Current Situation and Optimization Suggestions for Ageing-Appropriate Development of Urban Public Rest Facilities

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Abstract. With the increasing proportion of elderly people, China has long since entered an aging society, and the development of aging has continued to deepen. In the construction of the humanization level of the city, the development of age-appropriate public rest facilities has attracted much attention. This study will take the current aging society as the background and meet the physiological and psychological needs of the elderly group as the starting point to investigate in depth the current situation of the construction of urban public open space facilities. Based on the degree of aging, the level of urban construction, and social concern, this study selects the public rest facilities in Changning District, Shanghai, as the research object, and conducts a comprehensive analysis of the level of construction of aging-appropriate rest facilities. The study found that the construction of existing urban public rest facilities is still characterized by a variety of problems such as scarcity, single type, poor comfort, safety hazards, and lack of consideration for the physical scale of the elderly population and suggested corresponding improvements. Public rest facilities must follow the people-oriented principle, be based on the many different needs of the elderly, fully integrate the living habits of China's elderly population, and comprehensively improve the quality of life of the elderly population. This study is of great significance for the subsequent promotion of the construction of public rest facilities and the implementation of the construction of the humanization level of the city.

Keywords: Public rest facilities; elderly population; aging-friendly design.

1. Introduction

At present, China, the world's largest country in terms of population, has entered an aging society, and the development process of aging is still speeding up. Urban public rest facilities are a reflection of the level of humanistic care in the city, and their value is to be able to meet the multiple physical and psychological needs of urban residents at a high level. The quality of life of the huge number of elderly people has also become an important consideration in the construction of urban public rest facilities. However, due to China's rapid development over a long period of time in the past, there is a lack of thinking about the age-friendly design of urban public rest facilities [1]. Therefore, this study will be based on the current situation of the aging society, take the physiological and psychological needs of the elderly group as the starting point, and select typical cases to analyze the urban public rest facilities. By investigating the current situation of the construction of rest facilities, it has analyzed the shortcomings of their construction in terms of aging. Starting from the five perspectives of safety, convenience, interactivity, artistry, and comfort, put forward improvement suggestions for the existing problems so that the urban public rest facilities can be more suitable for the needs of the elderly groups in terms of appearance and function.

2. Development Analysis

2.1. Development Trend of Aging in China

According to statistics related to the People's Republic of China 2022 Statistical Bulletin of National Economic and Social Development, by the end of 2022, China's population aged 60 and above reached 280 million, accounting for 19.8% of the total population [1]. It is summarized in table 1. The aging of China's population continues to deepen.

Table 1. Population and its composition at the end of 2022.

Norm	Year-end number (tens of thousands)	Percentage (%)
National population	141175	100.0
Of which: 0-15 years (including under 16 years)	25615	18.1
16-59 years old (including less than 60 years old)	87556	62.0
60 years old and above	28004	19.8
Of which: 65 years old and above	20978	14.9

The number of provinces and cities in China that are aging is increasing, and they are mainly located in the southeastern coastal region. The spatial distribution of the elderly population is highly overlapped with the spatial distribution of regional economic development, the educational level of the population, and so on.

2.2. Current Behavioral Status and Needs of the Elderly

In old age, all bodily functions begin to deteriorate to varying degrees. Vision, memory loss, dullness of taste and smell, reduced motor coordination, decreased resistance, etc., and the functions of the body's tissues and organs gradually decline [2].

At the same time, physiological changes and psychological changes in the elderly interact with each other to a certain extent, and along with the degradation of physiological functions, the elderly population is prone to a sense of loss, inferiority, loneliness, fear, and other emotions [3].

After the end of a busy and regular pattern of life, seniors are suddenly transformed into an empty retirement life, and most seniors feel a void. Therefore, some elderly people have started to engage in some social activities to enrich their lives in old age. In urban public spaces, the types of activities are mainly categorized into three types: sports, recreation, and interaction [4]. Behavioral activities of the elderly are characterized by three features: aggregation, time domain, and geography [4].

