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Fear of Falling and Its Related Factors in the Older Adults with Heart Failure

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Abstract

Fear of falling (FOF) acts as an inhibitory factor for the activities of daily living and causes disability and dependence in the elderly suffering from heart failure (HF). This study aimed to determine FOF among the elderly with HF and its related factors. This cross-sectional study was performed on 445 elderly patients with heart failure who were referred to the HF clinic of Tehran Heart Center affiliated with Tehran University of Medical Sciences, Tehran, Iran, from March to July 2018. Participants in this study were selected randomly. Data collection was conducted using demographic characteristics form and Falls Efficacy Scale-International questionnaires. Data were analyzed using STATA software (Version 14). The mean FOF among participants was 36.7 out of 64 scores (ST=0.27 and CI: 95%). The level of FOF was moderate in 61% of the participants. Based on the obtained results, FOF had no statistically significant correlation with gender, education, smoking, and marital status (P>0.05); however, it had a statistically significant correlation with age, HF class, residence, medications, and the history of falls (P<0.05). It is recommended that health caregivers should develop a comprehensive care program that takes into account such factors as age, HF class, residence, medications, and history of falls to prevent and reduce the FOF. Therefore, given the importance of the issue of FOF in older adults with HF, a comprehensive care program and educational, counseling, and welfare interventions should be developed in a way to prevent and reduce FOF.

Keywords: Aging, Falling, Fear, Heart failure, Older adult

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Introduction

Falling during physical activity is one of the most important health issues in elderly people and has a high annual mortality rate and medical costs (1-2). Based on the reports of Centres for Disease Control and Prevention, fall death rates have increased by 30% in the last decade (3). The medical costs attributable to the elderly falls in the United States are estimated at approximately $50.0 billion (4). More than 800,000 elderly people are hospitalized due to falling injuries, and the rate and the costs of falls increase with the growth of the elderly population (5). Research in Iran indicates that 46.9% of the elderly fall at least three times during six months (6). Frequent falls in the elderly can cause FOF, low self-esteem, bone fractures of the skull, pelvis, and femur. It also increases the chance of recurrence, limits mobility, and decreases life expectancy which disrupts the physical, psychological, and social dimensions of the person's life (7).

FOF is a hidden risk factor for falling in older adults and means that one does not have confidence in one's ability to perform daily activities without falling and losing balance (8). FOF is also called a post-fall syndrome (9). FOF reduces daily activity and quality of life and increases the likelihood of falling in the elderly (10). In general, the prevalence of FOF ranges from 25% to 85% in the world, and the range of this prevalence has been reported to be from 36.4% to 76.2% in Iran (6-8). It is worth mentioning that FOF can occur even with no history of falling. Based on the results of some studies, the prevalence of FOF without a positive history of falling is estimated to be more than 50% (6, 11). A significant relationship has been observed between FOF and physical activity (12). The results of a study conducted in Brazil indicated that FOF has led to the reduction of activities in 52% of the elderly population (13). Based on the results of recent research, factors associated with FOF in the elderly include age (11), female gender (14), history of falling (11), physical dysfunction (15), depression, a low education level (11), cognitive impairment, living alone, and having chronic diseases (16).

HF is one of the chronic debilitating diseases in the elderly. Today, life expectancy in patients with HF has increased due to significant advances in the diagnosis and control of diseases which has led to advances in cardiovascular interventions and pharmacotherapy (17). Moreover, it should be noted that HF in the elderly is more important than young population due to the presence of age-related diseases, such as hypertension, atrial fibrillation, a vascular disease especially coronary artery disease, renal failure, and the simultaneous use of several drugs (18). Physical activity is a pillar in the treatment of HF and prevention from the progression of the disease. The patients are at risk of falling during activities due to certain conditions, such as decreased muscle strength, the consumption of medications with neurovascular and volume modulating properties (diuretics, digoxin, ad antihypertensive drugs), as well as drugs for orthostatic hypotension (19-20). A previous experience of falls in the elderly with HF can cause FOF (10). However, FOF may either be a positive reaction in the elderly which makes them more attentive while walking (11), or a disabling factor that causes activity restriction, lower quality of life, and increased hospitalization time (11, 21). Excessive activity restriction in the elderly with HF is of particular importance since it exacerbates the consequences of this disease (22).

