

Risk Factors for Falls Among Thai Older Adults in Community Setting

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Abstract

The burden of falls of the older Thai adult population is important to understand, predict and then present the action plans for district health care systems. This study aimed to examine the risk factors for falls among older adults at a community setting. A total of 3,207 subjects from sixteen districts were face-to face interviewed by trained research assistants from September 2015 to March 2016. The majority of respondents (61.30%) were over 60 years old (average = 63.77 years). The percentage of risk for falls was 30.50% of adults aged 50 years and older. This study highlighted nine factors associated with risk for falls, namely, gender, age, hearing, cognition, self-care, pain, activities of daily living (ADL), education level, and marital status (p -value < 0.05). Further steps should be taken to prevent risk for fall by established clinical screening for older adults; early intervention strategies that Thai-FRAT can have a major role for screening risk factors to prevent falls in the elderly with the volunteers. Encouragement of caregivers or relevant to take care of the elderly should be promoted for fall prevention.

Keywords: risk for falls, older adults, risk factors, Thailand

1. Introduction

The number of older persons (defined as aged 60 and over) in Thailand has grown rapidly and will continue to do so in the future decades. Since 1960 the number of older people in the Thai population has increased seven-fold from approximately 1.5 million to 10.7 million by 2015 or 16% of the total population. The aging population rate will accelerate with the number of older persons projected to increase to over 20 million by 2035, at which point they will constitute over 30% of the population. Moreover, the people of Thailand, 50 and older, have been increasing from 5.0% to 10.1% in 1950 to 2000 (Ana, 2015) and will be increasing to 23% in 2030 (Bergland, 2012). In 2010, a research showed that the elderly in Thailand died by fall about 1,600 person per years and increasing (Backman & Hentinen, 1999). In addition, the effect of falls in elderly by physical, mental, society and economic which main risk factors reflect the multitude of health determinants that directly or indirectly affect their well-being (Boyd & Stevens, 2009). These are categorized into four dimensions: biological, behavioral, environmental and socioeconomic factors (Boyd & Stevens, 2009). As the exposure to risk factors increases, the greater becomes the risk of falling and being injured (Cruickshanks *et al.*, 1998). The prevention of injuries associated with falls in older persons is a public health target in many countries around the world. There is good evidence that interventions such as multifactorial fall prevention and individually prescribed exercise are effective in reducing falls. However, we need to provide the intervention for the elderly with high risk of falls (Hoffman & Rodriguez, 2015). In Thailand, there is the study about developed falls risk assessment tool. The Thai-FRAT is the first assessment tool developed for the elderly in Thai community-dwellings. The elderly at high-risk (females, visual impairment, balance impairment, medication use, history of falls, and housing style) would be appropriately referred into a fall prevention program and linked to be an assessment tool of the prevention of falls in the elderly (Jennifer, 2013). The study for the risk factors associated with falls of the elderly in the communities of Thailand to find ways to prevent a fall in the elderly are as follows: 1). biological factors, the research study only: age, gender (Thiamwong, Thamarpirat, Maneesriwongul, & Jitapunkul, 2008) mobility (Noohu, Dey, & Hussain, 2014), chronic illness and self-care (Thiamwong *et al.*, 2008); 2) behavioral factors of the research study only: physical activity (Ministry of Public Health, 2009) and exercise (Noohu *et al.*, 2014); 3) environmental factors of the research study housing style and residential areas (Ministry of Public Health, 2009). The lack of study of the main risk factors in terms of risk for falls (female, visual impairment, balance impairment, medication use, history of falls, and housing style), and the factors associated with risk for falls in the elderly. Thus this research is focused on the study in risk for falls and associated factors among older adults which includes the following; biological factors: gender, age,

body mass index (BMI), cognition, chronic illness, self-care, ADL, and pain. Behavioral factors: alcohol use, physical activity, and exercise. Environmental factors: residential area. Socioeconomic factors: education level, marital status, and occupation.

2. Objectives

This study aimed to conduct household cross-sectional surveys to examine the risk factors for falls among older adults at the community level to understand current situations for target health promotion policy implementation among this vulnerable group.

3. Materials and Methods

Study design and subjects

This cross-sectional descriptive study aims to examine the risk factors for falls among older adults in communities of Thailand. The data were collected from September 2015 to March 2016. A total of 3,968 subjects from sixteen districts were face-to-face interviewed by trained research assistants. Prior the study, the researchers therefore excluded the 761 respondents who had missing data on key variables including risk for falls, biological factors, behavioral factors, environmental factors, and socioeconomic factors from the questionnaire. After all, in total 3,207 completed questionnaires were included in the analysis.

