Optimization Strategies of Beijing Elderly Care Service Stations Based on Questionnaire Survey Method: A Case Study of Zhanlan Road Street of Xicheng District

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Abstract 4 elderly care service stations in Zhanlan Road Street, Xicheng District, Beijing are selected, and questionnaires are designed and distributed to the surrounding elderly population to understand their needs and satisfaction with the station environment. By observing elderly care service stations on site, the characteristics, obstacles, and shortcomings of the environment are recorded, and relevant data are collected and analyzed, such as the characteristics of the elderly population being interviewed, the planning and design data of the station environment, and the distribution of service facilities. The overall characteristics of the spatial environment of elderly care stations are summarized, and renovation measures and optimization suggestions are provided for the current shortcomings, thereby providing some basis for the spatial design of community elderly care service stations in the future.

Keywords Old people, Community elderly care service station, Space renovation, Optimization strategy
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Since 2016, Beijing has further improved its four levels of elderly care service system, including city, district, street (township), and community (village), by constructing community elderly care service stations. Community elderly care service stations have become an important guarantee for solving the "last kilometer" of elderly care services[1-3]. By conducting interviews with elderly residents living near four elderly care service stations in Huangguayuan Community, Debao Community, Luyuan Community of Zhanlan Road Street, and Yuetan Street of Xicheng District, and randomly distributing questionnaires, it aims to understand the true elderly care service needs of the elderly, focus on the operation and service quality of elderly care service stations, the existing problems and difficulties, and propose corresponding countermeasures and optimization suggestions.

1 Research methods and objects

1.1 Methods and steps for environmental investigation of elderly care service stations

Questionnaire survey: questionnaires are designed and distributed to the elderly population to understand their needs and satisfaction with the station environment, and related shortcomings. The questionnaire includes questions about the conditions of station space facilities, service project requirements, safety, and other aspects.

Observation and recording: by observing elderly care service stations on site, the characteristics, obstacles, and shortcomings of the environment are recorded. Whether the indoor and outdoor service facilities of the station, as well as the layout of indoor and outdoor spaces, are suitable for aging, are observed.

Data analysis: relevant data are collected and analyzed, such as characteristics of the elderly population being interviewed, planning and design of living environments, and distribution of community service facilities. By using statistical analysis methods, the overall characteristics and problems of the living environment of the elderly can be revealed.

1.2 Design and distribution of questionnaires

Four elderly care service stations in Zhanzhan Road Street, Xicheng District, Beijing are selected as the research objects for investigation. The sample selection criteria are that the stations provide accommodation beds, with a scale area of 100-400 m^2 and basic service project functions, and a preliminary summary of their facilities is made (Fig.1-2, Table 1). The questionnaire is divided into questionnaires for elderly people who have used and not used elderly care stations. Among them, the questionnaire for elderly people who are using and have used elderly care stations mainly investigates and inquires about their satisfaction with elderly care stations and the shortcomings in their use; the questionnaire for elderly people who have not used elderly care stations mainly studies the reasons for not using them, what elderly care services they aspire to, and what their true needs are. The questionnaire that has used elderly care service stations starts from four aspects: spatial environment evaluation, spatial usage experience, spatial usage frequency, and service quality evaluation; the questionnaire that has not used elderly care service stations starts from the five aspects of home-based elderly care needs, nursing and care needs, medical care needs, spiritual and cultural needs, and regulatory rights protection needs. Moreover, evaluation and suggestions for the service supply of nearby elderly care stations are made.

2 Survey results and analysis

2.1 Analysis and summary of interviewee results

The group conducted a sampling survey on four communities (Huangguayuan Community, Debao Community, Luyuan Community, and Yuetan Community) in Zhanlan Road of Xicheng District from May 29 to June 1, 2023, using a simple random sampling method. Among them, 90% of the elderly are living independently. A total of 54 questionnaires are collected, with 40 responses and an effective response rate of 74.1%. Compared with the *Beijing Elderly Care Development Report* (2021), the gender ratio of the sample is slightly higher than that of the previous year by 0.46%, with male elderly being the majority. Their monthly disposable income is higher than the average level in Beijing.

