Fear of Falling and Associated Factors among Elderly People in Menoufia Governorate

Nehad B. Elsaid[1], Ayah M. Barakat[2], and Sally Abdelwanees[1]

1. Department of Public Health and Community Medicine, Faculty of Medicine, Menoufia University, Shebin El-Kom, Menoufia, Egypt.
2. Department of Family Medicine, Faculty of Medicine, Menoufia University, Shebin El-Kom, Menoufia, Egypt

Abstract:

Background: Among the elderly, fear of falling (FOF) is a common and dangerous health issue. FOF has been linked to a variety of negative outcomes, including disability in performing basic daily activities, decreased social interactions, depression, poor health-related quality of life, and all-cause mortality. Finding the predictors of FOF can aid in avoiding it and its consequences. **Objectives:** To assess the fear of falling and identify its associated factors among the elderly attending the outpatient clinics at Menoufia University Hospital. **Methods:** A cross-sectional study was conducted on a convenient non-probability sample of 710 older adults who attended the outpatient clinics at Menoufia University Hospital. They were assessed using four tools including questions about Socio-demographic and Clinical Data, the Falls Efficacy Scale-International (FES-I), Katz and Akpom Scale, and the Original General Anxiety Disorder (GAD-7) Scale. **Results**: FOF was present in 81.4% of the studied participants. On the analysis of the factors associated with FOF using logistic regression, the results determined older ages (≥75 years, OR= 12.88, CI 95%; 7.09-23.40), moderate and severe degrees of anxiety (GAD-7 score≥ 10, OR= 1.80, CI 95%; 1.07-3.04), presence of chronic diseases (OR= 0.342 CI 95%; 0.201-0.582), living alone (OR=10.69 CI 95%; 5.26- 21.77) and is partially dependent in performing activities of daily living (Katz score 7-12, OR= 10.07 CI 95%; 5.64-17.96). **Conclusion:** FOF was common in the elderly. It should be assessed regularly, and those at higher risk of developing a fear of falling should be screened. Prevention programs should be implemented to reduce FOF

Keywords: Elderly, Falling, Predictors

Introduction

The population of those 60 and older is growing over time. According to estimates, the number of elderly people in the world will increase from 524 million in 2010 to nearly 1.5 billion in 2050,[(1)] with developing nations accounting for the majority of this growth. According to the Central Agency for Public Mobilization and Statistics,[(2)] the elderly population in Egypt currently accounts for 6.9% of the entire population, and by 2030, it is projected to increase to 11.6% .

Fear of falling (FOF) is defined as deficient self-confidence in one's ability to avoid falls during the daily usual activities. [(3)]FOF can cause psychological disability to people as it makes them avoid specific daily activities, even if they can physically do it. In the U.S.A., it is a prevalent health problem

*Corresponding author: Nehadbadr@yahoo.com

among old people, with new cases ranging from 21 to 85% per year with limitation of movement in about one-third of them.[4] In Alexandria, 2008, residents of elderly care centers (governmental & private) had reported moderate to severe levels of FOF. [5]

FOF was proved by many studies to be associated with a decline in usual activities, anxiety, more exposure to falling actually, and diminished quality of life.[6]Regarding risk factors older age, female gender, diminished vision, positive history of falls, low socioeconomic standard, bad health status, diminished daily activity, presence of surrounding environmental risk for falls, living lonely and psychiatric disorders like depression and anxiety were found to be risk factors associated with fear of falling.[7] Elders with a fear of falling have usually slow motion with shorter steps and have disturbed gait, they also depend on assistive tools for mobility e.g., a cane or walker.[8] The actual occurrence of falls was strongly associated with fear of falls this was proven by many studies; Moreover, poor health status, chronic diseases, chronic intake of medications, and visual and auditory impairment were also accused to be contributing factors.[5] On the other hand, fear of falls was also frequent among elders who had never experienced a fall, so, a negative history of falls does not prevent the possibility to be a risk factor.[5] That's why studying the predictors of FOF is necessary to recognize high-risk people and to carry out suitable interventions to either prevent or control FOF.

