Factors Associated with Physical Frailty in Elderly Women with Low Socioeconomic Status in Urban Communities: A Cross-Sectional Study

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ABSTRAK

Latar belakang: *terdapat perbedaan faktor-faktor yang berhubungan dengan sindrom frailty pada populasi lanjut usia (lansia). Penelitian ini bertujuan untuk mengetahui proporsi perempuan lansia yang fit/ robust, pre-frail dan frail serta faktor-faktor yang berhubungan dengan physical frailty pada perempuan lansia di komunitas perkotaan.* ***Metode:*** *studi potong lintang pada perempuan berusia ≥60 tahun di area Jakarta Barat dan Pusat, Indonesia selama bulan Juli sampai September 2017. Sistem skor frailty berdasarkan Cardiovascular Health Study (CHS) untuk menentukan fit, pre-frail dan frail. Uji Chi-Square dan analisis regresi logistik dilakukan untuk menentukan hubungan antara variabel independen dengan sindrom frailty.* ***Hasil:*** *terdapat 325 subjek dengan median usia 67 (60–94) tahun, 95,7% dengan penghasilan di bawah Upah Minimum Provinsi/UMP-DKI Jakarta, tahun 2017 (<Rp.3.300.000≈238 USD/bulan), dan 92,6% dengan tingkat pendidikan 9 tahun ke bawah. Proporsi subjek yang tergolong fit (12,6%), pre-frail (63,4%) dan frail (24%). Analisis multivariat (regresi logistik) akhir mendapatkan faktor usia (>70 tahun) [OR 5,27], skor Barthel Index for Activities of Daily Living (B-ADL) yang lebih rendah [OR 2,85], gejala depresi [OR 6,79], dan indeks Euro Quality of Life-5 Dimensions (EQ-5D) [OR 1,96], yang berhubungan bermakna dengan sindrom frailty.* ***Kesimpulan:*** *proporsi kelompok perempuan lansia dengan status sosial ekonomi rendah di komunitas perkotaan, yang tergolong fit 12,6%, pre-frail 63,4% dan frail 24%. Faktor-faktor yang berhubungan dengan sindrom frailty adalah usia di atas 70 tahun, adanya gejala depresi, serta skor status fungsional dan indeks kualitas hidup terkait kesehatan yang lebih rendah.*

Kata kunci: *komunitas perkotaan, perempuan lansia, physical frailty, status sosial ekonomi rendah.*

ABSTRACT

Background: *there are differences in factors associated with frailty syndrome in elderly population. The aim of this research was to determine frailty status (fit, pre-frail and frail) and to identify factors associated with physical frailty in urban community-dwelling elderly women.* ***Methods:*** *a cross-sectional study of community-dwelling women aged 60 years and older was conducted in West and Central Jakarta regions, Indonesia, from July until September 2017. The Cardiovascular Health Study (CHS) score was used to determine frailty status (fit/ pre-frail/ frail). Chi-Square Test and logistic regression analysis were used to determine association between independent variables and physical frailty.* ***Results:*** *there were 325 female subjects with a median age of 67 (60–94) years; 95.7% had income below the Provincial Minimum Income of DKI Jakarta in 2017 (<3.3 million IDR≈238 USD/month), and 92.6% had a level of education ≤9 years. Subjects were classified into this following groups: fit*

(12.6%), pre-frail (63.4%) and frail (24%). Factors associated with physical frailty were age above 70 years old with OR 5.27, lower Barthel Index for Activities of Daily Living (B-ADL) with OR 2.85, depressive symptoms with OR 6.79, and Euro Quality of Life-5 Dimensions (EQ-5D) index with OR 1.96. ***Conclusion:*** *elderly women in the urban community with low socioeconomic status were classified as fit (12.6%), pre-frail (63.4%) and frail (24%). Factors associated with physical frailty were age above 70 years old, depressive symptoms, lower functional status and health-related quality of life index.*

Keywords: *elderly women, low socioeconomic status, physical frailty, urban community.*

