

The Safety of Walking Space for the Elderly People Living in Communities in Beijing, China

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Abstract

China has become an aging society. Aging in place is an important option for the elderly people in China due to the influence of Chinese tradition. Communities are the environment where the elderly people spend most of their time. The walking space in the communities is important for the safety of the elderly people. The research studied the safety of walking space of the elderly people living in the communities by using the data collected by observation, interviews and questionnaire surveys. The results identified three types of risks which are caused by pavements, public facilities and surrounding environment based on the qualitative analysis. The results of the quantitative analysis by using SPSS 19.0 found that the risks are highest in surrounding environment than the pavements and public facilities. The public facilities have the lowest risks. The findings of this study provide knowledge for future transformation of the old communities and the planning of new communities.

Keywords

Walking Space, Community, The Elderly People, Risk

1. Introduction

According to the sixth national census [1], as of November 1, 2010, China's elderly people over 60 years of age reached 178 million, accounting for 13.26% of the total population. Of which over the age of 65 for the elderly people reached 119 million, accounting for 8.87% of the total population. China has become the only country with a world elderly population of over 100 million. And it is predicted that this figure is growing at an annual rate of 3%. By 2025, the elderly will account for 19.34% of the total population. To 2040, the elderly will account for 27.8% of the total population [2].

For the elderly, their way of life, physiological characteristics and so on have

some particularity [3], and in their oldest life the community is the most important and the ideal place for activities and communication space. Most of the elderly in China are concerned about family happiness, neighborhood relations, geography, etc., often on their own family and long-standing community environment attachment, they generally do not want to easily leave their familiar living environment. With the increase in the degree of population aging, the dependence of older groups on the community, the proximity and the need to increase [4].

In the context of aging and motorized urban development patterns, discussion of the needs of physical environment for old adults to walk is very necessary. Creating a walkable neighborhoods for old adults to walk has become the importance of today's urban and rural planning, there is important social significance to research on it [5].

This paper attempts to study the problems that may be dangerous to the activities of the elderly in the community. On the basis of previous studies, through the questionnaire and semi-structured interviews, with the method of qualitative analysis to make sure the security risks of the community may be dangerous to the elderly's walking space. Through field investigation, found the impact extent of these security risks in the elderly's walking space. According to the survey results classified the safety hazard. Through this study, attempts have been made to minimize the number of nociceptive events that may be encountered in the course of walking for the elderly, to promote the walking environment of the elderly, to reduce the risk of predicting.

2. Data and Method

We chose B community as the main survey sites. Random interviews nearly 100 elderly people in the community, where 80 questionnaires were returned valid questionnaires to 75 parts, efficiency was 93.75%.

Based on the field investigation, the researchers went into the community to conduct on-the-spot investigation to understand the residents and their living environment, so as to grasp the living condition of the elderly in the community. In the interview investigation process, record the elderly's obstacles in the process of walking, combined with the literature, which mentioned the elderly's obstacle in their life of qualitative analysis, then extract the security risks and its types in the eyes of the elderly.

According to the preliminary survey design questionnaire and invite the elderly to fill in. Questionnaire designed according to "Likert rating scale" [6]. Likert scale is the most commonly used social survey and psychological tests in the fields of an attitude scale [7]. The scale consists of a set of questions or statements related to the subject, which is used to indicate the attitude, opinion, evaluation, or intention of the person in question. In practical applications, the scale of 5 levels is usually used, and the score is divided into 5 types by using the score of 1 to 5. It can be concluded that the scores of each item in the scale can be summed up, which reflects the overall attitude of the respondents to a certain

thing or topic. Based on this, we carry out the risk grade classification.

Further understanding the problems encountered of the elderly in the community life. Last, combine the qualitative data and quantitative data, deepen and improve the research system.

Among 75 elderly people, 60 - 64 years old accounted for 13.33%, 65 - 69 years old accounted for 13.33%, 70 - 74 years old accounted for 12%, 75 - 79 years old accounted for 21.33%, more than the age of 80 years old accounted for 40%. 90.67% of the elderly can take care of themselves, and in good physical condition (See **Table 1**).

3. Result

SPSS was used to analyze the questionnaire and interview data. Through the analysis of the results of the data, we reached the following conclusions:

3.1. Classification of the Security risk of Elderly Walking Space in Communities

The results identified three types of risks which are caused by pavements, public facilities and surrounding environment based on the qualitative analysis (**Table 2**).

3.2. Elderly Walking Space Community Safety Risk Rating Evaluation

We calculated and analyzed the questionnaire about the pavement obstacles security risks. It is possible to draw the question of the security risk related to the road obstacle in the elderly and the impact on the walking process (the higher the grade score, the higher the score of the elderly is caused by the analysis of the problems in the questionnaire. The deeper the security risks), as shown in **Table 3**.

Table 1. Interviewees age structure.

<i>Age</i>	60 - 64	65 - 69	70 - 74	75 - 79	Upon 80
<i>Proportion</i>	13.33%	13.33%	12%	21.33%	40%

Table 2. Classification of the security risk of Elderly walking space in communities.

