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## **Research on the Effectiveness of Yoga on Preventing Fall for the Elderly**

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### **Abstract**

This purpose of this study is to evaluate the effectiveness of Yoga on prevention of fall of the elderly, and was carried out with controlled trial. Forty participants were recruited at age 60 to 70 ( $66.7 \pm 4.3$ ). Subjects were divided into two groups, Yoga and Control. Participants in Yoga groups (aged  $66.6 \pm 2.3$ ) attended three sessions for practicing yoga (each session runs 60 minutes) in the mornings. Participants in Control group (aged  $67.5 \pm 2.7$ ) maintain daily activities. The Falls Efficacy Scale (FEL) is primary outcome measure. After 12 weeks of Yoga practicing, the participants in Yoga group showed significantly better results in comparison with those of Control group in the FES with p value from .05 to .001.

**Keywords:** Yoga, Fear of falling, Elderly

## Introduction

Muscle weakness, impaired gait, and diminished balance are the most significant risk factors for falling (Daley Spinks, 2000). Functional losses have been related to aging and these losses are also affected by physical inactivity (Brill, 2004). With increasing age, physical activity and physical function both decline (Yorston, Kolt, Rosenkranz, 2012). Even though functional losses are related to aging, these losses may also be the result of physical inactivity (Brill, 2004). Falling is one of the leading causes injuries and death which needs lots of cost for treatment (Chandler, Duncan, Sander, Studenski, 1996). After falling, older people have fear of falling, fear of movement, loss of confidence, reduction of control or dependent on others (Tinetti, Richman, Powell, 1990). Physical activities and exercises have been proven for improving balance and prevention of fall, and maintain physical fitness of older adults. Furthermore, physical activities and exercises are also beneficial of enhancing confidence, dependence in movement (Tinetti, et al., 1990).

Hatha yoga, one of the many forms of paths of yoga, focuses on overall fitness through pranayamas (breath-control exercise), asanas (postures), and chanda (meditation). Previous studies prove that Hatha Yoga is a gentle form of training which contains feelings, motion, and balance control (Brown, Koziol, Lotz, 2008; Di Benedetto, Innes, Taylor, Rodelheaver, Boxer, 2005). Yoga is also plausible intervention to positively impact both fear of falling and balance in older adults (Schmid, Van Puymbroeck, Koceja, 2010).

In addition to previous studies, this study is aimed evaluate the effectiveness of hatha yoga on prevention of falls in the elderly.

## Materials and Method

- Participants: Forty participants were recruited at age 60 to 70 ( $66.7 \pm 4.3$ ) from Center of Yoga in Vinh city of Vietnam. Inclusion criteria of both groups included the subjects being able to finish Mini Mental State Examination with a score greater than 25 and have no experiences in Yoga. Exclusion criteria included subjects with serious diseases such as symptomatic coronary insufficiency, orthostatic hypotension, and dementia.
- Intervention: Subjects were divided into two groups – yoga and control. The subjects were expected to consent and volunteer. Participants in yoga group were assigned three month yoga practicing. Participants in control group were instructed to maintain their routine daily activities. Statistics analysis was based on previous finding (Sharma, Gupta, Bijlani, 2008; Telles, Singh, Yadav, Balkrishna, 2012), using standardized mean difference of the group means,  $\alpha = 0.05$ , desired statistical power = 0.8, effect size is set at medium (0.5).
- Outcomes tests: Fall Efficacy Scale (FES) is outcome method which is to measure the fear of falling (as described in (Tinetti, et al., 1990). (table 1).
- Instrumentation: The instrumentation for this study included pencils; and FES score cards.
- Statistical analysis: An independent simple t-test was performed to analyze the differences between groups. Analysis of variance (ANOVA) was used to analyze the differences in test phases. A  $p < .05$  was considered to be statistical significant.

**Table 1.** Falls Efficacy Scale

Activity	Score
Take a bath or shower	0 1 2 3 4 5 6 7 8 9 10
Reach into cupboard	0 1 2 3 4 5 6 7 8 9 10
Prepare meals	0 1 2 3 4 5 6 7 8 9 10
Walk around the house	0 1 2 3 4 5 6 7 8 9 10
Get in and out of bed	0 1 2 3 4 5 6 7 8 9 10
Anwer the door or telephone	0 1 2 3 4 5 6 7 8 9 10
Get in and out of a chair	0 1 2 3 4 5 6 7 8 9 10
Getting dressed and undressed	0 1 2 3 4 5 6 7 8 9 10
Personal grooming (i.e. washing face)	0 1 2 3 4 5 6 7 8 9 10
Light housekeeping	0 1 2 3 4 5 6 7 8 9 10
Simple shopping	0 1 2 3 4 5 6 7 8 9 10

1 = Very confident; 10 = Not confident at all.

