Fear of Falling and Correlated-Factors in Community-Dwelling Older Adults in the Eastern Thailand

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Abstract

Older adults with fear of falling and activity restriction are at high risk for future falls and disability. This cross-sectional study aims to examine the prevalence and correlates of fear of falling among Thai older adults. We used multi-stage sampling to recruit 175 older adults from six areas across eastern Thailand. Questionnaires were used to collect participants' characteristics, health-related characteristics, and fear of falling. A full tandem stance test and Snellen chart were used to assess balance performance and visual acuity, respectively. Descriptive statistics and multivariate logistic regression were used for data analyses. The participants were 67.4% female, 28% experienced one or more fall in the past year, 85.1% reported fear of falling, and 39.4% restricted their activities due to this fear. All had no limitation of basic functional performance. Multivariate analysis indicated that female gender (OR 3.70, 95% CI 1.34-10.21), fall history (OR 10.16, 95% CI 1.14- 90.37), and anticipation of difficulty from falling (OR 1.32, 95% CI 1.16-1.50) were independently associated with fear of falling. About one-third of older participants received fall prevention education, 25.7% received home safety education, and only 18.3% received fear of falling education. The findings suggest a high prevalence of fear of falling in Thai older adults even though they are still having high functional performance. However, fall, fear of falling, and home safety education interventions were low delivered to older adults living in the eastern Thai communities. Community nurses should deliver more education regarding fall, fear of falling, and home safety, and health screening by targeting older women who experience falling and anticipate difficulty from falling.

Key words: Fear of falling, Falls, Older adults, Activity restriction

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Introduction

Globally, falls are the second leading cause of unintentional injury death that result in 684,000 death each year while 37.3 million fall-related injuries severe enough to require medical treatment (World Health Organization, 2021). Fatal falls are most prevalent among adults aged 60 and older, especially in low- and middle-income countries, making it is a major area of interest within the field of aging. According to the Thai Ministry of Public Health (2023) over 5 million older Thais fall each year while fatal falls increase from 2,310 cases in 2018 to 2,707 cases in 2023 or about 8 fall-related death each day. In addition to falling fatal trauma, falls create fear of falling (FOF), a psychological concern associated with falls among older populations.

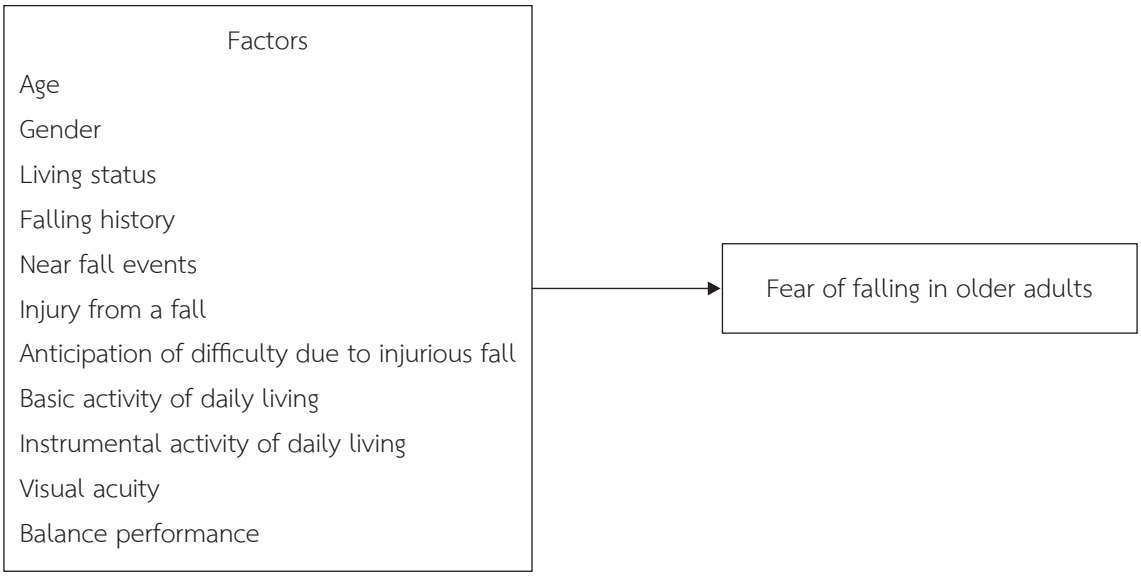
Appropriate level of FOF in a short period is a protective factor of future fall; however, excessive fear can lead to negative health outcomes from restriction of activities due to FOF (Deshpande et al., 2008). FOF prevalence varies from study to study. In a recent review, researchers reported FOF prevalence range from 12.2% to 96.7% (MacKay et al., 2021). In previous studies, researchers report FOF prevalence as 63.8% in older American (Lach & Noimontree, 2018), 48.6% in South Korea (Choi & Ko, 2015), 43.3% in Japan (Tomita et al., 2018), 53.4% in Taiwan (Chang et al., 2016), 57.5% in suburban communities near Bangkok (Sitdhiraksa et al., 2021), 76.1% in suburban communities in the northern (Phongphanngam et al., 2020), and 86% in the southern communities of Thailand (Thiamwong & Suwanno, 2017). FOF commonly develops after having a fall; however, even older adults who do not fall can develop this fear (Arfken et al., 1994; Lach & Noimontree, 2018). Longitudinal studies have shown that FOF causes avoidance of activities and leads to negative health outcomes including decreased physical performance, increased functional disabilities in activities of daily living (ADL) both basic and complex tasks (Liu et al., 2021), frailty (Baek et al., 2024), future falls (Allali et al., 2017; Baek et al., 2024; Delbaere et al., 2010), decreased quality of life (Arfken et al., 1994; Lee & Hong, 2020), depression, and decreased lifespans (Lee & Hong, 2020).