Nurses, as health care providers, need to be aware of FOF and its consequences for the elderly in both hospitals, other 24-hour care centers, and/or at patients' homes. Moreover, their close relationship with patients and their responsibility to maintain and promote patients' safety and health empowers them to consider the predictors before doing any preventive and control interventions. Based on the review of literature, few studies have addressed FOF in older adults with HF, and there is little information about FOF as a deterrent to physical activity in the elderly with HF. Therefore, the present study was designed with an eye to such major considerations as the growth of the elderly population, the increase in the incidence of chronic diseases including HF, the significance of physical activity as a pillar of treatment regimen in these patients, and the importance of falling as a patient safety index in hospitals. A better understanding of the factors associated with FOF can lead to the better prediction of the effective factors, reduction of FOF, an increase of the physical activity among the elderly with HF, and improvement of the patient's condition. Moreover, understanding the current level of FOF and its predictors not only increases awareness in this field but also leads to the selection of wise preventive and controlling interventions for the treatment of FOF and the improvement of quality of life in the elderly with HF. Therefore, the present study aimed to evaluate the level of FOF and its related factors in older adults with HF.

Methods

This cross-sectional study was performed on 445 elderly patients with HF who were referred to the HF clinic of Tehran Heart Center affiliated with Tehran University of Medical Sciences, Tehran, Iran, from March to July 2018. The sample size was calculated to be 385 patients based on the highest prevalence (50%) of FOF in the elderly population in previous studies (14), considering type 1 error (a) 5%, type II error (β) 20%, accuracy of 5%, using the formula $n = z^2_{1-a/2} * p (1-p) / d^2$. The sample size was increased to 445 participants, considering the design effect of 1.1, and a 5% attrition rate. Participants were selected by the simple randomization method and based on a table of random numbers.

The inclusion criteria included age over 60 years, the ability to move without the use of mobility aids (independence in daily activities), the lack of any known cognitive impairment based on the patients' self-report, a score of more than 23 in the Mini-Mental Status Examination, such as Alzheimer's disease, and a definite diagnosis of HF confirmed by a specialist with a HF fellowship. The researcher attended the research environment during the morning work shifts.

The data collection instrument included a demographic characteristics form and FES-I questionnaire.

The demographic characteristics form was used to obtain the participants' demographic data including age, gender, level of education, marital status, smoking status, residence, history of falls, Ejection Fraction, medications, and HF class.

The FES-I questionnaire was used to assess the level of concern about falling while performing various daily activities, which was developed as a part of the Prevention of Falls Network Europe project from 2003 to 2006 by Todd et al. This questionnaire has been widely used in many studies, especially in geriatric science (23). In a study conducted by Yardley et al., it was reported that the English version of FES-I had excellent internal and test-retest reliability (Cronbach's α=0.96, ICC= 0.96) (24).

In the present study, the reliability of this questionnaire was evaluated by the test-retest method after 10 elderly living in the community were asked to complete the questionnaires in two stages with a one-week interval. Subsequently, the correlation coefficient of 0.98 obtained in the statistical analysis of the results confirmed the reliability of the questionnaire.

This questionnaire consisted of 16 items for assessing the level of concern about the fall. The scale is scored based on a 4-point Likert scale from 1=not at all concerned to 4=very concerned. The total score of the scale that was obtained by adding the score of each item ranged from 16 to 64 with higher scores indicating higher fear of fall in the person and vice versa.

The researcher went to the HF clinic during the morning shift to complete the questionnaires. The questionnaires were completed by the researcher after explaining the objectives of the study to the participants and emphasizing the optionality of participation in the study.

The study protocol was approved by the Ethics Committee of the School of Nursing and Midwifery in Tehran University of Medical Sciences, Tehran, Iran (IR.TUMS.FNM.REC.1397.074). The special permissions were obtained from the relevant officials and the written informed consent was obtained from participants after explaining the study objectives to them. Participation in the study was voluntary and based on willingness. It is worth mentioning that the participants' information and the questionnaires were kept confidential.