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Table 1 Overview of the facilities of the survey subjects

Project	Opening time	Building area//m^2	Acceptable elderly population	Actual number of elderly people admitted to daycare	Number of service personnel equipped	Building type
Huangguayuan Community Elderly Care Service Station	2016-9-30	256	10	Check-in has not been opened yet	1 stationmaster (part-time doctor)+2 nurse's aides+1 trainee	Residential commercial renovation and expansion
Debao Community Elderly Care Service Station	–	195	4	No accommodation provided	1 stationmaster (part-time doctor)+2 nurse's aides	Renovation of the first floor of residential buildings
Luyuan Community Elderly Care Service Station	2018-7-8	340	10	No accommodation provided	1 stationmaster (part-time doctor)+2 nurse's aides+1 trainee	Renovation of the first floor of residential buildings
Yuetan Community Elderly Care Service Station	2018-2-28	100	4	No accommodation provided	1 stationmaster (part-time doctor)+1 legal advisor	Commercial storefront

2.2 Statistical analysis of random questionnaire survey results

Through interviews and questionnaires, it is found that most of the respondents are young elderly people, with the majority being those aged 50-70, accounting for approximately 82.5%. Among them, women account for 57.5% and men account for 42.5%. In the comparison of income between the two groups of people who use and do not use elderly care stations, it is found that the income of people who use elderly care stations is relatively high, and those who are above 8,000 yuan account for about 27.58%, while the proportion of people who do not use elderly care stations is 9.09%. About 58.62% and 72.72% of the users and non users respectively have worked in public institutions and corporate units, with a small portion engaged in individual businesses and others, accounting for approximately 41.38% and 27.19%, respectively. The majority of their income comes from retirement pensions. Table 2 shows the distribution of surveyed samples.

Table 2 Distribution of surveyed samples

Item		Age group				
		50-59 years old	60-69 years old	70-79 years old	Over 80 years old	Total
Sex	Male	4	7	5	1	23
	Female	2	6	3	2	17
Monthly income level yuan	Less than 3,000	0	0	1	0	1
	3,000-5,000	3	5	4	1	13
	5,000-8,000	4	7	3	2	16
	8,000-10,000	1	4	1	0	6
	Over 10,000	1	2	0	1	4
Unit analysis	Agricultural production	0	0	0	0	0
	Public institutions	2	7	6	1	16
	Enterprise unit	4	3	2	2	11
	Individual business owners	1	1	1	2	5
	Others	3	1	2	2	8
Elderly care station services	Not used	13	9	5	3	29
	Used	2	2	5	2	11

Through a survey questionnaire on the service needs of elderly people who have not used elderly care stations, it is found that maintenance and risk elimination, elderly restaurants, psychological counseling, community medication, family doctors, purchasing and semi payment on behalf of others, and rehabilitation therapy services are needed, while services such as home cooking, home care, and travel companionship are not needed. The reason may be that most of the respondents are non assisted elderly people. The main reasons for the elderly who have never used elderly care stations are that they do not need station services, the service prices are high, the service quality is not ideal, and other elderly people around them do not choose elderly care stations. It can be analyzed that the concept of elderly care stations is not clear for most elderly people, and there are many children taking care of them at home. The decision influencing factors can indicate that price is the largest and most important influencing factor, while proximity is more important in terms of hosting services. Service excellence ranks third, and scale is the lowest influencing factor (Fig.3).

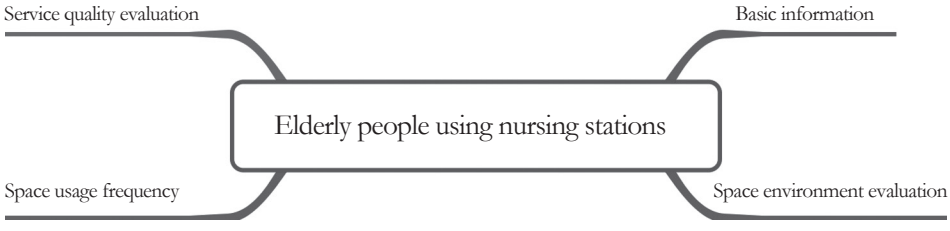

Fig.1 Questionnaire content for elderly people using elderly care service stations

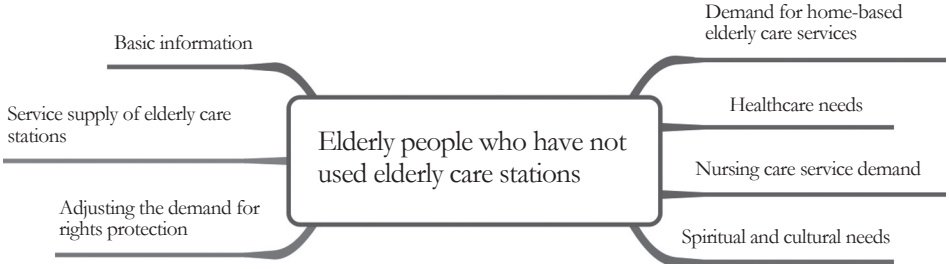

Fig.2 Questionnaire content for elderly people who have not used elderly care service stations