A number of cross-sectional studies have shown associations of FOF with advanced age, female gender (Chang et al., 2016; Choi & Ko, 2015;Thiamwong & Suwanno, 2017; Tomita et al., 2018), visual impairment (Choi & Ko, 2015; Thiamwong & Suwanno, 2017), pain (Tomita et al., 2018), depression, cognitive impairment (Choi & Ko, 2015), decreased physical function (Change et al., 2016), poor gait and balance (Asadi Samani et al., 2020; Thiamwong & Suwanno, 2017; Viaje et al., 2019), slow walking speed (Viaje et al., 2019), catastrophic beliefs about falls (Delbaere et al., 2009), decreased quality of life, and increased risk of death (Chang et al., 2017). Numerous studies found falling history was a significant correlated factor of FOF (Chang et al., 2016; Choi & Ko, 2015; Lach & Noimontree, 2018; Phongphanngam et al., 2020; Sitdhiraksa et al., 2021; Thiamwong & Suwanno, 2017; Tomita et al., 2018); however, the study by Sitdhiraksa and colleagues (2021) did not show significant association.

Previous studies revealed that FOF prevalence and associated factors varied significantly in the western and other Asian countries even within different geographic areas like in the northern, the southern, and the central city of Thailand. No study examined FOF in the eastern region of Thailand.

Thus, this study was conducted to 1) examine prevalence of FOF, and 2) identify factors associate with FOF in community-dwelling older adults living in the eastern Thailand.

Conceptual framework



Methods

Study design

This study was a cross-sectional design.

Population and sample

We used OpenEpi to calculate sample size based on 184,912 older population living in Cho Buri (Dean et al., 2013). Thus 175 older adults were recruited from six study sites using multi-stage sampling by randomly selected three of 11 districts and then randomly selected two subdistricts of each, one in urban and another in rural area, yielding six different subdistricts across Chonburi province in the eastern Thailand.

Data collection

Participants were recruited from social events, educational events, senior clubs at municipal community centers, temples, or primary health care centers. Inclusion criteria included 1) being Thai, 2) 60 years of age or older, 3) not demented based on a score of 0-3 on the clock drawing test (Watson et al., 1993), and 4) willing to participate in the study. Each participant received a gift costing 100 baths as an incentive. Researchers collected data using questionnaires and physical examinations. A research assistant was trained in questionnaires and physical examination (A Snellen chart and full tandem test).