Methods

Study design and sampling

A cross-sectional study was conducted among Egyptian elderly persons from 15 February to 15 July 2022. Older people aged 60 and above who met the inclusion criteria and represented a convenient non-probability sample were the target group. Inclusion criteria were set for older people aged 60 and above who lived in Egypt, Older people who were not able to communicate and unable to walk independently, with or without walking support were excluded.

Sample size

Based on the review of past literature,[9] found that the prevalence of fear of falling among elderly people was 64.4%, the sample was calculated by the following equation, N = Z1-α/2 2 P(1-P)/ d2. Where, Z1-α/2 equals1.96, P: is the expected proportion and d is the absolute error of precision equal to 0.05. The minimum sample size was 460 after considering a non-response rate and/or incomplete responses of 30%. A pilot study of 30 old people was

done for further validation and to assess the feasibility and clarity of the questionnaire language, their results were subsequently excluded from the study.

The questionnaire and data collection

Older people attending outpatient clinics in Menoufia University Hospital during the period of the study were interviewed to collect necessary information using the study tools.

It consisted of four parts:

Part I: It was an interface (containing the title, study aim, voluntary responses, confidentiality statement, and whether or not he/she consented to participate), questions about socio-demographic data, including age, gender, marital status, education level, occupation before retirement and living condition and questions about fall-related factors (history of falling, causes, site, time of falling and difficulty in getting up after fall and injury with fall); the presence of chronic disease and number of medications used, and use of medical aid devices)

Part II: Falls Efficacy Scale-International (FES-I) which contains 16 items, with scoring based on a 4-point. The total score ranges from 16 to 64 points; 16 meant no fear, 17–32 little fear, 33–48 moderate fear, and 49–64 intense fear.[10] According to Blanchard et al's study, fear of falling is present when FES-I is > 23 i.e. from 24 to 64 on the scale. [11]

Part III: Katz and Akpom Scale (1976), [12] was used to assess the degree of dependency in performing activities of daily living (ADL). It was translated into Arabic language and validated by (Melis and El Shazly 1999).[13] The scale includes grooming, toileting, eating, dressing, bathing, and mobility. The activities of daily living are measured and scored according to the individual's actual performance. A score from one to three was assigned to each level of dependency with a total score of 18. A score of 6 is assigned for those who are independent; a score from 7 to 12 is assigned for those who are partially dependent and a score from 13 to 18 is assigned for those who are dependent

Part IV: The Original General Anxiety Disorder (GAD-7) was applicable in measuring the respondents' level of anxiety and consists of seven multiple-choice questions. The total score ranges from 0 to 4 is minimal anxiety, 5–to 9 for mild anxiety, 10 to –14 for moderate anxiety and a score greater than 15 has severe anxiety.[14]

The English language was initially used to formulate the questionnaire, which was carefully revised by experts. To test the language capability of the questionnaire, it was translated into Arabic and then back to

English. The Arabic translation was further reviewed before the questionnaire distribution. A team of three public health and two family medicine experts were consulted to verify the validity of the questionnaire used in the study.

Data management

SPSS version 22 (SPSS, Inc., Chicago, Illinois, USA) was used to analyze data. The data was presented as a frequency and percentage for categorical variables and Mean and standard deviation for quantitative data. The chi-square test ($\chi 2$) was used to study the association between two qualitative variables. To assess the risk association of independent factors with the dependent one (Fear of falling), a multiple logistic regression was performed.

Ethical consideration

Approval to perform this study was granted by the Menoufia Faculty of Medicine Research Ethics Committee and Informed consent was obtained from each participant before the study, code approval number: 12/2022COM/9.

Results:

The study was done on 710 participants aged between 60- 95 years old with a mean age of 75± 9.7. Males constituted 51.3% of the older people. Regarding educational level, 54.4% were Illiterate & with an illiterate certificate, while 3.8% of them were educated university degree. About 67.7% were married, 30.7%were widows and 1.5% were divorced. The main occupation was employee 53% followed by housewives 27.7%, unskilled workers 8.6%, skilled workers 8%, and farmers 2.7%. Regarding living conditions 48.0% of them were living with their families, 44.8% living alone, and 7.2% with relatives (Table 1).

