Original article

Frailty and associated factors of elderly Buddhist monks in Chiang Mai Province, Thailand

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Objective To determine the prevalence of frailty and identify factors associated with frailty in elderly Buddhist monks in Chiang Mai Province.

Methods This cross-sectional descriptive study of elderly Buddhist monks (age ≥60 years) with a Barthel ADL score ≥12 living at temples in Muang District was conducted during the period 1 May through 30 June 2018. Each participating monk was interviewed and given a physical examination which included an assessment of frailty (using a modified version of the Fried's Frailty Phenotype) as well as an assessment of their current health status. Factors potentially associated with frailty were analyzed using Chi-square test and Fisher's exact test. Statistical analysis was done with SPSS for Windows version 22 software.

Results Of the 135 elderly Buddhist monks, most (80.0%) were in a state of pre-frailty and 7.4% were in a state of frailty. Positive criteria for frailty were low grip strength (85.2%), self-reported exhaustion (17.8%), slow walking speed (17.0%), low level of physical activity (4.4%) and unintentional weight loss (3.0%). Diabetes mellitus, polypharmacy, hospitalization in the past year, and abnormalities in the heart or extremities were statistically significantly associated with frailty ($p<0.05$).

Conclusion Most of the elderly Buddhist monks in the study were in a state of pre-frailty. Activities designed to increase grip strength and walking speed could potentially improve the health of these monks. A combination of frailty screening and comprehensive geriatric assessment should be used to evaluate the condition of each monk and identify appropriate treatment. **Chiang Mai Medical Journal 2019;58(4):211-21.**

Keywords: frailty, elderly Buddhist monks, Chiang Mai Province, Thailand

Introduction

Frailty is an age-related geriatric concept that refers to an increased vulnerability to stressors that results from a decrease in physiological reserves of multiple systems (1). With this condition, adaptability, dexterity, and ability to maintain balance become more difficult. Frailty (defined as exhibiting 3 or more of the 5 criteria in the Frailty Phenotype) also increases the risk of falling, confusion and disability. It is the most common disorder leading to death among the elderly (≥70 years) (2). The pre-frail condition (level 1 or 2 of the Frailty Phenotype) is associated with an increased risk of death (3).

Previous studies have found variation of the prevalence of frailty in the elderly. For example, An incidence of frailty of 6.9% in a community-dwelling elderly population (≥65 years) (4). The prevalence of frailty in 65 years old and over

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community-dwelling populations without disability in Europeans living in 10 countries to be 3.9% in Switzerland, 5.9% in Sweden, 6.6% in Austria, 8.2% in Germany, 8.5% in the Netherlands, 8.8% in Denmark, 9.3% in France, 11.3% in Greece, 14.3% in Italy, and 21.0% in Spain (5). A sample of 61,500 older persons (≥65 years) living in 21 communities around the globe and found the prevalence of frailty to range from 4.0 to 59.1% (6). 6.5% the English elderly (aged 60-69) were frail (7). Elderly individuals aged 60 and over who lived in suburban areas of Malaysia 5.7% were frail and were pre-frail 67.7% (8). In a pooled study reported the prevalence of frailty among elderly Japanese (age ≥65 years) as 7.4% (9). The prevalence of frailty in three Chinese populations (age ≥65 years) and found a prevalence of frailty in Hong Kong of 16.6%, in suburban areas of Taiwan of 33.1%, and in rural areas of Taiwan of 38.1% (10). A prevalence of frailty (2 or more of 4 criteria not including grip strength) among low and middle income country populations aged 65 years and over to be 10.2% in Cuba, 14.8% in the Dominican Republic, 9.2% in Puerto Rico, 14.6% in urban Peru, 14.5% in rural Peru, 8.4% in Venezuela, 11.4% in urban Mexico, 12.0% in rural Mexico, 1.8% in urban China, 2.8% in rural China, 15.2% in urban India and 11.4% in rural India (11).