By analyzing the distribution of activities among elderly people using elderly care stations, it can be concluded that the majority of them are self-care elderly, so activities are concentrated on singing, watching TV, sunbathing, etc.; next are walking and chatting. The proportion of reading is also relatively high, which may be related to a higher level of education. From the analysis of factors affecting the building environment, it can be concluded that distance, location recognition, and indoor temperature are relatively satisfactory,

while the degree of satisfaction of indoor noise, indoor air quality, and furniture aging suitability is relatively low. From the satisfaction of building usage, it can be analyzed that small and medium-sized supermarkets, public activity rooms, and elderly restaurants have higher satisfaction, while daytime care services, rehabilitation therapy rooms, assisted bathrooms, and psychological counseling rooms have lower satisfaction. From the analysis of building usage frequency, it can be concluded that small and medium-sized supermarkets, public activity rooms, and elderly restaurants have a higher usage frequency, which is consistent with satisfaction. Rehabilitation therapy rooms, assisted bathrooms, and psychological counseling rooms have lower satisfaction levels. From the relationship between building satisfaction and frequency, it can be analyzed that hair salons, medical rooms, day care rooms, and psychological rooms have a high frequency of use but low satisfaction, and can be used as key renovation spaces. Small and medium-sized supermarkets, public activity rooms, and elderly restaurants have a high frequency of use and satisfaction, and are recognized as places with good satisfaction (Fig.4).

2.3 Space analysis of elderly care service stations

A total of 4 elderly care stations and 1 day care center are surveyed. By drawing architectural floor plans, the characteristics of activity spaces are recorded, and data on the functions, layout forms, area scales, and spatial scales of each internal space are summarized. The surveyed elderly care stations can be roughly divided into four types of space: transportation space, residential space, functional space, and public activity space. The functional classification is divided into three types: access oriented elderly care service stations, life care oriented elderly care stations, and medical and elderly care integrated elderly care service stations, and the layout forms of each space are summarized and organized.

2.3.1 Huangguayuan Community Elderly Care Service Station. It belongs to a life care type of elderly care station, with one independent foyer and two corridors in the transportation space (merging activity spaces and separate transportation). Public activity space uses direct lighting, and enclosure forms are divided into two types: semi enclosed and semi open. The daytime care rooms in residential spaces are divided into two types: nursing unit and single corridor, and the employee dormitories are set up separately. The barber shop with functional room space is located at the entrance, and the kitchen is independently set up, and the rehabilitation and health room is a medical unit style (Fig.5).

2.3.2 Debao Community Elderly Care Service Station. There is no foyer in the transportation space, but two corridors (activity spaces are merged and set separately). Public activity spaces use direct lighting, but the lighting is poor, and the enclosed form can be divided into two types: fully enclosed and open. The daytime care room in the residential space is set up separately, and the employee dormitory is shared with the elderly. The barber shop in the functional room space is located at the entrance, and the kitchen is a third-party cooperative delivery service, and the rehabilitation and health room is a medical unit style (Fig.6).

2.3.3 Xicheng Luyuan Community Elderly Care Service Station. One shared foyer and two corridors are set up in the transportation space (activity spaces are merged and set separately). The public activity space uses direct lighting, but the care room is located semi underground and has poor lighting. The enclosure form can be divided into two types: fully enclosed and open. The day care room in the residential space is a nursing unit style, and the employee dormitory is set up separately. The barber shop in the functional room space is located at the entrance, and the kitchen is a third-party cooperative delivery service, and the rehabilitation and health room is set up separately (Fig.7).

2.3.4 Yuetan Community Elderly Care Service Station. One shared foyer and one corridor are set up in the transportation space, which will be merged with the activity space. Public activity spaces use direct lighting, with one enclosure form being open. There is no residential space available and functional room space, and most of the service facilities are third-party collaborations (Fig.8).

2.4 Current problems in the space of elderly care service stations

Luyuan Community Elderly Care Service Station has the largest scale and area, belonging to a life care type of station that provides accommodation conditions, but it has not yet been opened. Its space includes public activity rooms, living rooms, medical and health care rooms, and is supplemented by staff usage space as service rooms. It mainly focuses on cultural and entertainment activities and daytime care functions, serving self-care and semi self-care elderly people. These types of people have high requirements for service level and activity venues, but there are significant issues with the spatial configuration of Luyuan Community Elderly Care Service Station. The activity space is on the first floor, and the day care room is semi underground, which means that the elderly need