Measurements

Demographic information We obtained participants' demographic data, including age, gender, marital status, educational levels, and living status.

Fear of falling, fall, and fall-related information To capture FOF, we utilized a widely used single question 3-point Likert scale, "At the present time, are you somewhat, very, or not at all fearful or concerned that you might fall or lose your balance?" not at all, somewhat fearful, and very fearful (Arfken et al., 1994). Severity of FOF was assessed using a FOF rating scale "How concerned are you that you might fall? Please rate this concern from 0-10, with 0 = being not at all concerned and 10 = being very concerned." This scale was used in a clinical trial of a cognitive behavioral intervention for exercise (Schneider et al., 2004).

History of falls was assessed by "How many times in the past year have you fallen?" none, one, two or more times, please write in how many." The scale has been used in previous studies (Lach & Noimontree, 2018). Near fall events was examined by "In the past week, have you felt so unsteady that you thought you might fall, but didn't? How many times?" This scale was used in prior longitudinal study (Lach, 2005). Injury from a fall was assessed "Did you have any injuries as a result of your falls? no injuries, minor injuries, hospitalization due to hip fracture, and other injury requiring hospitalization". They were asked to describe their injuries. Finally, participants were asked to rate their anticipation of difficulty due to injurious fall "How much difficulty do you think a fall injury would cause in your life?" with 0-10, 0 = no difficulty and 10 = a lot of difficulty. Education about falls, FOF, and home safety were asked with yes/no response options.

Functional capacity Chula basic and instrumental ADL scales were used to assess activities of daily living (Chunharas, 2019). The total score ranges from 0-20 and 0-9 respectively, the higher scores the better functioning (Jitapunkul, 1999). A Snellen chart was used to assess visual impairment with a score of less than 6/12 indicating older adults at risk for falling (Yip et al., 2014). A full tandem balance was utilized to assess balance performance with a score of less than 10 seconds indicating fall risk (Rossiter-Fornoff et al., 1995).

All research measurements in this study were used and validated in previous studies (Jehu & Skelton, 2023; Jitapunkul, 1999; Lach & Noimontree, 2018; Rossiter-Fornoff et al., 1995; Yip et al., 2014).

Data analysis

SPSS version 26 was used to perform statistical analyses. Descriptive statistics showed no missing data from the 175 participants for data analysis. Univariate analysis was conducted using chi-square test, Fisher's exact test, or t-test to assess associations of FOF with demographic and health-related variables. We planned to utilize multiple regression to assess association of FOF as outcome variable and the following factors: age, gender, living status, near fall event, fall history, injury from a fall, visual acuity, balance performance, anticipation of difficulty from injury due to falling, and activity of daily living. However, the assumption of normality of the outcome variable was violated; therefore, logistic regression was used and the FOF rating was dichotomized to fear versus no fear.

Assumptions of logistic regression were checked as follows. The cross-tabulation table of categorical variables showed adequacy of expected frequencies of categorical variables (gender, near

fall event, fall history, visual acuity, balance performance, FOF). We found complete separation of near fall events. In other words, participants who experienced a near fall in the past week reported FOF. Living status had expected frequencies of less than five; therefore, near fall events and living status were dropped from multivariate analysis. With 3 standardized deviation criteria, there were no significant outliers. There was no multicollinearity or singularity among continuous factors. Variance inflation factors were less than five in all factors which indicated independence of errors. The interaction terms of each factor and its natural logarithm were not statistically significant, which indicated that the assumption of linearity of logit was met. We compared expected and observed variances with all factors in the model which indicated good fit with p values > .05 by deviance and Pearson criterion. Also, dispersion (approach 1) indicated that the model's predicted and observed variance were nearly no dispersion; therefore, the residuals were independent.

Ethical consideration/ Informed consent

The Burapha University Ethical Committee approved the study, (Sci 078/2561). Informed consent was obtained from all participants before data collection.

