

A study on the design of the public spaces in elderly apartments based on the demands of “Three Types”

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Abstract. With the progress of society and the economy, the Chinese population inevitably has an aging tendency. In this situation, the issue of aged providing becomes a focus that attracts all attention of the society, and elderly apartments have gradually become one of the most important forms of housing endowment. As a crucial part of the elderly apartment, public spaces are used for the elderly's activity and association, and it should consider the elderly's demands while designing. Depending on the differences in the elder's somatic function, the elder could be classified into three types: self-care, device-helping, and nursing-cared. Furthermore, their demands for public spaces in the elderly apartment are different according to the different characteristics of the “Three Types”. This paper will analyze cases of elderly apartments at home and abroad and summarize their design methods of public spaces, then combine with the present situation in our country, put forward the design strategy of public spaces in elderly apartments of the “Three Types”, according to the characteristics of the elder, and provide a reference for the optimization of the public spaces in the elderly apartment.

Keywords: elderly apartment, public spaces, self-care, device-helping, nursing-cared, space design

1. Introduction

According to the regulations of the United Nations Educational, Scientific and Cultural Organization (UNESCO), a country or region is considered to enter an aging society if the population aged 60 and above constitutes 10% or more of the total population, or if the population aged 65 and above constitutes 7% or more of the total population [1]. Currently, China has a population of over 160 million elderly individuals, increasing at a rate of nearly 8 million per year. Experts predict that by the year 2050, the elderly population in China will reach one-third of the total population. In the face of escalating aging issues, traditional home-based care models are insufficient to meet the demands. Professional senior apartments that integrate living, services, and healthcare are poised to be an excellent solution to address aging challenges and promote harmonious societal development [2]. Public spaces, as integral components of senior apartments, play a crucial role in the daily activities, neighborhood interactions, and life services of the elderly. While existing senior apartments have considered detailed and barrier-free design in the living spaces, the design of public spaces has not adequately addressed the diverse

needs of the elderly. This research aims to explore public space models in senior apartments that cater to the varied needs of different types of elderly individuals, focusing on the principles of design for self-care, device-helping, and nursing care senior apartments, and their interrelationship with residential spaces. The study utilizes case analysis, grounded in the “three types” of elderly needs, and proposes design strategies for public spaces in “three types” senior apartments based on the current situation in China.

2. Analysis of “Three Types” Demands on Public Spaces in Senior Apartments

Elderly individuals are categorized into “three types” based on their physical conditions: self-care, device-helping, and nursing care. Self-care elderly individuals possess complete self-care abilities, device-helping elderly individuals have some self-care ability but rely on tools such as wheelchairs and canes, and nursing care elderly individuals lack self-care abilities, primarily bedridden, and require care from caregivers. Public spaces in senior apartments encompass activity spaces, service spaces, and medical spaces. The “three types” of elderly individuals have different physiological and psychological characteristics, leading to varied demands on public spaces. Therefore, the design of public spaces should be based on the characteristics of the elderly, satisfying their diverse activity and functional requirements, providing better communication and healthcare services.

2.1. Analysis of “Three Types” Senior Apartment Cases:

Common senior apartments are categorized into three types: self-care (independent) senior apartments, device-helping (service) senior apartments, and nursing care (care) senior apartments. This paper selects three cases for each type and compares and analyzes their activity spaces, service spaces, and floor plans to summarize the characteristics of their public space designs (Table 1, 2, 3).

Table 1. Summary of Self-Care Senior Apartment Cases:

Apartment	Fair Oaks Apartments, USA (Figure 1)	Rainbow Villa Senior Apartments, Hong Kong [3] (Figure 2)	Sant Andreu Senior Apartments, Barcelona, Spain [4] (Figure 3)
Characteristics	Comprehensive support services	Integrated living, healthcare, and recreational facilities in a “one-stop” housing solution	Integration with the urban environment
Activity Spaces	Rich activity spaces; Specialized activity rooms (computer room, flower room, etc.)	Swimming pool, massage pool, fitness center, library, multipurpose hall, multifunctional activity room, craft ceramics room	Layered public senior leisure garden integrated with the building
Service Spaces	Daily services such as dining and laundry; Virtual services like telephone, television, call systems	Nursing beds, daytime care centers, and medical clinics	Social service center, psychological counseling center, rehabilitation fitness space

