Study on the Construction of Aging Suitability Evaluation System of Environmental Design in Urban Residential region in Cold Regions

Yang Yuanting

Changchun University of Architecture, Changchun, Jilin, China

Keywords: cold region; residential area; aging suitability

Abstract: Compared with other countries in the world, China's aging is characterized by large scale and rapid growth. According to statistics, 90% of the elderly "provide for the aged at home" through socialized services, 7% of the elderly can provide for the aged in the community through the purchase of community services, and 3% of the elderly choose to focus on social elderly care services "institutional elderly care", and the living environment will become the main carrier for the aged of 97% of the elderly. Therefore, under the background of the deepening degree of social aging, China urgently needs to study the construction and transformation of urban living environment from the perspective of the suitability of aging. To sum up, there is little comprehensive evaluation and quantitative research on the environmental suitability of urban residential region, whether it is the empirical enumeration or summary of the environmental suitability of residential region, or the qualitative analysis of individual elements.

1. Introduction

At present, against the backdrop of China's rapid economic development, China has entered an ageing society. There are problems such as a lagging medical and social security system, an ageing population structure and a lack of space and facilities for outdoor activities for the elderly. These problems have also become major hidden dangers for China's future development. With the ageing of China's social population, the well-being index of the elderly has drawn the attention of the whole society. In the context of building a moderately prosperous society, how to give the elderly a sense of security, happiness and mobility, and create a comfortable and livable living environment for them is a problem that the whole society needs to think about and solve together.

2. Cold Region

Cold cities are a special urban group in the northern hemisphere, which have an adverse impact on urban life due to long winter and harsh climate(As shown in Figure 1). China has a vast land area under cold climate conditions. The average temperature in January in Heilongjiang, Jilin, Liaoning and the northeast of Inner Mongolia Autonomous Region is below - 18 ℃. According to the standard that the average temperature in January in cold cities is below 0 ℃ studied and formulated by foreign experts and scholars, the number of cold cities in China will be more.

  DOI: 10.25236/ichamhe.2022.084

Figure 1 Legend of cold city.

3. Investigation and Analysis on the Characteristics of Outdoor Activities of the Elderly in Cold Region

In order to truly understand the use of outdoor space and the needs of the elderly under the influence of urban climate in cold areas, this study adopts the method of field investigation and investigation.

3.1. Respondents and content

Eight typical representative residential communities of different grades in Jilin, northern China, are selected, As follows: Jilin City, Longtan District: Wangjiang District, Longdong Pengcheng District, Longhua District, Global District, Park District, Xinguang Xinyi District, Chengde District, Jiangbin District.

3.2. Field investigation

In order to fully understand the impact of severe cold climate in cold cities, the investigation time is selected for two consecutive weeks in winter and December, including daily and holidays. The survey contents include the basic information of the community, landscape construction, traffic organization, activity distribution and activity characteristics of the elderly group.

3.3. Results Analysis

Types of outdoor activities for the elderly. The retired elderly aged 50-80 living in the community are divided into middle-aged and elderly group (50-65 years old) and elderly group (66-80 years old) according to their physical condition. Its activities are characterized by walking, fitness, walking the dog, taking photos and square dancing, which can reflect the active participation of the elderly in outdoor activities. Among them, the activities of the middle-aged and elderly mainly focus on fitness and sports, while the elderly aged 70-80 mainly focus on soothing walking, basking in the sun and singing. Photography is usually not an individual phenomenon, and it is usually in the early sunny weather after snow. Poker and chess are mostly played by men, and the number of people is basically the same every day. Walking the dog is a common phenomenon, generally middle-aged and elderly people, with relatively good physical quality.

From the perspective of spatial distribution, except that the equipment fitness place is fixed as a fitness square, most activities are concentrated in the sunny and sheltered environment[1]. In non snowy weather, most of the elderly are exposed to the sun, and the space selection is usually around the square with active people. Around the garden road with good landscape, such as walking and photography, in some communities, such as Phoenix Bay, as the ring road, the elderly will slowly form a team along the ring road and form a group effect. However, once the snow is not cleared in time, most of the venues are relatively slippery, which is not conducive to the travel of the elderly, and the number of people is greatly reduced. It is basically not used except in areas with large water bodies. After the light snow, making snowmen with children is only an individual phenomenon. In sections and areas with large topographic slope or rich vertical changes, the activities of the elderly are few.

The winter activity survey shows that the winter outdoor activities in the residential area of the elderly are not strongly dependent on outdoor environmental facilities, mainly focusing on fitness equipment and seats. Among them, construction equipment also tends to be simple, soothing, low physical requirements and small range of motion, such as spacewalk and rings. The use frequency of seats is relatively high, especially in the sunbathing stage in the afternoon, which is usually in short supply. Some communities have glass greenhouses. Although the problems in winter are not very good, they have better daylighting and wind protection. Therefore, they are very popular with the elderly, especially those who play chess and poker. The use of garbage cans and other facilities

is also general. Sometimes in sunny and windless environment, the elderly even play poker on the cutting green space or above the garbage can when there is no suitable place.

Figure 2 Recreational facilities.