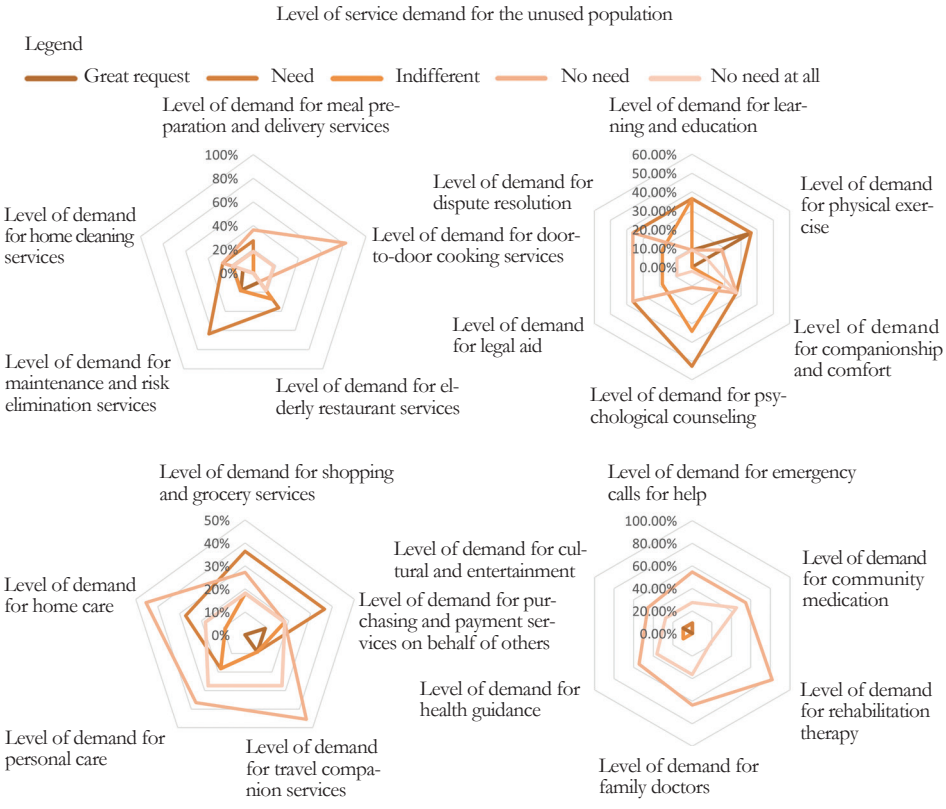

Fig.3 Degree of service demand for the population who have not used the station

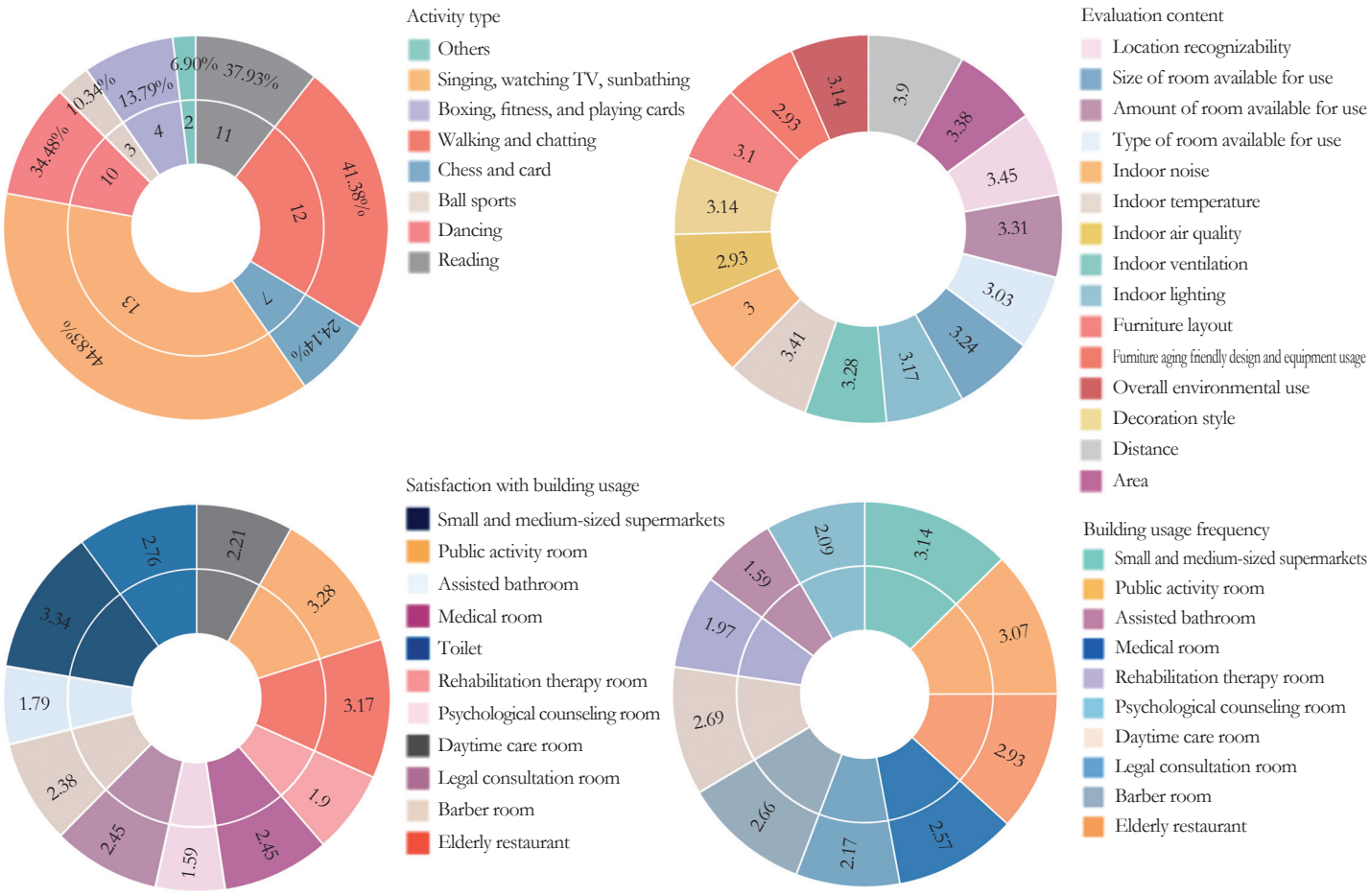

Fig.4 Satisfaction of the population who have used the station

to walk back and forth from the first floor to the negative first floor, increasing many risks. In addition, the semi underground room has poor lighting, and indoor temperature and humidity are difficult to adjust. The comfort of the space needs to be considered.

Yuetan Community Elderly Care Service Station belongs to the visiting type of elderly care service station, with a relatively small scale area compared to the other four service stations, generally ranging from 100 to 150 m^2. It is mainly used for service rooms, providing convenient door-to-door services and elderly dining table assistance services for the elderly. The station does not have any accommodation for the elderly. Most of the foot traffic comes from elderly people coming directly to pick up elderly meals or making phone reservations at home. Its space is relatively cramped, with a large portion being used to store supplies received by the elderly, while the rest is a combination of a foyer and activity space. The area allocation is unreasonable, and the elderly have a strong demand for entertainment activities. However, the activity space provided by the current situation cannot meet the activity needs of the elderly. There is also a serious problem. The ground paving of this station is made of marble material, which is hard, non elastic, easy to slip, difficult to clean, and has a high cost. Elderly people often enter and exit the station, and the ground will accumulate a lot of dust, making them more prone to falling, with unimaginable consequences. In the station, there are many miscellaneous items piled up on the "elderly dining table", which does not seem to be an exclusive "elderly dining table" area, and the size of the tables, chairs, and furniture is not suitable for the elderly to use (Fig.9).

3 Renovation measures and optimization suggestions for elderly care service stations

3.1 Prospective transformation strategy based on survey results

