ORİJİNAL ARAŞTIRMA ORIGINAL RESEARCH

Fear of Falling in Community-Dwelling Older People: Relationship with Sleep Quality, Depression and Quality of Life

Toplumda Yaşayan Yaşlılarda Düşme Korkusu: Uyku Kalitesi, Depresyon ve Yaşam Kalitesi ile İlişkisi

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ABSTRACT Objective: Fear of falling is not only a risk factor for falls it is also associated with health problems in older people. The purpose of this study was to explore the relationship of fear of falling with sleep quality, depression, and quality-of life in community-dwelling elderly. **Material and Methods:** The study included 150 community-dwelling elderly aged ≥65 with Mini Mental State Examination score ≥25. Data on fear of falling were collected by Falls Efficacy Scale-International, sleep quality by Pittsburgh Sleep Quality-Index, depression by Geriatric Depression Scale, and quality-of life by Short Form-36. **Results:** Sleep quality, depression, and quality-of life were significantly different in participants with and without fear of falling. Fear of falling was correlated with depression and sleep quality scores positively, and with quality of life negatively. According to the regression analysis, positive correlations with fear of falling were sleep quality and depression scores. Physical functioning and pain-subscales were negatively correlated with fear of falling scores. **Conclusion:** In this study; poor sleep quality, depressive symptoms, and lower quality of life were associated with higher fear of falling in older people. It may be beneficial to design targeted interventions to improve sleep quality, psychological health, and quality-of life for reducing fear of falling in community-dwelling older people.

Keywords: Elderly; fear of falling; sleep quality;
           depression; quality of life

ÖZET Amaç: Yaşlı insanlarda düşme korkusu, sadece düşmeler için bir risk faktörü değildir, aynı zamanda sağlık sorunları ile de ilişkilidir. Bu çalışmanın amacı, toplumda yaşayan yaşlılarda düşme korkusunun uyku kalitesi, depresyon ve yaşam kalitesi ile ilişkisini araştırmaktı. **Gereç ve Yöntemler:** Çalışma, Mini Mental Durum Değerlendirme Testi ≥25 olan 65 yaş üstü 150 yaşlıyı içeriyordu. Uluslararası Düşme Etkinlik Skalası ile düşme korkusu, Pittsburgh Uyku Kalite İndeksi ile uyku kalitesi, Geriatrik Depresyon Ölçeği ile depresyon ve Kısa Form-36 ile yaşam kalitesi verileri toplandı. **Bulgular:** Düşme korkusu olan ve olmayan katılımcılarda; uyku kalitesi, depresyon ve yaşam kalitesi anlamlı olarak farklıydı. Düşme korkusu, depresyon ve uyku kalitesi skorları ile pozitif, yaşam kalitesi ile negatif olarak korele idi. Regresyon analizine göre uyku kalitesi ve depresyon skorları düşme korkusu ile pozitif korelasyon gösterdi. Fiziksel işlevsellik ve ağrı alt ölçekleri ise düşme korkusu skorları ile negatif korelasyon gösterdi. **Sonuç:** Bu çalışmada, kötü uyku kalitesi, depresif belirtiler ve düşük yaşam kalitesi yaşlı insanlarda düşme korkusu ile ilişkili bulunmuştur. Toplumda yaşayan yaşlılarda düşme korkusunu azaltmak için uyku kalitesini, psikolojik sağlığı ve yaşam kalitesini iyileştirmeye yönelik girişimler planlamak faydalı olabilir.