2.3. Status of Construction of Public Rest Facilities

Urban public facilities include plazas, roads, open spaces, garbage cans, public restrooms, and so on. As a representative of public facilities, the main value of public rest facilities lies in meeting the living needs of urban residents in a higher quality. Urban public facilities are a direct reflection of the city's humanistic spirit [5]. In the rapid development process of cities in the past, design has placed much more emphasis on efficiency than on humanization. Planning lacks a forward-looking and holistic approach. Therefore, it can be seen in past urban space planning that the design is mostly based on the average scale of an able-bodied adult as a reference. Most public facilities and buildings have, to a certain extent, neglected the inconvenience of some elderly people and special groups of people using these facilities and spaces.

In general, the current problems of China's aging rest facilities are mainly in the following areas: low coverage; uneven distribution of facilities; lack of follow-up routine maintenance; and homogenization of facility types [6]. Therefore, to a large extent, the inadequacy of public rest facilities has resulted in the elderly not being able to participate in rest activities on an equal footing.

2.4. Principles of Ageing-Friendly Design for Public Rest Facilities

Along with the aging of the population, the needs and demands of the elderly for various public rest facilities in the city are increasing. Taking into account the physiological needs, psychological needs, and behavioral characteristics of the elderly, the following five principles and standards for the aging-friendly design of public rest facilities are summarized.

Safety of public rest facilities [7]. Due to their special physical and mental state, older people have a higher need for safety. The safety of rest facilities is not only reflected in the safety performance of the facilities themselves, but also in their location, appearance sense of use, etc. to give the elderly a sense of security. In addition, the rest space should emphasize the private needs of the elderly, create

appropriate rest spaces for the elderly with different personality preferences, and ensure the diversity and recreation of the environment [7].

Accessibility of public rest facilities [7]. Public open space facilities should bring convenience to the elderly in terms of their functions. By understanding the needs of the elderly, the functions of rest facilities should be increased appropriately so that they can provide convenient and practical services to the public. Public rest facilities should also bring convenience to the lives of the elderly in terms of form, location, and surrounding configuration.

Interactivity of public rest facilities [7]. Since the elderly are prone to a sense of loss, loneliness, and inferiority, they should, in addition to material living conditions, enrich their spiritual and cultural life in order to counteract this gap. Public rest facilities should increase their motivation to participate in outdoor activities and create a participatory rest environment for the elderly to reduce their sense of isolation.

Artistry in public rest facilities [7]. Elderly people are more sensitive psychologically, preferring mature and low-key styles, and some older groups also have nostalgic feelings [7]. Therefore, public rest facilities should be designed in terms of shape and color. At the same time, the full integration of local culture is conducive to the healthy psychological and physical development of the elderly.

Comfort of public rest facilities [7]. Elderly people require a higher level of comfort from public rest facilities due to the deterioration of their physical functions. The average scale of the elderly should be used as a reference for ageing-friendly design to reduce the physical burden on the elderly.

3. Case Study

Urban public rest facilities can provide the most direct services to citizens and are one of the elements that can most easily reflect the humanization of urban construction. Public open space facilities generally serve the following functions: to sit down for a long period of time to rest, to stop for a short time, to lean on for a moment, or otherwise [6].

Shanghai's aging population remains high, with the elderly population having reached 5815500, accounting for about 23.4% of the city's total population, far exceeding the international standard of 10% of the urban population aging [8]. It is summarized in table 2. The needs of this group need to be fully taken into account in the planning of urban public facilities.

Table 2. Ranking of China's Provinces in terms of aging degree.