It should regularly conduct surveys and research to understand the real needs and concerns of the elderly. It could obtain feedback through questionnaire surveys, on-site visits, and other means to clarify their expectations and needs for elderly care stations, in order to optimize service content and form, and provide personalized care and services tailored to the personalized needs of the elderly. Good communication and interaction with elderly people could be established, to understand their needs, and provide tailored services. It could consider adjusting service prices to make it more competitive. Costs can be reduced by collaborating with communities and seeking government subsidies, thereby reducing the economic pressure on elderly people to use elderly care station services. It should emphasize service quality, and strengthen training and management[4]. It should ensure that employees have good professional knowledge and skills, and pay attention to a humane service attitude. The publicity and promotion of elderly care stations could be strengthened, to increase their visibility and recognition. The service content and advantages of elderly care stations can be promoted through community announcements, brochures, social media, and other means to attract more attention and choices from the elderly. By organizing community acti-

vities, interest groups, and other means, communication and mutual assistance among the elderly could be promoted, allowing them to feel the warmth and support of the community, thereby increasing their recognition of elderly care stations. Considering that the elderly feel that the station is far away, more sub stations should be established, and more sub stations for elderly care should be established in different communities or regions, so that the elderly can access the station more conveniently and reduce the transportation time and cost for the elderly to go to the station. At the same time, online service platforms could be considered to provide remote medical consultations, online health courses, etc., to facilitate elderly people's access to relevant services at home. In addition, it is also possible to explore cooperation with other institutions to provide more diversified services. The professional skills and service attitude of practitioners could be improved.

