

Research Article**Frailty phenotype characteristics of Community-dwelling frail elderly people in a sub-district**

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Abstract

The study was aimed to determine the physical frailty phenotype among community-dwelling elderly people in a northern sub-district. The subjects of 48 frail elderly people (17.2%) were reported among 280 volunteers age of 60 years and more. In clinical practice frailty can be diagnosed using Fried criteria, requiring at least three of the five indicators: 1) unintentional weight loss (4.5 kilogram in past year); 2) self-report exhaustion; 3) grip strength weakness; 4) slow walking speed; and 5) low physical activity. Two common phenotypic variances were poor muscle strength or hand grip weakness (87.5%), and exhaustion (83.3%), followed by slowness (68.8%), low physical activity (68.8%), and unintentional weight loss (25.0%), respectively.

Keywords: Frailty, phenotype, community-dwelling, elderly people

Introduction

Frailty is a clinical syndrome characterized by multiple characteristics including weight loss, and/or fatigue, weakness, low activity, slow motor performance and gait abnormalities. Three terms are commonly used interchangeably to identify vulnerable elderly one: 1) comorbidity (multiple chronic conditions); 2) frailty; and 3) disability. Frailty defined as clinical state of increasing vulnerability, resulting from aging-associated decline in reserve and function such that the ability to cope with every day or actual stressors is compromised. [1,2] Fried criteria is widely recognized for frailty assessment in both research and clinical services. [3] Frailty has been operatively definition as phenotypic and clinical criteria, with a biological basis. All physical decline and physical changes have taken place dynamically and lead to frailty. [2,4] Frailty were present in which three or more of the following five criteria including unintentional weight loss of 4.5 kilograms in the past year, self-report exhaustion, weakness (grip strength), slow walking speed, and low physical activity. [5-7]

Fried and colleagues used data from the Cardiovascular Health Study, participants were 5,317 men and women 65 years or more (4,735 from an original cohort recruited in 1989 to 1990,

and 582 from an African American cohort recruited in 1992 to 1993), the results found that the overall prevalence of frailty in the community-dwelling population was 6.9 %; the condition increased with age and was greater in women than men. Frailty was associated with being African American, having lower education and income, poorer health, and having higher rates of comorbid chronic diseases and disability. [5] A meta-analysis study reported the prevalence of frailty (17.4%) and pre-frailty (49.3%) in low and middle-income countries, [8] and a systemic review stated the mean frailty prevalence of 10.7% among 61,500 subjects (65 years of age or more) as well. [9] Two studies in Japan and China also reported the frailty prevalence of 7.4 and 13.1 %. [10,11]

Thailand is moving into a full-aging society. The United Nations reports that the proportion of the elderly population (60 years of age or more) in Thailand, and the prospect proportion will increase from 5.0% in 1950 to 20.0 and 29.8 % in 2017 and 2050, respectively. [12] United Nations reported that Thailand have largest change in the proportion of elderly population up to 13% between 2015 and 2030. [13] While the Department of Provincial Administration, Ministry of Interior, reported 15.07% (9,934,309 populations) elderly people in Thailand by the year 2016, compared to Lampang province of 19.83%. [14]

The study was aimed to determine the physical frailty phenotype among community-dwelling elderly people in a sub-district.

Material and Method

The investigation was a cross-sectional study. The data was gathered from 280 elderly people, 60 years of age or more, who are living in 3 villages of Thung Hua sub-district, Wang Nuea district, Lampang province. The exclusion criteria included communication ability, and the exclusion

included trouble walking, dementia, severe depression, and severe vision problems.