INTRODUCTION

Indonesia has an aging population, which is based on the percentage of the elderly population in 2012 reaching more than 7% of the total population.[1] The National Socioeconomic Survey (Susenas) data in 2014 showed that the proportion of elderly women in Indonesia (both in urban and rural areas) was higher than men.[2] Unfortunately, research by Woo et al.[3] in Hong Kong suggests that female gender is associated with a higher incidence of frailty syndrome and is considered an intrinsic risk factor.[3,4] Along with the increasing population of elderly people (especially women) in Indonesia, elderly women in frail condition will also be found more often in society.

Frailty can be seen as a clinical syndrome (phenotype) or accumulation of comorbidities (deficits) occurring in the elderly with a pathological aging process.[5,6] The Cardiovascular Health Study (CHS) score system is used to determine the condition of elderly individuals as fit/robust, pre-frail, or frail. It is the most commonly used scoring system in frailty syndrome studies, particularly in the community, and has good predictive ability (area under curve [AUC] mortality of 0.72).[7,8] The main risk factors affecting the occurrence of frailty are genetics, age, unhealthy lifestyles/environments, and illnesses (including subclinical or consequences of certain trauma).[9] Other associated factors include low socioeconomic status, nutritional status, cognitive impairment, chronic inflammation, and depression.[6,9-12] A direct association between frailty and elevated levels of inflammation, as marked by elevated interleukin-6 (IL-6), C-reactive protein (CRP), fibrinogen, and factor VIII, independent of common chronic disease states has been observed.[9] In Indonesia, no studies have specifically assessed the factors associated with frailty syndrome in community-dwelling elderly women. This study aimed to determine further the association between various factors, including sociodemographic, clinical (cognitive, nutritional, functional and mental status/symptoms of depression), and laboratory (serum CRP) factors and frailty syndrome in urban community-dwelling elderly women.

METHODS

This was a cross-sectional study used to determine the factors associated with frailty syndrome in urban community-dwelling elderly women. It was conducted between July and September 2017 in *Rukun Warga* (RW) 01–09, *Kelurahan* Kalianyar (*Kecamatan* Tambora, West Jakarta, Indonesia) and community-based elderly daycare facilities (established by the government), referred to as *Pusat Santunan Dalam Keluarga* (PUSAKA), in the Central Jakarta region (consisting of PUSAKA 5 (Menteng), 10 (Kali Pasir), 34A (Percetakan Negara), 34B (Kramat Jaya Baru), and 120 (Kramat Sentiong). The inclusion criteria were elderly women (aged 60 years old and above) and a willingness to participate. The exclusion criteria were total immobility and acute disease, including respiratory infections, arthritis, stroke, angina pectoris, emergency/urgency hypertension, and exacerbations of chronic obstructive pulmonary disease (COPD). Eligible subjects were recruited with consecutive sampling. After providing written informed consent, eligible subjects underwent several examinations. The collected data consisted of demographics (age, level of education, and income), functional status (Barthel Index for Activities of Daily Living [B-ADL], cognitive status (Abbreviated Mental

Test [AMT]), nutritional status (Mini Nutritional Assessment [MNA] full-form), depressive symptoms (15-item-Geriatric Depression Scale [GDS]), comorbidities (Cumulative Illness Rating Scale for Geriatrics [CIRS-G]), polypharmacy (>4 drugs), and health-related quality of life (EQ-5D index with 3-Likert Scale, using Japan as the reference to determine the optimal cut-off of the study). Assessment of frailty status (fit, pre-frail, and frail) was performed using the CHS scoring system.[3,4]

Physical examinations and anthropometry were also performed. Handgrip strength of the dominant hand was assessed using a Jamar hydraulic handheld dynamometer model J0015 and was conducted in accordance with the American Society of Hand Therapists (ASHT) recommended procedure.[23] The 15-foot walking test was performed to measure usual gait speed. Detection for low-grade chronic inflammation related to the aging process ("inflammaging") was made based on the results of quantitative serum CRP.

