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Original Article

Circumstances of falls and fall-related injuries among frail elderly under home care in China



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ABSTRACT

This exploratory study investigated the circumstances of falls and fall-related injuries among frail elderly people under home care. A convenience sample of 500 frail elderly (60–99 years old) from the Wanshoulu and Yuyuantan communities in Beijing's Haidian District during February 2013 and March 2014. Fall circumstances and related injuries were characterized by detailed interviews and questionnaires. The article reports the results of a study that the overall fall incidence was 41.5%, and higher for females than males. Falls mainly occurred in individuals who were over 80 years old (50.0%) and indoors (67.9%). The percentage of subjects who experienced a combined injury after the fall was 56.3%, whereas 19.0% fell causes a fracture. Approximately 35% of the subjects were hospitalized, and 27.6% of the subjects recovered more than 30 days. Results indicate that, falls in the frail elderly caused serious damage, and fall-related circumstances should be a great concern in this population.

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1. Introduction

Falling is the main cause of accidental death in the elderly, and is also responsible for much long-term pain, loss of function, and disability. Approximately 18–44% of the elderly (persons over 65 years) in China are reported to fall each year [1–3]. In Beijing, the accidental injury mortality rate is 22.78 per 100,000 people, the fifth-highest (3.79%) cause of death [4]. Fall injuries in the elderly account for 61.84% of the total injuries and are the leading cause for medical treatment. To address this issue, Beijing has launched a three-year program

for elderly fall intervention and prevention of damage. However, the incidence of falls in this increasing aging population continues to rise, becoming a major public health concern.

Symptoms of frailty are common in the elderly; they have reduced reserves and resistance to stressors and an increased risk of falls, disability, hospitalization, and institutionalization [5]. Frailty is usually described by four components: fatigue/resistance (can the subject walk up one flight of stairs?), aerobic (can the subject walk more than one block?), illness (more than five kinds), and loss of weight (>5% of body weight lost in the last six months). Previous studies have shown that frailty is

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associated with falls mainly because the loss of muscle mass – which contributes to falling – is a major component of the frailty syndrome [6–9]. Multiple illnesses lead to poly-pharmacy, another major cause of falls, and impaired balance. Weight loss leads to weakness and exacerbates the muscle loss associated with sarcopenia. Frailty also plays a role in the poor outcomes of falls, including trauma, functional decline, and disability [10–13]. Frail individuals may also have more difficulty coping with the consequences of surgery following a hip fracture than individuals who are not frail [14]. Approximately 30% of hip fracture patients will die within one year [15], and many more will experience significant functional losses; this not only affects the physical and mental health of the elderly, but also results in a great burden of care to families and society. The direct medical cost caused by falls in the United States in 2010 was approximately 3 billion dollars [16]. In Holland, fall-related medical costs reached 675, 400, 000 euros [17]. In China, the annual medical cost of elderly falls is approximately 5 billion [18], resulting in a social resource consumption of about 600–800 billion. After a fall, the elderly experience post-fall anxiety syndrome, which can impair daily life with depression, helplessness, and isolation [19].

Fall risk factors are divided into internal and external factors [20]. Internal factors include age, history of falls, weakness of the lower limbs, and balance. External factors mainly include psychiatric medication and environmental risk factors. New research suggests that risk factors should be classified according to the individual, environment, and behavior, as well as how these three factors interact. Few studies have investigated the specific and detailed environmental factors related to falling of the Chinese frail elderly under home care; the circumstances leading to falls among the frail elderly still need to be elucidated. The appropriate selection of existing interventions is critical to minimize the incidence of falls and their consequences in the frail elderly. However, such knowledge cannot be generalized to older frail individuals unless this subpopulation is included in these studies.

In this study, we investigated the indoor and outdoor falls and fall-related injuries of the frail elderly. We analyzed the circumstances and consequences of the falls, and determined the differences in the features of the falls.

2. Material and methods

2.1. Research ethics

The study protocol was reviewed and approved by the hospital's research ethics committee. Permission to conduct the study was obtained from the Nursing Director of the Hospital. A guarantee of confidentiality and anonymity was included in the invitation letter given to each participant.

2.2. Selection of participants

We randomly selected 500 frail elderly residents in the Wanshou Road community and Yuyuantan community in the Haidian District, Beijing. The residents were studied for one year, in which a total of 190 fall occurred. The inclusion criteria were as follows: subjects of age >60 years with frailty

diagnosed according to the Fried criteria and a life expectancy >6 months; the ability to walk independently; voluntary participation; the ability to communicate; and no serious diseases of the nervous system.

2.3. Data collection

We used a questionnaire and interviews to collect the data. After the occurrence of a fall, a doctor conducted home visits. The survey tools consisted of a questionnaire and a community elderly fall risk assessment scale. The self-made questionnaire assessed gender, age, marital status, economic life, living conditions, source of care, walking, chronic diseases, medication, daily life ability, specific time of fall, place of fall, reason for fall, nature of fall, site of injury after a fall, processing method, recovery after injury, and injury after care. The questionnaire's reliability and validity were tested, yielding a Cronbach's alpha coefficient of 0.823. The validity of the questionnaire's content was evaluated by experts, all of which agreed that the items were in good agreement with the investigation contents. The Falls Risk for Older People in the Community screening tool developed by the Australian National Institute of Geriatric Research and revised into Chinese by Wang et al. [21] was used for the assessment of elderly falls and had a Cronbach's alpha coefficient of 0.804. The scale consists of 19 specific evaluation items, using A to D four classification. Scores ranged from 0 to 3, with higher scores indicating higher fall risks.

To reduce bias, the questionnaires were reviewed by the same team of investigators visiting the households, and on-site recycling was conducted. Participants were given instructions in how to complete the questionnaires. The survey data were checked for double entries and then compared for consistency.

Subject age was categorized as 65–79 years old or 80 years and older. Activity level was categorized as minimal, moderate, or vigorous. Location was categorized as indoors or outdoors. Activity was categorized as walking, sitting, standing, walking up or down stairs, lavatory visit, sports and recreation, getting out of bed, housekeeping, cycling, or other. Fall injuries were defined by the International Classification of Diseases 10th revision (ICD-10) and categorized as fracture, laceration, or contusion. Activity distributions leading to indoor and outdoor falls were described separately for all falls. Fall-related fractures were defined as fractures with external codes W00–W19 (ICD-10).

2.4. Data analysis

Data were analyzed by Epidata 3.1 software. Differences in categorical variables were assessed using the chi-square test. Continuous variables were assessed using the Mann–Whitney U test. P values < 0.05 were considered to be statistically significant.

3. Results

Among 500 elderly, 190 (38.0%) reported falling at home in the past 12 months. These subjects (those that fell) had an average

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