Prevalence of Falls Among the Rural Elderly — Three PLADs of Western China, 2017–2018

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Summary

What is already known about this topic?

As population aging becomes serious in China, the elderly health problems stand out prominently. Prevention of falls of the elderly has become an important subject in China's public health.

What is added by this report?

The prevalence of falls among rural elderly in western China was 9.6%. The highest prevalence was registered among the groups of female, aged 70 and over, or Salar ethnicities, or with visual deficiency and chronic diseases, of which 33.0% fell subjectively due to their poor body balance, and 65.8% fell objectively due to slippery floor or ground obstacles.

What are the implications for public health practice?

Considering the health status of the elderly in the western China and the prevalent fall-related risk factors, health education in respect of falls prevention should be performed. Moreover, the home environment of the elderly should be checked for potential safety hazards and improved if necessary, and medical and health resources should be rationally allocated to target population in order to avoid any reoccurrence of falls injury and thus relieving the burdens upon individuals, families and the society.

According to the Sixth National Population Census of China, people aged 65 years and older accounted for 8.9% of the total population in 2010, which suggested that China had transitioned into an aging society (*1*). As the elderly population increases, their health problems are becoming increasingly concerning, and unintentional injuries, such as falls, being one of the most important issues affecting their health (*2*). Physiological factors including sensory and muscular degeneration, diseases, and environmental factors may all contribute to a higher prevalence of falls in the elderly (*3*). This study investigated the prevalence of falls among the 4,582 rural elderly aged 60 years and older in 3 provincial-level administrative divisions

(PLADs) of western China — including Chongqing Municipality, Yunnan Province, and Qinghai Province. This study was part of the National Health Commission's (NHC) survey "Community Participation to Promote Rural Elderly Health — Phase II" project that was completed from November 2018 to January 2019. The participants were selected using a multistage random cluster sampling method from 36 administrative villages in 6 project counties of Yunnan, Qinghai, and Chongqing: 2–3 townships of each county were randomly selected followed by 2 villages of each township; elderly villagers aged 60 years and over in the selected villages were interviewed if they were able to understand and answer the questions on their own and had a local residence history of no less than 6 months.

The face-to-face questionnaire interviews were conducted to collect information on participants' demographic characteristics, health-related conditions, and prevalence of falls (occurrence and number of falls in the past year, the causes of the falls, and consequences of falls). A fall was defined as "an incident in which a patient suddenly and involuntarily came to rest upon the ground or surface lower than their original station" (*4*). There were two types of falls: 1) falls from one surface to another surface; and 2) falls on the same surface excluding those caused by paralysis, epilepsy, or external violence (*5*). This study investigated falls within a year before the survey time.

Chi-square analysis was performed to determine the differences in the prevalence of falls across groups. Significance was defined as $p<0.05$, and SPSS statistical software (version 22.0, SPSS Inc, Chicago, IL, USA) was used to conduct all analyses.

Among the 4,582 persons interviewed, 2,313 were male (50.5%), and 2,269 were female (49.5%). The average age was 71.5±7.2 years old (Table 1). A total of 439 persons experienced falls with 75.6% experiencing 1 fall and 24.4% experiencing 2 or more falls. The average prevalence of falls was 9.6%, with 8.5% for males and 10.7% for females (χ^2=6.609, p=0.01).

TABLE 1. Demographic characteristics and prevalence of falls among rural elderly — three provincial-level administrative divisions of western China, 2017–2018.

Item	Number	Percentage (%)	Number of falls	Prevalence (%)	χ^2	p
Gender					6.609	0.010
Male	2,313	50.5	196	8.5		
Female	2,269	49.5	243	10.7		
Age					21.200	<0.001
≥ 60 years	2,522	55.0	196	7.8		
≥ 70 years	1,451	31.7	171	11.8		
≥ 80 years	609	13.3	72	11.8		
Ethnicity					11.375	0.003
Han	1,827	39.9	194	10.6		
Salar	78	1.7	14	17.9		
Other	2,677	58.4	231	8.6		
Educational level					15.606	<0.001
Below primary school	3,032	66.2	324	10.7		
Primary school	1,164	25.4	95	8.2		
Junior high school and above	386	8.4	20	5.2		
Vision problems					14.873	<0.001
Yes	3,351	73.1	152	12.3		
No	1,231	26.9	287	8.6		
Chronic disease					10.997	0.001
Yes	2,910	63.5	192	11.5		
No	1,672	36.5	247	8.5		
Total	4,582	100.0	439	9.6		

The prevalence of falls was the highest (11.8%) in the group aged ≥70 years (χ^2=21.2, p<0.001).