Sample size was determined by equation of hypothesis of two proportion with alpha (α) 5% and power 80%. The bivariate analysis for categorical variables was performed using Chi-Square analysis, which compared the non-frail (fit and pre-frail) group with the frail group. Bivariate analysis applied a 95% confidence interval (CI) and p-value of each factor/variable. Furthermore, variables with $p<0.25$ in bivariate analysis were incorporated into the multivariate analysis. The multivariate analysis was performed with logistic regression (backward method) to get an independent variable(s) which associated significantly ($p<0.05$) with frailty syndrome. All analyses were performed using the Statistical Package for the Social Sciences (SPSS) software version 20.0 (SPSS Inc., Chicago, IL). This study was approved by The Ethical Committee of Faculty of Medicine, Universitas Indonesia (No. 470/UN2.F1/ETIK/2017).

RESULTS

There were 328 subjects recruited, but one was excluded due to refusal to undergo laboratory examination and two were excluded because they were in an acute disease phase. This resulted in 325 subjects who were eligible for the study. The median age of the subjects was 67 (min–max: 60–94) years old. Most of the subjects (92.6%) had only completed up to junior high school (≤9 years of education). Most had a monthly income below 238 USD (95.7%). The most common comorbidity was mild musculoskeletal disease (53.5%), and 76.9% had a CIRS-G score below 5. Polypharmacy was found in only 4.6% of subjects, and analgesic/non-steroidal anti-

Table 1. Sociodemographic characteristics of the subjects (n=325)

Variables	Values
Age (years), median (min–max)	67 (60–94)
Age Group (years), n (%)	
- 60–69	208 (64)
- 70–79	97 (29.8)
- ≥80	20 (6.2)
Level of Education (years), n (%)	
- Low (0–9)	301 (92.6)
- Medium (10–12)	17 (5.2)
- High (>12)	7 (2.2)
Income Level (million IDR/month), n (%)	
- <1	142 (43.7)
- 1–3.3*	169 (52)
- >3.3*	14 (4.3)
Comorbidity, n (%)	
- Musculoskeletal disease (mild)	174 (53.5)
- Hypertension	140 (43.1)
- Upper gastrointestinal disease (mild)	101 (31.1)
- Diabetes Mellitus	88 (27.1)
- Impairment of vision and/or hearing (mild)	77 (23.7)
CIRS-G score, n (%)	
- <5	250 (76.9)
- ≥5	75 (23.1)
Polypharmacy, n (%)	
- Yes	15 (4.6)
- No	310 (95.4)
Medications used, n (%)	
- Analgesic/NSAID	88 (27.1)
- Calcium channel blocker (CCB)	78 (24)
- Vitamin B	34 (10.5)
- Angiotensin Converting Enzyme (ACE) inhibitor	30 (9.2)
- Metformin	30 (9.2)

min–max: minimum–maximum, NSAID: Non-Steroid Anti-Inflammatory Drug
*Provincial Minimum Income in DKI Jakarta (2017): 3.355.750 IDR (~238 USD) per month.

inflammatory drugs (NSAID) were consumed by 27.1% of all subjects (**Table 1**).

The proportion of independent subjects (B-ADL score: 20) was 86.2%. There were 44 subjects (13.5%) who had mild dependency due to problem in going up and dows stairs. Cognitive status (AMT) showed normal results in 73.2% of subjects. The median on the Physical Activity Scale for the Elderly (PASE) was 322 (42.0–2704.8) Kcal/week. The mean (SD) for handgrip strength was 15.5 (4.3) kg. The median time required to walk 15 feet (≈4.57 meters) or 15-foot walking time was 5.41 (2.29–24.9) seconds. The median speed of walking (usual gait speed) was 0.84 (0.18–2.0) meters/second. The median for quantitative serum CRP level was 0.24 mg/dL (0.02–10.51) (**Table 2**).