Anahtar Kelimeler: Yaşlılık; düşme korkusu; uyku kalitesi;
                     depresyon; yaşam kalitesi

Fear of falling is defined as low perceived self-efficacy at avoiding falls during essential, nonhazardous activities of daily living.[1] Its prevalence among older adults has been reported to range between 20 and 85%, and has been associated with increased risk of falling.[2-5] Previously it was believed

that fear of falling was a consequence of falling, but recent studies have revealed fear of falling in those who have no fall experience.[4,6] When fear of falling is not exaggerated, it may be healthy response to increase safety especially in older people with a high fall risk and its absence may reflect reduced safety awareness. On the other hand, excessive fear of falling may result in avoidance of activities, social isolation, and reduced quality of life and may lead to loss of independence. And even more, these changes may contribute to the placement of a community-dwelling elderly into institutional care.[3,7-10]

Given the multifaceted and adverse effects of fear of falling in elderly, it is important to explore the relevant risk factors of fear of falling for evaluation and prevention of this fear among older adults. In this respect, fear of falling has been the focus of interest by many researchers. Older age, female gender, previous falls, impaired physical and cognitive function, comorbidities, depressive disorders, living alone, and low educational level are known risk factors for fear of falling in older people.[3,4,11]

During the ageing process, more than half of older people suffer from sleep problems and depressive symptoms which are significant predictors of falls.[12-22] Previous studies indicated that depressive symptoms and sleep problems were also associated with worse quality of life.[23-27] Additionally falls may result in deterioration of quality of life.[5] It seems that there are mutual relationships between falls, sleep quality and emotional status, and quality of life in older adults. Although they all are closely related to risk of falling, their associations with fear of falling have been addressed only in few trials.[11,28-32] From this point of view, we aimed to examine the little known relationship between fear of falling, sleep quality, depression, and quality of life. The relation of fear of falling with fall history, body mass index, co morbidities and number of medications were also explored.

■ MATERIAL AND METHODS

This cross-sectional study was conducted at Department of Physical Medicine and Rehabilitation of Medical Faculty of Ondokuz Mayıs University between June 2016 and June 2017. The study sample included 150 community-dwelling volunteers aged 65 and over. Individuals were excluded if they had a score <24 on the Mini Mental State Examination (MMSE); were primarily bed-bound or wheelchair dependent; had amputation of lower extremities; had known sleep or balance problems and psychiatric disorders; had medications that might affect sleep, balance, and emotional status. The Medical Research Ethics Committee at Ondokuz Mayıs University (B.30.2.ODM.0.20.08/219, date: April 15, 2016) approved the study protocol and verbal consent was obtained from the participants. The study was conducted in accordance with the principles of the Declaration of Helsinki.

The same researcher interviewed with participants face-to-face. All participants were questioned about age, gender, educational level, walking aids used, a history of falls, medical co morbidities (*such as hypertension, coronary artery disease, diabetes mellitus, asthma, chronic obstructive pulmonary disease, benign prostate hypertrophy, thyroid diseases, musculoskeletal diseases, renal diseases*), and current medications. The participants' body height and weight measures were taken and body mass index was calculated.

FEAR OF FALLING

The Falls Efficacy Scale International (FES-I) assesses concerns relating to basic and more demanding activities, both physical and social. It contains 16 items scored on a four-point scale (1=not at all concerned to 4=very concerned). Total score ranges from 16 (absence of concern) to 64 (extreme concern).[7] Patients were divided into two groups according to the cut-off value determined for our country as FES-I score <24 and FES-I score ≥ 24. [33]

SLEEP QUALITY

The Pittsburgh Sleep Quality Index (PSQI) was used for the subjective assessment of sleep quality.[34] It is a questionnaire consisting of 19 items which are scored on a 4-point scale (0-3) to obtain 7 subcategories: sleep duration, sleep disturbances, sleep latency, daytime dysfunction, sleep efficiency, sleep quality and medication use. The sum of all subscores represents the total sleep quality score (0-21) with

higher scores indicating lower sleep quality. Since a standard cut-off >5 is indicative of poor sleep quality, patients were divided into two groups as PSQI total score ≤5 and PSQI total score >5.[35]

DEPRESSION

Depressive symptoms were evaluated using Geriatric Depression Scale (GDS).[36] Participants were asked 30 yes/no questions relating to symptoms of depression experienced during the previous week. The total score ranges from 0 to 30 (0-10=no depression, 11-20=mild depression, 21-30=moderate-severe depression).[37]

