

Renewal Strategy of Public Space Suitable for Aging in a Typical Community in Beijing—A Case Study of Pingguoyuan Street

Lei Wang, Ran Xue, Xinrui Wang, Xiaoya Fang, Kejia Cheng

School of Architecture and Art, North China University of Technology, Beijing, China

Abstract: *Community outdoor public space is the most dependent type of urban public space in the daily life of elderly individuals. How to make the urban community outdoor public space more suitable for the daily use of the elderly is an important problem that needs to be solved at present. This paper takes Pingguoyuan Street in Shijingshan District of Beijing as the main research object, through field surveys, questionnaires, interviews and other methods to understand the needs of the elderly to investigate and analyse the current situation of the outdoor public space in the community of Pingguoyuan Street. It is proposed an age-appropriate transformation strategy based on the needs of elderly individuals.*

Keywords: Suitable for aging, Central urban area, Community public space, Renewal strategy.

1. Exordium

1.1 The Research Background

Since the beginning of the 21st century, China's population aging process has accelerated and deepened. The proportion of elderly individuals aged 65 years and above increased from 6.96% in 2000 to 13.5% in 2020. The aging of the population, especially in cities, is a crucial trend of social development in our country and its fundamental condition over a long period thereafter. To pay attention to and to study the space and health needs of the elderly and implement the national strategy of actively coping with population aging is an inherent requirement for implementing the people-centered development philosophy and ensuring that hundreds of millions of senior citizens in China live in peace in their old age.

In Beijing, the capital and our country's megacity, the aging problem is particularly increasingly evident. According to the latest statistics released by the Beijing Aging Office, by the end of 2020, the city's permanent resident elderly population was 4.299 million, accounting for 19.6% of the total resident population. The registered elderly population was 3.786 million, accounting for 27.0% of the total registered population. This is especially true in the central city, where most of the people living there are older, urban natives.

In this day and age, the community outdoor space in the metropolis generally has problems such as low attention to community outdoor public spaces, poor senility, lack of refined design, and the like. How to make urban community outdoor public space more suitable in the daily for the elderly is an important problem to be solved in an aging society.

1.2 Previous Study

China's active response to the aging of the population has formed a strategic policy at the national level and indicates that the core value of urban planning in the new era is suitable for aging. With community public outdoor activity spaces as the core, it is more inclined to adapt to the activities of elderly

individuals. Since the late 1990s, Chinese scholars have begun to pay attention to the adaptability of the elderly in outdoor spaces, and their research methods emphasize observation and qualitative analysis. For example, Jianmin Zhang analyzed multilevel and diverse outdoor activity environments that are conducive to maintaining the elderly's independent living ability and physical and mental health and put forward the design and suggestions of various outdoor activity spaces for the elderly living at home and the elderly living together [1]. Then, many scholars began to study the urban public space of plentiful and promotion strategies. For example, Jusheng Song and Yi Sun analyzed and summarized the characteristics of community activities for the elderly in Shenzhen through questionnaires, behavioral observation records and interviews and put forward the community elderly outdoor space planning and design strategy [2]. Hanqi Lei and Huiqin Hu proposed the optimization strategy of outdoor activity venues for the elderly by studying the living behaviors of elderly individuals [3].