About 42.4% had been exposed to falls in the last year; only one fall was 32.6%, two falls were 31.9 and three or more falls were 35.5%. The causes of falls were slipping at 43.7%, inside the home at 53.2%, and at daytime at 64.1%. The health-related consequences of falling reported by older people were difficulty in getting up after falling78.7%, and injury, or fracture after falling 37.2% (Table 2). The prevalence of fear of falling was 81.4%, according to the FES-I scale; 2.4% of them had no fear, 35.1% had mild fear, 41.1% had moderate fear and 21,4 had intense fear (Fig 1).

Fear of falling was significantly higher in elderly people >75 years old. Fear of falling was significantly higher in females than males and in the elderly living alone (p-value<0.05) (Table 3). The presence of chronic disease and use of medical aid devices were higher among those who have a fear of falling, (p-value<0.001 and 0.033

respectively). Higher degrees of anxiety and dependency were also associated significantly with the presence of fear of falling, (p-value 0.002 and <0.001 respectively), (Table 4). In logistic regression analysis, older ages (≥75 years, OR= 12.88, CI 95%; 7.09-23.40), moderate and severe degrees of anxiety (GAD-7 score≥ 10, OR= 1.80, CI 95%; 1.07-3.04), presence of chronic diseases (OR= 0.342 CI 95%; 0.201-0.582), living alone (OR=10.69 CI 95%; 5.26- 21.77) and being partially dependent (Katz score 7-12, OR= 10.07 CI 95%; 5.64-17.96) appeared to be significant predictors for fear of falling among the studied group (Table 5).

Discussion

Fear of falling (FOF) is one of the most important clinical features influencing older adults and a common health problem encountered in later life. Fear of falling is common in elderly individuals who have never experienced a fall. This proposes that extra factors, other than the experience of falling, might be related to developing a fear of falling. FOF may cause limiting physical activities. With a vicious cycle, limitations in physical activities are expected to cause loss of muscle strength and mass beyond the expected by aging and constitute a well-identified risk factor for future falls. Furthermore, FOF can decrease quality of life, which may be due to decreases in social contact or leisure time activities.

The current study revealed that the prevalence of FOF among studied participants was high at 81.4% compared to similar studies conducted in Egypt (Mansoura city),[9] Ethiopia (Bahir Dar City), [15] and China (Beijing),[16] which was 64.4%, 59.9%, and 58.8% respectively. However, the prevalence of this study was lower than that of Iran (90.3%),[17] Diamantina, Brazil (90.4%),[18] and Rio de Janeiro, Brazil (95.2%).[19] These variable results may be due to the different study settings and measurement methods for assessing FOF (as a single direct question, validated FES, Activities-Specific Balance Confidence scale…). Another study conducted among older adults treated at a Geriatric Day Hospital in Barcelona showed a lower prevalence of FOF (38.7%). [20] The highly different result between the current study and Barcelona's study may be due to the use of day hospitals as an advantage for Barcelona's study participants, as those hospitals are designed for the elderly population with special adjustments to reduce falls such as bed heights, non-slippery grounds, adequate lighting, and auxiliary staff making them more confident with low FOF. In addition, having them in the facility for some time gives the

physicians the possibility to detect the fear of falling and perform interventions on the identified determinants to reduce this fear. Another reason may be that the prevalence of fear of falling is lower in studies using the Activities-Specific Balance Confidence scale (in Barcelona's study) than in these using the FES scale (in the present study) as reported in the systematic review of Alarcón *et al.*[21]

In the present study, FOF was more prevalent among older adults aged 75-<85 years compared to the younger (aged less than 75 years) and age was an important risk factor for FOF. This result was supported by Tomita *et al*,[22] showed that the prevalence of fear of falling increased with age in both sexes, and age is considered as one of the most important risk factors of FOF. This study's finding is justified because advanced age is associated with more problems and frailty, which may put older adults at risk of falling and fear of falling. On the other side, it was reported by Mann *et al.,* (2006),[23] that advancing age is not a precursor to the fear of falling and there are other factors contributing to the fear of falling as physical and psychosocial attributes.

