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FACTORS ASSOCIATED WITH FEAR OF FALLING IN PATIENTS WITH KNEE AND HIP OSTEOARTHRITIS

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ABSTRACT

Objective: To identify factors associated with fear of falling among patients with knee and/or hip osteoarthritis.

Subjects and Methods: A descriptive cross-sectional study was conducted on 151 patients aged ≥40 years with knee and/or hip osteoarthritis who were examined and treated at University Medical Center Ho Chi Minh City from January 2025 to April 2025. Patients were diagnosed according to the ACR 1991 criteria. Fear of falling was assessed using the Falls Efficacy Scale–International (FES-I).

Results: The study included 151 patients with knee and/or hip osteoarthritis. A history of falls (OR = 3.88, p = 0.006) and the WOMAC physical function score (OR = 1.11, p = 0.045) were independently associated with a high level of fear of falling.

Conclusion: A history of falls and impaired physical function, particularly lower limb functional limitations, were independently associated with a high level of fear of falling. Assessment and interventions aimed at improving physical function should be emphasized to help reduce fear of falling and prevent falls in the community.

Keywords: Fear of falling, falls, osteoarthritis.

1. INTRODUCTION

Knee and hip osteoarthritis are common chronic musculoskeletal disorders among middle-aged and older adults, causing chronic pain, functional limitation, and reduced quality of life [1,2]. According to global estimates in 2020, approximately 595 million people were living with osteoarthritis, with the knee and hip being the most frequently affected joints [2]. Lower-limb osteoarthritis impairs physical function, negatively affects gait and balance, and consequently increases the risk of falls [1,3].

Falls are both a risk factor for and a consequence of fear of falling. Fear of falling (FOF) is a common but under-recognized problem. It may occur in individuals with or without a prior history of falls, leading to activity restriction, physical deconditioning, and an increased risk of future falls. However, in Vietnam, evidence regarding factors associated with fear of falling among patients with knee and/or hip osteoarthritis remains limited. Therefore, This study was conducted to identify factors associated with fear of falling among patients with knee and/or hip osteoarthritis.

2. SUBJECTS AND METHODS

2.1. Study Design and Setting

A descriptive cross-sectional study was conducted among patients diagnosed with knee and/or hip osteoarthritis who attended the outpatient clinic at University Medical Center Ho Chi Minh City from January 2025 to April 2025.

Sample Size

$$n \geq Z^2_{1-\alpha/2} \frac{p(1-p)}{d^2}$$

With p = 0.11 according to the study by Dorte T. Grønne [1], d = 0.05, and Z = 1.96, the calculated sample size was 151 patients with knee and/or hip osteoarthritis.

Eligible patients were recruited using a convenience sampling method until the required sample size was reached.

2.2. Inclusion and Exclusion Criteria

- Inclusion criteria:

Patients aged ≥40 years who were diagnosed with knee and/or hip osteoarthritis according to the American College of Rheumatology (ACR 1991) criteria and agreed to participate in the study.

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- Exclusion criteria:

History of knee or hip surgery or trauma. Rheumatoid arthritis or gout. Conditions affecting gait and balance (e.g., stroke, Parkinson's disease). Inability to answer questions (aphasia, inability to understand Vietnamese). Inability to ambulate independently on two legs (e.g., wheelchair users, lower-limb amputation)

2.3. Variables and Data Collection Instruments

Study Variables

The study variables included: Sociodemographic characteristics: age, sex, education level, occupation, marital status. Clinical characteristics: type of osteoarthritis, number of affected joints, disease duration, pain severity assessed by the Visual Analog Scale (VAS), lower-limb joint function assessed by the WOMAC questionnaire, Activities of Daily Living (ADL), Instrumental Activities of Daily Living (IADL), History of falls, Use of walking aids. Fear of Falling (FOF): FOF was assessed using the Falls Efficacy Scale – International (FES-I) [6]. The FES-I score was categorized into three levels: Low FOF (16–19 points). Moderate FOF (20–27 points). High FOF (28–64 points). The FES-I has demon strated good validity and reliability and is recommended for research and clinical purposes [4]. This study used the Vietnamese version translated by Tran Thi Hoang Oanh [5], with a Cronbach's alpha of 0.98.