2. Analysis of the Current Situation and Problems of Typical Public Space

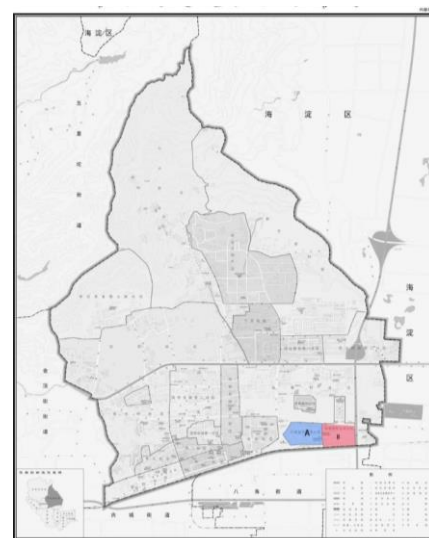


Figure 1: Community Distribution Map of Pingguoyuan Street

This paper takes Pingguoyuan Street in the Shijingshan District of Beijing as the main research object through field surveys, questionnaires, interviews and other methods to understand the needs of the elderly to investigate, and analyze the current situation of the outdoor public space in the community of Pingguoyuan Street and proposes a renovation strategy suitable for aging. In the following papers, A is used to denote the Yongjingsiji community and B is used to denote the Junkeyuan community.

2.1 The Needs of the Elderly

It is an inevitable natural phenomenon that one’s physiological function will gradually deteriorate after entering old age. The main physiological changes in elderly individuals are sensory degeneration, motor degeneration, nervous system degeneration and metabolic degeneration [4].

2.1.1 Physiological needs

A questionnaire survey was conducted among the elderly in the community. A total of 50 questionnaires were distributed and 42 questionnaires were effectively collected. Most of the elderly have sensory deterioration: 75% have presbyopia, 55% have poor hearing, 35% have poor ability to adapt to temperature differences, and 30% have olfactory and tactile deterioration (as shown in Figure 3). Therefore, they have higher requirements for the external living environment, such as lighting and color. In terms of athletic ability degradation, 65% of the elderly have muscle strength degradation and 55% have inflexibility of legs and feet, which makes them slow and more prone to fatigue (as shown in Figure 4). Therefore, it is more necessary to have rest facilities and space in the community. On the issue of the nervous system, the old man exhibits memory decline: 65% of the elderly have memory problems, 50% have poor thinking skills, and 35% have balance problems. (As shown in Figure 5), to memory loss. The ability to respond to form the outside world becomes sluggish, so improving the identification system and security community environment is also very important for elderly individuals.