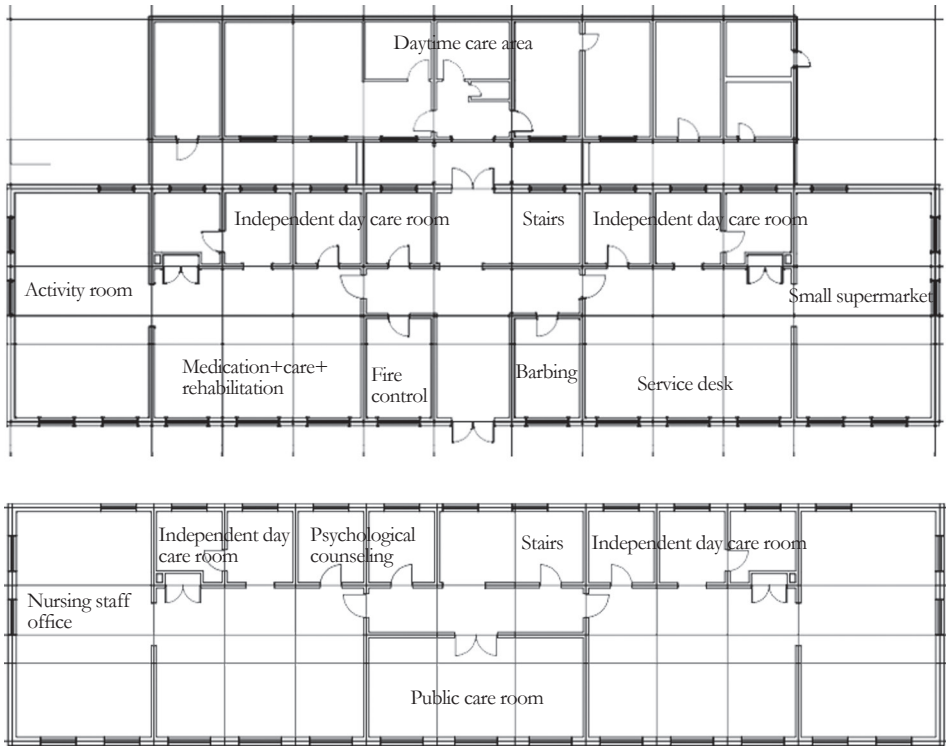

Fig.5 Plan of the first and second floors of Huangguayuan Community Elderly Care Service Station