Although gender was found to have a significant relation to the fear of falling in the current study, they were not found to be a predictor of developing a fear of falling. This is inconsistent with the studies conducted by Saleh *et al*,[9] which stated that being a female increased the FOF, and it was explained by women's greater care for their health and higher prevalence of osteoporosis and musculoskeletal system weakness among women. Pohl *et al*,[24] postulated that one plausible reason is that females are more sensitive to emotions and more open about feelings, whereas males want to demonstrate fearlessness and hence are less likely to admit to FOF.

Also, it was shown in the present study that fear of falling was significantly higher in lonely older adults than in those who live with family or relatives**.** It was in line with the results of Zali *et al.*,[25] and Saleh *et al.*,[9] that living status was a significant indicator of FOF. It is justified that older adults who live alone may feel unsafe due to a lack of assistance from others or an urgent need for a caregiver who is responsible for providing total physical care, particularly in times of crisis or emergency. In addition to an older person's awareness of the dangers of falling. On the other hand, it was inconsistent with the study of De Roza *et al*,[26] found no significant association between FOF and living status.

The current study displayed that the FOF was higher among the elderly who used medical aids and had chronic diseases such

as hypertension, diabetes mellitus, and cardiac disease. This result is in line with the study of Saleh *et al.* [9][25]

The present study showed that FOF was more prevalent among the elderly with severe anxiety symptoms and the presence of moderate or severe anxiety was a predictor of FOF**.** It was supported by the study of Hughes *et al.,* [27] that there was an association between anxiety and fear of falling**.** Anxiety is often triggered by fear itself. There is a mutually reinforcing relationship between FOF and anxiety. Anxiety may be a cause of FOF itself, or FOF itself may be a cause of anxiety. The current findings confirmed earlier research in that anxiety symptoms raised the risk of having a fear of falling. The basis for anxiety disorders, fear, and anxiety symptoms may be related and the presence of anxiety symptoms may be what makes people afraid of falling.

Surprisingly, there was no relation between FOF and the occurrence of falls in the previous year**.** When compared to the prevalence of falls within the past year (42.4%), FOF was more prevalent (81%) in the study population. The majority of patients with FOF had not fallen at all the previous year, and previous falls were not found to be a predictor of later developing a fear of falling. According to the study of BahatÖztürk *et al*,[28] about 50% of older people with FOF had never fallen before, and those previous falls were not found to be a risk factor for developing a fear of falling. Furthermore, a prospective cohort study in Japan reported older people without a fall history also developed FOF. [29] It is different from the result of Tomita *et al.*,[22] reported that falls in the previous year were significantly associated with fear of falling in both sexes. Having had at least one fall is an independent risk factor for developing a fear of falling. FOF itself can be a significant cause of future falls by deconditioning and distraction from focusing on gait and balance due to overwhelming anxiety.

ADL limitation is regarded as a significant risk factor for FOF. The majority of the elderly with FOF were partially dependent on others to perform activities of daily living (ADLs)**.** This was also consistent with the finding of BahatÖztürk *et al.*,[28]who discovered that FOF was significantly related to QOL in older adults and that ADL limitation was an independent associate of FOF. Functionality is affected by decreased physical activity caused by a fear of falling. The FOF, combined with impaired functionality, paralyzes older adults, limiting their overall movements. Otaki *et al.*,[30] on the other hand, reported that no correlation was observed between

functional independence measure scores and the intensity of fear of falling. The difference between Otaki et al's result and the current study's result may be attributed to differences in the studied subjects, as Otaki et al's study included older adults suffering from dementia.

There were some limitations of the current study that should be taken into account. Since it is a cross-sectional study, causal relationships are not established. Therefore, prospective research is necessary. Future research should also take into account variables like the dimensions of social support that people receive and the risk factors for falls both inside and outside the home; these variables, which were not examined in the current study, may influence people's fear of falling. Generalizations based on the current study should be made with caution because the study sample, which was selected using the convenient non-random sample, is not entirely representative of the elderly Egyptian population.