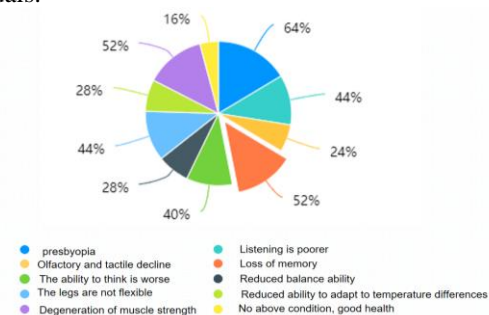


Figure 2: Physical condition of the elderly

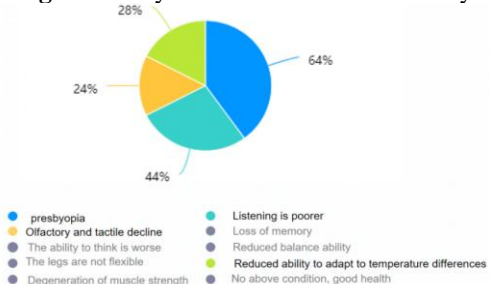


Figure 3: Proportion of degraded perception

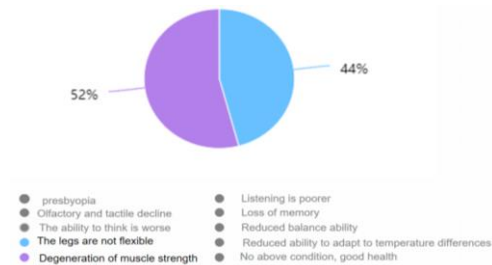


Figure 4: Ratio of motor ability degeneration

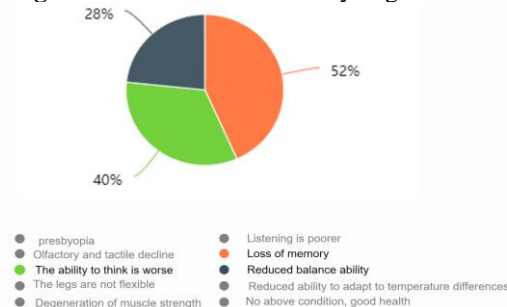


Figure 5: Proportion of nervous system degeneration

2.1.2 Psychological needs

Since most of the elderly are already in the retirement stage, compared with the working period, they have less social interaction and change the focus of life. In addition, due to physiological and physical aging and other objective factors, elderly individuals are more likely to have various psychological characteristics such as loneliness, frustration and loss. Therefore, the elderly also have a greater need to engage in social interaction in the community and maintain good interaction with neighbors and friends to alleviate loneliness. At the same time, we need more public service functions suitable for aging, such as activity rooms for elderly individuals, chess and card rooms, and pension, to meet our social needs and relieve our psychological pressure.

2.1.3 Behavioral requirements

From the perspective of the types of activities of elderly individuals, the activities of the elderly are mainly divided into necessary activities, spontaneous activities and social activities. Essential activities are the contents that must be carried out without the influence of changes in the external environment, such as buying vegetables, seeking medical treatment, shopping, etc. Spontaneous activities are the contents that the elderly spontaneously choose whether to carry out activities and the duration of activities, such as leisure and entertainment, sports and fitness, walking and chatting, playing chess, etc (as shown in Figure 6). Elderly people’s participation in spontaneous activities is directly affected by the living environment, so they also need good activity space. Social activities are collective activities that need to communicate with others[5]. From the perspective of the behavioral ability of elderly individuals, the self-care elderly have strong behavioral ability. In terms of space demand, they consider the abundance of leisure and sports space more. However, elderly individuals with media-assisted and media-assisted care have weak behavioral abilities and poor physical and mental conditions and pay more attention to safety and comfort in space demand.

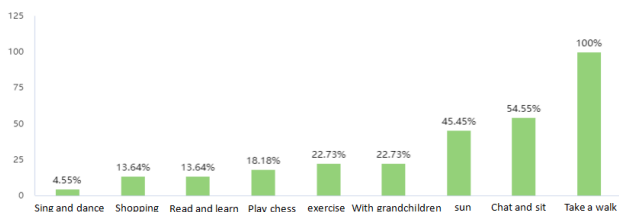


Figure 6: Types of activities for the elderly in the community

2.2 Current Situation and Problems of Community Public Space

2.2.1 Public space

Due to the limited physical strength of elderly individuals, they cannot exercise for a long time, so it is necessary to provide good rest space and rest facilities for elderly individuals. Through investigation, it is found that the number and density of public space seats for the elderly in the A community are moderate, and they are under trees with wind and sunshine or in open fields (as shown in Figure 7). However, the number of seats in the community of the Academy of B community is insufficient and only concentrated in the square, and the density distribution is unreasonable (as shown in Figure 8). On the ground pavement, the pavement that major district designed different qualitative material for public space is fitted. But to avoid to bring unnecessary harm to the elderly, ground pavement should adopt prevent slip, the qualitative that does not reflect light, and have good water absorption. In terms of lighting, the A community residential area has more shadow areas at night, which has bigger security risks. The B community light is dazzling, easily causing the discomfort of elderly individuals.



Figure 7: Public space seats in the A community

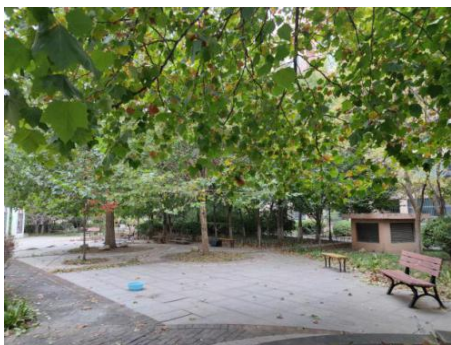


Figure 8: Public space chairs in the B community

Internal and surrounding found through the research community, A community of life form a complete set of completer and more reasonable configuration, the community has supermarkets, pharmacies, etc. So, the life more

convenient and quick, old people prefer to go out, vibrant community (as shown in Figure 9); Life B community inside the village did not form a complete set, so the elderly travel distance farther, community dynamic low (as shown in Figure 10). However, most of the residential areas in the main activity places around the public toilet is not set, which is inconvenient for elderly individuals.