The frailty criteria required at least three of the five indicators. [5-7,15]

1) weight loss - self-reported weight loss of 4.5 kg or more unintentionally in the last year,

2) exhaustion - self-reported of either feeling that everything the person did was an effort in the last week (3 to 4 days per week or most of the time),

3) weakness: grip strength stratified by sex and body mass index that calculated as the weight in kilograms divided by the height in meter squared (men: ≤ 29 kg for $BMI \leq 24$, ≤ 30 kg for $BMI 24.1$ to 26.0 , ≤ 30 kg for $BMI 26.1$ to 28.0 , ≤ 32 kg for $BMI > 28$; women: ≤ 17 kg for $BMI \leq 23$, ≤ 17.3 kg for $BMI 23.1$ to 26.0 , ≤ 18 kg for $BMI 26.1$ to 29.0 , ≤ 21 kg for $BMI > 29$),

4) slowness - observed when walking 4.57 meters at usual place stratified for sex and height (men: time ≥ 7 seconds for height ≤ 173 cm, time ≥ 6 seconds for height > 173 cm; women: time ≥ 7 seconds for height ≤ 159 cm, time ≥ 6 seconds for height > 159 cm), and

5) low physical activity - using a version of the World Health Organization, Thailand (global physical activity questionnaire - GPAQ) [16] (men: energy expenditure < 383 Kcal on activity scale; women: < 270 Kcal on activity scale).

Descriptive statistics were distributed as means (standard deviations) and association between frailty variables were analyzed with Chi-square test, and $p < 0.05$ indicated the statistical significance.

The study was approved by the Research Ethics Committee of Regional of Health promotion 1 Ministry of Public Health, Thailand (No.40/2017).

Results

There were 48 (17.2%) phenotypic frailty persons among 280 elderly people. Their mean age (SD) was 72.79 (8.2) years, the majority was female (60.4%), healthy (81.3%), normal body mass index (50%), illiterate (56.3%), and married (64.6%). Only one-seventh (14.6%) had a job with average monthly income of 981.25 (641.03) Baht.

Two common frailty indicators were handgrip weakness (87.5%) and exhaustion (83.3%),

followed by slowness (68.8%), low physical activity (68.8%), and unintentional weight loss (25.0%), respectively. All of indicators were not significant related with sex and age, except elderly women had significantly lower proportion of slowness ($p<0.05$) than men, and the elderly people (75 years of age or less) had significantly higher unintentional weight loss than those over 75 years of age. (**Table 1**)

Table 1 Distribution of the proportion of frailty indicators with sex and age

N=48	Weight loss	Exhaustion	Weakness	Slowness	Low physical activity
Frailty indicator, %	25	83.3	87.5	68.8	68.8
Sex, male, %	21.1	73.3	94.7	47.4*	78.9
Age \leq 75 years, %	34.4*	84.4	81.3	68.8	71.9

* statistical significance, $p<0.05$

Discussion

Frailty prevalence of the community-dwelling older adults in the study was 17.2%. The figure is higher than several studies of USA, [5] Japan [10], and China [11], while similar to the report of low and middle-income countries. [8] The prevalence variety of frailty may due to the broad range of sociodemographic, physical, biological, lifestyle, and psychological factors show a longitudinal association with frailty. These factors should be considered when developing interventions aimed at preventing and/or reducing the burden associated with frailty among community-dwelling older adults. [17]

The study demonstrated two common frailty indicators of handgrip weakness and exhaustion, whereas a study reported that slowness is the most common frailty indicator and associated with physical activity. [18]

Meanwhile, the study result of 8,684 community-dwelling older people (65+) who participated in this cross-sectional study, based on

the five Fried frailty criteria, found that most frailty criteria were grip strength, walking speed, physical activity, exhaustion and weight loss, respectively [17,18] and cross-sectional study 484 frail older adults admitted to a geriatric day hospital unit showed that slow gait speed was the most informative component for frailty [19].

The study has several limitations to mention. First, the frailty components are influenced by the overlap between two physical frailty components, poor hearing and poor vision. Second, we used a cross-sectional design for determining the frailty characteristics; because of this design, strict cause-effect interpretations between the frailty components are not possible. Third, the sample is not representative; there is small sample ($n=48$), 60.4% of the participants were female, and focused on frail older adults 60 years and older. These differences in percentages can be explained by the fact that few people older than 90 years participated in our study.

In conclusion, we identified a prevalence of frailty among community-dwelling older adults was 17.2%. The most prevalence of frailty components among frail older adults were poor muscle strength (87.5%) and exhaustion (83.3%). Frailty components as slowness (68.8%), and low physical activity (68.8%) had the same proportion. We should be measure the frailty using physical frailty phenotype for screening and promote training program may prevent the frailty process.

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