

## Use of the frailty index in evaluating the prognosis of older people in Beijing: A cohort study with an 8-year follow-up



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### ABSTRACT

**Objective:** Frailty is a significant healthcare challenge in China. However, the relationship between frailty and the prognosis of older people in China remains unclear. The present study aimed to evaluate the prevalence of frailty and determine if the frailty index, a comprehensive geriatric assessment, was associated with the prognosis of older people in a Chinese population.

**Methods:** Data were drawn from the Beijing Longitudinal Study of Aging, a representative cohort study with an 8-year follow-up. Evaluations based on the use of the frailty index were performed in a cohort of 1808 people aged 60 years and over residing in Beijing urban and rural areas. The initial survey was conducted in 2004, with follow-up surveys at 3, 5, and 8 years. Mortality data for all individuals were collected and analyzed.

**Results:** The frailty index and the age of individuals showed the same trend, with a higher frailty index expected as age increased. Respondents with the same frailty index level differed across factors such as sex and location. Male individuals, rural dwellers, and older individuals showed higher frailty rates than female individuals, urban dwellers, and younger individuals.

**Conclusions:** Frailty is a condition associated with problems across multiple physiological systems. The frailty index increases with age, and may be a significant tool for evaluation of the prognosis of older people in China.

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## 1. Introduction

The increasing number of older people in China poses a significant public health challenge, particularly with regard to improving healthcare and social outcomes in older populations (Yao et al., 2014). Aging people show increasing morbidity, dependence, and vulnerability (Boeckxstaens et al., 2014). Clinical tools such as comprehensive assessments are an important part of providing effective healthcare for older populations. For example, the choice of medication or surgical methods based on a comprehensive assessment in patients with tumors could reduce

the incidence of adverse drug reactions and operation risk (Kim et al., 2011; Kristjansson et al., 2010; Rybicki et al., 2015). Comprehensive assessment can be used to inform specific treatment for older patients with chronic disease, slowing the decline of physical functioning and improving quality of life (Parlevliet et al., 2012; Teymoortash et al., 2014). Comprehensive assessment also improves accuracy of diagnosis, personnel allocation, functional and cognitive status, as well as reducing the care burden on families, medical expenses, and mortality rates (Aucella et al., 2012).

Frailty is a common and important geriatric syndrome characterized by age-associated declines in physiologic reserve and functioning across multiorgan systems. Frailty leads to increased vulnerability for adverse health outcomes such as falls, disability, hospitalization, and mortality (Bortz, 2010; Brown, Sneed, Rutherford, Devanand, & Roose, 2014; Vairaktarakis et al., 2015). The prevalence of frailty has been reported to be between 4% and 59% in studies with participants aged 65 years or over (Collard, Boter, Schoevers, & Oude Voshaar, 2012). As a predictor of

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comorbidities, falls, the use of healthcare services, health conditions, institutionalization, impairment, stroke and cardiovascular disease (CVD), poor quality of life, and mortality, frailty is a particularly relevant field of study for public health (Melin et al., 2014; Nichols, Varadarajan, Bock, & Blumin, 2014; Pegorari & Tavares, 2014; Ramsay et al., 2014; Woo, Goggins, Sham, & Ho, 2005). However, a standardized definition of frailty has not yet been established. The frailty index (FI) was proposed by Rockwood in 2008 (Rockwood, Mogiher, & Mitnisk, 2004) as a method for the comprehensive assessment of the health of older individuals. A comprehensive geriatric assessment focuses on the assessment of the physiological, psychological, and functional status of older individuals (Collard et al., 2012). The FI is an important method for evaluating frailty, as it evaluates the health status of older individuals using a cumulative calculation method, and can predict long-term prognosis. While there is an increasing recognition of frailty and its consequences in older populations, there are few initiatives implemented that systematically manage this condition (Ramsay et al., 2014). Therefore, the present study aimed to evaluate the prevalence of frailty and to determine if the FI as a comprehensive geriatric assessment was associated with prognosis in the Beijing Longitudinal Study of Aging, a study of community-dwelling older people.