4. Landscape Status of Urban Residential Areas in Cold Regions

Through the survey, it is found that the landscape construction of new urban residential areas in cold areas can respect the climate characteristics, actively respond to the impact of cold urban climate, and begin to consider the transformation of outdoor environment in winter, but the spatial planning of most residential areas has not been coordinated. For example, some scenic pavilions are set in areas covered by long-term architectural shadows, which are basically ignored in winter.

It can be seen from the survey that many facilities are poorly maintained, resulting in reduced use functions. Sunken squares and waterscape are abandoned in winter and often become uncontrolled areas. There are many plastic bags, paper and other garbage on the snow, and they are black and gray. Animal feces, especially pet dog feces, are exposed to dry or snowy grass, and no one can clean them up. The roads in some residential areas are very slippery due to ice. In these residential areas, the elderly rarely have outdoor activities. During the visit, it was also learned that most elderly people are afraid of falling and feel unsafe[2]. This is mainly due to the untimely property management, which has greatly affected the use of outdoor space for the elderly, and the lack of design and services related to aging.

Barrier free design is set in the entrance area of the building, but the landscape environment of the residential area has almost no feeling except the road. The activity space is limited by the residential area planning, there is no separate area suitable for the elderly, and the facilities are obviously insufficient.

5. Construction Strategy of Aging Adaptability in Urban Residential Areas in Cold Regions

5.1. Utilization of ice and snow resources

Fully consider the long-term impact of cold areas on cities in cold areas, and take corresponding countermeasures at all levels of urban design. We should not only consider improving the livability of the urban environment in the warm climate season, but also fully consider the improvement of the livability of the urban environment in the cold climate season, so as to truly achieve the goal of livable urban space environment in the cold region. On the one hand, winter friendliness is at the planning and design level. On the other hand, we should actively guide the elderly to face the winter characteristics of cold cities, actively participate in outdoor activities, improve their physical condition through appropriate activities, especially establish social groups to avoid the loneliness of

the elderly.

Ice and snow are unique resources in cold cities, which can form landscape characteristics. At present, most elderly groups have experienced life such as going to the mountains and countryside, and have unforgettable feelings about traditional ice activities. We can consider using the existing water body and other small environments in the community to introduce other activities such as Snowman making, so as to facilitate the physical activities of the middle-aged and elderly people. The production and display of ice and snow sculptures can also enrich family activities in the community, so that the elderly can participate with their families and improve their happiness.

For the elderly, the biggest concern about the outdoor environment in winter lies in the potential safety hazards of ice and snow roads. Therefore, it is suggested to consider the form of ground pavement in landscape design and adopt anti-skid materials with coarse texture. Handrails shall be set in curves or areas with large slopes and steps to protect the elderly in time. Barrier free design also fully considers the travel and activities of the elderly, and handrails are set around some activity places. With the advent of the intelligent era, it is suggested to set up an emergency alarm system in combination with the monitoring system to improve the safety of the use of outdoor space for the elderly.

5.2. Suitability planning and renewal design of new communities

In the overall planning, sunshine analysis and simulation are used to pre judge the space, so as to avoid that the activity space such as landscape pavilion and fitness equipment is located in the area covered by long-term architectural shadow. Winter cold wind is one of the important factors affecting urban living environment. Effective shielding of winter cold wind is a very important countermeasure. Above the dominant wind direction in winter, set up enclosed spaces such as terrain, landscape, structures and plants, create a microclimate environment with sufficient sunshine and shelter in winter, enhance the suitability of Winter Environmental Landscape in residential areas, and meet the outdoor activities needs of the elderly. Conditional communities can combine greenhouses and greenhouses to expand indoor and outdoor space, so as to better improve the activity quality of the elderly.

The landscape of the existing residential area has been completed, and the unsuitable areas can be reasonably adjusted and transformed in combination with the layout characteristics of the community. The corresponding site space is limited, and the residential areas with insufficient construction can block the cold wind by planting trees. In sunny areas, seats are set up to provide space for the elderly to bask in the sun. For the existing landscape sketch, if the position cannot be adjusted, it can be considered to temporarily increase the windshield in the upwind direction to improve the comfort in winter.

6. Conclusion

Through the comprehensive evaluation and application of environmental aging in urban residential areas, it can be seen that there is a strong correlation among the three elements of traffic space aging, public space aging and environmental sketch and related facilities aging. The evaluation system is based on the current development of environmental suitability of urban residential areas and does not lead the development of environmental suitability of urban residential areas in the future, which requires the continuous development of indicators with the practice of environmental suitability of urban residential areas. At present, with the further deepening of China’s population aging, the index system still needs to be tested and improved in practice, so as to dynamically adjust the evaluation index system in practice.

Acknowledgments

The Education Department of Jilin Province The Research on the Construction of Aging

Evaluation System for Environmental Design of Residential Areas in Cold Cities, JJKH20221320SK

References

[1] Xie Yushu, Lin Na, Huang Qitang.Research on Landscape Aging Transformation of Old Residential Areas under Home-based Elderly Care Mode[J]. Journal of Shenyang Architecture University (JCR-SSCI),2019,21,(2):117-123.

[2] Jiang Bingtian, Chang Jiang, Zhang Xinlun.Study on the Aging Status and Improvement Strategy of Outdoor Environment in Existing Residential Areas in Xuzhou[J].Chinese and foreign architecture, 2019,(11):102-105.