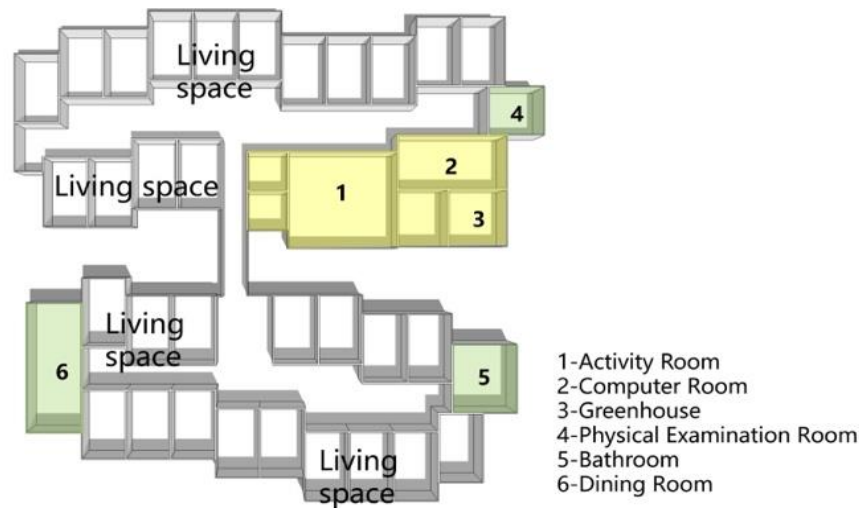


Figure 1. Floor Plan of Fair Oaks Apartments, USA

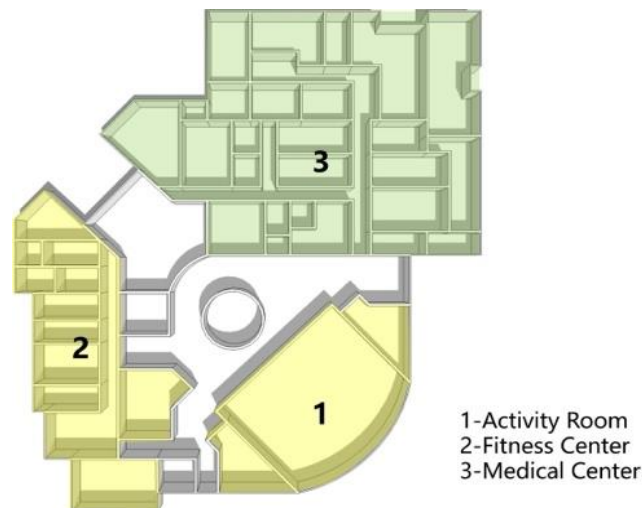


Figure 2. Ground Floor Plan of Rainbow Villa Senior Apartments, Hong Kong

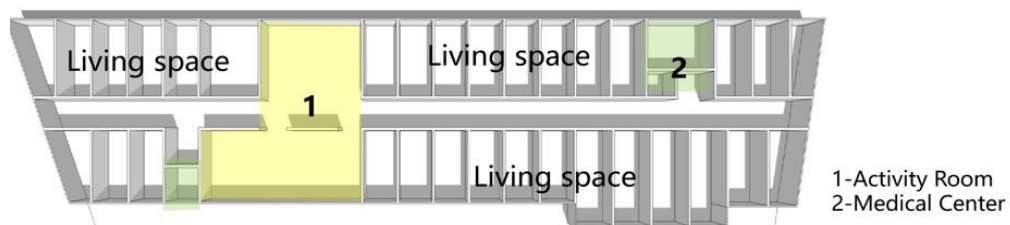


Figure 3. Floor Plan of Sant Andreu Senior Apartments, Barcelona, Spain
(Note: All images in this paper are original creations of the author.)

Self-care senior apartments prioritize the daily activities of the elderly, providing features like libraries, communication centers, fitness centers, computer rooms, flower rooms, craft ceramics rooms, and leisure gardens. These public spaces are often centrally located within the apartment complex and have distinct boundaries from the residents' living.