QUALITY OF LIFE

Short Form-36 (SF-36) was used to assess quality of life.[38] It is a widely applied generic instrument for measuring health status and consists of eight dimensions: physical functioning, social functioning, physical role, emotional role, mental health, energy, bodily pain and general health perceptions. The sum scores range from 0 (worst) to 100 (best).[39]

FALL HISTORY

Fall was defined as an unexpected event in which the participants come to rest on the ground, floor, or lower level. The participants were asked whether they had fallen in the last 12 months and if so how many times fallen.

COGNITIVE FUNCTION

MMSE is the most common test used to assess cognitive mental status. It measures retention, memory recall, attention, calculation, language and visuospatial performance. The MMSE is scored from 0 to 30 points, with a higher score indicating better cognitive performance. A result below 24 points suggests dementia.[40] Participants with a MMSE score <24 that restrict ability to accomplish interview, were excluded.

AMBULATORY STATUS

The ambulatory status of the participants was classified using the Functional Ambulation Category. It is a common clinical gait assessment scale and distinguishes six levels of walking ability on the basis of the amount of physical support required (0=non ambulatory, 5=independent functional ambulation).[41]

STATISTICAL ANALYSES

The data were analysed using the IBM SPSS version 21.0 for Windows. The sample size was calculated by a statistician with PASS 2011 software. A priori power analysis using data from a previous study assessing sleep quality in older people indicated that a sample of 150 would have 1.00 power and p<0.05 based on PSQI scores.[30] The Kolmogorov-Smirnov test was used to analyse normal distribution assumption of the quantitative outcomes and all data were not normally distributed. Descriptive data were presented as minimum–maximum (median). Participants were divided into two groups according to FES-I and PSQI scores, and Mann-Whitney U test (for ordinal variables) and Chi-square test (for gender comparison) were used to compare the groups. The correlations were investigated by using Spearman correlation analysis. Multivariate linear regression analysis was performed to determine if GDS, PSQI, and SF-36 scores were associated with FES-I scores. p values less than 0.05 were considered statistically significant.

◼ RESULTS

The sample consisted of 150 elderly aged between 65-92 years and of the participants, 84 (56%) were women. Table 1 provides the demographic and clinical characteristics of the participants.

The comparison of clinical parameters in participants according to their FES-I scores is shown in Table 2. Of the participants 71 (47.3%) had a FES-I score ≥ 24. Women had significantly higher FES scores than men (p<0.001). There was a significant difference between the two groups in terms of number of comorbidities, number of falls, GDS scores, SF-36 scores and the PSQI scores (for duration of sleep and sleep efficiency subscores p<0.05, for the other parameters p<0.001). Number of medications was not statistically different in two groups (p<0.05).

When the participants were divided into two groups according to PSQI total scores, PSQI total score was >5 in 88 (58.7%) participants (Table 3).

TABLE 1: Demographic and clinical characteristics of the participants (n=150).

