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Original Study

Association of Social Frailty With Both Cognitive and Physical Deficits Among Older People

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A B S T R A C T

Objectives: Our objective was to investigate the association between social frailty and cognitive and physical function among older adults.
Design: This was a cross-sectional study.
Setting: We examined community-dwelling adults in Japan.
Participants: Participants comprised 4425 older Japanese people from the National Center for Geriatrics and Gerontology-Study of Geriatric Syndromes.
Measurements: Social frailty was defined by using responses to 5 questions (going out less frequently, rarely visiting friends, feeling unhelpful to friends or family, living alone, and not talking with someone every day). Participants showing none of these components were considered nonfrail; those showing 1 component were considered prefrail; and those showing 2 or more components were considered frail. To screen for cognitive deficits, we assessed memory, attention, executive function, and processing speed. Having 2 or more tests with age-adjusted scores of at least 1.5 standard deviations below the reference threshold was sufficient to be characterized as cognitively deficient. To screen for physical function deficits, we assessed walking speed (<1.0 m/s cut-off) and grip strength (<26 kg for men; <18 kg for women cut-off). Scoring below the cut-off point on 1 or more tests was sufficient to be characterized as physically deficient.
Results: The prevalence of social frailty was the following: nonfrailty, 64.1% (N = 2835); social prefrailty, 24.8% (N = 1097); social frailty, 11.1% (N = 493; *P* for trend < .001). All cognitive function tests (word list memory, Trail Making Test parts A and B, and the symbol digit-substitution task) significantly varied between social frailty groups; physical function (gait speed and grip strength) also varied between social frailty groups (all *P*s for trend <.001). Referred to social nonfrailty, social frailty was independently associated with each cognitive deficit (odds ratio = 1.61, 95% confidence interval 1.13–2.30) and deficits in physical function (odds ratio = 1.99, 95% confidence interval 1.57–2.52) after adjusting for covariates.
Conclusions: This study revealed that social frailty is associated with both cognitive and physical function among Japanese older adults. And social frailty status was also negatively associated with physical function. Further studies are needed to elucidate if a casual association exists between social frailty and cognitive and physical function.

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Frailty is defined as a biologic syndrome associated with multisystem decline in physiological reserve and increased vulnerability to stressors, resulting in increased risk of adverse outcomes including disability, hospitalization, and death.[1–3] In older people, frailty increases with advancing age and poses a higher risk of activities of daily living (ADL) disability compared with nonfrail older people.[4–6] Frailty should be prevented to avoid subsequent health problems.

There is consensus on the definition of physical frailty, which is well known. Numerous studies examined impacts of frailty on adverse health outcomes, especially focusing on disability[7,8]; however, frailty also has a cognitive[9] and social component.[10] With respect to the cognitive aspect of frailty, an International Consensus Group for "cognitive frailty" was organized by the International Academy on Nutrition and Aging and the International Association of Gerontology and Geriatrics in 2013. They provided the first definition of "cognitive frailty" in older adults.[11] Older individuals with cognitive frailty had the highest risks of instrumental ADL limitations.[9]

Social frailty also increases the risk of mortality and disability,[10,12] as does physical and cognitive frailty. However, few studies have examined social frailty status and its association with physical and cognitive function. An operational definition of "social frailty" using simple questions was reported to assess social engagement for older people,[10] and older people who had social frailty had a significantly higher risk of future disability incidence compared with those with nonfrailty status.[10] The operational definition of social frailty involves simply assessing the risk of disability by lower social engagement status among older people. Social engagement in later life is associated with cognition and physical function among older people[13,14]; therefore, older people with social frailty have the possibility of having cognitive and physical functional deficits. However, the association between social frailty and cognitive and physical function is not clear. If an association were identified, the operational definition of social frailty would have clinical relevance. Therefore, we investigated the association between social frailty and cognitive and physical function among community-dwelling older adults.