## 2. Material and methods

### 2.1. Study design

The Beijing Longitudinal Study of Aging was a cross-sectional study comprising 1865 people dwelling at home, drawn from the

general Beijing population in 2004 aged 60 years or over. Separate follow-up studies were conducted in 2007, 2009, and 2012, and mortality data for all individuals were collected and analyzed (Zhe et al., 2013). Of the initial sample of 1865 older people, 57 refused to complete the survey, and there were 629 cases of death, providing a baseline sample of 1808. Instances of death or loss for the follow-up surveys were confirmed through family members, or the neighborhood or village committee.

### 2.2. Data collection

The assessments were completed by trained staff using standard survey instruments. During person-to-person interviews, data were collected regarding many aspects such as demographic characteristics, physical health, mental health, chronic disease, economic conditions and so on. Physical examination includes blood pressure, height, weight, waist circumference and hip circumference. All the subjects were signed the informed consent. The number of death or loss in follow-up surveys were confirmed through the family member, neighborhood or village committee. The causes of lost includes out, refused to check and demolition.

### 2.3. Evaluation of the FI

The FI was evaluated by the cumulative decline in older individuals (Bortz, 2010). In the present study, 68 parameters were drawn from six variables: demographic characteristics, physical health, physical function, living behavior, social function, mental health, and cognitive function. The parameters were chosen according to the selection principle proposed by Rockwood in

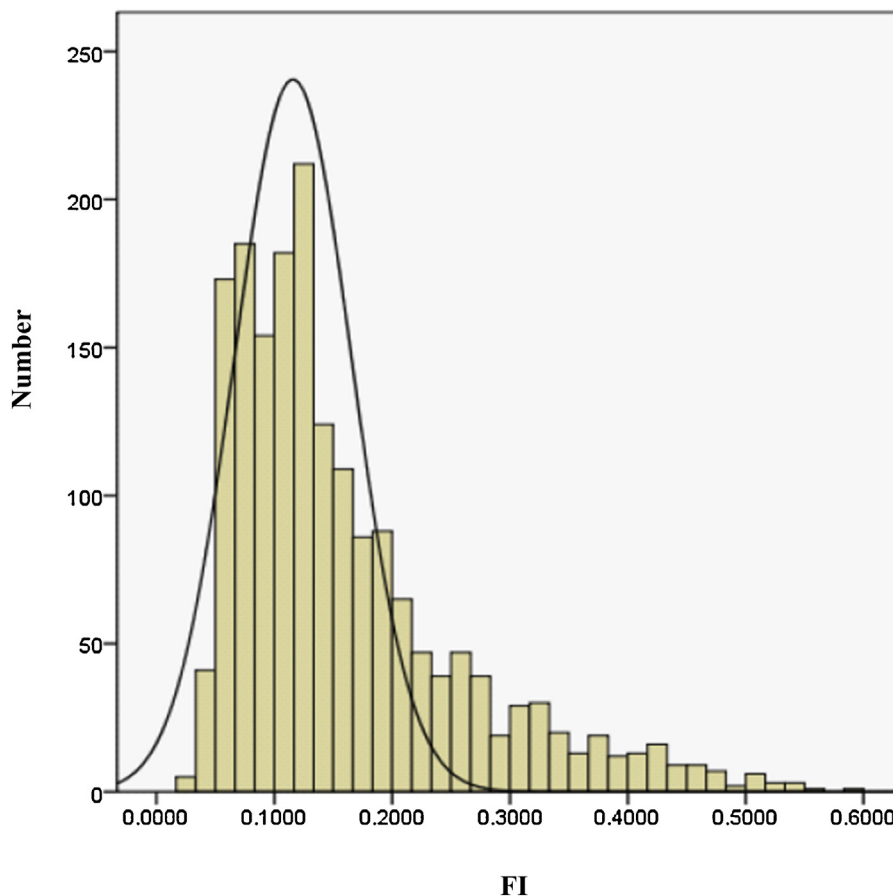


Fig. 1. Frequency distribution of FI ( $n = 1808$ ). Mean = 0.16, Std. Dev. = 0.099.

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