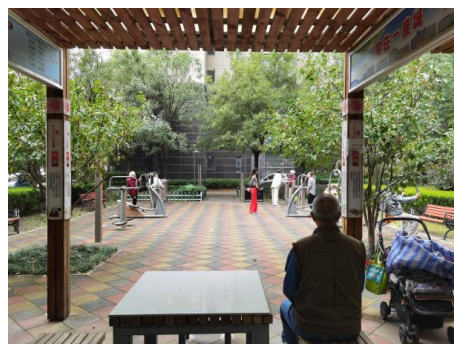


Figure 9: The A community space facilities



Figure 10: The B community space facilities

2.2.2 Green space

A community of green space in pursuit of layout on the beautiful and novel appearance, internal imitation maze of public landscape and the field of the shop is unfavorable to the elderly activities in the workplace and for the site residents low utilization rate (as shown in Figure 11). However, in terms of landscape types, landscape types are diverse. For example, the center of the community contains waterfront space, including water steps and hydrophilic platform, which is convenient for the elderly to gathered to watch, play and rest. The landscape axis is designed with clear axis and clear direction, which is convenient for the elderly to watch and enrich their leisure life. Compared with the other B community, its landscape design is relatively simple and lacks the combination of other recreational facilities or landscape viewing functions, so it is impossible for the elderly to stay here (as shown in Figure 12).



Figure 11: The maze garden and paved floor of A community



Figure 12: The space facilities of the B community

2.2.3 Traffic space

The distance between underground parking and ground parking in A Community and the main entrance is far, resulting in mixed traffic between people and vehicles, long parking routes, and crossing the residential and activity space of the elderly, which has certain safety risks. The parking space in front of the house is small, which can not meet the needs of residents in the community, and there is a barrier-free access, which is not conducive to the elderly travel (as shown in Figure 13). The underground parking distance of B community is close to the main entrance, and the car, so not only convenient parking, but also reducing the probability of vehicles travelling inside the village, making old people safer activities within the community. The ground stop owners to relatively remote locations reduced the streamline crossover to elderly travel activities. Buildings set up plenty of non-motor vehicles parking spaces to make bike travel more convenient (as shown in Figure 14).



Figure 13: A community road human motorized car parking



Figure 14: B community parking lot and road

3. Typical Public Space Optimal Aging Update Policy

3.1 Continuous Safe Walking Space

According to the questionnaire survey and field observation, the community, the most frequently in the elderly outdoor activities is to walk, so the community safe step line space is especially important. For motor vehicles and walkways, combined with ground identification and road warning column may be used for one road, and the inevitable human space motorized vehicle deceleration zone to reduces the speed. On the sign system, yellow lines and slogans are used to remind people where there are certain security risks. Signage at special places, such as express stations, community hospitals, etc. In addition, in the setting of the road and sidewalk for the elderly to exercise and walk, it is necessary to maintain stability and design barrier-free facilities in places with height differences to ensure the safety of the elderly to travel conveniently (as shown in Figure 15). This can be improved according to the illuminating system at the same time, in the need to travel on foot space, to ensure the safety of the old man in a nocturnal, prevent falls.



Figure 15: The height difference space in the A community

3.2 Good Fitness Space Environment

The main behavior of the space type is mainly for walking, TaiJi, sword, dancing, etc. The existing residential communities should build fitness plazas or activity spaces with appropriate areas according to the number of residents, so as to meet the needs of the elderly for fitness activities (as shown in Figure 16). According to the survey, the fitness of old people is often combined with a walking activity. Therefore, the fitness space should be set with trail penetration to form a diversified composite fitness space. Fitness equipment can be added to the edge of the square, the green space between houses, the edge of the slow walking path, and the micro terrain to meet the needs of more fitness activities, and fitness trails can be set to connect them in series (as shown in Figure 17).