## Findings

**Table 2.** Characteristics of the study samples

Items	Yoga group	Control group	P value
Average of age	66.6 ± 2.3	67.5 ± 2.7	> 0.05
Quantity (male/female)	6/14	6/14	
Height	156.41 ± 9.17	156.92 ± 7.50	
Weight	57.27 ± 8.45	56.89 ± 7.61	
BMI	23.43 ± 2.00	23.35 ± 2.05	
Heart rate (beat/m)	75.54 ± 7.74	75.81 ± 8.20	
Systole (mmHg)	129.5 ± 14.3	130.3 ± 13.7	
Diastole (mmHg)	86.5 ± 10.2	85.1 ± 9.6	

The descriptive characteristics of the research samples of the groups are indicated in table 1. The average age of both groups is equivalent. Mean and standard deviation of age, height, weight, BMI, systole and diastole of both research groups are shown.

**Table 3.** Anova comparisons of variables between Yoga and Control groups<sup>b</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.665	11	1.151	6.118	.000 <sup>a</sup>
	Residual	29.548	157	.188		
	Total	42.213	168			

a. Predictors: (Constant), Sum, answer door, phone; walk around house; prepare meal; out of bed; out of chair; light housekeeping; simple shopping; bath or shower; reach cupboard; dress, undress.

b. Dependent Variable: Groups

There are significant changes in all item of FES between the two research groups. Anova showed differently changes at level of .000 (table 3).

**Table 4.** Comparisons of each variable between Yoga and Control groups

Activity	Levene's Test for Equality of Variances		t-test for Equality of Means	
	F	Sig.	t	Sig. (2-tailed)
Bath or shower	52.516	.000	-4.048	.000
Reach cupboard	138.572	.000	-3.654	.000
Prepare meal	22.335	.000	-4.304	.000
Walk around house	15.132	.000	-4.276	.000
Out of bed	72.202	.000	-3.079	.003
Answer door, phone	2.115	.150	-4.586	.000
Out of chair	38.530	.000	-3.517	.001
Dress, undress	114.229	.000	-3.359	.001
Light housekeeping	40.050	.000	-3.852	.000
Simple shopping	19.893	.000	-4.196	.000
Sum	10.062	.002	-2.490	.015

In the test for independent samples, there are remarkable changes in all items of FES with statistical values less then .000 between the two groups (table 4).

### Discussion and Conclusion

The effectiveness of yoga practicing on prevention of fall for elderly was assessed in this study. After 3 months of yoga practicing, fear of fall of the elderly was significantly improved. In the present study, the yoga practice group reduced the fear of falling significantly. The present findings of the result is in line with the findings of Schmid et al, 2010 which suggested that 12-week yoga intervention may reduce fear of falling and improve balance ability in older adults. It is also proved by the research of Brown et al (2008), which concluded that a yoga based exercise program can reduce the risk of falls in seniors. This finding, to some extent, is consistent with results of previous study that yoga improved the fear of falling and balance (Ross Thomas, 2010; Schmid, et al., 2010), health-related aspects of physical fitness (Tran, Holly, Lashbrook, Amsterdam, 2001). Practicing yoga has been shown to improve flexibility and muscle force in adults without known pathology (Tran, et al., 2001), vital capacity (Birkel Edgen, 2000), aerobic capacity (Ray, Sinha, Tomer, 2001) and motor speed (Dash Telles, 1999).

In addition, another finding indicated that after the 8-week yoga program, lower body strength increased significantly for those in the yoga group and other notable trends occurred in terms of coping, upper body strength and aerobic endurance (Van Puymbroeck, Payne, Hsieh, 2007). It also suggested that for young adults, a short-term yoga program of this type can improve balance substantially, produce modest improvements in leg strength, and improve leg muscle control for less-steady subjects (Hart Tracy, 2008). Findings of one exploratory study

suggested that yoga practice may improve hip extension, increase stride length, and decrease anterior pelvic tilt in healthy elders, and that yoga programs tailored to elderly adults may offer a cost-effective means of preventing or reducing age-related changes in these indices of gait function (Di Benedetto, et al., 2005). Yoga is also found beneficial for activities in standing, sitting, and lying on the floor and may be effective in improving mobility, postural control, and gait speed in community-dwelling older adults (Kelley, Aaron, Hynds, Machado, Wolff, 2014).

This study revealed that yoga participants outperformed their counterparts in control group in most of items of fear of falling.

This study, however, has some limitations such as small sample size. In this study, we used two groups, while the yoga group received training program but control group did not. That might lead to the social effects or biased opinions resulting from individuals in both groups.

In this controlled trial study, yoga is beneficial to decrease the fear of falling and prevent fall in the elderly. Assessment of the effects of yoga may be focused more on chronic disease with a long-term training program in the future.

### **Conflict of Interest**

The author has not declared any conflicts of interest.

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