Table 2. Summary of Device-helping Senior Apartment Cases

Apartment	Kokoro Senior Apartments, San Francisco, USA [5]	Jasmine Senior Apartments, Singapore [3]	The Avenue Senior Apartments, USA [5]
Characteristics	Japanese elderly apartment on the site of a former church	Fine and barrier- free design	Senior apartments in a bustling urban area
Activity Spaces	Dining hall also serves as a venue for entertainment, gatherings, and fitness exercises. A book corner and administrative office space are arranged on one side of the corridor, with a resting area for guests on the other side.	Activity rooms, reading corners, gym within the apartment; provides a community platform for interaction	Community public activity center, including guest rooms, large dining hall, small dining hall for family or friends gatherings, sun terrace, computer room, multifunctional recreation room, beauty salon, and office.
Service Spaces	Enclosed courtyard between old and new buildings for residents to enjoy sunlight and plant flowers	Wellness center in the community; apartment clinic	Lounge, nursing station, bathhouse, shared kitchen, and outdoor leisure small garden.

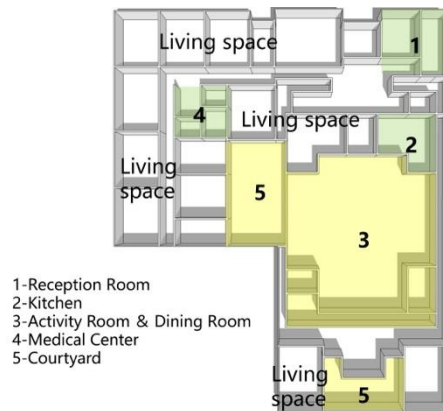


Figure 4. Floor Plan of Kokoro Senior Apartments, San Francisco

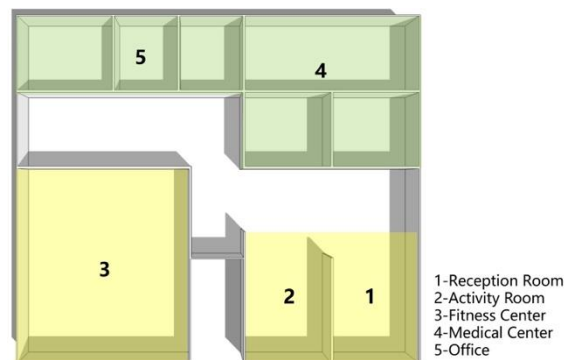


Figure 5. Floor Plan of Jasmine Senior Apartments, Singapore

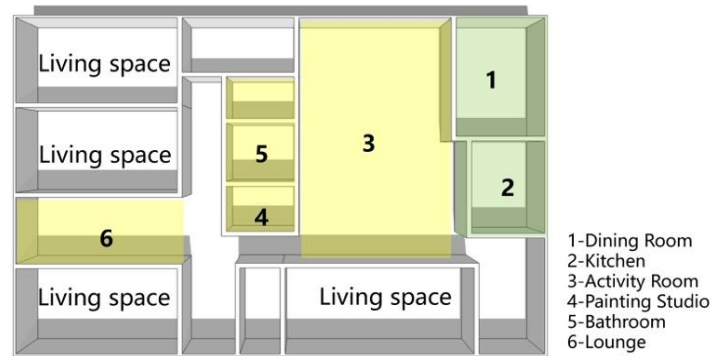


Figure 6. Floor Plan of The Avenue Senior Apartments, USA

Device-helping senior apartments emphasize close connections between elderly individuals and society. The design integrates public spaces, especially service spaces, with the layout of elderly residents' living spaces, making it convenient for assisted elderly individuals to access. Additionally, these apartments provide comprehensive medical services.

Table 3. Summary of Nursing Care Senior Apartment Cases

Apartment	Special Care Building in the Sofielund Elderly Community, Denmark [6]	Tokyo Tamagawa Nursing Home, Japan [7]	Sawayano Nursing Home, Japan [8]
Characteristics	Fully-caring apartments for dementia patients	Unit care model	Emphasis on the care process
Activity Spaces	Public activity center, entertainment facilities, massage center	Shared living room within care units; communication courtyard; rooftop platform	Communication courtyard; gardening activity space
Service Spaces	Rehabilitation guidance space, care restaurant, community medical service center	Public kitchen within care units; medical services within care units	Ordinary nursing rooms; temporary care rooms; integrated with a hospital