Surveys of the prevalence of frailty in communities in Thailand found the incidence to be 43.5% in a community in Krabi Province (12), 32.1% in various communities in Bangkok (13), 26.4% in Serm Ngam District, Lampang Province (14), and 58.7% in a public residential home in the Bangkok metropolitan area (15).

Factors found to be related to frailty include diabetes mellitus, dementia, polypharmacy, and hospitalization among others. The presence of frailty depends on deterioration in muscle and nerve function, declining cardiopulmonary reserve and loss of executive function. Diabetes mellitus tends to cause impairment in each of these systems and may have some impact on the development of frailty (16). Frailty and dementia have emerged as priority areas in both research and clinical settings due to their high prevalence as well as to their negative impact on the individual's quality of life and on public health care resources (17). Polypharmacy is a common phenomenon in older populations, increasing the incidence of hospitalization. Older French people (70 years and over) found that 17.0% were categorized as frail and after adjustment for sociodemographic and health variables, polypharmacy (5-9 drugs) and excessive polypharmacy (10 drugs or more) were associated with frailty with odds ratio 1.77 (95% CI 1.20-2.61) and 4.47 (95% CI 2.37-8.42) (18). The relationship between frailty and polypharmacy in older people. Their systemic review suggested that polypharmacy was a major contributor to the development of frailty (19). 383 residents in six Australian residential care facilities for the elderly (aged 65 years and older) found that most frail residents had a higher risk of death than non-frail residents (20). In addition, a history of falling, underlying diseases, polypharmacy, having been hospitalized in the previous year, depression, and cognitive impairment have been shown to be the statistically significantly associated with frailty (p<0.05) (13).

Buddhist monks are a category of people that have self-care limitations (21). Data from Maharaj Nakorn Chiang Mai Hospital from 2015-2017 indicated that most elderly Thai Buddhist monks had underlying diseases such as diabetes mellitus and hypertension both of which were among the top five diseases affecting Buddhist monks treated at Maharaj Nakorn Chiang Mai Hospital. Similarly a study of Buddhist monks in Photharam Hospital, Ratchaburi Province, Thailand found that asthma, pulmonary emphysema, hypertension and diabetes mellitus resulted in monks requiring hospitalization. Factors that contributed to the onset of these diseases were include smoking, unhealthy diet, lack of physical exercise, and no physical health examinations (22).

Most Thai people are adherents of the Buddhist religion and respect Buddhist monks. However, while lay people live in homes with their family, Buddhist monks live in Buddhist temples with other monks. For that reason, when

monk develops illness, who will take care of him tends to problematical. As there have been no reports on the incidence of frailty among Buddhist monks, this study was designed to determine the prevalence of frailty and to identify frailty associated factors in a sample group of elderly Buddhist monks living in Chiang Mai Province as a first step in planning for the provision of suitable health care and health status monitoring among Buddhist monks.

Methods

Study design and population

This was a cross-sectional descriptive study of a purposely selected group of 135 elderly monks identified from a total population of 1,309 Buddhist monks (data form report of Buddhist monks living at temples in Muang District, Chiang Mai Province during 2017). The study was conducted between 1 May and 30 June 2018.

The sample size of 121 monks was calculated using the formula of Krejcie RV and Morgan DW (23) $S=X^2NP(1-P) \div [d^2(N-1) + X^2P(1-P)]$ where S= required sample size, X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (1.96 x 1.96=3.841), N= the population size, P= the population proportion (assumed to be 0.50 since this would provide the maximum sample size), d= the degree of accuracy expressed as a proportion (0.05)

Sample size of 121 came from

$$(1.96)^2(175)(0.5)(1-0.5)\div[(0.05)^2(175-1)+(1.96)^2(0.5)(1-0.5)]$$

There were a total of 185 elderly Buddhist monks (≥ 60 years) living in Muang District, Chiang Mai Province. Ten of those were included in a study pretest, leaving 175 monks. Inclusion criteria were being an ordained Buddhist monks age 60 or over, living at a temple in Muang District, Chiang Mai Province, the ability to communicate in the Thai language, and willingness to voluntarily participate in the study. Exclusion criteria were a Barthel ADL index scores <12 (i.e., individuals physically dependent on others for routine daily activities), death before the study began or relocation outside Muang District during the study. A total of 135 elderly Buddhist monks were enrolled in this study.