Research instrument

A face-to-face interview questionnaire was adapted from World Health Organization's (2002) study on Global Ageing and Adult Health Thailand 2014. The questionnaire consisted of five parts: 1) biological factors; 2) behavioral factors; 3) environmental factors; 4) socioeconomic factors; and 5) risk for falls. A questionnaire was reviewed by three experts in public health, and it was reused and modified regarding to the comments and inputs. After revised according to experts, the questionnaire was translated in "Thai" language. Before handling the research process, the Thai translation questionnaire was conducted to 30 adults aged 50 years and older in selected community hospital. The purpose of conduct in the pretest was to detect any unclear statement, or misleading questions in the research instrument, and to check the questions to ensure the validity of the questionnaire before it were used on the target respondents.

Data analysis

Univariate analysis was used to describe the percentage. Odds ratios and Chi-square tests were used to identify any association and measure the strength of the relationship between each independent variable and risk for falls. All variables are statistically significant at p -value < 0.05 .

Ethical considerations

The study was reviewed and approved by the committee of ethics, Mahidol University (No.2014/266.3009). Personal data of respondents was coded and kept as confidential information.

4. Results and Discussion

The percentage of risk for falls among adults aged 50 years and older in the communities of Thailand were 30.50%.

About Biological Factors; the respondents have shown that the majority of respondents (63.00%) were female, (61.30%) aged 60 years and over. The finding indicated that one-third (32.40%) of respondents were overweight and obesity. Over three-quarters of respondents had less than moderate hearing (88.60%), and cognition (81.80%). Over two-thirds (67.80%) of respondents were refer to the hypertension, but over three-quarters of respondents were referred to have diabetes (82.20%), stroke (96.90%), heart disease (98.20%), and fibrosis (98.60%). Nearly three-quarters (78.50%) of respondents had less than moderate self-care, and 98.90% were non-dependent on routine activities (ADL). Moreover, over three-quarters (86.10%) of respondents had less than moderate pain (Table 1).

Table 1 Distribution of respondents' characteristics in biological factors among adults aged 50 years and older in the communities of Thailand. (n=3,207)

Respondents' characteristics in biological factors	n (%)
Female	2019 (63.0)
60 years and over	1966 (61.3)
Overweight and obesity	1038 (32.4)
Less than moderate hearing	2841 (88.6)
Less than moderate cognition	2623 (81.8)
Chronic illness (the doctor's no diagnosis in)	
Hypertension	2175 (67.8)
Diabetes	2637 (82.2)
Stroke	3107 (96.9)
Heart disease	3148 (98.2)
Fibrosis	3162 (98.6)
Less than moderate self-care	2518 (78.5)
ADL; non dependent	3173 (98.9)
Less than moderate pain	2761 (86.1)

Behavioral factors: the majority of respondents (11.40%) had alcohol use in the past three months. In physical activity: only 9.30% had activities or worked in moderate, while 21.20% had activities or the worked heavily. Moreover, only 6.10% exercised in moderate, while 24.00% did exercised heavily. Environmental Factors: over two-third (68.90) of respondents were outside the municipality. Socioeconomic factors: the respondents show the majority of respondents (83.20%) completed primary school or lower. Over two-thirds (67.10%) of respondents had spouses, and the finding indicated that nearly three-quarters (77.60) of respondents presently work (Table 2).

Table 2 Distribution of respondents' characteristics in behavioral factors, environmental factors, and socioeconomic factors among adults aged 50 years and older in the communities of Thailand. (n=3,207)

Respondents' characteristics in	n (%)
<i>Behavioral Factors</i>	
Alcohol use; yes	366 (11.4)
Moderate physical activity	297 (9.3)
Heavy physical activity	680 (21.2)
Moderate exercise	196 (6.1)
Heavy exercise	770 (24.0)
<i>Environmental Factors</i>	
Outside municipality	2209 (68.9)
<i>Socioeconomic Factors</i>	
Primary school completed and lower	2669 (83.2)
With Spouse	2153 (67.1)
work status at the present	2488 (77.6)

Bivariate analysis indicated that level of gender, age, hearing, cognition, self-care, pain, ADL, education level, and marital status were associated with risk for falls (p-value < 0.05) (Table 3).