Results

Participant characteristics

Of the 175 participants, 67.4% were female, 43.4% were aged 70 or older (mean age = 69.3, range = 60-89, SD 6.3), 66.3% completed primary school, 51.4% were married, and 93.7% lived with a spouse or other family members (see Table 1).

Health-related characteristics

Table 1 shows that overall participants had high functional performance. All participants had high scores for basic ADLs, while only 14.9% had some complex ADL limitations. The main impairment was being unable to use public transportation independently. Most of participants (86.9%) had one or more health problems. Regarding falls and fall risk, 28% reported falls in the previous year. Based on balance performance, 24.6% of participants were at increased risk for falling, whereas 42.3% were classified as increased risk of falling by the visual acuity test. Only 34.3% had learned about fall prevention, 18.3% had learned about FOF, and 25.7% were educated about home safety (some data not shown).

Prevalence of fear of falling

Based on the FOF rating scale the prevalence of FOF was high at 85.1% (median = 5, interquartile range: IQR = 7), 81.7% by the 3-point Likert scale, and 39.4% also reported activity restriction due to the fear. Of the participants, 22.9% had experienced a near fall event within a week prior to the study, 28% fell in the previous year, and 41.7% were injured from a fall (see Table 1); overall 46.9% had one of these experiences. Of those with an injurious fall, 75.8% had minor injuries, 6.1% were hospitalized due to a hip fracture. More than ninety percent of participants anticipated difficulty due to injury from a fall with a mean score of 8 out of 10 (range 0 = 10, SD = 3.3), only 8% did not anticipate difficulty.

Univariate associations with fear of falling

Univariate analysis showed that gender, fall history, near fall events, balance impairment, and anticipation of difficulty from an injury were all individually associated with FOF. Older women were more likely than men to report FOF (X^2 (1) = 12.81, p < .001). Compared with those without falling history, older adults who fell in the previous year were more likely to have FOF (X^2 (1) = 6.74, p = .009), as were those who had a near fall event (X^2 (1) = 12.81, p < .001). Older adults with balance impairment were more likely than those without balance problems to have FOF (X^2 (1) = 4.69, p = .03). Participants with FOF had greater concern of difficulty from injury due to falling (M = 8.6, SD = 2.7) than those without such fear (M = 4.7, SD = 4.5), t (28) = -4.22, p <.001). There was no significant association between FOF and other demographic and health-related variables.

Table 1. Participants' characteristics and correlates of fear of falling (*N* = 175)

	Overall (*N* = 175)	Fear of falling (n%)		
Variables	**n (%)**	**Yes (n = 149)**	**No (n = 26)**	**p-value**
Age (mean/SD)	69.3 (6.3)	69.1 (6.3)	60.8 (6.6)	.593
Gender				
Male	57 (32.6)	40 (70.2)	17 (29.8)	< .001
Female	118 (67.4)	109 (92.4)	9 (7.6)	
Living status				
Live alone	11 (6.3)	9 (81.2)	2 (18.2)	.669
Live with spouse or family members	164 (93.7)	140 (85.4)	26 (14.9)	
Fall in a previous year				
No	126 (72)	101 (80.2)	25 (19.8)	.003
One or more fall	49 (28)	48 (98)	1 (2)	
Injury from a fall				
No	109 (58.3)	91 (82.7)	19 (17.2)	.242
Yes	66 (41.7)	58 (89.2)	7 (10.8)	
Near fall event in a previous week				
No	135 (77.1)	109 (80.7)	26 (19.3)	-
Yes	40 (22.9)	40 (100)	0	
Poor balance performance				
No	132 (75.4)	108 (81.8)	24 (18.2)	.03
Yes	43 (24.6)	41 (95.4)	2 (4.6)	
Poor visual acuity				
No	101 (57.7)	82 (81.2)	19 (18.8)	.086
Yes	74 (42.3)	67 (90.5)	7 (9.5)	

Table 1. (Cont.)