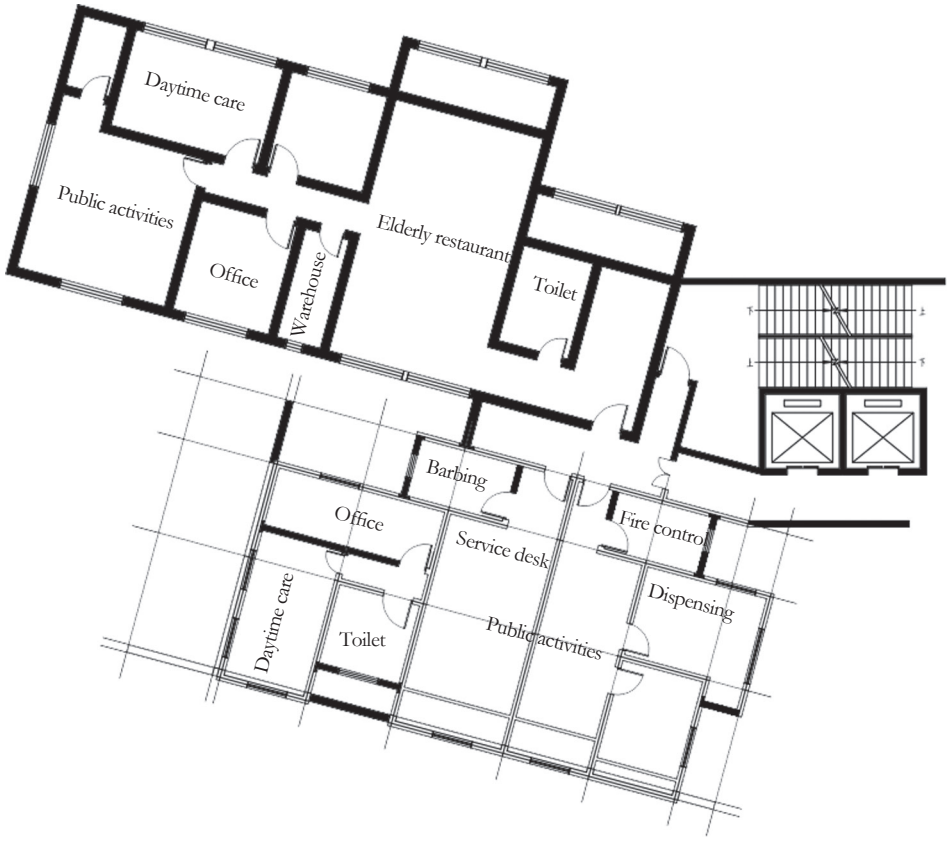

Fig.6 Plan of Debao Community Elderly Care Service Station

3.2 Suggestions for spatial layout and facility improvement

3.2.1 Reasonably allocating building scale and integrating different functional spaces according to local conditions. The scale of the visiting station is relatively small, and the main users inside the station are staff. The staff of the Yuetan Community Elderly Care Station said they can provide elderly dining tables and activity areas, but the research team believes that it cannot provide these two places well. The ground should be made of anti slip and vibration reducing materials, such as cork flooring, elastic roll materials, solid wood flooring, composite solid wood flooring, etc. Indoor lighting should avoid glare. It is believed that it is necessary to optimize and improve the quality of on-site and home services, and rely on safe and efficient third-party institutions to better serve the elderly.

3.2.2 Ensuring space capacity. The Luyuan Community Elderly Care Station mainly focuses on cultural and entertainment activities as well as day care functions, with rich and complex functions. Considering the current situation, multiple activity rooms can be merged. It is recommended that the building scale should be between 300 and 600 m^2, the outdoor activity space should be around 50 m^2, and the indoor activity space should be between 20 and 30 m^2 each. It is recommended to use 60−150 m^2 for living rooms and 80−100 m^2 for restaurants. The painting room on the negative floor can be swapped with the pharmacy and rehabilitation room on the first floor. And the living care room needs to have a comfortable environment, try not to place such spaces underground, and create a warm and convenient living environment for the elderly[5].

3.2.3 Increasing accessibility facilities. In order to facilitate the entry and movement of

elderly people, entrances and passages should have barrier free design, such as handrails, slopes, spacious doorways, etc. If the elderly care station has multiple floors, it should be equipped with accessible elevators for the elderly to go up and down the floors. The width of corridors and walkways should be spacious enough for the elderly to use assistive devices, such as wheelchairs or walking aids. The size of the room should be spacious enough to accommodate the daily activities of the elderly, such as beds, wardrobes, tables and chairs, etc. The outdoor space of elderly care stations usually includes courtyards and gardens to provide a place for elderly people to relax and engage in activities. The outdoor space should be flat, safe, and equipped with comfortable seats and shade. The size of beds in indoor spaces should be determined based on the height and individual needs of the elderly, usually single or double beds. The height of the bed should be moderate to facilitate elderly people getting on and off the bed. The height and depth of the chair should be suitable for the body proportion of the elderly to provide a comfortable sitting position, and armchairs or adjustable height chairs may be more suitable for the elderly.

4 Conclusion and inspiration

Through the analysis and research of the survey questionnaire data on the needs of elderly people in communities of Zhanlan Road Street, the following conclusion can be drawn: the demand for elderly care service stations in the community is extensive and diverse. Survey data shows that the needs of elderly people in the community for elderly care service stations include daytime care, medical and health care, cultural and entertainment activities, psychological support, and other aspects. This indicates that the renovation strategy of elderly care service stations should fully consider meeting the diverse needs of the elderly. At the same time, elderly people have certain expectations and requirements for the indoor and outdoor space, furniture and facilities, and transportation convenience of elderly care service stations. This suggests that in the renovation strategy, attention should be paid to improving the environmental quality and convenience of stations, in order to provide a comfortable and convenient elderly care service environment. It is worth noting that elderly people have high expectations for the service items, quality of service personnel, and service quality of elderly care service stations. Therefore, attention should be paid to improving the service level of elderly care service stations, training professional service personnel, and establishing effective service supervision and feedback mechanisms[6].

The transformation strategy of elderly care service stations should be guided by the needs of elderly people in the community, focus on diversified services, and improve service quality. Simultaneously, aging friendly design could be considered. This will help improve the quality of