Methods

Participants

We used data from the Obu Study of Health Promotion for the Elderly (OSHPE), which was part of the National Center for Geriatrics and Gerontology-Study of Geriatric Syndromes, a cohort study whose primary goal was to establish a screening system for geriatric syndromes and to validate evidence-based interventions for preventing geriatric syndromes.[9] OSHPE enrolled community-dwelling older people aged 65 years and older. Participants were recruited from Obu, a residential suburb of Nagoya, Japan.[15] Between August 2011 and February 2012, 5104 community-dwelling elderly people initially participated in a baseline OSHPE assessment that included a face-to-face interview and measures of physical and cognitive function.[15] Exclusion criteria were as follows: (1) disabled in basic ADL (n = 41), including unconfirmed cases (n = 2); (2) having a severe disease (ie, dementia, cerebrovascular disease, Parkinson disease, or depression, n = 431), including unconfirmed cases (n = 1); (3) having a general cognitive impairment (Mini- Mental State Examination score <21) (n = 152), including unconfirmed cases (n = 11); and (4) missing data in the social frailty variables (n = 55). Eight hundred forty potential participants were excluded, leaving 4425 participants. All participants voluntarily provided informed consent before inclusion. The Ethics Committee of the National Center for Geriatrics and Gerontology approved the study protocol.

Operationalization of Social Frailty

We operationalized social frailty using 5 questions, including going out less frequently compared with last year (yes), visiting friends sometimes (no), feeling helpful to friends or family (no), living alone (yes), and talking with someone everyday (no). Participants showing none of these components were considered nonfrail; those showing 1 component were considered prefrail; and those showing 2 or more components were considered frail.[10]

Cognitive Function

Assessment of cognitive function was conducted using the National Center for Geriatrics and Gerontology-Functional Assessment Tool (NCGG-FAT).[16] The NCGG-FAT consists of 4 domains: memory [word list memory-I (immediate recognition) and word list memory-II (delayed recall)], attention (an electronic tablet version of the Trail Making Test part A), executive function (an electronic tablet version of the Trail Making Test part B), and processing speed (an electronic tablet version of the Symbol Digit-Substitution Task). The NCGG-FAT had high test-retest reliability and moderate to high validity among community-dwelling older adults.[17] Before study commencement, all staff received training from the authors in the correct protocols for administering the assessment measures. All tests used in this study had established standardized thresholds for the definition of impairment in the corresponding domain (scores <1.5 standard deviations below the age- and education-specific means) from a population-based cohort data consisting of community-dwelling older adults. We considered deficits in cognitive function to be characterized by lower scores on 2 or more of the tests in the NCGG-FAT. Participants without deficits on these tests were considered cognitively intact, and those with a lower score in 1 test alone were considered to have a minor cognitive deficit; we did not include minor cognitive deficits as cognitive deficits.

Physical Function

We measured walking speed and grip strength as physical functions. Walking time was measured over a 2.4-m distance in seconds using a stopwatch. Participants walked on a flat and straight surface at a comfortable walking speed. Two markers indicated the start and end of a 2.4-m path, with a 2-m section to be traversed before passing the start marker so that participants were walking at a comfortable pace by the time they reached the timed path. Participants continued walking for an additional 2 m past the end of the path to ensure a consistent pace while on the timed path. Slow walking speed was defined using a validated cutoff value (<1.0 m/s).[15,18]

Grip strength was measured using a Smedley-type handheld dynamometer (GRIP-D; Takei Ltd, Niigata, Japan). Lower-grip strength was defined according to a sex-specific maximum grip strength cutoff (<26 kg for men; <18 kg for women).[19] We considered physical function deficits to be characterized by slow walking speed or/and lower grip strength.

Sociodemographic Variables and Covariates

Using face-to-face interviews, we examined participants' sociodemographic characteristics (age, sex, education level), medical history (medications, chronic diseases (eg, hypertension, diabetes, hyperlipidemia)), and job status (presence of work for a fee). Examined covariates were as follows: body mass index (BMI), physical activity, and depressive symptoms. Depressive symptoms were measured at baseline using the 15-item Geriatric Depression Scale (GDS), which contains 15 yes/no question items and provides a score between 0 and 15.[20] Physical activity was evaluated as the total