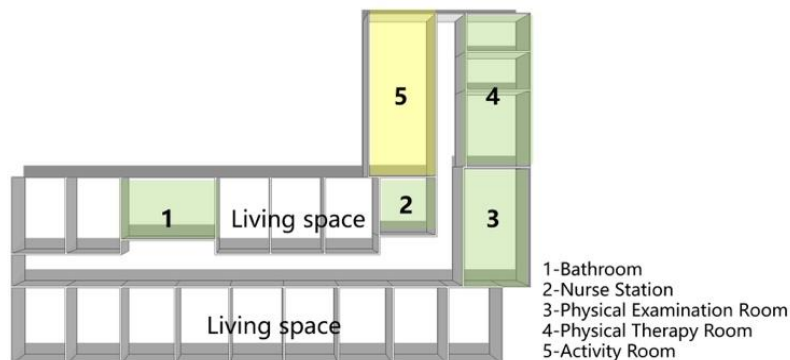


Figure 7. Floor Plan of the Special Care Building in the Sofielund Elderly Community, Denmark

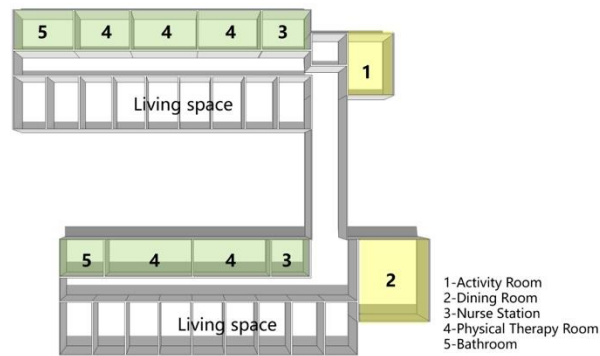


Figure 8. Floor Plan of Tokyo Tamagawa Nursing Home, Japan

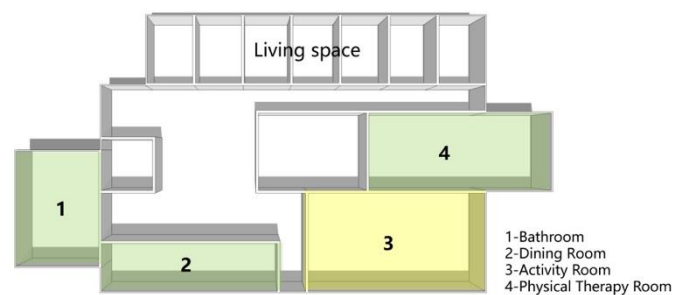


Figure 9. Floor Plan of Sawayano Nursing Home, Japan

Nursing care apartments emphasize the quality of care, requiring essential medical service facilities. Service spaces are arranged in close proximity to elderly living spaces, utilizing green plants and courtyards to enhance the comfort and sense of stay in public spaces.

2.2. Analysis of the Demands on Public Spaces in Senior Apartments for “Three Types”

Public spaces encompass activity spaces and service spaces, with service spaces including daily service spaces (dining, kitchen, laundry, etc.) and medical spaces (examination rooms, nursing rooms, therapy rooms, etc.). Through the analysis of the above cases, a comparative analysis was conducted on the distance between public spaces and living spaces, the proportion of different types of public spaces, the composition of activity spaces, and the composition of service spaces in the three types of senior apartments.

Overall, the life of self-care elderly individuals is relatively independent and private, with public spaces concentrated and distant from living spaces. Activity spaces have the highest proportion, daily service spaces are essential, and medical spaces have the smallest proportion but are indispensable. Device-helping public spaces are closer to living spaces and often combine into a whole. Activity spaces have the highest proportion, and the proportions of service spaces and medical spaces are close to that of activity spaces. Nursing care requires long-term care, with service spaces close to living spaces, while activity spaces are relatively distant. Medical spaces are the primary public spaces, and the proportions of activity spaces and daily service spaces are relatively small.

In terms of the functional composition of activity spaces, self-care apartments have the highest proportion of learning and entertainment spaces, followed by neighborhood interaction spaces. Device-helping apartments have the highest proportion of social interaction spaces. Nursing care apartments have a relatively smaller overall proportion, with little difference between the types. In terms of the functional composition of service spaces, self-care apartments are mainly daily service spaces. Device-helping apartments have similar proportions of daily service and medical spaces. Nursing care apartments are mainly medical spaces.