Variables	Overall (*N* = 175) n (%)	Fear of falling (n%) Yes (n = 149)	No (n = 26)	p-value
Anticipation of difficulty from injury due to falling (mean/SD)	8 (3.3)	8.6 (2.7)	4.7 (4.5)	< .001
Basic ADL	19.7 (0.7)	19.4 (0.8)	19.7 (0.7)	.131
Complex ADL	8.8 (0.7)	9 (0.7)	9 (0)	-

Note. Data presented as n (%) unless otherwise indicated. Basic ADL = Basic activities of daily living. Complex ADL = Complex activities of daily living. Chi-square test, Fisher's exact test, or t-test at alpha level < .05,

Multivariate associations with fear of falling

Table 2 shows the results of the multivariate logistic regression. Female gender (X^2 (1) = 6.64, p = .010), fall history (X^2 (1) = 7.01, p = .008), and anticipation of difficulty due to falling (X^2 (1) = 20.50, p < .001) increased risk of fear of falling. Older female were 3.7 times (OR 3.7, 95% CI 1.34-10.21) more likely to have FOF than older male. Compared with those without a fall history, fallers were 10.16 times (OR 10.16, 95% CI 1.14-90.73) more likely to have FOF. Participants were 1.32 times more likely to be fearful for each point increase in anticipation of difficulty (OR 1.32, 95% CI 1.16-1.50).

Table 2. Multivariate association of fear of falling with participants' characteristics and health-related variables (*N* = 175)

Variables	Fear of falling	
	Odds ratio	95% CI
Gender		
Male	1	Reference
Female	3.70	1.34-10.21
Fall history in a previous year		
No falls	1	Reference
One of more falls	10.16	1.14-90.73
Injury from a fall		
No	1	Reference
Yes	NS	
Anticipation of difficulty from injury due to falling	1.32	1.16-1.50
Poor balance performance		
No	1	Reference
Yes	NS	

Table 2. (Cont.)

Variables	Fear of falling	
	Odds ratio	95% CI
Poor visual acuity		
No	1	Reference
Yes	NS	

Note. Logistic regression at alpha < .05, NS = non statistically significance, CI = confidence interval

Discussion

FOF was a significant issue for older adults in the eastern communities of Thailand. The overall prevalence of FOF was 85.1% by the FOF rating scale (81.7% by the 3-point Likert scale). None of these older adults had ADL limitations. These findings indicate that FOF is high prevalence in older Thai in the study area even in older people who still have high functional performance.

In the current study, FOF was common in high functioning community-dwelling Thai older adults living in eastern Thailand; the prevalence was higher than studies of other older Asian populations in Taiwan 53.4% (Chang et al., 2016), South Korea 48.6% (Choi & Ko, 2015), and Japan 43.3% (Tomita et al., 2018), in western populations including the UK 19% (Kumur, 2014) and the US 63.8% (Lach & Noimontree, 2018), and Africa like Ethiopia 59.5% (Birhanie et al., 2021). Thai rates were higher. Compared with previous studies in Thailand by Sitdhiraksa and colleagues (2021) in suburban communities near Bangkok, Thiamwong and Suwanno (2017) in southern Thailand, and Phongphanngam and Nawai (2020) in northern Thailand, we found a higher FOF prevalence.

Possible explanations for the higher rate of FOF in our study might include the difference in lifestyle between people living in the different regions in Thailand. Chon Buri, located in the eastern region, is an economic and industrial area, and more urbanized. Prior studies were in Nakhon Si Thammarat (southern) and Chiang Mai (northern), which are agriculture areas. Older people in these rural agriculture areas may still work on the farms (National Statistic Office, 2025). Older people in our eastern region may have less intensity of regular physical activity but are more concerned about falling.

Compared with other Asian and Western older populations, the higher FOF prevalence rate found in this study may be accounted for by the lack of age-friendly environments. Home safety issues, especially slippery floors are common in the bathrooms of most Thai houses (Jarutach & Lertpradit, 2020). Bathrooms are not designed to separate wet and dry zones. In addition, grab bars and non-slip mats are not usually available. Most Thai houses in this region have two stories, and stair handrails are not available in most houses. Lack of safe pedestrian walkways such as uneven edges, curves, obstacles with food vendors on the walkways are common in the environment in Thailand. These situations create falling hazards and may play a significant role in FOF. As reported by Jarutach and Lertpradit (2020) only 7.3% of Thai houses were designed and suitable for older adults.