The strengths of the current study should be emphasized. In this study, a sizable elderly population was assessed. Furthermore, the authors took into account some factors, particularly psychosocial factors that may have an impact on the fear of falling. The FES-I, a valid and reliable tool for assessing fall risk, was also used to measure fear of falling. Because of its more theoretical basis—social cognitive theory—it has been suggested that the FES-I is the best way to operationalize the fear of falling. Studies that evaluate phenomena using a single question frequently underestimate the phenomenon. [18]

Conclusion and recommendations:

Fear of falling was common among elderly persons, living alone, history of previous falls and being independent, presence of chronic disease was associated with increased risk for fear of falling, so we recommend that health education programs for the elderly and their families to reduce their fear of falling are a critical issue to focus on, also, screening programs in outpatient clinics should be applied for the early detection of elderly at considerable risk of falling.

Declarations:

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Conflict of Interest:

The authors declare no conflict of interest.

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Table 1: Sociodemographic characteristics of the studied group:

	Studied group N=710
Age	
mean± SD	75±9.7
Range	60-95
Gender	No (%)
Male	364 (51.3)
Female	346 (48.7)
Education	
Illiterate & illiterate certificate	386 (54.4)
Primary& Preparatory	216 (30.4)
Secondary	81(11.4)
University	27(3.8)
Marital status	
Married	481 (67.8)
Widowed	218 (30.7)
Divorced	11 (1.5)
Occupation before retirement	
Housewives	197 (27.7)
Employee	376 (53.0)
Unskilled workers	61 (8.6)
Skilled workers	57 (8.0)
Farmers	19 (2.7)
Living with	
Alone	318(44.8)
Family	341(48.0)
Relatives	51(7.2)

Table 2: Distribution of the studied group according to details of previous fall (total no = 301):

Previous fall data	No (%)
Occurrence of fall the last year	
Yes	301 (42.4)
No	409 (57.6)
No of fall	
One	98 (32.6)
Two	96 (31.9)
Three or more	107 (35.5)
Cause	
Slipping	131 (43.7)
Loss of balance	83 (27.7)
Feeling dizzy	79 (26.3)
Other causes	7 (2.3)
Site of fall	
Inside home	160 (53.2)
Outside home	141 (46.8)
Time of fall	
Daytime	193 (64.1)
Nighttime	108 (35.9)
Difficulty in getting up after fall	
Yes	237 (78.7)
No	64(21.3)
The fall caused injury or fracture	
Yes	112 (37.2)
No	189 (62.8)

Table 3: Relation between socio-demographic data of the studied participants and the presence of fear of falling:

	No fear of fall n= 132	Fear of fall n= 578	Test $\chi 2$	P value
Age groups				
60-	110(83.33)	183 (31.6)	118.6	<0.001
75-	13(9.85)	201 (34.8)		
≥ 85	9 (6.81)	194 (33.6)		
Gender				
Male	83 (62.9)	281 (48.6)	8.8	0.003
Female	49 (37.1)	297 (51.4)		
Education				
Illiterate & illiterate	79 (59.8)	307 (53.1)	2.03	0.567
certificate	36 (27.3)	180 (31.1)		
Primary& Preparatory	13 (9.9)	68 (11.8)		
Secondary	4 (3.0)	23 (4.0)		
University				
Work status				
Housewife	36 (27.3)	161 (27.9)	0.892	0.949
Employee	73 (55.3)	303 (52.4)		
Unskilled worker	9 (6.8)	52 (9.0)		
Skilled worker	11 (8.3)	46 (8.0)		
Farmer	3 (2.3)	16 (2.7)		
Marital status				
Married	95 (72.0)	386 (66.8)	1.71	0.446
Widowed	36 (27.3)	182 (31.5)		
Divorced	1 (0.7)	10 (1.7)		
Live				
Alone	13 (9.8)	305 (52.8)	107.3	<0.001
with family	90 (68.2)	251 (43.4)		
with relatives	29 (22.0)	22 (3.8)		