Characteristic	Median (minimum-maximum)	n (%)
Age (years)	70 (65-92)	
Gender		
Female		84 (56)
Male		66 (44)
Education		
Literate		34 (22.7)
Primary education		70 (46.7)
Secondary education		29 (19.3)
College		17 (11.3)
Comorbidity		
Musculoskeletal diseases		72 (52)
Hypertension		96 (64)
Coronary artery diseases		43 (28.7)
Diabetes		7 (4.7)
Thyroid gland diseases		7 (4.7)
Asthma		6 (4)
Benign prostatic hypertrophy		13 (8.7)
Number of comorbidities	2 (0-4)	
Number of medications	2 (0-4)	
Use of walking aids		
Without aids		131 (87.3)
Cane		18 (12.0)
Walker		1 (0.7)
Functional ambulation category		
Level 5 (independent)		141 (94)
Level 4 (dependent outdoors)		9 (6)
Body mass index (kg/m2)	27.40 (15.57-44.63)	
Number of falls	0 (0-20)	
Mini mental state examination	26 (24-30)	
Falls efficacy scale-international	22.5 (16-56)	
Geriatric depression scale	7.5 (0-25)	
Pittsburgh sleep quality index		
Total	6.5 (1-18)	
Sleep quality	1 (0-3)	
Sleep latency	3 (0-6)	
Duration of sleep	1 (0-6)	
Sleep efficiency	1 (0-3)	
Sleep disturbance	1 (0-3)	
Day dysfunction	0 (0-4)	
Need medications to sleep	0 (0-0)	
Short form-36		
Physical function	85 (20-100)	
Social function	87 (37-100)	
Physical role	100 (37-100)	
Emotional role	100 (0-100)	
Pain	74 (22-100)	
General health	72 (15-100)	
Mental health	80 (40-92)	
Energy	75 (30-95)	

There was a significant difference between the two groups in fear of falling, depression and quality of life (except emotional role subscale) scores. Number of medications was not statistically different in two groups (p<0.05).

In correlation analysis, FES-I scores of the participants were positively correlated with body mass index and the number of falls (respectively; r=0.309 and r=0.437) (p<0.001) (Table 4). There was a strong positive correlation between FES-I and GDS scores (r=0.728) (p<0.001) (Table 4). PSQI total and all subscales were positively correlated with FES-I scores (p<0.05) (Table 4). There were strong negative correlations between FES-I scores and all subscales of SF 36 except emotional role (r=-0.430) (p<0.001) (Table 4).

In multivariable linear regression analysis, it has been found that the most significant correlation with FES-I was GDS (p<0.001) (Table 5). All PSQI scores, and physical function and pain subscales were also found to be influential variable on FES-I (p<0.05) (Table 5). Adjusted R^2 was to calculate the effect size. According to Cohen, R^2 can be deemed insignificant when <0.02 and large if > 0.35.[42] A value of 0.577 in this study indicates a good level of prediction. The multiple linear regression analysis equation was as follows:

$$Y=b_0+b_1X_1+b_2X_2+.....+ b_8X_8$$

Where Y was dependent variable, X_1 through X_8 were independent variables, b_0 was the value of Y when all of the independent variables (X_1 through X_8) were equal to zero, and b_1 trough b_8 were the estimated regression coefficients.

DISCUSSION

Fear of falling is a common concern for community dwelling elderly. It is of great importance to detect and prevent this fear because it is not only a risk factor for falls, it is also associated with health problems in older people.[43] In the present study, there was a close relationship between fear of falling, sleep quality, depression, and quality of life. Fear of falling was also associated with fall history, co morbidities, and body mass index.

TABLE 2: Comparison of the clinical parameters in the participants according to fear of falling (n=150).			
	FES-I <24 n= 79 (52.7%)	FES-I ≥24 n= 71 (47.3%)	
Characteristic	Median (minimum-maximum)	Median (minimum-maximum)	p
Gender (female/male)	27/52	57/14	<0.001
Age (years)	70 (65-84)	71 (65-92)	0.208
Body mass index (kg/m2)	26.47 (15.57-40.06)	28.34 (19.96-46.63)	0.010
Number of comorbidities	1 (0-3)	2 (0-4)	<0.001
Number of medications	1 (0-4)	2 (0-4)	0.119
Number of falls	0 (0-5)	0 (0-20)	<0.001
Geriatric depression scale	3 (0-19)	14 (1-25)	<0.001
Pittsburgh sleep quality index			
Total	4 (1-14)	10 (2-18)	<0.001
Sleep quality	0 (0-2)	1 (0-3)	<0.001
Sleep latency	2 (0-6)	4 (0-6)	<0.001
Duration of sleep	1 (0-3)	1 (0-3)	0.008
Sleep efficiency	0 (0-3)	1 (0-3)	0.002
Sleep disturbance	1 (0-2)	1 (1-4)	<0.001
Day dysfunction	0 (0-4)	1 (0-4)	<0.001
Short form-36			
Physical function	95 (25.100)	55 (20-100)	<0.001
Social function	100 (62-100)	75 (37-100)	<0.001
Physical role	100 (0-100)	50 (0-100)	<0.001
Emotional role	100 (33-100)	95 (0-100)	<0.001
Pain	100 (51-100)	51 (22-100)	<0.001
General health	82 (25-100)	56 (15-92)	<0.001
Mental health	84 (56-92)	68 (40-92)	<0.001
Energy	80 (45-95)	60 (30-85)	<0.001