Table 2. Functional status, psycho-cognitive status, activity level, health-related quality of life, and serum CRP characteristics of the subjects (n=325)

Variables	Values
Functional Status	
B-ADL (score), n (%)	
- Independence (20)	280 (86.2)
- Mild dependency (12–19)	44 (13.5)
- Moderate dependency (9–11)	1 (0.3)
Cognitive Status (AMT Score), n (%)	
- Normal (8–10)	238 (73.2)
- Mild Memory Disorder (4–7)	73 (22.5)
- Severe Memory Disorder (0–3)	14 (4.3)
Depressive Symptoms (GDS score), n (%)	
- Normal (0–4)	277 (85.2)
- Suggestive of Depression (5–9)	33 (10.2)
- Indicative of Depression (≥10)	15 (4.6)
PASE score (Kcal/week), median (min–max)	322 (42.0–2704.8)
Handgrip strength (kg), mean (SD)	15.5 (4.3)
Walking time* (seconds), median (min–max)	5.41 (2.29–24.9)
Gait Speed (meters/second), median (min–max)	0.84 (0.18–2.0)
Health-related Quality of Life	
- EQ-5D index, median (min–max)	76.8 (41.8–100)
- EQ-5D VAS, median (min–max)	70 (10–100)
CRP (mg/dL), median (min–max)	0.24 (0.02–10.51)

min–max: minimum–maximum, SD: Standard Deviation
*from 15-foot walking test

Symptoms of depression were found in 4.6% of subjects. Median health-related quality of life (EQ-5D) index after conversion using the reference from Japan was 76.8 (41.8–100). Meanwhile, subjective perceptions about the current level of health reflected in the EQ-5D Visual Analog Scale (VAS), showed a median of 70 (10–100). Then, the Spearman correlation test was performed and a statistically significant positive low correlation was found between health-related quality of life index (EQ-5D) and EQ-5D VAS ($r=0.245$; $p<0.001$; $r2=0.06$) (**Table 2**).

Based on the MNA score (full-form), the proportion of subjects with normal nutritional status, at risk for malnourished, and malnourished was 48.3%, 47.4%, and 4.3%, respectively. Based on the Asia-Pacific criteria for body mass index (BMI), more than half of all subjects (60.6%) were classified in the overweight-obesity category, followed by normal BMI (26.5%), and underweight (12.9%). The mean (SD) for mid-arm, waist, and calf circumference were 27.1 (4.2) cm, 87.8 (13.2), and 30.5 (4.8) cm, respectively (**Table 3**).

The proportion of subjects classified as fit, pre-frail, and frail was 12.6%, 63.4%, and 24%, respectively. Weakness (poor handgrip strength)

Table 3. Nutritional status and anthropometric characteristics of subjects (n=325)

Variables	Values
Nutritional Status (MNA Score), n (%)	
- Normal (≥24)	157 (48.3)
- At risk for malnourished (17–23.5)	154 (47.4)
- Malnourished (<17)	14 (4.3)
BMI* (kg/m2), n (%)	
- <18.5 (Underweight)	42 (12.9)
- 18.5–22.9 (Normal)	86 (26.5)
- ≥23–24.9 (Overweight)	44 (13.5)
- 25–29.9 (Obese I)	90 (27.7)
- ≥30 (Obese II)	63 (19.4)
Mid-arm circumference (cm), mean (SD)	27.1 (4.2)
Waist circumference (cm), mean (SD)	87.8 (13.2)
Calf circumference (cm), mean (SD)	30.5 (4.8)
Triceps Skinfold (mm), median (min–max)	6.8 (1.6–31.8)

*Asia-Pacific Criteria for BMI, SD: standard deviation, min-max: minimum–maximum

and low physical activity were the most common manifestations of physical frailty found in frail (89.7%) and pre-frail (74.3%) groups. Otherwise, unintended weight loss showed as the least common manifestation. (**Figure 1**)