Data collection

After providing informed consent, each participant was interviewed about their demographics including age, years as a Buddhist monk, education level, dhamma scholar level, present Buddhist monk level, receipt of influenza vaccination in the past year, existence of underlying diseases, e.g., hypertension, diabetes mellitus, dyslipidemia, osteoarthritis, a fall in past year, polypharmacy (≥5 medications daily) (24), hospitalization in the past year, presently smoking or consuming alcohol and a history of drug allergy. The monks were given a physical examination which evaluated overall their health status and a frailty assessment conducted by the researcher and two assistant nurses with expertise in using the interviews tools as well as knowledge of physical examination procedures. For this study, normal body mass index (BMI) was defined as 18.5-22.9 kilograms/meter square (25), normal blood pressure (BP) was defined as ≤140/90 mmHg (26), and normal heart rate (HR) was defined as 60-100 beats per minute (27).

Frailty assessment and other assessments

A modified version of Fried's Frailty Phenotype was used for the frailty assessment. The modified criteria were seen as being more appropriate for the activities of monks than the original criteria. Five criteria were used to measure frailty. The first was grip strength, which was measured 3 times using a Sammons Preston 5030 Jamar Hydraulic Hand Dynamometer. Grip strength was evaluated using a combination of absolute grip strength (in kg) and body mass index (BMI) as it was assumed that someone at the same frailty level who had a higher BMI would also have a greater grip strength. Monks were considered frail if they had the following grip strength/BMI values: ≤29/≤ 24, 30/24.1-26, 30/26.1-28, and 32/> 28.

The second measure was slow walking speed. Walking speed was measured 2 times over a distance of 15 feet and was calculated using a

combination of absolute walking speed and height, i.e., taller monks were expected to be able to walk faster. Monks were rated frail if their mean walking time was ≤7 sec for a height ≤173 cm and ≤6 sec for a height >173 cm. The third category, low level of physical activity, was modified from the Global Physical Activity Questionnaire (GPAQ) (28) The final two categories were self-reported exhaustion and unintentional weight loss during the previous year. Individuals were classified as non-frail (meeting none of the above five criteria), pre-frail (meeting 1-2 of the criteria), or frail (meeting 3-5 of the criteria).

Other assessments in this study were the Patient Health Questionnaire (PHQ 9)(Thai language version) which was used to assess depression, with scoring of 7-12 = mild, 13-18 = moderate, and >19 = severe (29,30). Cognitive impairment assessment was done using the Mental State Examination (MSET10) (Thai language version) which is based on education level. Score/full score results indicating cognitive impairment were <13/22 for someone with no formal education, <16/29 for education below secondary school, and <21/29 for education at the secondary school level or above (29,31). Assessment of ability to perform daily routines was done using the Barthel Activities of Daily Living Index (BAI) (Thai language version). Barthel scores of 0-4, 5-11, and ≥12 indicated total dependence, partial dependence, and total independence respectively (29). Evaluation of nutritional status used the Mini Nutritional Assessment (MNA®) (Thai language version). Scores of 0-7, 8-11, and 12-14 indicated lack of nutrients, at risk of malnutrition, and normal nutrition, respectively (29,32).

Data quality control

The questionnaires used in this study were evaluated independently for validity and accuracy by three experts (Content Validity Index = 0.92). A pretest was conducted with ten elderly Buddhist monks after which area of potential confusion in individual questionnaire items were resolved. The data entered into the computer was double-checked for completeness and accuracy before conducting the data analysis.

Ethics approval and consent to participate

This study was approved by Research Ethics Committee, Faculty of Medicine, Chiang Mai University (No.137/2561). All procedures performed in the study involving human participants were conducted in accordance with the ethical standards of the institutional and/or national research committee. All participants signed informed consent forms.