Figure 16: The A community fitness space



Figure 17: Fitness space with the combination of trials

3.3 Rich Layers of Green Space

The transformation of landscape greening design is often combined with a space to design. A good landscape for the elderly to enjoy the object, is beneficial to the physical and mental health of the elderly. Most old residential area landscapes tend to lack the layers. In order to enrich the level of green space and shorten the distance between people and nature, the waterscape can be combined with the square (as shown in Figure 18). During the transformation, attention should be paid to the spatial feeling of the new layout landscape, such as gardens and water features that can be enjoyed when the elderly have a rest and chat. The walking path can be combined with the natural landscape, giving the elderly a better experience and a more comfortable environment.

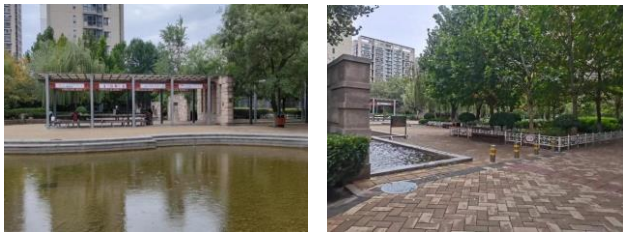


Figure 18: The A community waterscape

3.4 Easy to Exchange Contact Space

The main type of behavior in this space is communication, which compensates for the loneliness of the elderly. The main needs of the elderly are concentrated in group interaction, small-scale interaction, and personal space. As for the group communication, key transformations should be carried out on the nodes of the communication space with high frequency: the space environment can be improved by appropriately adding seats, planting shady trees, planting the separation between hedgerows and vehicle lanes, adding barrier-free facilities, and changing the ground material (as shown in Figure 19, shown in Figure 20). As for the small one, it can set semi-closed communication spaces in the group for communication, or combine the design of children's activity facilities, which is conducive to the elderly with grandchildren gathering negotiation, children as the center of the topic, faster understanding between each other. In the setting of private space, for example, the green space between houses is interspersed with private communication space, which is conducive to the old friends to maintain close relations, and the small space provides a quieter and more private environment, which is more conducive to the communication between the old people. For example, the entrance and exit of the residential area, the intersection of the

road, the entrance of the restaurant and other spatial points where the elderly are easy to gather.



Figure 19: A community communication space



Figure 20: B community communication space

4. Conclusion

At present, most of the elderly in our country still live in the old communities with a complex population structure and single lifestyle cultures and activities. Through the investigation of the elderly, this paper found and summarized the shortage of age-appropriate in the community, and put forward the age-appropriate transformation strategy for the outdoor public space in the old community to effectively improve the healthy age-appropriate outdoor public space environment for the elderly, and further improve the happiness and sense of gain of the elderly.

Acknowledgment

This paper is supported by “North China University of Technology: Innovation and entrepreneurship training program for College Students”, No. 108051360022XN372.

References

- [1] Jianmi Zhang. Suitable for outdoor environment of urban elderly research[J]. Journal of architecture, 1997(09): 11-15+65.
- [2] Trunk Song, Yi Sun, Yamei Xie. Based on the characteristics of the elderly community activities space planning and design strategies, typical community outdoors activity space in Shenzhen as an example[J]. Urban Planning, 2017, 41(05): 27-36.
- [3] Hanqi Lei, Huiqin Hu. Community elderly outdoor activities, behavior and the relationship between the activity field of research[J]. China's Residential Facilities, 2017(09): 39-44.
- [4] Ye Yang. Based on the “family pension mode” residential area optimum aging study[D]. Beijing University of Architecture, 2017.

- [5] Yao Yao. Both residential home endowment modes described updated research[D]. Tianjin University, 2016.