Ranking	Region	Aging ratio	Elderly population (million)
1	Liaoning	25.72%	1095.45
2	Shanghai	23.38%	581.55
3	Heilongjiang	23.22%	739.57
4	Jilin	23.06%	555.12

Since 2022, Changning District in Shanghai, China, has invested in the construction of a large number of public rest facilities in order to implement the requirements of the "Beautiful Neighborhood" and "15-minute Living Circle" plans. More than 200 new (remodeled) open space facilities will be added (remodeled) throughout the region by 2023 through new construction, remodeling, upgrading, and sharing [9].

3.1. Analysis of Public Rest Facilities

This study starts from some of the rest facilities in Changning District, Shanghai, and investigates the shape, material, and spatial form of the rest facilities in detail. It comprehensively analyzes the problems and construction level of the aging public rest facilities in Changning District from five perspectives: safety, convenience, interactivity, artistry, and comfort.

For example, the pocket parks located on both sides of Zhongshanxi Road at Anshun Road are rich in styles of sitting-out facilities. The sitting-out facilities are of the more traditional seating type. The seating facilities are adapted to the local conditions, making full use of the original terrain height

difference, supplemented by staggered landscaping and stepped seating. This rest space creates neighborhood pocket parks that provide both a sitting area for pedestrians and a place for pet-owning residents to play with their animals, centralize fecal matter, and exchange tips on pet ownership. The seats have localized elements, and a simple map of the Anshun road section is shown on the seat backrest. Some of the seat backrests are made of iron perforated plate material, and lights are arranged behind the backrests so that the light can show rich and bright lighting effects at night through the gaps of the perforated plate. As shown in Figure 1. There are also some seats with traditional red lacquered wood surfaces. In terms of the spatial pattern created by the seating arrangement, there are two main types of space. One is an open layout with seats arranged in parallel rows, and the other is a semi-open layout with semi-enclosed rows.



Fig. 1. South side of Anshun Road rest seats.

On the wide plaza around the "Heart of Hongqiao" on Yili Road, Anshun Road, the resting facilities are mainly shaped seats. As shown in Figure 2. The seats are lower, do not come with seatbacks, and the seats are made of stone throughout. The original flower bed greenery is complemented by the use of undulating grassy slopes, which are interwoven with curved gray seats. The seating in the plaza is dispersed in a circular row, creating a more open space.

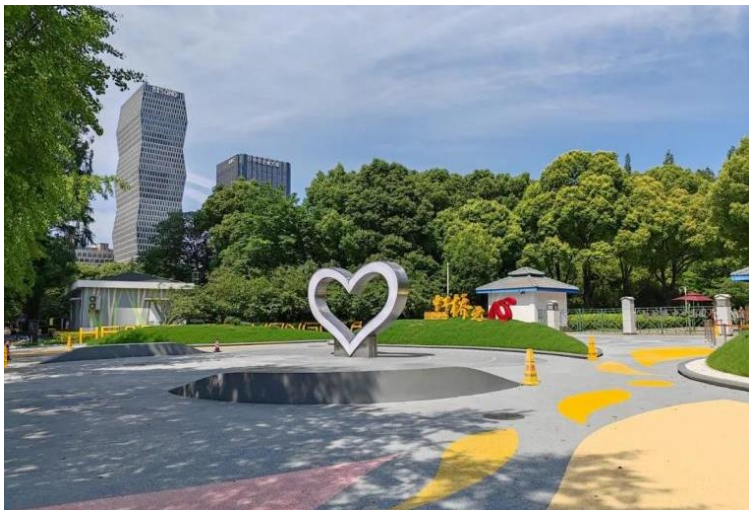


Fig. 2. Resting Seats at the "Heart of Hongqiao" Plaza, Anshun Road.

The addition of a leaning device on the north side of Anshun Road is a clever way to save sidewalk space while taking into account the needs of the crowd. The unit is finished in bright yellow metallic throughout. As shown in Figure 3. The site is set up with two different leaning heights, with the high unit suitable for the elderly and the low unit for children. The high device is equipped with handles to make it easier for the elderly to get up, and hooks are added so that portable heavy objects can be stored temporarily.