Different types of senior apartments have different activity radii, compositions of public spaces, and focuses on activity spaces and service spaces. Due to the different physiological and psychological characteristics of the “three types,” public spaces in their corresponding apartments should strive to meet the diverse needs of the “three types” (Table 4, 5).

Table 4. Characteristics and Comparative Needs of “Three Types” for Public Spaces

Elderly Type	Self-Care	Device-helping	Nursing Care
Apartment Type	Self-Care Senior Apartment	Device-helping Senior Apartment	Nursing Care Apartment Type
Physiological Characteristics	Fully self-reliant, lacks calcium, osteoporosis, hunchback, height decrease, slow reactions	Semi-self-reliant, needs assistance with canes, wheelchairs, etc., requires caregiver assistance	Lack the ability to care for themselves and are bedridden for an extended period, professional companionship and medical care are required
Psychological Characteristics	Sense of loneliness, reduced self-worth, hopes to engage in self-interests and hobbies	Sensitivity, poor psychological endurance, feelings of isolation	Low self-esteem, loss, and despair
Required Services	Laundry, cleaning, psychological counseling, healthcare	Laundry, cooking, cleaning, psychological counseling, medical examinations, nursing, rehabilitation training	Laundry, meal delivery, cleaning, turning services, bathing, regular health check-ups, and medical nursing
Main Activities	Reading, watching news, audio-visual entertainment, calligraphy practice, chatting, card games, handicrafts, performances, gardening	Reading, watching news, chatting over tea, card games, walking exercises, sunbathing	Enjoy rest, sun exposure, and scenic views

Table 5. Corresponding Spaces and Characteristics of Main Activities for “Three Types”

Activity	Elderly Type			Required Spaces	Space Characteristics
	Self-care	Device-helping	Nursing care		
Reading and Watching News	√	√		Reading Room	Private, strong sense of intimacy, quiet
Audio-Visual Entertainment	√	√		Multimedia Room, Living Room	Relatively open
Calligraphy Practice	√	√		Calligraphy Room, Reading Room	Quiet
Chatting	√	√		Corridor, Tea Room, Living Room	Private, strong sense of intimacy
Card Games	√	√		Card Room, Recreation Room	Relatively open

Table 5. (continued)

Handicrafts	√			Handicraft Room, Living Room	Private, strong sense of intimacy
Performances	√			Multi-function Room, Courtyard	Large area, more concentrated
Gardening	√			Flower Room, Balcony, Courtyard	Suitable area, good sunlight
Walking Exercises		√		Corridor, Courtyard, Gym	Barrier-free walking space and facilities
Sunbathing	√	√	√	Balcony, Courtyard, Roof	Good orientation, ample sunlight
Enjoying the View	√	√	√	Balcony, Courtyard, Roof	Good lighting, ventilation
Public Kitchen	√	√		Self-service Restaurant, Kitchen	Adequate space, more concentrated
Medical Examinations	√	√	√	Examination Room, Medical Room	Well-equipped facilities
Rehabilitation Therapy		√	√	Therapy Room	Quiet, well-equipped medical facilities

For self-care elderly individuals with relatively strong self-care abilities, the need for nursing services is minimal. However, in centralized apartments, more spaces for entertainment, learning, and socializing are required. Device-helping elderly individuals have limited mobility, requiring nursing and rehabilitation therapy. Public activities are mainly static, such as reading, watching TV, and playing cards. Nursing care elderly individuals, bedridden for long periods, have fewer public recreational activities but high demands for medical rehabilitation.

3. Discussion on Public Space Design for Senior Apartments Based on the Needs of the “Three Types”

Through the above analysis, combined with the current situation of elderly care in China, strategies for the design of public spaces in three types of senior apartments are proposed, focusing on public space organization models, activity spaces, and service spaces.

3.1. Self-Care Senior Apartments with “Centralized” Arrangement of Public Spaces Independent of Living Spaces

Firstly, in self-care senior apartments, public spaces should be kept away from the living spaces of the elderly. These spaces can be set independently within the apartment (Figure 10) or independently within the elderly care community (Figure 11). On one hand, this approach avoids disturbing the daily lives of self-care elderly individuals. On the other hand, it promotes gathering, enhancing a sense of community and belonging, making public spaces essential places for neighborly interactions.