Afterward, the data were analyzed using STATA software (Version 14) and descriptive statistics including frequency (percentage), as well as analytical statistics, such as the Pearson Chi-square analysis and logistic regression analysis. A p-value less than 0.05 (P<0.05) was considered statistically significant in the present study. In addition, the Kolmogorov-Smirnov test was used to determine the normality of the distribution of data.

Results

Based on the obtained results, the mean age in both genders was about 75 years (the age range of 60-93). The majority of the participants were married (78.15%), male (67.19%), lived in their own homes (44.27%), and were non-smoker (70%). Most of the participants (55.73%) were just able to read and write, were in HF class II (49.44%), had an Ejection Fraction (EF) of 36-41% (51.68%), and a history of falling (53.26%). The level of FOF was moderate in 61% of the participants.

Based on the results of the Pearson Chi-square test, there was a statistically significant correlation

between FOF and residence, history of falling, medications, and HF class (P<0.05). The elderly who lived in their own home (46%), with HF class IV (70.6%) and a history of falls (85%) had a higher frequency percentage of low FOF. In all medications used by the elderly with HF, the frequency percentage of moderate FOF was higher (Table 1).

In the logistic regression analysis, severe FOF was included as a dependent variable, and gender, age, disease class, residence, history of falling, smoking, and Ejection Fraction were entered as independent variables. The results of logistic regression showed that participants with HF class III were 15.9 times more likely to feel severe FOF than participants with HF class I. Moreover, in class IV the risk of FOF decreased due to the hospitalization of the participants. The results of logistic regression analysis indicated that patients with Ejection Fractions of 26-35% were 8.5 times more likely to have a severe FOF, compared to those with an Ejection Fraction of 15-25%. The severity of FOF was 2.37 times higher in the elderly with a history of falling compared to those without a history of falling. Severe FOF was 2.7 times higher in the elderly living in nursing homes than in those living in their own homes (Table 2).

Table 1. Frequency distribution of Fear of Falling (Low, Moderate, and Severe) based on demographic characteristics of the participants

Variable		Fear of falling			P-value
		Severe	Moderate	low	
Gender	Female	24 (31%)	88 (32%)	34 (35%)	0.77
	Male	53 (68%)	185 (68%)	61 (64%)	
Marital status	Single	0 (0%)	2 (0.5%)	0 (0%)	0.66
	Married	59 (76%)	216 (79%)	72 (75%)	
	Deceased spouse	18 (23%)	49 (18%)	21 (22%)	
	Divorced	0 (0%)	5 (2%)	2 (2%)	
Level of Education	Able to Read and write	40 (51%)	150 (55%)	58 (61%)	0.43
	Diploma	28 (36%)	97 (35%)	33 (34%)	
	Above diploma	9 (11%)	24 (8%)	4 (4%)	
Residence	Own home	34 (44%)	119 (43%)	44 (46%)	<0.001
	Relatives' home	14 (18%)	118 (35%)	38 (40%)	
	Nursing home	28 (36%)	36 (13%)	13 (13%)	
Drugs	Cigarette	17 (22%)	39 (14%)	12 (12%)	0.11
	Opioids	17 (22%)	39 (14%)	10 (10%)	
	Not used	45 (58%)	195 (71%)	73 (76%)	
History of falling	No	23 (30%)	171 (63%)	14 (15%)	<0.001
	Yes	54 (70%)	102 (37%)	81 (85%)	
Degree of heart failure	Class I	3 (4.4%)	65 (95.6%)	0 (0%)	<0.001
	Class II	20 (9.1%)	180 (81.8%)	20 (9.1%)	
	Class III	52 (42.3%)	20 (16.3%)	51 (41.5%)	
	Class IV	2 (5.9%)	8 (23.5%)	24 (70.6%)	
Medications	Anti-depressant	(3.4%) 1	17 (58.6%)	11 (38%)	<0.001
	Anti-hypertensive	5 (7.6%)	(60%) 39	(32.4%) 21	
	Digoxin	(18.2%) 10	27 (49.1%)	18 (32.7%)	
	Diuretic	24 (27.3%)	(45.4%) 40	(27.3%) 24	
	Anticoagulant	(35.5%) 11	(54.8%) 17	3 (9.7%)	
	Some of them (polypharmacy)	18 (10.2%)	121 (68%)	(21%) 38	