The result of the Chi-Square test showed factors associated with frailty, including age with OR 4.99, lower B-ADL score with OR 3.82, lower AMT score with OR 1.99, malnourished (MNA<17 and/or BMI<18.5 kg/m2) with OR 1.94, depressive symptoms with OR 7.11, and comorbidity (CIRS-G) with OR 1.71. The mean difference of health-related quality of life indices between the two groups was found to be significant. (**Table 4**)

The independent variables with p<0.25 from the results of bivariate analysis were age (p<0.001), decreased functional status based on B-ADL (p<0.001), decreased cognitive status (p=0.013), malnourished (p=0.087), depressive symptoms (p<0.001), and comorbidity (p=0.090). The health-related quality of life index parameters (EQ-5D and EQ-5D VAS), using the optimal cutoffs of this study, were 72 (AUC 58% [95% CI 50.4–65.6]) and 75 (AUC 59.5% [95% CI 52.2–66.9]), respectively. **Table 5** shows a final multivariate analysis of factors associated with frailty in elderly women, consisting of age (>70 years), decreased functional status (B-ADL score<20), depression symptoms (GDS score ≥10), and decreased health-related quality of life (EQ-5D index and EQ-5D VAS).

DISCUSSION

This study consisted of 325 women aged 60 years and older who lived in six different locations/communities and agreed to participate in the study. The proportion of elderly subjects who resided in PUSAKA, Central Jakarta Area (PUSAKA 5, 10, 34A, 34B, and 120) comprised 70% of the subjects, and the rest were residents of Kelurahan Kalianyar (West Jakarta). Therefore, the characteristics of this study mainly reflect the characteristics of elderly women in PUSAKA. The establishment of PUSAKA, a kind of day care, was initiated by the Jakarta Provincial Government in 1987. It is a social service for community-dwelling elderly people that most

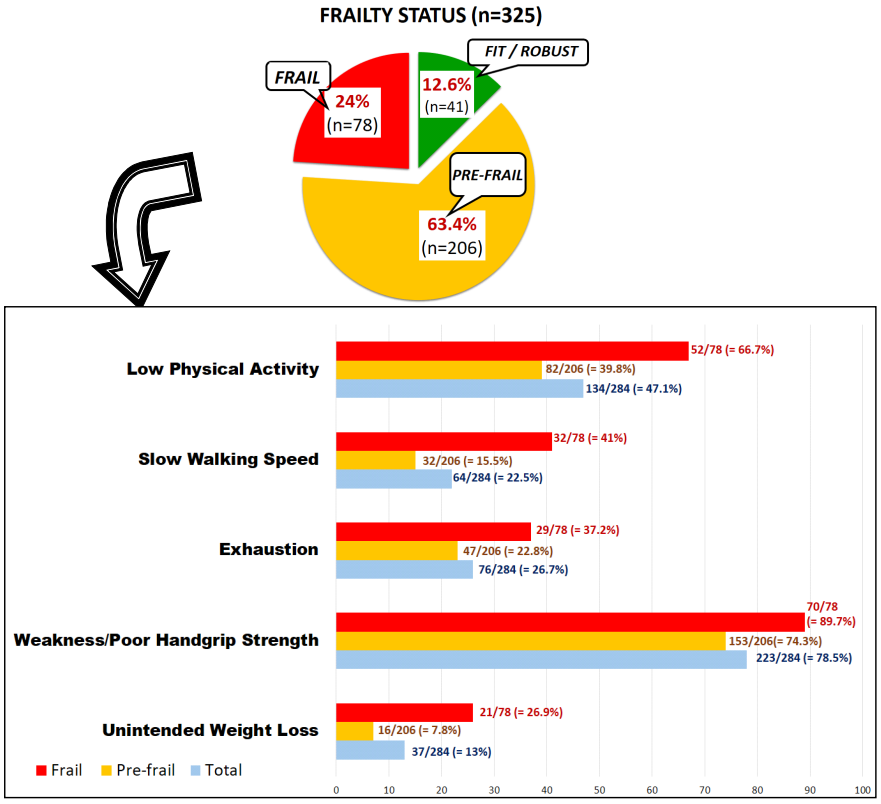

Figure 1. The proportion of frailty components (CHS)