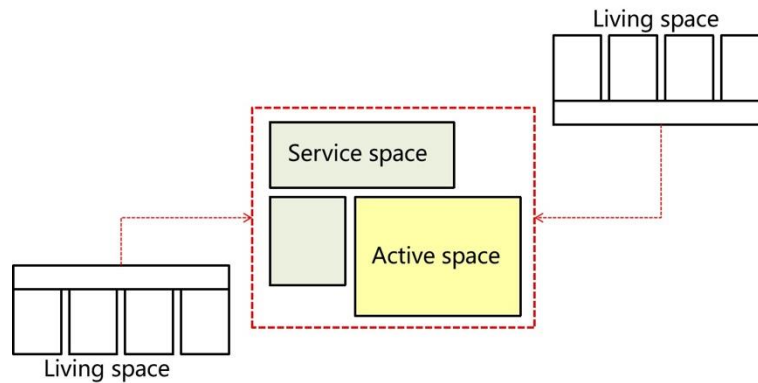


Figure 10. Independent Arrangement of Public Spaces within Senior Apartments

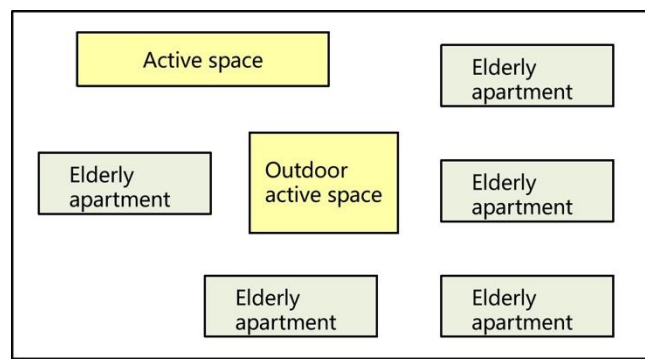


Figure 11. Independent Arrangement of Public Spaces within the Community

Secondly, for self-care elderly individuals with relatively strong self-care abilities, the activity spaces should be diverse. These spaces should include not only general activity spaces such as reading rooms, multimedia rooms, communal halls, and card rooms but also feature spaces like computer rooms, flower rooms, viewing rooms, and multifunctional halls.

Finally, as self-care elderly individuals have relatively healthy physical conditions and low requirements for medical services, the services provided by the apartment should be relatively comprehensive. On one hand, even though self-care elderly individuals do not need specialized treatment and care spaces, facilities like examination rooms and medical rooms must be available. Simultaneously, temporary care rooms should be set up to assist self-care elderly individuals who may temporarily require nursing. On the other hand, daily service spaces such as self-service kitchens and laundry rooms should be present, meeting the requirements for barrier-free accessibility.

3.2. Device-helping Senior Apartments with “Mixed” Arrangement of Public and Living Spaces

Firstly, in device-helping apartments, public spaces and living spaces are arranged in a “mixed” manner (Figure 12), forming a unified whole connected through corridors or courtyards. Due to the limited mobility of assisted elderly individuals, both activity and service spaces are organized to be close to their living spaces, creating no distinct boundaries. This design allows elderly individuals to feel a sense of comfort similar to “home” during entertainment, socializing, resting, and receiving medical care.

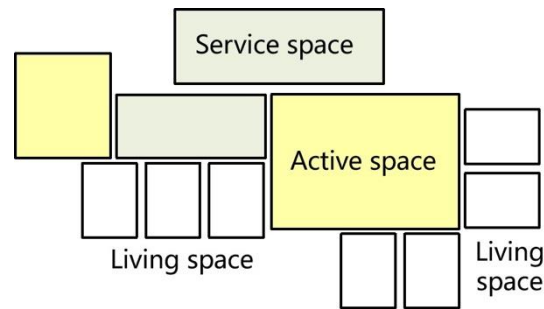


Figure 12. “Mixed” Public Spaces in Device-helping Senior Apartments

Secondly, multifunctional halls and activity communication halls are set up within the apartment, catering not only to residents but also welcoming community members [9]. This open public space not only compensates for the physical limitations of assisted elderly individuals but also alleviates their psychological sense of isolation and neglect. It maintains the elderly’s “social identity.”

Finally, corridors are often considered activity areas for the elderly. When external environments and physical conditions limit elderly individuals, they use corridor spaces for physical exercise by walking back and forth. Corridors are frequently visited spaces, effectively encouraging social interactions among the elderly [10]. Particularly for assisted elderly individuals, who need space for walking exercises, barrier-free corridors or halls are essential, facilitating walking exercises while providing seating for social interactions.