Statistical analysis

Data analysis was done using SPSS for Windows version 22. Statistics are presented as mean ($\bar{X}$)±standard deviation (SD) or percentage. Nominal variables were analyzed by

Chi-square test (expected values >5) or Fisher's exact test (expected values >5). Statistical significance was set at $p<0.05$.

Results

The majority of the participants (62.2%) were <70 years old ($\bar{X}$=69.02, SD=7.40) and most (51.9%) had been a Buddhist monk for more than 30 years ($\bar{X}$=31.53, SD=19.93). In term of education, 51.1% had below a secondary school level, 63.7% were dhamma scholars at an advanced level, and 54.1% were below provost. In the area of health, 90.4% had not received an influenza vaccination in past year, 41.5% were polypharmacy, 25.2% had been hospitalization in the past year, 79.3% had underlying diseases, and 88.9% had abnormalities during their physical examination (Table 1).

Positive criteria for frailty and pre-frailty in the surveyed population included low grip strength (85.2%), self-reported exhaustion (17.8%), slow walking speed (17.0%), a low level of physical activity (4.4%) and unintentional weight loss (3.0%) (Table 2).

The evaluation categorized 12.6% of the participants as non-frail, 80.0% as pre-frail, and 7.4% frail (Table 3).

Factors associated with frailty among the elderly Buddhist monks living in Muang district,

Table 1. Baseline characteristics of participants (n=135)

Characteristics	n (%)
1. Age (years) ($\bar{X}$ = 69.02, SD = 7.40)	
< 70	84 (62.2)
≥ 70	51 (37.8)
2. Years as a Buddhist monk ($\bar{X}$ = 31.53, SD = 19.93)	
≤ 30	65 (48.1)
> 30	70 (51.9)
3. Education level	
Below secondary school	69 (51.1)
Secondary school or above	66 (48.9)
4. Dhamma scholar level	
Below advanced	49 (36.3)
Advanced	86 (63.7)
5. Present Buddhist monk	
Below provost	73 (54.1)
Provost or above	62 (45.9)
6. Influenza vaccination in past year	
No	122 (90.4)
Yes	13 (9.6)
7. Underlying diseases	
No	28 (20.7)
Yes	107 (79.3)
7.1 Hypertension	
No	67 (49.6)
Yes	68 (50.4)
7.2 Diabetes mellitus	
No	99 (73.3)
Yes	36 (26.7)
7.3 Dyslipidemia	
No	73 (54.1)
Yes	62 (45.9)
7.4 Osteoarthritis	
No	98 (72.6)
Yes	37 (27.4)
7.5 Other diseases	
No	48 (35.6)
Yes	87 (64.4)
8. Fall in past year	
- No	111 (82.2)
- Yes	24 (17.8)
9. Polypharmacy	
- No	79 (58.5)
- Yes	56 (41.5)
10. Hospitalization in past year	
- No	101 (74.8)
- Yes	34 (25.2)

Table 1. (Continuous)

Characteristics	n (%)
11. Smoking at present	
- No	113 (83.7)
- Yes	22 (16.3)
12. Alcohol consumption at present	
- No	135 (100.0)
- Yes	0 (0.0)
13. Drug allergy history	
- No	114 (94.4)
- Yes	21 (15.6)
14. Physical examination	
- Normal	15 (11.1)
- Abnormalities	120 (88.9)
14.1 Body mass index ($\bar{X}$ = 25.49, SD = 4.28 kilograms/meter square)	
- Normal	36 (26.7)
- Abnormalities	99 (73.3)
14.2 Blood pressure	
Systolic blood pressure ($\bar{X}$ = 138.28, SD = 18.94 mmHg)	
Diastolic blood pressure ($\bar{X}$ = 83.47, SD = 13.92 mmHg)	
- Normal	73 (54.1)
- Abnormalities	62 (45.9)
14.3 Pulse ($\bar{X}$ = 78.97, SD = 12.91 beats per minute)	
- Normal	129 (95.6)
- Abnormalities	6 (4.4)
14.4 Head, eyes, ears, nose, throat (HEENT)	
- Normal	127 (94.1)
- Abnormalities	8 (5.9)
14.5 Chest	
- Normal	134 (99.3)
- Abnormalities	1 (0.7)
14.6 Heart	
- Normal	133 (98.5)
- Abnormalities	2 (1.5)
14.7 Lungs	
- Normal	133 (98.5)
- Abnormalities	2 (1.5)
14.8 Abdomen	
- Normal	135 (100.0)
- Abnormalities	0 (0.0)
14.9 Extremities	
- Normal	120 (88.9)
- Abnormalities	15 (11.1)

