

Activity outside the home, environmental barriers, and healthy aging for community-dwelling elderly individuals in China

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Summary

Elderly individuals benefit from frequently engaging in activities outside the home because such activities sustain the overall health and functioning of an aging body. However, environmental barriers can limit participation in activities outside the home by elderly individuals. The current study examined the factors that influence the frequency with which elderly individuals living in China engage in activity outside the home. Data were collected from 2,402 elderly individuals residing in the Jiangning district of Shanghai, China in 2015. Face-to-face interviews were conducted based on a questionnaire, and multiple regression analysis was used to measure influencing factors. Results revealed that elderly respondents with a better self-reported health status ($p = 0.2499$) engaged in activities outside the home more frequently. In addition, elderly respondents residing on higher floors of multi-floor residential buildings ($p < 0.001$) were less likely to participate in activities outside of the home. This effect was virtually eliminated, however, when the residence in question was equipped with an elevator ($p < 0.001$).

Keywords: Floor of residence, multi-floor residential building, activities outside the home, elevator, elderly individuals

Activity outside the home plays an important role in maintaining health among the elderly. Activity outside the home refers to activities performed in daily life and includes activities related to social networking, work, and transportation (1-3). Regular outings from a limited "living area" (*i.e.* an area where a person spends large amounts of time engaged in everyday activity) facilitates participation in meaningful activities within a society (4). These social activities may help the elderly ameliorate feelings of loneliness, build social networks, and satisfy social needs. In addition to the social aspects, elderly individuals engage in the most intense levels of physical activity outside of the home (5). Previous studies have suggested that going outside less frequently is associated with poorer overall health and mental problems in the elderly. Therefore, the elderly benefit from engaging in activities outside the home with a certain frequency since such activities sustain overall health and functioning in comparison to individuals who do not engage in activities

outside the home (6-8).

In 2007, the World Health Organization collected basic information on elderly people in 33 nations and then published *Global age-friendly cities: A guide* (9). This guide suggests that multi-floor residential buildings be equipped with an elevator if residents are elderly individuals. An age-friendly city has buildings that are more accessible to meet the varying needs of elderly people. Accordingly, elderly individuals need to reside on lower floors of residential buildings or have access to an elevator in a multi-floor residential building to remain able to engage in activities outside the home. Moreover, the 2015 *World Report on Aging and Health* outlines a framework for action to foster *Healthy Aging* built around the new concept of functional ability (10). The report indicated that architectural obstacles need to be reduced in order to facilitate activity by the elderly and it also revealed that varying levels of physical functioning and mental ability may limit activity by the elderly. Therefore, architectural plans need to feature ramps, handrails, elevators, and appropriated signage to facilitate use by the elderly, regardless of their level of activity.

Environmental barriers are associated with unsatisfactory living conditions or inadequate infrastructure. The elderly are predicted to have

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significantly lower scores for activities of daily living (ADL) and instrumental activities of daily living (IADL) if environmental barriers restrict their ability to engage in activities outside the home (11). This finding is substantiated by correlations between environmental barriers and restricted ability to engage in activities outside the home. In addition, many studies have provided evidence of an association between depressive mood and engaging in activities outside the home less frequently due to environmental barriers (5,7,8). A European study on how environmental barriers influence activities outside the home found that an environment of poor quality and poor street connectivity led to elderly individuals being unwilling go outside (12). In contrast, a Tokyo study found that green spaces near the residence of elderly individuals encourage their desire to engage in activities outside the home and may decrease their risk of mortality (11).

Unquestionably, Chinese elderly are faced with the environmental barriers mentioned earlier. However, there is one particular environmental barrier that many

Chinese elderly are likely to face but that Western elderly may not encounter. This particular environmental barrier is living in an apartment building that is not equipped with an elevator because of the age of many residential buildings in China. Descending stairs may hamper elderly individuals from engaging in activities outside the home, and thus eventually lead to inactivity. This inactivity, in turn, results in a decline in health and functioning. For this population, environmental pressure may decrease the desire to engage in activities outside the home.

According to *China's Design Code for Residential Buildings* promulgated in 1987, a building with more than 7 floors must be equipped with an elevator. In 2016, the elderly population (\geq the age of 60) in Shanghai totaled 4.58 million (13). Recent statistics indicated that 1.8 million elderly people resided in old buildings in Shanghai in 2013 (14). Old buildings referred to a three- (or four-) story house or an older style building with fewer than seven floors. None of these old buildings were equipped with an elevator.