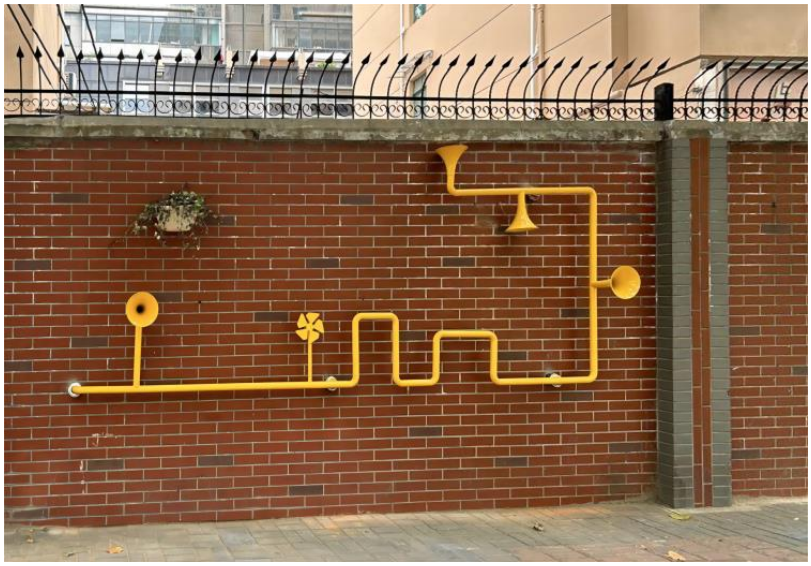


Fig. 3. Pipeline leaning device on the north side of Anshun Road.

3.2. Problems of Public Rest Facilities

There are several problems regarding public rest facilities in Changning District, Shanghai:

In response to safety, physical and psychological safety hazards were identified for some of the rest facilities. Physiologically, some iron facilities are too smooth, which, considering the slow motor function of the elderly, may easily cause them to slip and pose safety hazards. There are also some seats that are too low, making it easy for the elderly to become unsteady in their center of gravity when they sit down. At the same time, a seat that is too low causes the elderly to bend their legs for long periods of time, creating intense discomfort when they get up again. Psychologically, the choice of colors for some of the rest facilities can also create feelings of insecurity among the elderly. For example, grey seats tend to make older persons feel depressed when using them, which is not conducive to mobilizing them for social activities. There are also some facilities that, in order to enhance identification, have chosen a more exaggerated bright yellow color, which is visually and psychologically stimulating to the elderly, increases the sense of insecurity, and is not easy for the elderly to use [10].

In response to convenience, the study identified spatial inconvenience and functional inconvenience of public rest facilities in the area. Spatially, the rest facilities are mainly located in the older urban renewal areas and their service area is limited to the residential neighborhoods adjacent to the streets. In the face of the city's aging, its numbers and distribution are far from meeting the needs of the elderly. Functionally, the rest facilities do not take into account the sheltering functions required by the elderly. Behavioral activities of older adults are territorial, and daily behavioral activities are influenced by the content of the activity, the weather, and other factors. Older people like to spend time outdoors in the summer, taking into account factors such as the summer heat and light [7]. Public rest facilities should be equipped with sun-shading functions to provide cooling places for the elderly. Seniors enjoy sunbathing on outdoor rest facilities during the winter months, which are characterized by low temperatures, humidity, and rain [7]. Therefore, the rest facilities should have a certain degree of protection from wind and rain to provide shelter for the elderly in times of sudden weather changes.

In response to the interactivity, the vast majority of facilities lack the ability to hang, organize, and place items. When traveling, seniors need to carry items such as presbyopes, purchased vegetables and fruits, cups of water, and newspapers with them [7]. These items are usually placed on the floor or in corners, which affects the quality of the environment and also tends to be forgotten.