In this study, we found that FOF was significantly associated with female gender (OR 3.70), fall history (OR 10.16), and anticipation of difficulty from injury due to falling (OR 1.32). These findings are consistent with the findings of a several previous studies as reported in two systematic reviews (Denkinger et al., 2015; Scheffer et al., 2008). Contrary to some studies (Sitdhiraksa et al., 2021; Thiamwong & Suwanno, 2017). We did not see this association of balance performance and FOF in our participants. However, this is similar to some other studies (Deshpande et al., 2008; Lach, 2005; Phongphanngam et al., 2020). We found anticipation of difficulty from injury due to falling associated with FOF which is similar with that of Delbaere and colleague (2009) who found that catastrophic beliefs about falls associated with FOF. According to this finding, we hypothesize that psychological factors such as anticipation of difficulty from injury due to falling affected FOF more than physical factors in Thai older adults. This may be due to high concerns of older people of being a burden to their families, as many older adults live with extended family. Further study is warranted to investigate this hypothesis.

We did not see significant associations of FOF with advanced age, living status, or poor visual acuity which are in line with the study of Thiamwong and Suwanno (2017) in Thai older adults. It is, however, contrary with studies in other geographic areas (Austin et al., 2007). A possible explanation is that our older adults were recruited from social events or elderly clubs; therefore, the participants were relatively young and active, and still had high functional performance. Another explanation is that living status did not play significant role for FOF in older Thai because in Thai culture people live close by and always have activities together with their neighbors. Thus, female gender, fall history, and anticipation of difficulty from injury due to falling appear as robust factors related to f FOF, whereas advanced age, near fall event, poor balance performance, poor visual acuity, and anticipation of difficulty due to falling warrant further investigation.

While FOF is common in participants, we found only a few of them had been educated about fall prevention (34.3%), home safety (25.7%), and FOF (18.3%). This study provides evidence that health professionals need to do more work to provide education on these topics to help older adults develop appropriate concerns about falling and identify home fall hazards and home modifications to manage them. Policy work is needed to improve aged-friendly environments for older adults at home and in community settings.

Study limitations and strengths

Our study has some limitations. We utilized a cross-sectional design; consequently, the study results do not prove causality. However, these findings may help generate questions for further study. We recruited older participants who actively participated in social events; therefore, our participants were young with a high level of functioning. As a result, our findings may not be generalizable to older Thai people living in community such as homebound older adults. Despite these limitations, the sample was large to identify the high level of fear of falling and important risks for this problem. While some variables were self-report, we also included physical performances testing of balance and visual acuity which provides stronger evidence about the participants' fall risks.

Conclusions and Implications of the results

This study reveals high reports of FOF in high functioning community-dwelling older adults in Thailand; however, FOF and fall prevention education was low. More actions and interventions are needed to address both FOF and falls in Thai older adults. Female gender, fall history, and anticipation of difficulty from injury due to falling were independently associated with FOF. These older adults with FOF are at risk for functional decline from activity restriction due to FOF and should be the primary targets for intervention. Community-based health education focusing on falls, FOF, and home safety intervention is recommended. Nurses should be encouraged to deliver or refer older adults to evidence-based interventions, such as the Otago exercise (Zou et al., 2022), Stepping On (Mahoney, 2014), Tai Chi (Bubela et al., 2019), or Matter of Balance programs (Healy et al., 2008) to alleviate fear , and reduce activity restriction that can further fuel future falls and frailty.

Recommendation for the future study

Since all FOF studies in Thailand utilized a cross-sectional design, causality can not be examined. Longitudinal study is recommended for further study. Experimental design like quasi-experimental designs or randomized-controlled trial are also recommended to investigate intervention to alleviate FOF.

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