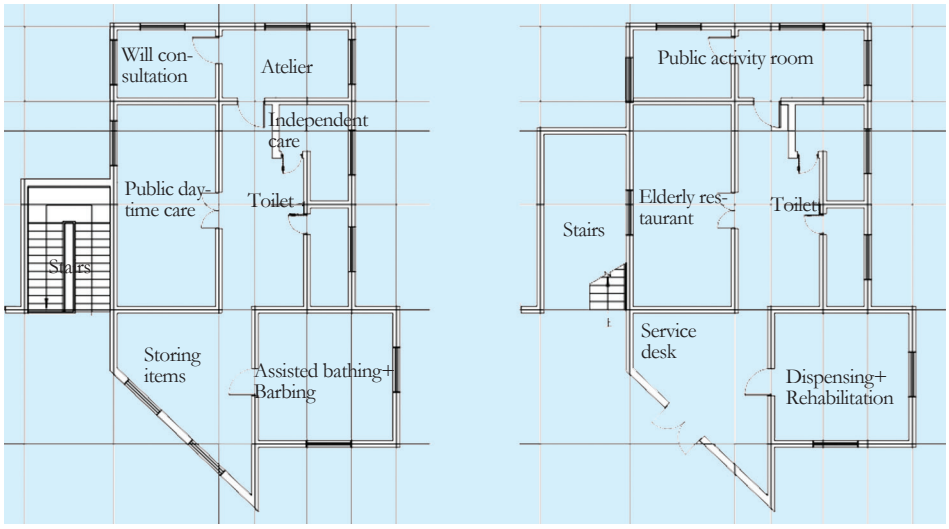

Fig.7 B1 and first floor plan of Xicheng Luyuan Community Elderly Care Service Station

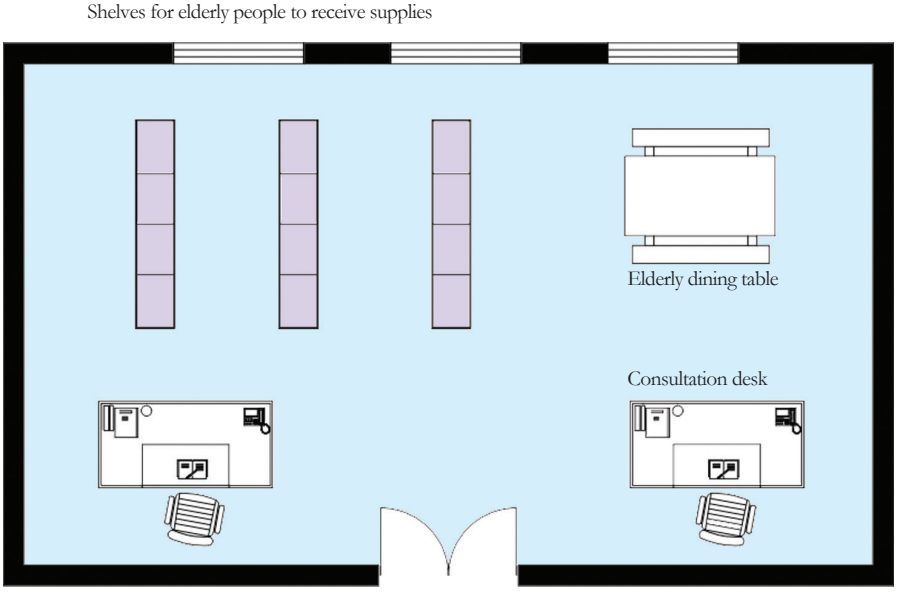

Fig.8 Plan of Yuetan Community Elderly Care Service Station

Fig.9 Elderly dining table area and marble floor

(To be continued in P26)

for improvement.

4.2 Suggestions

With the rapid development of China's social economy, the existing configuration of public service facilities can no longer meet the actual needs of residents. Under the development concept of equalization and sharing of basic public services in cities, improving the allocation of public service facilities and enhancing their accessibility and fairness has become an inevitable requirement for urban planning and development. In view of this, the following suggestions are proposed.

(1) The configuration of public service facilities should fully consider the balanced distribution in space. If the configuration of urban public service facilities only focuses on the total demand of the regional population, overly focuses on the "per capita" indicator, and does not consider the convenience and accessibility of residents' use, it is easy to cause insufficient use of public service facilities, which limits the comprehensive benefits of urban public service facilities.

(2) It should promote the diversification and comprehensiveness of urban public service facility allocation. The allocation of public service facilities should not be limited to a single type of resource allocation. It is necessary to comprehensively consider the diverse living needs of residents, form a comprehensive system of multiple types of public service facilities, and maximize the comprehensive benefits of public service facility resources.

(3) It should achieve a balance between supply and demand of public service facilities in terms of quantity and space. While improving the accessibility of public service facilities, attention should also be paid to the total size and spatial distribution characteristics of the residential population, and the differences in resource allocation of public service facilities between regions should be reduced in both quantity and space, achieving a multi-dimensional balance between supply and demand of facilities.

This paper focuses on the spatial differences in accessibility of multiple types of public service facilities, and comprehensively evaluates the fairness of facility configuration from the perspectives of social and spatial equity. It helps to optimize the number, scale, and functional planning layout of public service facilities in the old urban area of Guangzhou, aiming to alleviate the pressure on facility services in the central urban area of Guangzhou to a certain extent. It also provides a scientific theoretical basis for improving the urban living environment, enhancing urban spatial vitality, and building a people-centered urban development.

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life for the elderly and promote the aging friendly development of the community.

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