Table 4. Bivariate analysis for factors associated with frailty

Variables	Frailty Status [n (%)]		OR (95% CI)	P value
	Frail (n=78)	Non-Frail (n=247)		
Age (years old)				
- >70	45 (57.7)	53 (21.5)	4.99	<0.001*
- ≤70	33 (42.3)	194 (78.5)	(2.90–8.58)	
Low income level				
- Yes	75 (96.2)	236 (9.5)	1.16	1.000
- No	3 (3.8)	11 (4.5)	(0.31–4.28)	
Low education level (<9 years)				
- Yes	74 (94.9)	227 (91.9)	1.63	0.531
- No	4 (5.1)	20 (8.1)	(0.54–4.92)	
Decreased functional status (B-ADL score <20)				
- Yes	22 (28.2)	23 (9.3)	3.82	<0.001*
- No	56 (71.8)	224 (90.7)	(1.99–7.35)	
Decreased cognitive status (AMT score <8)				
- Yes	54 (69.2)	131 (53.0)	1.99	0.013*
- No	24 (30.8)	116 (47.0)	(1.15–3.42)	
Malnourished (MNA score<17 and/or BMI<18.5 kg/m^2)				
- Yes	15 (19.2)	27 (10.9)	1.94	0.087*
- No	63 (80.8)	220 (89.1)	(0.97–3.87)	
Depressive symptoms (GDS score ≥10)				
- Yes	10 (12.8)	5 (2.0)	7.11	<0.001*
- No	68 (87.2)	242 (98.0)	(2.35–21.52)	
Comorbidity (CIRS-G score ≥5)				
- Yes	24 (30.8)	51 (20.6)	1.71	0.090*
- No	54 (69.2)	196 (79.4)	(0.96–3.024)	
Polypharmacy				
- Yes	5 (6.4)	10 (4.0)	1.62	0.577
- No	73 (93.6)	237 (96.0)	(0.53–4.90)	
High CRP (≥0.25 mg/dL)				
- Yes	37 (47.4)	125 (50.6)	0.88	0.720
- No	41 (52.6)	122 (49.4)	(0.52–1.46)	
EQ-5D index, median (min–max)	70 (20–100)	75 (10–100)	-	0.010*
EQ-5D VAS, median (min–max)	69.3(41.8–100.0)	76.8 (52.7–100)	-	0.030*

CI: Confidence Interval, OR: Odds Ratio, *p<0.25, Non-frail=Pre-frail and Fit subjects

Table 5. Final multivariate model of factors associated with frailty

Variables	OR (95% CI)	P value
Age (>70 years old)	5.27 (2.92–9.52)	<0.001
Decreased functional status (B-ADL score<20)	2.85 (1.37–5.94)	0.005
Depressive symptoms (GDS score ≥10)	6.79 (1.98–23.25)	0.002
Decreased health-related quality of life		
(EQ-5D index<72)	1.96 (1.09–3.52)	0.024
(EQ-5D VAS<75)	1.93 (1.06–3.53)	0.031

of them still live with their families. PUSAKA is located in every area of the urban village/ Kelurahan (only in DKI Jakarta) and its main task is to assist with fulfilling the basic needs of the elderly in need (clothing, food, shelter, and health care). It also provides physical, mental, and spiritual guidance and attempts to provide an understanding of the roles and responsibilities of families, the environment, and society in overcoming the problems facing the elderly. In general, the elderly assisted by PUSAKA are of low socioeconomic status.