Table 3 Association between independent variables and risk for falls

Independent variables	Risk for falls		OR(95%CI)
	Yes (%)	No (%)	
<i>Biological Factors</i>			
Gender			
male	16.00	84.00	1
female	39.00	61.00	3.36 (2.81-4.02)
Age			
50-59 years	26.30	73.70	1
60 years and over	33.10	66.90	1.38 (1.18-1.62)
BMI			
Underweight	31.60	68.40	1
Normal	29.50	70.50	.90 (77-1.04)
Overweight	31.10	68.90	1.04 (87-1.23)
Obesity	34.80	65.20	1.24 (93-1.65)
Hearing			
Less than moderate	27.50	72.50	1
Moderate	53.90 55.90	46.10 41.10	2.34 (2.41-3.83)
Upper moderate			2.92 (1.48-5.78)
Cognition			
Less than moderate	25.40	74.60	1
Moderate	51.70 62.30	48.30 37.70	2.92 (2.39-3.56)
Upper moderate			3.96 (2.65-5.91)
Hypertension			
No	29.80	70.20	1
Yes	31.90	68.10	0.91 (77-1.07)
Diabetes			
No	30.00	70.00	1
Yes	33.00	67.00	0.87 (72-1.06)
Stroke			
No	30.40	69.60	1
Yes	32.00	68.00	0.93 (61-1.43)
Heart disease			
No	30.60	69.40	1
Yes	27.10	72.90	1.18 (66-2.11)
Fibrosis			
No	30.60	69.40	1
Yes	26.70	73.30	1.21 (62-2.35)

Table 4 Association between independent variables and risk for falls

Independent variables	Risk for falls		OR (95%CI)
	Yes (%)	No (%)	
<i>Biological Factors</i>			
Selfcare			
Less than moderate	22.60	77.40	1
Moderate	57.30 65.30	42.70 34.70	3.96 (3.26-4.8) 4.69 (3.38-6.52)
Upper moderate	ADL		
Non dependent	30.10	69.90	1
Dependent	70.60	29.40	2.35 (1.88-2.94)
Pain			
Less than moderate	25.10	74.90	1
Moderate	63.40	36.60	4.62 (3.94-6.16)
Upper moderate	65.30	34.70	4.99 (2.63-7.65)
<i>Behavioral Factors</i>			
Alcohol use			
No	30.80	69.20	1
Yes	28.40	71.60	0.89 (0.70-1.14)
Moderate physical activity			
No	30.90	69.10	1
Yes	30.40	69.60	0.98 (0.81-1.17)
Heavy physical activity			
No	30.90	69.10	1
Yes	30.40	69.60	0.98 (0.81-1.17)
Moderate exercise			
No	33.70	66.30	1
Yes	30.30	69.70	0.86 (0.63-1.16)
Heavy exercise			
No	31.60	68.40	1
Yes	30.20	69.80	0.94 (0.79-1.12)
<i>Environmental Factors</i>			
Residential area in municipality			
Inside	28.30	71.70	1
Outside	31.50	68.50	1.17 (0.99-1.38)
<i>Socioeconomic Factors</i>			
Education level			
Higher than primary school completed	26.20	73.80	1
Primary school completed and lower	31.40	68.60	1.19 (1.03-1.39)
Marital status			
With Spouse	28.60	71.40	1
Without Spouse	34.30	65.70	1.20 (1.08-1.34)
Occupation (work status at the present)			
No	33.40	66.60	1
Yes	29.70	70.30	1.19 (0.99-1.14)

Discussion

Falls are one of the major problems in the elderly and are considered one of the “Geriatric Giants”. Recurrent falls are an important cause of morbidity and mortality in the elderly and are a marker of poor physical and cognitive status (Boyd & Stevens, 2009). In this research, the percentage of risk for falls among adults aged 50 years and older in the communities of Thailand were 30.50%. In Thailand, Suchada Pattaramongkolrit, Siriorn Sindhu, Orapan Thosigha, Wilaipun Somboontanot, reported that the results

revealed subjects experienced at 37.8% prevalence of falls over the prior six months (Ministry of Public Health, 2009). Another research; Wannaporn Boonpleng, Wadeerat Sriwongwan, and Pattana Sattawatcharawanij study about rate and associated factors for falls among elderly people: Chaopraya Waterfront Community in Nonthaburi Province. The prevalence rate of falls was 41.3%. Number of falls in women was four times higher than in men (Thiamwong et al., 2008). In this study, nine factors were associated with risk for falls as gender, age, hearing, cognition, selfcare, pain, ADL, education level, and marital status (p -value < 0.05).

Gender and age were associated with risk for falls, respondents who were female likely to risk for falls (39.00%) than those who were male (16.00%) OR=3.36, 95%. Respondents who 60 years and over more likely to risk for falls (33.10%) than those who 50-59 years (26.30%) (OR=1.38, 95%CI = 1.18-1.62). This is because women having less muscle strength and worse performance on physical functioning when compared to men and the elderly aged 60 years and older with a body transformation include. Changes in vision such as presbyopia, look no apparent, changes in the musculoskeletal system, the deterioration of the joints, ligaments, the restrictions on movement changes in the urinary tract, and the elderly frequent urination at night. This may increase the risk for falls than those who are still of working age (Muir, Berg, Chesworth, Klar, & Speechley, 2010).

