglect were incorporated into the model in the second stage, education status no longer remained a significant predictor of frailty, suggesting that psychosocial factors overshadowed the influence of demographic characteristics.

In this study, the participants living in nuclear family households showed lower frailty levels. Previous studies have shown that family structure is a predictor of better health and quality of life in older adults, motivates participation in daily activities by providing social support, and reduces frailty by helping older adults cope with stress (Herrera-Badilla et al., 2015; Yu et al., 2023). Given that the family structure and living arrangements of older adults can influence their frailty levels, individuals living alone should be prioritized for frailty assessments.

The place where an older adult lives determines their frailty by affecting their physical, psychological, and social health. While older adults living in isolated areas with limited social opportunities become frailer, those living in safe and accessible environments can be more active and independent (Li et al., 2018; Zhang et al., 2020). In our study, living in urban areas was associated with lower frailty, consistent with research showing that urban residents benefited from better access to healthcare and social services (Fan et al., 2020; Yuan et al., 2023). In contrast, rural older adults may face multiple disadvantages. This is especially relevant in Türkiye, where rural infrastructure, access to healthcare, and economic resources remain unevenly distributed (Yeşil & Karakaş, 2023). In rural areas, community mental health nurses play an important role in identifying psychosocial risks in older adults and delivering personalized preventive interventions.

The results of this study demonstrated that the participants reporting pain exhibited higher levels of frailty. The presence of pain has been demonstrated to elevate the risk of frailty, as it impairs physical functionality and independence while also giving rise to psychological and social issues (Crosignani et al., 2022; Saunders et al., 2023). In older adults, there is a need to prioritize pain management to reduce frailty and enhance quality of life. Similarly, positive self-perceived health was associated with lower frailty in this study. This variable reflects broader well-being and should be considered in health promotion efforts. A negative perception of health may increase frailty by worsening physical and psychological health conditions (Elliot et al., 2018; Faria et al., 2022). A study conducted with older adults in a health unit in Portugal revealed an association between self-perception of health status and lifestyle and multidimensional frailty (Faria et al., 2022). A lower likelihood of having a positive self-perception of health was observed among older adults who were frail (Zhao et al., 2017). The findings of this study aligned with those of previous studies, which have indicated that a low perception of health predicts frailty in older adults.

Limitations

This study had some important limitations. First, it was conducted in a university hospital located in an urban area of Istanbul, which may limit the generalizability of the findings to populations in rural or

socioeconomically diverse settings. The study employed a cross-sectional design aimed at evaluating associations between variables. However, this design does not permit causal inferences. Additionally, the use of self-reported data introduces potential sources of bias, such as recall bias and social desirability bias, which may have influenced the responses of the participants. Although the sample size was statistically adequate, the participants may not fully represent the diversity of the general older adult population in terms of socioeconomic, cultural, and health-related characteristics. While a random sampling method was employed, the fact that the sample was drawn only from individuals who presented to a single institution may still limit its representativeness. Another limitation was the exclusion of individuals with MMSE scores below 24, which may have led to the underrepresentation of cognitively impaired older adults who are typically more susceptible to frailty. Furthermore, the study did not include standardized clinical assessments to verify medical or psychiatric diagnoses. Multi-center study designs, more heterogeneous samples, and the integration of objective clinical evaluations are recommended to enhance the external validity and scientific robustness of future findings.

Conclusion

The results of this study revealed that 60.6 % of the participants were frail, 53.7 % reported loneliness, 28.6 % exhibited symptoms of depression, and 32.4 % displayed self-neglect. Depression, loneliness, and self-neglect were significant predictors of frailty, with higher levels of these psychosocial factors associated with increased frailty risk among older adults. In contrast, higher education status and positive perceptions of health were significantly associated with reduced frailty, while the absence of pain, cohabitation with a nuclear family (spouse/partner and children), and predominantly urban residence emerged as strong protective factors against frailty.

The high prevalence of frailty, depression, loneliness, and self-neglect among older adults underscores the critical role of nurses in the early identification of psychosocial risks and the implementation of comprehensive assessments. In particular, psychiatric and community mental health nurses should be actively involved at all stages of risk detection and intervention. To facilitate this, structured training programs are essential to strengthen the psychosocial assessment competencies of nurses working with older populations. Moreover, nurses should deliver targeted educational programs for caregivers, addressing key issues such as frailty, depression, loneliness, self-neglect, and health-promoting behaviors. This is especially crucial in rural or underserved regions, where community-based screening programs led by trained nurses serve as a vital mechanism for the early detection of psychosocial risks and frailty. In this context, reaching frail older adults through home visits and telehealth strategies may be an effective approach to overcoming access barriers and ensuring the continuity of care. These interventions are expected to improve the awareness levels of older adults, as well as their coping abilities concerning frailty, depression, loneliness, and self-neglect.

Given the cultural and societal dynamics in countries with evolving family structures and socioeconomic challenges, there is an increasing need for culturally sensitive and contextually tailored approaches. In this regard, psychiatric nurses play a central role not only in delivering individualized care but also in coordinating system-level responses, collaborating with policymakers, advocating for vulnerable populations, and guiding individuals toward appropriate services.

Future research should employ longitudinal or experimental designs to establish causal relationships and evaluate the effectiveness of interventions. Additionally, cross-cultural comparisons and localized intervention studies are warranted to better understand how sociocultural contexts influence frailty and self-neglect.

CRediT authorship contribution statement

Yasemin Adıgüzel Yaşar: Writing – review & editing, Writing – original draft, Resources, Methodology, Data curation, Conceptualization. **Sümeyye Gencer:** Writing – review & editing, Writing – original draft, Resources, Methodology, Data curation, Conceptualization. **Nesrin İlhan:** Writing – review & editing, Supervision, Methodology, Formal analysis, Conceptualization. **Türkinaz Aştı:** Writing – review & editing, Supervision, Conceptualization.

Ethics approval statement

This study was conducted in accordance with the principles outlined in the Declaration of Helsinki. Ethics committee approval (31.08.2023/E-54022451-050.05.04-121154) and institutional permission (28.07.2023/E-35700536-108.99-116864) were obtained for the implementation of the study.

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Declaration of competing interest

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