Table 2. Five positive frailty criteria (n=135)

Criteria	Normal n (%)	Abnormal n (%)
1. Low grip strength	20 (14.8)	115 (85.2)
2. Slow walking speed	112 (83.0)	23 (17.0)
3. Low level of physical activity	129 (95.6)	6 (4.4)
4. Self-reported exhaustion	111 (82.2)	24 (17.8)
5. Unintentional weight loss	131 (97.0)	4 (3.0)

Table 3. Health status of participants (n=135)

Health status	n (%)
1. Frailty	
- Non-frail (0 criteria)	17 (12.6)
- Pre-frail (1-2 criteria)	108 (80.0)
- Frail (≥3 criteria)	10 (7.4)
2. Depression	
PHQ 9 points ($\overline{X}$ = 1.13, SD = 1.64)	
- No-depression (0-6 points)	134 (99.3)
- Mild depression (7-12 points)	1 (0.7)
3. Cognitive impairment	
MSET10 score ($\overline{X}$ = 26.41, SD= 2.68)	
- No	128 (94.8)
- Yes	7 (5.2)
4. Dependence in activities of daily living	
BAI score ($\overline{X}$ = 19.79, SD = 0.70)	
- Total independence (≥12)	135 (100.0)
5. Nutritional status	
MNA® score ($\overline{X}$ = 12.81, SD= 1.31)	
- Normal nutrition	114 (84.4)
- At risk of malnutrition	21 (15.6)

Chiang Mai Province were analyzed using the Chi-square test and Fisher's exact test. It was found that diabetes mellitus, polypharmacy, hospitalization in the past year, abnormal heart findings and abnormal extremities findings were factors statistically significantly associated with frailty (p<0.05) (Table 4).

Discussion

The prevalence of frailty found in this study (7.4%) was similar to that reported previous in studies of Americans (6.9%) (4), Europeans (3.9-21.0%) (5), English (6.5%) (7), Malaysian (5.7%) (8) and Japanese (7.4%) (9) but the incidence was lower than in previous studies of Chinese populations in Hong Kong (16.6%), suburban Taiwan (33.1%), rural Taiwan (38.1%) (10), Latin America and India (1.8-14.8%) (11). The prevalence of frailty among Thai monks in this study was lower than that reported in studies of lay Thai populations in a community, in Krabi Province (43.5%) (12) in communities in Bangkok (32.1%) (13) in Serm Ngam District, Lampang Province (26.4%) (14), and in a public residential home, in the Bangkok metropolitan area (58.7%) (15).

Healthy aging is defined as the process of developing and maintaining a level of functional ability that enables wellbeing in older age. Functional ability includes the intrinsic physical and mental capacity of the individual, relevant environmental characteristics (home, social, community, etc.), and the interaction between them. Limitations in physical capacity in different settings found differences in the lives of the aging, e.g. elderly living in a less enabling environment may find daily life activities much more difficult (33). This may be a factor in the variation in the prevalence of pre-frailty reported in different studies.

The prevalence of frailty has been shown to be impacted by modifications in the frailty phenotype with the criteria physical inactivity and weight loss being the most often modified (34). This study used GPAQ for modified low physical activity criteria because we considered the modified criteria to be more appropriate for the activities of the monk than the original. The criteria which was most frequently associated with elderly Buddhist monks classified as frail or pre-frail was low grip strength (85.2%).