Respondents who have upper moderate hearing (55.90%) more likely to risk for falls than those who have less than moderate hearing (27.50%) (OR = 2.92, 95% CI = 1.48-5.78). This is because hearing loss is common in older adults, increases in prevalence and severity with age, and can affect quality of life and ability to function (Ngalonde, online). The functional consequences of hearing loss for older adults are now surfacing in epidemiological studies demonstrating that hearing loss (difficulty in hearing other people's conversations) were factors associated with falls (Nualnetr, Sriruang, Boonmat, Chaiyamon, & Boonyarat, 2010). In Thailand, 15 percent of the elderly suffers from hearing issues, hearing conditions also deteriorate with age, with more women than men and those living in the rural than urban areas suffering from hearing deficiency problems (Kuhirunyaratn, Prasomrak, & Jindawong, 2003).

Cognition also associated with risk for falls. Respondents who have upper moderate cognition (62.30%) are more likely to risk for falls than those who have less than moderate cognition (25.40%) (OR = 3.96, 95% CI = 2.65-5.91). This is because cognition, difficulty in learning new things, like traveling to new places, new activities associated with falls (Boyd & Stevens, 2009; Nualnetr, 2010). Higher cognition in community-living elderly was associated with increased social support. Life-style management should provide social activities for the elderly to promote a better quality of life. Social support is important in daily activities of the elderly (Yeh & Liu, 2003).

Respondents who have upper moderate self-care (65.30%) more likely to risk for falls than those who have less than moderate self-care (22.60%) (OR = 4.69, 95% CI = 3.38-6.52). Self-care is not a separate part of old men's or women's lives, it is associated closely with their past life and with the future. As an activity, self-care is not just a rational way to maintain health. It also reflects the person's overall attitude towards health care, illnesses and manner of living (Gobbo, Bergamin, Sieverdes, Ermolao, & Zaccaria, 2014). The research found that self-care is associated with falls (Pattamongkolrit, Sindhu, Thosigha, & Somboontanot, 2013).

Respondents who have upper moderate pain (65.30%) were more likely to take risk for falls than those who have less than moderate pain (25.10%), (OR = 4.99, 95% CI = 2.63-7.65). Pain is sore or an aching body, and aging is associated with decreased muscular strength which affects the major postural functions, especially global balance. In order to maintain postural stability, it is necessary that there to be interactive between the musculoskeletal system and the sensory system, and this interaction requires the complex integration of sensory information regarding the position of the body relative to the surroundings, and the ability to generate force to control movement (Thiamwong et al., 2008). Older adults that had balance impairment had an increased risk of falling (Tideiksaar, 2004). Many studies found that pain is the risk factor associate with falls (Boyd & Stevens, 2009).

The respondents who were dependent on other people for routine activities are more likely to have falls (70.60%) than those who were non-dependent on other people to the routine activities (30.10%) (OR = 2.35, 95 % CI = 1.88-2.94). Another research study about fall risk factors in elderly community-dwelling

found that ADL limitations as risk factors shown to be strongly associated with falls (Nualnetr, 2010). This is because the elderly people in Thailand have been rapidly increasing, and most elderly people are suffering from chronic diseases such as cardiovascular, diabetes mellitus and cancer to name a few (Boonpleng, Sriwongwan, & Sattawatcharawanij, 2015). Economic and social development of the country, the elderly might be expected to suffer with problem of dependency and disability leading to increased burden of disease.

Education level: respondents who completed the primary school and lower were more likely to take risk for falls (31.40%) than those who completed at higher than primary school (26.20%) (OR = 1.19, 95% CI = 1.03-1.39). The research found that education level has been shown to predict falls in two studies (World Health Organization, 2015). This may due to the lifestyle of highly educated people. For instance, college-educated workers tend to be less physically active due to the 'desk-job' environment, especially when compared to more hands-on, blue-collar workers.

The respondents who were living without spouses were riskier for falls (34.30%) than those with a spouse (28.60%) (OR = 1.20, 95% CI = 1.08-1.34). This is because the elderly living with spouses have the opportunity to take care of each other and the people in their family for fall prevention. Therefore, the elderly living without spouses are more likely to fall than those with spouses.

When interpreting our findings, the following limitations should be considered. Risk for falls and independent variables were reported through a face-to-face questionnaire. It is possible that respondents underreported risk for falls, could decrease the memory bias and desirable response bias. Moreover, this study sample was overrepresented by females, as in commonly found in household surveys in rural areas of Thailand. This study does not describe in detail each variable such as physical activity, exercise, alcohol use, and marital status.

5. Conclusion

One-third of elderly Thai had risks for falls. Nine factors were associated with risk for falls as gender, age, hearing, cognition, self-care, ADL, pain, education level, and marital status. Further steps should be taken to prevent risk for falls by established clinical screening older adults, and early intervention strategies that Thai-FRAT can be the major role for screening risk factors to prevent fall in the elderly with the volunteers. Encouragement of caregivers or relevant to take care of the elderly should be promoted for prevention for falls.

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