The consequences of falls were serious and typically represented by injuries of different levels (52.8%), which included severe pain or soft tissue injury (40.5%) and fractures (12.3%). The multiple-choice questionnaire analysis showed that poor body balance (33.0%), skelasthenia (24.4%) and instant physical discomfort (24.1%) were the main personal reasons of falls. Slipper floors/obstacles (65.8%) and insufficient/blinding light (11.6%) were the main environment causes of falls (Table 2).

DISCUSSION

This study showed that the prevalence of falls among this sample of the rural elderly in the western China was 9.6%. The prevalence of falls was higher among females than males, and the prevalence of falls was higher among the group aged ≥70 years than the group aged <70 years.

The prevalence of falls appeared to vary among

TABLE 2. The causes of falls among rural elderly in three provincial-level administrative divisions of western China, 2017–2018.

Cause of fall	Number	Proportion (%)
Personal cause		
Poor body balance	145	33.0
Skelasthenia	107	24.4
Instant physical discomfort	106	24.1
Inattentive	65	14.8
Poor eyesight	52	11.8
Other	14	3.2
Environmental cause		
Floor slippery/obstacle	289	65.8
Insufficient or blinding light	51	11.6
The stairs being too high	21	4.8
Other	13	2.9
Furniture height not suitable	12	2.7
The bathroom lacks handrails	5	1.1

areas, regions, and countries (6–7). In China, a study in Qingpu District of Shanghai found that the

prevalence of falls among the community elderly was 7.9% (*8*), while another in Shijiazhuang City of Hebei Province found that the prevalence was 11.2% (*9*). Globally, studies in Japan suggested that an estimated 20% of older adults fall each year, while a study in the Latin/Caribbean region found that the proportion of elderly adults who fell each year ranging from 21.6% in Barbados to 34% in Chile (*10*). One possible reason for this inconsistency is that many studies fail to specify a clear definition of falls and result in ambiguity. Therefore, the operational definition of a fall with explicit inclusion and exclusion criteria is critical.

This study had several conclusions about falls amongst the study population. First, 70 years appeared to be a node indicating a changing trend in prevalence, and the prevalence of falls was higher for females than male in all age groups. Second, the prevalence of falls was high among the elderly with visual deficiencies and chronic diseases as elderly with visual deficiencies likely could not accurately detect risk factors in their environment, which made them more susceptible to falls that were avoidable. The elderly with chronic diseases were more vulnerable to illnesses and other physical problems than otherwise healthy elderly individuals, which likely made them more likely to fall.

Various personal and environmental causes may lead to falls among elderly people. Personal causes included poor body balance, sickness, vision loss, chronic diseases, or other health problems. Environmental main causes included slippery floors or ground obstacles and inadequate lighting. Such causes can be avoided through increasing exercise interventions, observing poor physical conditions, and improving home/living environments. Key health education information should be developed and distributed to help elderly people know what preventive actions can be taken when they feel uncomfortable physically, how to prevent osteoporosis, and how to check/improve their home environment. In addition, appropriate interventions such as physical exercises should be intensified to maintain or improve the physical condition of elderly people.

Being an ethnic minority was also found to be an important fall-related risk factor. Our study indicated that the prevalence of falls was higher among the elderly of Salar. A pairwise comparison of fall rates of various ethnic groups found that the difference between the Salars and other ethnic groups was statistically significant. The analysis suggested that this may be due to poorer living environments of the Salars, as this group typically lived in plateaus and mountainous areas where factors such as slippery floor or obstacles may lead to falls. Attention should therefore be paid to this vulnerable population in terms of improving living environments and providing educational materials and intervention activities in the appropriate language.

This study was subjected to some limitations. First, this was a retrospective study, which when coupled with elderly patients having likely reduced memory capacities and other health problems, may have made recall bias inevitable. Prospective study designs are more widely used, which may contribute to the prevalence of falls being lower in this study than others. Second, this study did not collect information on deaths due to falls. Some participants also denied or failed to report certain falls that did not cause body injuries. The prevalence of falls might therefore be underestimated.

This study investigated the prevalence of falls amongst the rural elderly population in three PLADs of western China. These results could help inform targeted interventions that can prioritize high-risk groups and help design educational materials.

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