Recommendations for management of frailty provided by experts in the Asia Pacific region include that all older adult with frailty should be referred to a progressive, individualized physical activity program that includes resistance training components (33,35). Based on our study, a program to increase grip strength and increase walking speed should be part of a health promotion program for elderly Buddhist monks. Diabetes mellitus, polypharmacy, hospitalization in the past year, abnormal heart findings, and abnormal

Table 4. Association between frailty and demographics, health status (n=135)

Factors	Frailty classification			*p*-value
	Non-frail n (%)	Pre-frail n (%)	Frail n (%)	
1. Age (years)				0.836
- < 70	11 (64.7)	66 (61.1)	7 (70.0)	
- ≥ 70	6 (35.3)	42 (38.9)	3 (30.0)	
2. Years as Buddhist monk				0.856
- ≤ 30	8 (47.1)	53 (49.1)	4 (40.0)	
- > 30	9 (52.9)	55 (50.9)	6 (60.0)	
3. Educational level				0.443
- Below secondary school	9 (52.9)	53 (49.1)	7 (70.0)	
- Secondary school or above	8 (47.1)	55 (50.9)	3 (30.0)	
4. Dhamma scholar level				0.431
- Below advanced	4 (23.5)	42 (38.9)	3 (30.0)	
- Advanced	13 (76.5)	66 (61.1)	7 (70.0)	
5. Present Buddhist monk rank				0.210
- Below provost	11 (64.7)	59 (54.6)	3 (30.0)	
- Provost or above	6 (35.3)	49 (45.4)	7 (70.0)	
6. Influenza vaccination in past year				0.214
- No	17 (100.0)	97 (89.8)	8 (80.0)	
- Yes	0 (0.0)	11 (10.2)	2 (20.0)	
7. Underlying diseases				0.060
- No	7 (41.2)	20 (18.5)	1 (10.0)	
- Yes	10 (58.8)	88 (81.5)	9 (90.0)	
7.1 Hypertension				0.080
- No	11 (64.7)	54 (50.0)	2 (20.0)	
- Yes	6 (35.3)	54 (50.0)	8 (80.0)	
7.2 Diabetes mellitus				0.022*
- No	15 (88.2)	80 (74.1)	4 (40.0)	
- Yes	2 (11.8)	28 (25.9)	6 (60.0)	
7.3 Dyslipidemia				0.122
- No	12 (70.6)	58 (53.7)	3 (30.0)	
- Yes	5 (29.4)	50 (46.3)	7 (70.0)	
7.4 Osteoarthritis				0.104
- No	16 (94.1)	75 (69.4)	7 (70.0)	
- Yes	1 (5.9)	33(30.6)	3(30.0)	
7.5 Other diseases				0.146
- No	8 (47.1)	39 (36.1)	1 (10.0)	
- Yes	9 (52.9)	69 (63.9)	9 (90.0)	
8. Fall in past year				0.982
- No	14 (82.4)	89 (82.4)	8 (80.0)	
- Yes	3 (17.6)	19 (17.6)	2 (20.0)	
9. Polypharmacy				0.008*
- No	15 (88.2)	61 (56.5)	3 (30.0)	
- Yes	2 (11.8)	47 (43.5)	7 (70.0)	
10. Hospitalized in past year				0.007*
- No	16 (94.1)	81 (75.0)	4 (40.0)	
-Yes	1 (5.9)	27 (25.0)	6 (60.0)	
11. Smoking				0.629
- No	13 (76.5)	92 (85.2)	8 (80.0)	
- Yes	4 (23.5)	16 (14.8)	2 (20.0)	