Data Collection Procedure

Eligible participants were interviewed directly using a structured questionnaire. Clinical information was obtained through patient interviews, direct clinical examination, and medical record review.

2.4. Statistical Analysis

Data were entered into Microsoft Excel and analyzed using STATA version 17.

Univariate analysis was performed to examine the associations between sociodemographic factors, clinical characteristics, and fear of falling. Variables with statistical significance in univariate analysis were included in a multivariable logistic regression model to identify independent factors associated with fear of falling. The level of statistical significance was set at $p < 0.05$.

2.5. Ethical Considerations

The study was approved by the Institutional Review Board in Biomedical Research (Approval No. 72/ĐHYD-HĐĐĐ).

3. RESULTS

Table 1. Association Between Sociodemographic Characteristics, Clinical Features, and Fear of Falling

Variable		Total	FOF			p-value
			Low	Moderate	High	
Age (mean ± SD)		61.5±8.5	57.0±8.6	61.3±8.2	63.8±8.1	0.003[b]
Age group	40-49	12	6 (50.0)	5 (41.7)	1 (8.3)	0.022[a]
	50-59	53	9 (17.0)	27 (50.9)	17 (32.1)	
	60-69	55	10 (18.8)	27 (49.1)	18 (32.7)	
	≥70	31	2 (6.5)	13 (41.9)	16 (51.6)	
Sex	Male	21	12 (57.1)	3 (14.3)	6 (28.6)	<0.0001[a]
	Female	130	15 (11.5)	69 (53.1)	46 (35.4)	
Use of walking aids	No	136	26(19.1)	69(50.7)	41(30.2)	0.004[a]
	Yes	15	1(6.7)	3(20.0)	11(73.3)	
Limitation of the IADL	No	107	27(25.2)	53(49.5)	27(25.2)	<0.0001[a]
	Yes	44	0(0.0)	19(43.2)	25(56.8)	
Falls in the past 12 months	No	118	26(22.0)	59(50.0)	33(28.0)	0.002[a]
	Yes	33	1(3.0)	13(39.4)	19(57.6)	

a: Chi-square test; b: One-way ANOVA; Only variables with statistically significant associations are presented.

A statistically significant association was found between age, age group, and level of fear of falling ($p < 0.05$), with a clear trend of increasing fear of falling with advancing age. In particular, in the ≥70 age group, the proportion of patients with high fear of falling accounted for 51.6%.

Regarding sex, there was a statistically significant association between sex and fear of falling ($p < 0.0001$), with female patients showing a higher tendency toward fear of falling compared to male patients.

A statistically significant association was also observed between the use of walking aids and level of fear of falling ($p = 0.004$). Among patients who did not use walking aids,

moderate fear of falling was the most common (50.7%). In contrast, among those using walking aids, the highest proportion was observed in the high fear-of-falling group (73.3%).

With p < 0.0001, there was a statistically significant difference between fear-of-falling levels and dependence in instrumental activities of daily living (IADL), whereas no statistically significant difference was found for dependence in basic activities of daily living (ADL). Notably, among patients dependent in ADL and IADL, 100% were classified in the moderate-to-high fear-of-falling groups.

Regarding a history of falls within the past 12 months, the test results showed a statistically significant association between fall history and level of fear of falling (p = 0.002). Among the 33 patients with a history of falls, the high fear-of-falling group predominated, with 19 patients (57.6%), compared to 13 patients (39.4%) in the moderate group and only 1 patient (3.0%) in the low fear group.