FES-I: Falls efficacy scale-international.

TABLE 3: Comparison of the clinical parameters in the participants according to sleep quality (n=150).			
	PSQI ≤5 n=62 (41.3%)	PSQI >5 n=88 (58.7%)	
Characteristic	Median (minimum-maximum)	Median (minimum-maximum)	p
Age (years)	69 (65-92)	70.5 (65-86)	0.474
Number of comorbidities	1 (0-4)	2 (0-4)	0.030
Number of medications	1 (0-4)	2 (0-3)	0.483
Number of falls	0 (0-5)	0 (0-20)	0.009
Geriatric depression scale	4 (0-22)	11 (0-25)	<0.001
Falls efficacy scale-international	16.5 (16-39)	30 (16-56)	<0.001
Short form-36			
Physical function	95 (25-100)	65 (20-100)	<0.001
Social function	100 (50-100)	87 (37-100)	<0.001
Physical role	100 (0-100)	75 (0-100)	<0.001
Emotional role	100 (0-100)	90 (0-100)	0.013
Pain	100 (30-100)	61 (22-100)	<0.001
General health	76 (30-100)	67 (15-100)	<0.001
Mental health	84 (48-92)	72 (40-92)	<0.001
Energy	80 (45-95)	65 (30-95)	<0.001

PSQI: Pittsburgh sleep quality index.

TABLE 4: Spearman correlation coefficients between the clinical parameters in participants (n=150).							
	Age	**BMI**	**Number of comorbidities**	**Number of medications**	**Number of falls**	**FES-I**	**GDS**
FES-I	0.148	0.309*	0.346	0.139	0.437*	-	0.728*
GDS	0.051	0.273**	0.303*	0.137	0.337*	0.728*	-
PSQI							
Total	0.070	0.241**	0.228**	0.098	0.276**	0.566*	0.412*
Sleep quality	0.074	0.218**	0.270**	0.109	0.250**	0.596*	0.433*
Sleep latency	0.029	0.161**	0.128	0.026	0.168**	0.473*	0.353*
Duration of sleep	-0.041	0.166**	0.217**	0.084	0.185**	0.236**	0.178**
Sleep efficiency	0.021	0.199**	0.241**	0.196**	0.132	0.316*	0.211**
Sleep disturbance	0.091	0.195**	0.034	0.015	0.297*	0.358*	0.247**
Day dysfunction	0.153	0.140	0.161**	0.042	0.303*	0.434*	0.324*
Short form-36							
Physical function	-0.259**	-0.255**	-0.353*	-0.151	-0.337*	-0.717*	-0.571*
Social function	-0.106	-0.175**	-0.320*	-0.132	-0.253**	-0.624*	-0.691*
Physical role	-0.215**	-0.173**	-0.340*	-0.127	-0.312*	-0.615*	-0.548*
Emotional role	-0.110	-0.177**	-0.266**	-0.118	-0.215**	-0.430*	-0.654*
Pain	-0.151	-0.250**	-0.373*	-0.200**	-0.375*	-0.638*	-0.496*
General health	-0.178**	-0.241**	-0.356*	-0.175**	-0.337*	-0.653*	-0.720*
Mental health	-0.005	-0.342*	-0.249**	-0.150	-0.266**	-0.640*	-0.824*
Energy	-0.121	-0.261**	-0.301*	-0.172**	-0.322*	-0.669*	-0.833*