Table 4. Continuous

Factors	Frailty classification			*p*-value
	Non-frail n (%)	Pre-frail n (%)	Frail n (%)	
12. Alcohol drinking				NA
- No	17 (100.0)	108 (100.0)	10 (100.0)	
- Yes	0 (0.0)	0 (0.0)	0 (0.0)	
13. Drug allergy history				0.392
- No	14 (82.4)	93 (86.1)	7 (70.0)	
- Yes	3 (17.6)	15 (13.9)	3 (30.0)	
14. Physical examination				0.371
- Normal	3 (17.6)	12 (11.1)	0 (0.0)	
- Abnormalities	14 (82.4)	96 (88.9)	10 (100.0)	
14.1 Body mass index				0.381
- Normal	6 (35.3)	26 (24.1)	4 (40.0)	
- Abnormalities	11 (64.7)	82 (75.9)	6 (60.0)	
14.2 Blood pressure				0.329
- Normal	11 (64.7)	55 (50.9)	7 (70.0)	
- Abnormalities	6 (35.3)	53 (49.1)	3 (30.0)	
14.3 Pulse				0.456
- Normal	17 (100.0)	102 (94.4)	10 (100.0)	
- Abnormalities	0 (0.0)	6 (6.6)	0 (0.0)	
14.4 HEENT				0.490
- Normal	17 (100.0)	101 (93.5)	9 (90.0)	
- Abnormalities	0 (0.0)	7 (6.5)	1 (10.0)	
14.5 Chest				0.882
- Normal	17 (100.0)	107 (99.1)	10 (100.0)	
- Abnormalities	0 (0.0)	1 (0.9)	0 (0.0)	
14.6 Heart				0.012*
- Normal	16 (94.1)	108 (100.0)	9 (90.0)	
- Abnormalities	1 (5.9)	0 (0.0)	1 (10.0)	
14.7 Lungs				0.776
- Normal	17 (100.0)	106 (98.1)	10 (100.0)	
- Abnormalities	0 (0.0)	2 (1.9)	0 (0.0)	
14.8 Abdomen				NA
- Normal	17 (100.0)	108 (100.0)	10 (100.0)	
- Abnormalities	0 (0.0)	0 (0.0)	0 (0.0)	
14.9 Extremities				<0.001*
- Normal	15 (88.2)	100 (92.6)	5 (50.0)	
- Abnormalities	2 (11.8)	8 (7.4)	5 (50.0)	
15. Depression				0.882
- No	17 (100.0)	107 (99.1)	10 (100.0)	
- Yes (Mild)	0 (0.0)	1 (0.9)	0 (0.0)	
16. Cognitive impairment				0.065
- No	17 (100.0)	103 (95.4)	8 (80.0)	
- Yes	0 (0.0)	5 (4.6)	2 (20.0)	
17. Nutrition status				0.055
- Normal nutrition	16 (94.1)	92 (85.2)	6 (60.0)	
- At risk of malnutrition	1 (5.9)	16 (14.8)	4 (40.0)	

*Statistically significant ($p< 0.05$), NA; data not analyzed

extremities findings were factors statistically significantly associated with frailty in this study (p<0.05). These factors were also described in a report from comprehensive geriatric assessment conducted by groups of Asia-Pacific experts (35). Similar to previous studies in Thai population samples, hospitalization in the past year and polypharmacy were also found to be associated with frailty (p<0.05) (13). Our results are also similar to studies done in French population samples which found 17.0% of individuals aged 70 or over were categorized as frail and that polypharmacy was associated with frailty in 53.6% of those cases (18).

This study is the first to investigate the prevalence of frailty and to identify associated factors in elderly Buddhist monks. A combination of frailty screening tools and comprehensive geriatric assessment were used in both diagnosis and post-study treatment. A combination of frailty screening tools and comprehensive geriatric assessment should be used to evaluate the monks and to assess benefits of treatment (33). The benefits of this screening program could be expanded if healthcare providers were able to use it. It was available not only in a primary healthcare setting but also in secondary and tertiary healthcare centers.

Conclusion

Of the elderly Buddhist monks in this study 7.4% were categorized as frail while 80.0% were categorized as pre-frail. Diabetes mellitus, polypharmacy, hospitalization in the past year, abnormal heart findings, and abnormal extremities findings were factors statistically significantly associated with frailty (p<0.05). Health promotion, including activities to increase grip strength and walking speed, could help reduce incidence of frailty and pre-frailty in elderly Buddhist monks.