Table 4: Relation between the medical history of the studied participants and the presence of fear of falling:

	No fear of fall n= 132	Fear of fall n= 578	Test $\chi 2$	P value
Chronic diseases				
Yes	53(40.2)	372 (64.4)	26.2	<0.001
No	79 (59.8)	206 (35.6)		
Chronic intake of medications				
Yes	118 (89.4)	487 (84.3)	2.25	0.134
No	14 (10.6)	91 (15.7)		
No medications taken				
<4	95 (72.0)	426 (73.7)	0.165	0.684
≥4	37 (28.0)	152 (26.3)		
Use of medical aid devices				
Yes	67 (50.8)	352 (60.9)	4.57	0.033
No	65 (49.2)	226 (39.1)		
GAD-7 score for level of anxiety				
No anxiety	56 (42.4)	150 (25.9)		
Mild anxiety	15 (11.4)	86 (14.9)	14.88	0.002
Moderate anxiety	22 (16.7)	145 (25.1)		
Severe anxiety	39 (29.5)	197 (34.1)		
Katz				
Independent	72 (54.5)	71 (12.3)	119.3	<0.001
Partially dependent	60 (45.5)	507 (87.7)		
Exposed to fall last year				
Yes	57 (43.2)	244 (42.2)	0.041	0.839
No	75 (56.8)	334 (57.8)		

Chronic diseases asked about were; hypertension, diabetes, and cardiac diseases.

Table 5: Univariate and multivariate analysis for independent predictors of fear of falling among the studied group:

	Univariate analysis		Multivariate analysis	
	Odds ratio (CI 95%)	**P value**	**Odds ratio (CI 95%)**	**P value**
Age group				
60-	1(r))		1(r)	
≥75-	12.95(6.37-26.32)	<0.001	12.88 (7.09-23.40)	<0.001
GAD-7 degree of anxiety				
No & mild anxiety	1 (r))		1(r)	
Moderate &Severe	1.68(1.15-2.47)	0.007	1.80 (1.07-3.04)	0.027
Gender				
Male	1 (r))		1(r)	
Female	1.79(1.21-2.6)	0.003	1.63 (0.959-2.76)	0.071
Presence of chronic diseases				
Yes				
No	0.372(0.252-0.547)	<0.001	0.342 (0.201-0.582)	<0.001
	1 (r))		1(r)	
Use of medical aids				
Yes	1.51(1.03-2.21)	0.033	0.952 (0.555-1.63)	0.856
No	1(r))		1(r)	
Live with whom				
Alone	10.23(5.64-18.55)	<0.001	10.69 (5.26- 21.77)	<0.001
with family or relatives	1(r)		1(r)	
Katz's class of dependency				
Independent	1(r)	<0.001	1(r)	
Partially dependent	8.57(5.61-13.08)		10.07 (5.64-17.96)	<0.001