FES-I: Falls efficacy scale-international; GDS: Geriatric depression scale; PSQI: Pittsburgh sleep quality index; BMI: Body mass index.
*p<0.001 **p<0.05

Sleep patterns change across life span but sleep disorders are not the natural consequence of advanced age.[12] During the ageing process, more than half of elderly suffer from sleep problems including nocturnal awakening, difficulties in falling asleep, and early waking.[13] Sleep disturbances are one of the risk factors for falls and associated with a variety of physical and psychological problems.[12-18,20,21,44] Poor sleep quality increases the risk of falls in older people by leading worse physical and cognitive function, poor postural control, higher reaction time.[16] But in the literature there is a knowledge gap on fear of falling and sleep quality. Only Chang et al. have reported a higher number of subjects with fear of falling had poor sleep quality (PSQI >5).[11] In the current study, a positive correlation was found between fear of falling and sleep quality scores. The fear of falling in patients with and without sleep problem was statistically different. All sleep quality scores were the major determinants of fear of falling. These results suggest that fear of falling in older adults is closely related to sleep quality, and poor sleep quality may lead to an increase in fear of falling.

TABLE 5: Multiple regression analysis with FES-I as dependent variable and GDS, PSQI, SF-36 as independent variables (n=150).					
	Fear of falling (FES-I)				
	Unstandardized coefficients		**Standardized coefficients**		
	B	**Std. error**	**β**	**t**	**p**
Depression (GDS)	0.771	0.092	0.497	8.376	0.000
Sleep quality (PSQI)					
Total	-7.657	3.213	-3.060	-2.383	0.018
Sleep quality	11.800	3.402	0.857	3.468	0.001
Sleep latency	7.756	3.269	1.406	2.372	0.019
Duration of sleep	7.204	3.406	0.426	2.115	0.038
Sleep efficiency	8.098	3.228	0.704	2.508	0.013
Sleep disturbance	9.592	3.340	0.431	2.872	0.005
Day dysfunction	8.291	3.364	0.810	2.465	0.015
Quality of life (SF-36)					
Physical function	-0.171	0.048	-0.393	-3.534	0.001
Social function	0.055	0.065	0.081	0.843	0.401
Physical role	-0.001	0.034	-0.000	-0.024	0.981
Emotional role	-0.010	0041	-0.021	-0.243	0.809
Pain	-0.082	0.039	-0.185	-2.113	0.036
General health	0.001	0.052	0.002	0.021	0.984
Mental health	-0.124	0.111	-0.140	-1.113	0.268
Energy	-0.153	0.097	-0.209	-1.577	0.117

FES-I: Falls efficacy scale-international; GDS: Geriatric depression scale; PSQI: Pittsburgh sleep quality index; BMI; Body mass index.

Depressive symptoms are closely related to falls and fear of falling, and depression is one of the important risk factors associated with fear of falling.[4,11,19,22,30,31,45] There is a mutual relationship between fear of falling and depression. Activity restriction due to fear of falling may result in social isolation and related depression in older people. On the other hand, depression may cause elderly to be less confident about their physical activity and to be afraid to fall.[30,45] Moreover, some researchers have suggested that fear of falling may be an expression of generalized anxiety in older individuals.[4] In the current study; although depression level of the participants were not found to be very high, increased fear of falling was strongly correlated with increased depression scores. In addition, depression scores of older individuals with fear of falling were significantly higher and the most important determinant of fear of falling was depression. In concordance with other studies, the results of this study indicate that fear of falling is associated with depressive symptoms and older adults with depressive symptoms may have increased fear of falling.