For comfort, some of the facilities have poor tactile material choices and some of the seating facilities are not equipped with seat backs. Most of the rest facilities are made of iron and stone, both of which are less tactile and difficult to adapt the shape to the seating requirements. Among them,

iron and stone have high heat and cold conductivity, and after a long period of light or low temperature, the material becomes too cold or hot, and the elderly cause damage to their skin when using it. Public rest facilities, especially seating facilities, should be equipped with a backrest function to support the cervical vertebrae, back, and lumbar region of the elderly, so as to alleviate fatigue and provide rest for the elderly.

4. Discussion and Recommendations

Based on the survey results and existing problems of public rest facilities in Changning District, Shanghai, it proposes aging-appropriate improvements to public rest facilities in the area by studying the different physiological and psychological needs of the elderly.

The spacing and density of the siting of rest facilities should be reasonable, so as to avoid increasing the burden on the elderly in walking for a long time; and the number of facilities should be increased appropriately according to the needs of the population. At the same time, a certain number of semi-enclosed private rest spaces should be added to meet the diversified needs of elderly groups [11].

Considering the psychological and physiological needs of the elderly. The shape is based on the body size of the elderly and meets the needs of various postures. Facility design should choose soft, temperature is not easily affected by the material, such as preserved wood material. The colors are mature, non-stimulating colors, which produce benign emotional guidance for the elderly. At the same time, the colors are integrated with the surrounding environment and space, and the hues are coordinated, unified, and recognizable [10].

According to the behavioral habits of the elderly, sitting facilities should be adapted to the needs of sitting, leaning, and other movements, and functions such as placing and hanging objects should be added. Provide sun and rain shelters to protect the elderly during weather changes according to local regional characteristics.

The relevant government departments should establish the basic working concept of putting people at the center of their work, start from the actual interests and needs of the people, take positive action, and formulate complete processes and policies. in order to ensure that the construction work and subsequent maintenance of urban aging rest facilities are effectively implemented [12].

5. Conclusion

Starting from the development trend of aging in China, this paper summarizes the physiological and psychological characteristics and behavioral habits of the elderly and summarizes and organizes the principles of aging-adapted design of public rest facilities through a large number of literature analyses and case investigations. The study analyzes the design of existing public rest facilities according to the characteristics of the elderly and finds that China's current public rest facilities construction is still very much lacking in the consideration of the elderly population. The construction of rest facilities is still characterized by problems such as scarcity, variety, poor comfort, safety hazards and failure to take into account the physical size of the elderly population. The social problem of population aging in China is still very serious, and aging-friendly design needs to be given more attention. In the future planning of public rest facilities in the city, the human-oriented design principle should be followed in the aging-friendly design, taking the physiological and psychological needs of the elderly as the starting point, drawing on and learning from excellent designs, and fully studying the relevant scientific theories. It is necessary to fully integrate the living habits of the elderly in China, to meet the needs of the elderly in China, and to explore a design path that is truly suitable for the elderly in China.

The innovation of the study is that Changning District of Shanghai, a city with more serious aging and a high level of urban public facilities construction, was selected, which is leading and exemplary for the construction of aging-appropriate rest facilities in the whole country. A comprehensive

analysis of the existing public rest facilities in the area, including their problems and deficiencies, was conducted through the next step, and many ideas for improvements that could be made based on the characteristics of the elderly were suggested. The research results aim to provide convenient public activity environments for the elderly, to enhance the comfort and convenience of this group's life, to reflect society's care for the elderly, and to make a positive contribution to China's smooth transition to an aging society.

In this paper, a variety of rest facilities and influencing factors are taken into account in the depth of the research direction, and in the future, it can focus on a single area to do more comprehensive and in-depth special research. Due to the limited length of the article, there are still some deficiencies in the research on the aging-friendly design of public rest facilities, and the direction of the subsequent research can be directed to in-depth research and expansion in multiple perspectives, multiple levels, and multiple fields.

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