Table 2. Logistic regression model for severe fear of falling

Variable		Odds Ratio	95% Confidence Interval	P-value
Gender		1.095	1.858- 0.645	0.73
Age		1.085	1.120 – 1.051	<0.001
History of falling		2.373	4.028 – 1.398	0.001
Degree of heart failure	Class I		Reference	
	Class II	2.166	7.527- 0.623	0.22
	Class III	15.868	53.291 – 4.725	<0.001
	Class IV	1.354	8.514 – 0.215	0.74
Residence	own home		Reference	
	relatives' home	0.430	0.832 – 0.222	0.01
	nursing home	2.739	4.958 – 1.513	0.001
Drugs	cigarette		Reference	
	opioids	1.985	3.739 – 1.053	0.03
	not use	1.823	3.523 – 0.943	0.07
Ejection Fraction	15 – 25 %		Reference	
	26 – 35 %	8.523	28.579 – 2.541	0.001
	36 – 41 %	1.276	4.532 – 0.359	0.70

Implications for Practice
Based on the results of the present study, FOF in the elderly with HF was moderate. The effective factors in FOF in the elderly with HF included age, HF class, residence, and history of falls.
The results revealed that the severe FOF was higher in the elderly with a history of falls compared to the elderly with no history of falls. It seems that the previous experience of falling and having a negative mentality can be effective in this regard. Since FOF is usually a consequence of a previous fall in the elderly, it is often considered a risk, which should be considered in the arrangements for the education and counseling of the elderly.
Based on the results of the present study, most of the older adults with HF class IV had low FOF which can be due to the reduced mobility in the older adults with HF due to disease progression.
The prevalence of severe FOF was higher among the elderly who lived in the nursing homes, while the prevalence of low FOF was higher among the elderly who lived in their own homes. This may be due to the lack of support for the elderly by their relatives, as well as insufficient care in the nursing homes. This is an important point that should be considered by the health care providers in nursing homes.
The results showed that the severe FOF is higher in the use of digoxin, diuretics, and anticoagulants. Therefore, in adjusting the medication regimen of these patients, the concomitant use of these drugs should be considered.
Therefore, given the importance of the issue of FOF in the older adults with HF, a comprehensive care program and educational, counseling, and welfare interventions should be developed in a way to prevent and reduce FOF, increase functional independence, and improve the health and quality of life in the elderly patients.
Regarding the limitations of the present study, one can refer to the impossibility of discovering the relationship between cause and effect. Moreover, the results of the present study cannot be generalized due to the type of study design. The place of residence is different from the Living arrangement; however, in the present study, the living arrangement was not evaluated which can be considered another limitation in this study.

Conflicts of Interest

The authors declare that they have no conflict of interest regarding the publication of the present study.