The proportion of elderly women in the fit/ robust, pre-frail, and frail categories in present study was 12.6%, 63.4%, and 24%, respectively. Similar results were obtained by Kobayashi et al.13, who found that the proportion of frail elderly women in Japan was 22.8%. The average age in their study was older (74.7 (5) years old), but with a higher PASE score. The proportion of elderly women in frail condition in the present study was greater than in a study by Gale et al.[14] (14.8%). However, their study involved subjects with a younger age range (aged 50 years and over), so the likelihood of them being more frail elderly was decreased. Several components of the frailty syndrome assessment (based on CHS) which mostly found in pre-frail and frail elderly subject groups were poor handgrip strength and low physical activity. This probably indicates that the clinical manifestation of physical frailty among subjects began with low daily physical activity which result in a decrease in handgrip strength (weakness). Low physical activity may also due to the quantity/severity of existing comorbidities. However, most of the subjects in the present study had mild disease with low level of severity, which did not significantly affect their low level of physical activity. The low physical activity level was also in line with the high proportion of subjects with excess BMI (overweight-obese). In the final multivariate analysis, only age (above 70 years), decreased functional status (B-ADL score), depressive symptoms, and decreased health-related quality of life (EQ-5D index<72 and EQ-5D VAS<75) were consistently and independently associated with frailty syndrome in elderly women in the community. Conversely, low education level and income, comorbidity, polypharmacy, malnutrition, and quantitative serum CRP levels were not associated with frailty syndrome.

In this study, age was significantly associated with frailty syndrome with OR 5.27 (95% CI 2.92–9.52). This is consistent with a study from Hong Kong by Woo et al.[3] which found that older age (>75 years) was associated with frailty in community-dwelling elderly women with OR 1.59 (95% CI 1.32–1.93). Based on the CHS scoring system, the proportion of elderly in the frail category is approximately 10–25% in the 65 years and above age group and reaches 45% in the 85 years and above age group.[3] Theoretically, along with the aging process, there are various physiological changes, such as activation of certain inflammatory processes, changes in body composition (decreased muscle mass), hormonal imbalances (menopause, andropause, corticopause, and somatopause), and insulin resistance. These changes can ultimately contribute to frailty syndrome.[15]

Decreased functional status (B-ADL score <20) was also found to be significantly associated with frailty syndrome in elderly women with OR 2.85 (95% CI 1.37–5.94). Similar result also found by Setiati et al.[24] which suggested significant association between functional status and physical frailty with OR 3.86 (95% CI 1.04-8.06). Diez-Ruiz et al.[15] found that regardless of the assessment used for evaluating frailty syndrome, the decline in functional status was indicated by a decrease of 10% or more in B-ADL and/or L-IADL scores for at least two years, thereby increasing the chances of the individual to have an unresolved frailty syndrome. In addition, elderly people with decreased functional status (due to any condition) were vulnerable to become frail due to the occurrence of sarcopenia, which is considered as an important element in the pathophysiology of physical frailty.[16]

The present study also obtained a consistent relationship between symptoms of depression (GDS score ≥10) and frailty syndrome in urban community-dwelling elderly women with OR 6.79 (95% CI 1.98–23.25). Chen et al.[17] similarly found a relationship between depression and pre-frail and frail conditions, with OR 3.66 (95% CI

2.28–5.09) and OR 6.89 (95% CI 3.05–15.55), respectively. Depression is considered to diminish mobility, food intake, social life, daily activity and awareness of healthy lifestyles, thus ultimately contributing to frailty. The present study found that only 4.6% of the overall subjects showed symptoms of depression, but approximately two-thirds of the subjects who were frail were depressed (with a GDS score ≥10). Dent et al.[18] suggested lower cut-off for GDS (>5 indicative of depression) and with this limitation, depression was associated with frailty syndrome with OR 2.66 (95% CI 1.29–5.47). Further study of the causes of psychological frailty among elderly women in the community is needed.