In order to investigate whether the floor of residence

Table 1. Baseline characteristics of elderly individuals who had to descend stairs or who lived on the ground floor/had access to an elevator

Items	Descended stairs to engage in exercise outside the home, N (%)	Live on the ground floor or used an elevator to engage in exercise outside the home, N (%)	p value
Gender			0.9762
Male	668 (58.09)	482 (41.91)	
Female	728 (58.15)	524 (41.85)	
Age	71.24 \pm 7.34	70.57 \pm 7.01	0.0441
ADL	19.62 \pm 0.84	19.74 \pm 0.88	< 0.0001
IADL	7.67 \pm 0.94	7.72 \pm 0.86	0.1754
Self-reported health*			0.2499
Unhealthy	612 (59.48)	417 (40.52)	
Healthy	781 (57.13)	586 (42.87)	
Floor of residence			< 0.0001
Ground floor	0 (0)	509 (100)	
Second floor	471 (97.52)	12 (2.48)	
Third floor	310 (95.98)	13 (4.02)	
Fourth floor	232 (91.7)	21 (8.3)	
Fifth floor	182 (83.49)	36 (16.51)	
Sixth floor	169 (81.25)	39 (18.75)	
Seventh floor	32 (43.84)	41 (56.16)	
> Seventh floor	0 (0)	335 (100)	
Activities			< 0.0001
Inside only	237 (69.1)	106 (30.9)	
Outside the home	1,159 (56.29)	900 (43.71)	

ADL refers to routine activities in daily life that people are capable of performing, without assistance. These necessary functions include eating, bathing, dressing, and toileting; IADL refers to instrumental activities of daily living, including light housework, food preparation, shopping, and managing one's finances. *6 of 2,402 respondents did not respond to the question about self-reported health on the questionnaire.

Table 2. Factors influencing the desire of respondents to engage in activities outside the home

Effects	Point Estimate	95% Wald Confidence Interval	p value
Age	0.913	0.896 - 0.930	< 0.0001
Gender (Female vs. Male)	1.139	0.875 - 1.483	0.3323
Self-reported health status (Healthy vs. Unhealthy)	3.048	2.304 - 4.034	< 0.0001
ADL	1.068	0.936 - 1.219	0.3296
IADL	1.480	1.303 - 1.682	< 0.0001
Elevator (Yes vs. No)	2.051	1.519 - 2.768	< 0.0001
Floor of residence	0.968	0.939 - 0.998	0.0342

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influences the desire of community-dwelling elderly to engage in activities outside the home, 2,402 active individuals age 60 or older residing in the Jiangning district of Shanghai, China were surveyed. Face-to-face interviews were conducted in 2015 based on a questionnaire. Respondents were divided into two groups: respondents who had to descend stairs to go outside and respondents who lived on the ground floor or who did not need to descend stairs as a result of access to an elevator. Demographic characteristics including age, gender, and self-reported health status and physical status including scores for both ADL and IADL were obtained. Multiple regression analysis was used to identify the factors influencing the desire of respondents to engage in activities outside the home.

As shown in Tables 1 and 2, the results yielded three interesting findings. First, elderly respondents with a better self-reported health status engaged in activities outside the home more frequently. Second, the floor on which a respondent resided was associated with the frequency with which the respondent engaged in activities outside the home. Further, the current study found that residing on a higher floor of a building resulted in less desire to engage in activities outside the home. Interestingly, respondents residing in an apartment building equipped with an elevator retained the desire to go outside and remain active, and these individuals were less influenced by the floor on which they resided. The results indicate that an elevator is extremely important within this context, enabling improvement of a less than ideal situation.

Activity outside the home is quite important to successful aging. Environmental barriers predict a significant decline in activity outside the home. In the current study, descending stairs represented a substantial environmental barrier to engaging in activities outside the home. Unfortunately, most of the old apartment buildings in China lack an elevator, so residents must descend stairs to go outside. However, an elevator can eliminate that problem. In light of this information, multi-floor residential buildings with elderly residents should be equipped with an elevator. Moreover, results of the self-reported health status indicated that elderly individuals with a better self-reported health status engaged in activities outside the home more frequently. This suggests that relatives, and society at large, should encourage those individuals to engage in activities outside of the home.

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