Further study of elderly Buddhist monks in diverse areas is needed. Health care centers should develop health promotion and prevention programs to reduce avoidable premature disability and dependency in elderly Buddhist monks.

Limitations of the study

A limitation of our study is that it focused exclusively on Buddhist monks in urban areas. There may be differences in the incidence of frailty and factors associated with frailty among elderly Buddhist monks in rural areas and in smaller communities.

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List of abbreviations

BMI: body mass index; BP: Blood pressure; HR: Heart rate; PHQ 9: Patient Health Questionnaire; MSET10: The Mental State Examination; BAI: The Barthel Activities of Daily Living Index; MNA®: The Mini Nutritional Assessment

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Conflicts of interest

There is no conflicts of interest in this study.

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ความชุกและปัจจัยที่เกี่ยวข้องของภาวะเปราะบางในพระสงฆ์สูงอายุในจังหวัดเชียงใหม่ ประเทศไทย

ถวัลย์รัตน์ รัตนสิริ และ พีระศักดิ์ เลิศตระการนนท์
ภาควิชาเวชศาสตร์ครอบครัว คณะแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่

วัตถุประสงค์ เพื่อศึกษาความชุกและปัจจัยที่เกี่ยวข้องของภาวะเปราะบางในพระสงฆ์สูงอายุ จังหวัดเชียงใหม่

วิธีการ เป็นการวิจัยเชิงพรรณาภาคตัดขวาง ในพระสงฆ์ที่มีอายุ ≥60 ปี และมี Barthel ADL score ≥12 คะแนน ที่จำพรรษาในวัดเขตอำเภอเมือง จังหวัดเชียงใหม่ โดยประเมินภาวะเปราะบาง (โดยใช้แบบประเมิน Modified Version of the Fried's Frailty Phenotype) และประเมินสุขภาพทั่วไป

ผลการศึกษา จากการศึกษาพระสงฆ์สูงอายุ จำนวนทั้งหมด 135 รูป ร้อยละ 80.0 เริ่มมีภาวะเปราะบาง ร้อยละ 7.4 มีภาวะเปราะบางในกลุ่มพระสงฆ์ที่มีภาวะเปราะบาง ได้รับการวินิจฉัยว่ามีภาวะเปราะบางจากแรงบีบมือต่ำกว่าเกณฑ์มาตรฐาน (ร้อยละ 85.2) รู้สึกเหนื่อยล้าในการใช้ชีวิตประจำวัน (ร้อยละ 17.8) ความเร็วในการเดินต่ำกว่าเกณฑ์มาตรฐาน (ร้อยละ 17.0) และเกณฑ์อื่น ๆ อีก (ร้อยละ 7.4) ปัจจัยที่เกี่ยวข้องกับภาวะเปราะบางอย่างมีนัยสำคัญทางสถิติ (p <0.05) ได้แก่ โรคเบาหวาน การใช้ยาหลายชนิด ประวัติการเข้านอนโรงพยาบาลในช่วง 1 ปีที่ผ่านมา ความผิดปกติของหัวใจและความผิดปกติของระยางค์

สรุป พระสงฆ์สูงอายุส่วนใหญ่อยู่ในช่วงเริ่มมีภาวะเปราะบาง กิจกรรมที่ช่วยเพิ่มความแข็งแรงของแรงบีบมือและความคล่องตัวในการเดิน จะช่วยทำให้พระสงฆ์มีสุขภาพที่ดีขึ้นได้ การคัดกรองภาวะเปราะบางร่วมกับการประเมินภาวะสูงอายุแบบองค์รวม ควรถูกนำมาใช้ในการประเมินพระสงฆ์ เพื่อให้การดูแลรักษาที่เหมาะสม
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คำสำคัญ: ภาวะเปราะบาง พระสงฆ์สูงอายุ จังหวัดเชียงใหม่ ประเทศไทย