The decline in the quality of life of a person is also related to physical performance. Frailty syndrome is almost always associated with disability and handicap and thus has a higher risk for poor quality of life.[19] Multivariate analysis in present study found a relationship between life quality parameters (EQ-5D index) and frailty syndrome. The interpretation of the results of this 3-Likert-Scale of EQ-5D index in present study refers to the population in Japan, as it was the only reference within the country's scope in Asia during the course of present study. The EQ-5D VAS describes the subject's perception of quality of life (value 0–100). If the subject's perception of his or her level of health indicates a declining/ poor outcome, then it may also be related to the low health condition. Similar results, but with different instruments, were obtained by Rizzoli et al.[19] They reported that compared with the fit/ robust elderly group, the pre-frail and frail elderly groups were significantly associated with lower health-related quality of life scores (physical and cognitive domains). Decreased quality of life in the elderly may be due to the presence of the physical component of frailty (including sarcopenia), but it may also be affected by other conditions (including depression and pain) that are not necessarily related to the frailty syndrome itself.

Pro-inflammatory cytokines have been shown to affect the occurrence of frailty either directly (by increasing protein degradation), or indirectly (by affecting important metabolic pathways).[12] The Women's Health Initiative (WHI) nested case control study obtained tissue plasminogen activator (t-PA) and D-dimer levels in the highest quartile predicting the risk of frailty syndrome at OR 1.52 (95% CI 1.05–2.22) and OR 1.57 (95% CI 1.11-2.22), but no correlation was found between IL-6, CRP, fibrinogen, and factor VIII with frailty.[25] Present study also did not obtain a significant association between serum quantitative CRP levels and physical frailty. Conversely, Soysal et al.[9] found increased CRP and IL-6 levels in the frail and pre-frail elderly groups, compared to the fit/robust elderly group. This may reflects the complexity "inflammaging" which involves several pro-inflammatory proteins. No association found between serum CRP with physical frailty in present study might be due to the type and/or number of all subjects' comorbidities. Musculoskeletal disease (mild) found in most subjects did not affect serum CRP significantly. Present study also did not get a significant association between malnourished condition (according to MNA score and/ or BMI <18.5 kg/m^2) with physical frailty in community-dwelling elderly women. This may be due to the low proportion of subjects who were malnourished (4.3%) and/or underweight (12.9%). However, high proportion (60.6%) of overweight-obesity category may lead to another concern (e.g. sarcopenic-obesity) which may contribute to physical frailty. There is also growing evidence to suggest that obesity, and especially abdominal obesity, may contribute to frailty by promoting pro-inflammatory processes, insulin resistance, fat infiltration of the skeletal muscle, poor physical activity and hormonal changes with catabolic and satiation effects (such as increased leptin or decreased adiponectin levels).[4,9]

There are limitations of present study. The first is cross-sectional design, which does not allow causal relationships to be established between possible risk factors and frailty because of temporal ambiguity. Also, it only examined quantitative serum CRP in order to search for the simplest laboratory examination possible that could be examined easily at various health facilities. This study also found that most subjects were supported by PUSAKA (70%) for

their basic needs, making it more representative of the elderly population in urban areas with low socioeconomic status. Nevertheless, this study is the first study in Indonesia to specifically examine factors related to frailty syndrome among elderly women in the community. Since the present study found that almost a quarter of community-dwelling elderly women were frail, therefore examination of frailty status should be performed routinely in elderly patients at various levels of health facilities, especially primary health care. Periodic evaluation of functional status, depression screening, and assessment of the quality of life in elderly women (especially with low socioeconomic status) in urban communities should be mandatory, due to their close relationship to the frailty syndrome. Research on male elderly population is also needed since gender may contribute to different factors in the process of frailty. Further study with cohort designs is necessary to elaborate the effect of these factors on the transition of frailty status.

CONCLUSION

The proportion of elderly women with low socioeconomic status in the urban community who were fit, pre-frail, and frail was 12.6%, 63.4%, and 24%, respectively. Factors associated with frailty syndrome were age above 70 years old, presence of depressive symptoms, decreased functional status, and health-related quality of life index. Conversely, malnutrition, decline in cognitive function, comorbidity, polypharmacy, and quantitative serum CRP levels were not associated with frailty syndrome in elderly women with low socioeconomic status in the urban community.

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