The association between fear of falling and quality of life is a well known issue but it is still unclear which one affects the other. Fear of falling has a significant impact on quality of life and increased fear of falling is associated with poor quality of life.[4,8,11,28,29,32] In line with previous researches, a negative correlation was found between participants' fear of falling and quality of life scores and older adults with fear of falling had poor quality of life. The correlations between fear of falling scores and physical function and pain subscales were strong and these two subscales were the major determinants of fear of falling. It can be concluded that reduced quality of life due to pain and deterioration of functional capacity may cause older people to be afraid of falling.

Older age, fall experience, having chronic disorders, and polypharmacy have been shown as relevant risk factors with fear of falling in older adults.[11,30] In the current study, the numbers of falls and co morbidities were significantly higher in participants with fear of falling, as expected. But there was no difference in terms of the number of medications. While lower body mass index leads to a higher

risk of severe injury from a fall, higher body mass index has been shown to have a negative effect on fall efficacy.[46,47] This negative effect was explained as obesity increased fear of falling by reducing physical activity.[47] In the present study, older individuals with fear of falling had significantly higher body mass index than those without and the higher body mass index was correlated with increase in fear of falling. It can be suggested that obesity management in older people may be effective in reducing fear of falling. Body mass index may influence fear of falling over different ways but there is limited information about this relationship. Future studies may clarify the relation of fear of falling with body mass index. Additionally, as shown previously, women had higher fear of falling than men in this study.[9]

Sleep disturbance causes physical and psychiatric problems and increases risk of mortality.[23] Sleep problems such as excessive daytime sleepiness and extreme sleep durations are correlated with poor quality of life in elderly.[23,24,27] It was stated that depressed older persons have poor sleep quality.[23,24] A good quality of life is also associated with the absence of depression.[25,26] As expected, older adults with poor sleep quality reported more depressive symptoms and lower quality of life in the current study. The positive correlation between the sleep quality and depressive symptoms may indicate that older individuals may become depressed because of poor sleep quality or depressive symptoms may cause sleep problems. The negative association between depressive symptoms and quality of life which is reported previously was also confirmed in this study. In the current trial; sleep quality, depressive symptoms, and quality of life were found to be closely related to each other. Additionally; poor sleep quality, impaired quality of life, and depressive symptoms had negative effects on fear of falling in elderly. For this reason, none of these should be ignored in the evaluation of fear of falling in older individuals.

The main limitation of this study is its cross-sectional design so it is not possible to express the causality of the relationships between the variables, and how fear of falling and the factors effecting fear of falling change over time. The lack of assessment of life habits (e.g., diet, physical activity), nocturia, liv-

ing status (living alone or living with someone), and presence of anxiety is another limitation of this study. Additionally, all information collected was self-reported. Since cognitive function is important in the administration of the questionnaires, older adults with MMSE score 25 and above were included. This study did not include older individuals with sleep disorders and depression which limits its generalizability. On the other hand, sample homogeneity increases the strength of the study.

CONCLUSION

The results of the current study highlight the importance of the assessment of associated factors with fear of falling in community-dwelling elderly. Poor sleep quality, presence of depressive symptoms, and lower quality of life were associated with higher fear of falling. Furthermore; because of the close relationship between sleep quality, depressive symptoms, and quality of life, it can be suggested that fear of falling in older people should be assessed comprehensively. Additionally; older adults who had falls history, co morbidities and high body mass index were likely to have a higher fear of falling in this study. Community-dwelling elderly who have sleep problems, depressive symptoms, poor quality of life, co morbidities, fall experience, high body mass index may be at risk to have higher fear of falling. It is strongly recommended that older people should be kept in the community and should be let to age in their place rather than specialized institutions.[48] And it is well known that many older people are afraid of falling and fear of falling is associated with increased risk of admission to care institutions. So, comprehensive evaluation of fear of falling in older adults has clinical importance. It may be beneficial to design targeted interventions to improve sleep quality, psychological health, and quality of life for reducing fear of falling in community-dwelling elderly.

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