Table 2. Association Between WOMAC, VAS, and Fear of Falling

Variable		Total	FOF			p-value
			Low	Moderate	High	
WOMAC total score; mean (SD)		27.5(9.4)	19.8(7.0)	26.3(7.6)	33.3(9.1)	<0.0001[b]
WOMAC pain; mean (SD)		5.8(2.1)	4.3(1.7)	5.6(2.0)	6,8(1.8)	<0.0001[b]
WOMAC stiffness; median (IQR 25–75)			1(1-2)	2(1-3)	3(2-4)	0.0008[c]
WOMAC physical function; mean (SD)		19.4(7.0)	13.8(5.4)	18.4(5.6)	23.6(6.9)	<0.0001[b]
VAS categories	Mild	20	7(33.3)	12(57.1)	2(9.5)	<0.0001[a]
	Moderate	81	15(18.5)	44(54.3)	22(27.2)	
	Severe	50	5(10.2)	16(32.7)	28(57.1)	

a: Chi-square test; b : One-way ANOVA; c : Kruskal–Wallis test

There was a statistically significant association between the WOMAC total score, WOMAC pain, WOMAC stiffness, WOMAC physical function, and the level of fear of falling (p < 0.05).

The mean WOMAC total score as well as the component WOMAC scores showed a progressive increase across FES-I categories, indicating that greater symptom severity and functional impairment were associated with higher levels of fear of falling.

A statistically significant association was also found between VAS pain categories and the level of fear of falling (p < 0.0001). As pain severity increased, the proportion of patients with high fear of falling increased correspondingly. In the mild VAS group, most patients reported low or moderate fear of falling. In the moderate VAS group, the proportion of high fear of falling was 27.2%, whereas in the severe VAS group, this proportion rose markedly to 57.1%.

Table 3. Multivariable Logistic Regression Model Examining Factors Associated with High Fear of Falling

Variable	High FOF	
	p	OR (KTC 95%)
History of falls	0.006	3.88 (1.50-10.28)
WOMAC physical function	0.045	1.11 (1.00-1.24)

Only variables with statistically significant associations are presented.

In the multivariable logistic regression analysis, variables with statistical significance in the univariate analysis (p < 0.05) were included in the model.

Patients with a history of falls had a 3.88-fold higher likelihood of experiencing high fear of falling compared to those without a history of falls (p = 0.006).

Each one-point increase in the WOMAC physical function score was associated with a 1.11-fold increase in the odds of high fear of falling (p = 0.045).

No independent associations were found between age, sex, use of walking aids, VAS pain categories, WOMAC pain, WOMAC stiffness, or IADL dependence and high fear of falling.

4. DISCUSSION

This study demonstrates that fear of falling is a common issue among patients with knee and/or hip osteoarthritis. A history of falls within the past 12 months was identified as an independent factor associated with high fear of falling. Patients with a previous fall had nearly a fourfold increased risk of high fear of falling compared to those without such a history.

After experiencing one or more falls—particularly in individuals with functional impairment due to osteoarthritis—patients may lose confidence in their ability to maintain balance. This reduced confidence can lead to heightened fear during daily activities, ranging from walking indoors and transferring from sitting to standing, to participating in social activities. A study by Zijlstra [6] reported that individuals with recurrent falls had nearly a

sixfold increased risk of fear of falling compared to those without falls (OR = 5.72; 95% CI: 4.40–7.43), while those who had fallen once had more than a twofold increased risk (OR = 2.28; 95% CI: 1.89–2.75). Impaired physical function assessed by the WOMAC scale, particularly the physical function subscale, was also independently associated with high fear of falling. Although studies examining the relationship between fear of falling and individual WOMAC components in patients with osteoarthritis remain limited, the present findings are consistent with those reported by Fernandes et al. [7]. This suggests that functional limitation may play a more critical role than pain severity alone in the development of fear of falling.

Sociodemographic factors such as age and sex were not independently associated with fear of falling in this study. Some previous studies have reported higher rates of fear of falling among women and older adults [8]; however, these findings are not entirely consistent across studies and may depend on sample characteristics and the degree of functional impairment.

Based on these findings, routine assessment of fear of falling should be integrated into the management and rehabilitation of patients with knee and/or hip osteoarthritis. Interventions focusing on improving physical function, enhancing balance, and preventing falls are important strategies to reduce fear of falling and improve quality of life among patients in the community.

5. CONCLUSION

Fear of falling is a common problem among patients with knee and/or hip osteoarthritis. A history of falls and impaired physical function, particularly lower-limb functional limitation, are independent factors associated with high levels of fear of falling. Assessment and targeted interventions to improve physical function should be emphasized to help reduce fear of falling and prevent falls in the community.

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