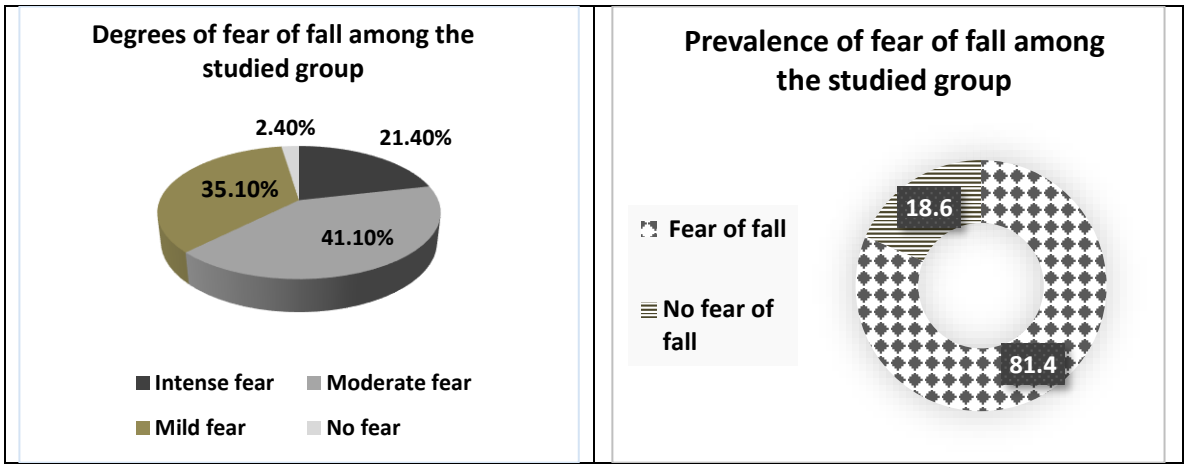

Figure (1): Prevalence and degree of fear of falling among the studied group

الملخص العربي

الخوف من السقوط والعوامل المرتبطه به لدي كبار السن المترددين علي العيادات الخارجيه بمستشفي الجامعه بمحافظة المنوفية

نهاد بدرالسيد[١] ، آية مصطفي بركات [٢] ، سالي عبد الونيس [١]

١. قسم الصحة العامة وطب المجتمع ، كلية الطب ، جامعة المنوفية ، شبين الكوم ، المنوفية ، مصر.
٢. قسم طب الأسرة ، كلية الطب ، جامعة المنوفية ، شبين الكوم ، المنوفية ، مصر.

الخلفية: يعد الخوف من السقوط مشكلة صحية شائعة وخطيرة بين كبار السن. تم ربط الخوف من السقوط بمجموعة متنوعة من النتائج السلبية، بما في ذلك الإعاقة في أداء الأنشطة اليومية الأساسية ، وقلة التفاعلات الاجتماعية، والاكتئاب، وسوء جودة الحياة المتعلقة بالصحة ، والوفاةلأسباب متعددة.لذلكايجادمتنبئات الخوف من السقوطيساعد في تجنبه وتجنب عواقبه. **الاهداف**: تقييم الخوف من السقوط والتعرف على العوامل المصاحبة له لدى كبار السن بمحافظة المنوفية. **الطريقة:** أجريت دراسة مقطعية على ٧١٠ من كبار السن المترددين علي العيادات الخارجية بمستشفى جامعة المنوفية.تم تقييمهم باستخدام أربع أدوات بما في ذلك أسئلة حول البيانات الاجتماعية والديموغرافية والإكلينيكية، والمقياس الدولي لكفاءة السقوط (FES-I) ، ومقياس كاتزوأكبوم ، والمقياس الأصلي لاضطراب القلق العام (GAD-7). **النتائج**: وجد الخوف من السقوط في ٨١,٤ ٪ من المشاركين بالدراسة. عند تحليل العوامل المرتبطة بـالخوف من السقوط باستخدام الانحدار اللوجستي ، شملت النتائج الأعمار الأكبر سناً (≤٧٥ سنة ، OR = 12.88، CI 95 ٪ ؛ ٧,٠٩-٢٣,٤٠) ،وجود درجات القلق المعتدلة والشديدة (درجة GAD-7 10 ، OR = 1.80، CI 95 ٪؛ ١,٠٧-٣,٠٤)، وجود أمراض مزمنة (OR = 0.342 CI 95٪؛ ٠,٢٠١-٠,٥٨٢)، العيش وحيدا (OR = 10.69 CI 95٪؛ ٥,٢٦ - ٢١,٧٧) والاعتماد الجزئيفي أداء أنشطة الحياة اليومية (درجة كاتز ٧-١٢ ، OR = 10.07 CI 95٪ ؛ ٥,٦٤-١٧,٩٦). **الخلاصة:** كان الخوف من السقوط شائعًا بين كبار السن. لذلك يجب تقييمه بانتظام ، ويجب عمل فحص مبكر للأشخاص الأكثر عرضة للإصابة بالخوف من السقوط. يجب تنفيذ برامج وقائية للحد من الخوف من السقوط ، وتعزيز النشاط اليومي ومنع السقوط بين كبار السن.

الكلمات المفتاحية: المسنين ، السقوط ، المتنبئات