References

1. Ngamsangiam P, Suttanon P. Risk factors for falls among community-dwelling elderly people in Asia: a systematic review. Sci Technol Asia. 2020;25(3):105-26.
2. Kooshiar H, Najafi Z, Mazlom S, Azhari A. Comparison of the effects of exhilarating and normal physical activities on the balance and fear of falling in the elderly residing in nursing homes of Mashhad. Evid Based Care. 2015;5(1):35-46.
3. Centers for Disease Control and Prevention. Fact sheet older adult falls. Available at: URL: https://www.cdc.gov/steadi/pdf/STEADI_ClinicianFactSheet-a.pdf; 2020.
4. Florence CS, Bergen G, Atherly A, Burns E, Stevens J, Drake C. Medical costs of fatal and nonfatal falls in older adults. J Am Geriatr Soc. 2018;66(4):693-8.
5. Galet C, Zhou Y, Ten Eyck P, Romanowski KS. Fall injuries, associated deaths, and 30-day readmission for subsequent falls are increasing in the elderly US population: a query of the WHO mortality database and National Readmission Database from 2010 to 2014. Clin Epidemiol. 2018;10:1627-37.
6. Najafi Ghezlcheh T, Ariapour S, Jafari Oori M. Epidemiology and relationship of fall and fear of falling in the elderly residing at Kamrani nursing home, Tehran, Iran. Iran J Ageing. 2016; 10(4):152-61.
7. Berg RL, Cassells JS. The second fifty years: promoting health and preventing disability. Washington (DC): National Academies Press; 1992.
8. Dadgari A, Hojati H, Mirrezaie SM. The relationship between the risk of falling and fear of falling among aged hospitalized patients. Nur Pract Today. 2020;7(1):30-7.
9. Pena SB, Guimarães HCQCP, Lopes JL, Guandalini LS, Taminato M, Barbosa DA, et al. Fear of falling and risk of falling: a systematic review and meta-analysis. Acta Paul Enfermagem. 2019;32(4):456-63.
10. Nomura T. Relationship between fear of falling, physical activity, and health-related quality of life in elderly daycare service users. Asian J Occup Ther. 2017;13(1):41-6.
11. Taghadosi M, Motaharian E, Gilasi H. Fear of falling and related factors in older adults in the city of Kashan in 2017. Arch Trauma Res. 2018;7(2):50-5.
12. Borhaninejad V, Rashedi V, Tabe R, Delbari A, Ghasemzadeh H. Relationship between fear of falling and physical activity in older adults. Med J Mashhad Univ Med Sci. 2015;58(8):446-52.
13. Fucahori FS, Lopes AR, Correia JJ, Silva CK, Trelha CS. Fear of falling and activity restriction in older adults from the urban community of Londrina: a cross-sectional study. Fisiotera Movimento. 2014;27:379-87.
14. Thiamwong L, Suwanno J. Fear of falling and related factors in a community-based study of people 60 years and older in Thailand. Int J Gerontol. 2017;11(2):80-4.
15. Pirrie M, Saini G, Angeles R, Marzanek F, Parascandalo J, Agarwal G. Risk of falls and fear of falling in older adults residing in public housing in Ontario, Canada: findings from a multisite observational study. BMC Geriatr. 2020;20(1):11.
16. Vo THM, Nakamura K, Seino K, Nguyen HTL, Van Vo T. Fear of falling and cognitive impairment in elderly with different social support levels: findings from a community survey in Central Vietnam. BMC Geriatr. 2020;20(1):141.
17. Huitema AA, Harkness K, Malik S, Suskin N, McKelvie RS. Therapies for advanced heart failure patients ineligible for heart transplantation: beyond pharmacotherapy. Can J Cardiol. 2020; 36(2):234-43.
18. Malavolta M, Caraceni D, Olivieri F, Antonicelli R. New challenges of geriatric cardiology: from clinical to preclinical research. J Geriatr Cardiol. 2017;14(4):223-32.
19. Nayor M, Vasan RS. Preventing heart failure: the role of physical activity. Curr Opin Cardiol. 2015;30(5):543-50.
20. Soloveva A, Fedorova D, Villevalde S, Zvartau N, Mareev Y, Sitnikova M, et al. Addressing orthostatic hypotension in heart failure: pathophysiology, clinical implications and perspectives. J

Cardiovasc Transl Res. 2020;13(4):549-69.

21. Schoene D, Heller C, Aung YN, Sieber CC, Kemmler W, Freiberger E. A systematic review on the influence of fear of falling on quality of life in older people: is there a role for falls? Clin Interv Aging. 2019;14:701-9.

22. Doukky R, Mangla A, Ibrahim Z, Poulin MF, Avery E, Collado FM, et al. Impact of physical inactivity on mortality in patients with heart failure. Am J Cardiol. 2016;117(7):1135-43.

23. Yuki K, Asaoka R, Ono T, Awano-Tanabe S, Murata H, Tsubota K. Evaluation of fear of falling in patients with primary open-angle glaucoma and the importance of inferior visual field damage. Invest Ophthalmol Vis Sci. 2020;61(3):52.

24. Yardley L, Beyer N, Hauer K, Kempen G, Piot-Ziegler C, Todd C. Development and initial validation of the Falls Efficacy Scale-International (FES-I). Age Ageing. 2005;34(6):614-9.