<i>Risk Type</i>	<i>Security Risks Point</i>
Pavement	Pavement damage, Different material in pavement, Narrow roads, Roadside obstacles, Road obstacles, Roadside stairs, Car blocking, Renovation waste dumps, Surface water, Uneven pavement, Manhole covers up, Manhole covers down, No manhole covers, Unit stairs in different heights
Public Facilities	Intersection identify, Traffic lights, Lack of rest seats, Door narrow in community, Public door stairs height, Public service facilities obstacles (such as transformer box), Exercise equipment in small space
Surrounding Environment	Mixed vehicles, Car speed fast, Trees block the view, Lack of lighting at night, Cars accounted for leisure space, Obstacles in leisure facilities, Lack of green

Table 3. Pavement security risk rating score.

<i>Pavement Security Risk</i>	Pavement Damage	Road Obstacles	Uneven Pavement	Renovation Waste Dumps	Roadside Stairs	Surface Water	Manhole Covers Up
<i>Rating Score</i>	4.80	3.93	4.75	3.56	2.79	3.8	3.43
<i>Pavement Security Risk</i>	Narrow Roads	Roadside Obstacles	No Manhole Covers	Different Material in Pavement	Car Blocking	Manhole Covers Down	Unit Stairs in Different Heights
<i>Rating Score</i>	3.81	4.21	3.04	3.27	4.97	3.41	2.85

Table 4. Public facilities security risk rating score.

<i>Public Facilities Security Risk</i>	Intersection Identify	Lack of Rest Seats	Door Narrow in Community	Exercise Equipment in Small Space	Public Door Stairs Height	Public Service Facilities Obstacles
<i>Rating Score</i>	2.89	3.97	2.64	3.44	2.93	3.04

Table 5. Surrounding environment security risk rating score.

<i>Surrounding Environment Security Risk</i>	Mixed Vehicles	Car Speed Fast	Block the View	Cars Accounted for Leisure Space	Obstacles in Leisure Facilities	Lack of Lighting at Night	Lack of Green
<i>Rating Score</i>	4.81	5.00	3.13	4.80	3.71	3.73	3.41

Table 6. Pavement, public facilities, surrounding environment security risk rating score.

<i>Security Risks</i>	<i>Rating Score</i>
Pavement	3.76
Public Facilities	3.15
Surrounding Environment	4.09

Table 7. Rank distribution of Elderly Walking Space security risk type.

<i>Rank</i>	<i>Security Risks Type</i>
Level 1	Car speed fast, Car blocking, Mixed vehicles, Pavement damage, Cars accounted for leisure space, Uneven pavement, Roadside obstacles
Level 2	Lack of rest seats, Road obstacles, Narrow roads, Surface water, Lack of lighting at night Obstacles in Leisure facilities, Renovation waste dumps, Exercise equipment in small space, Manhole covers up, manhole covers down, Lack of green, Different material in pavement, Block the view, No manhole covers, Public service facilities obstacles
Level 3	Public door stairs height, Intersection identify, Unit stairs in different heights, Roadside stairs, Door narrow in community

Table 4 summarized the public facilities security risks rating score. From **Table 3** we can clearly see that the public facilities on the elderly caused by the public facilities security risk is lower than pavement security risks (higher grade

score, indicating that the elderly the deeper the feeling of the security risk caused by it).

Table 5 summarized the safety problems related to the surrounding environment, through **Table 5** can be clearly seen that the elderly's feelings to the different types of security risks in the same surrounding environment have the great gap. That the elderly on the surrounding environment security risks vary from person to person.

Integrated rating score statistics of three types of security risks, we also found that the risks are highest in surrounding environment than the pavements and public facilities. The public facilities have the lowest risks (See **Table 6**).

3.3. Elderly Pedestrian Space Security Risk Rating Profile

According to rating score, we can divide the security risk into three levels: 4 points or more for the level 1, it represents a great influence, 3 - 4 for the level 2, shows the influence of the general, 2 points or less for the level 3, showing little impact (See **Table 7**).

According to the survey results that older people relative to the static environment of the community in terms of the harm outside, the vary dynamic environment in community is easier give them a psychological burden.

In addition, older people in the community safety risk of walking space in the questionnaire survey also found: the construction of the community's closer, the less security risks included; security risks overall showing residential area security risks is more than in other land; the main road safety risk distribution less, and open space are more.

4. Limitations and Future Research Directions

As is the case with any study, there are several limitations associated with this research worthy of being acknowledged. This study only explores the problems of the safety of the elderly in the walking space, and there are still many shortcomings in the process, and the scholars who are devoted to this problem will be discussed in depth.

First, the study of the object mostly living to the elderly at home who can take care of themselves, did not choose other ways to pension elderly people to investigate, the future of this problem can be extended to the object of study.

Second, the field survey and interviews in this study are based on the community in Beijing and are not related to the elderly in other areas. Whether or not the hierarchical safety risks of the elderly in the community is applicable to the national community and yet to be further verification.

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