3.3. Comprehensive Configuration of Public Spaces in “Unit-Style” Nursing Care Senior Apartments

Firstly, in nursing care apartments, public spaces and living spaces are organized into a nursing unit (Figure 13). Each unit includes 8-10 bedrooms for elderly residents, along with an activity room, nursing station, laundry room, care room, washroom, therapy room, etc. Caregivers can uniformly attend to elderly individuals within a unit. Two to three nursing units are connected through public spaces, collectively forming a senior apartment.

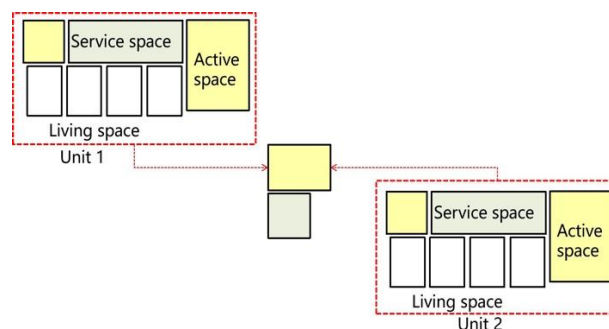


Figure 13. “Unit-Style” Public Spaces in Nursing Care Senior Apartments

Secondly, green wellness spaces are incorporated to instill hope in nursing care elderly individuals. Balconies, courtyards, and rooftops are adorned with green plants, meeting the elderly’s needs for viewing while creating wellness spaces in line with traditional Chinese health culture.

Finally, medical spaces are hierarchically set up as “General Care Rooms - Temporary Care Rooms - Specialized Care Rooms.” Different medical care spaces are arranged based on the physical condition of nursing care elderly individuals, optimizing medical resource allocation. The entire care process takes place within the same elderly care facility, enhancing acceptance among the elderly.

In China, most senior apartments are not exclusively one type of the “Three Types” but often involve mixed residency. Therefore, when designing public spaces, the needs of the “Three Types” should be simultaneously considered. Combining design strategies for public spaces in the “Three Types” can

comprehensively meet the needs of the elderly, providing a better living space and environment for aging.

4. Conclusion

Public spaces in senior apartments not only accommodate all activities for the elderly except sleep but also play a crucial role in maintaining the lifestyle from before moving in and serving as the main carrier for the elderly's spiritual life in their later years. Therefore, the design must not only address the inconvenience caused by aging but also recreate a sense of "home" for the elderly [11]. This paper proposes different organizational forms and design strategies for public spaces based on the needs of the elderly and the "Three Types." Concentrated arrangement of public spaces, diverse activity spaces, and comprehensive daily services can increase the sense of belonging for self-care elderly individuals. Mixed arrangement of public spaces, barrier-free corridor spaces, and open communication spaces can promote social interactions and alleviate loneliness for assisted elderly individuals. In unit-style nursing care, green wellness spaces and hierarchically configured care spaces create a comfortable care environment for nursing care elderly individuals. The design of public spaces should adapt to the diverse requirements of the elderly for daily communication and activities, making public spaces comfortable places for entertainment, leisure, and aging, extending beyond living spaces.

References

- [1] Chen Zhilin. Research on Residential Building Design Based on Elderly Care [D]. Hubei: Wuhan University of Science and Technology, 2011.
- [2] Feng Lei, Hu Zhenyu. Discussion on the Design of New Senior Apartments under the Background of Aging [J]. *Huazhong Architecture*, 2010(4): 59-61.
- [3] Liu Dongwei, Qin Shan, Zhang Jing. Reflections on the Construction and Design of New Senior Apartments in the Context of Aging Socialization of Elderly Care [J]. *Residential Area*, 2013(6): 46-55.
- [4] [Spanish] Eusebio Bruno Fare, [Secret] Yumu, Li Gaoli. Analysis of Two Examples of Elderly Buildings and Design Strategies in Catalonia, Spain [J]. *Era Architecture*, 2012(6): 48-53.
- [5] Quan Xin. New Trends in the Design of Retirement Communities and Senior Apartments in the United States [J]. *Architectural Journal*, 2013(3): 81-85.
- [6] Comparative Study of Foreign Elderly Care Models — A Case Study of the United States, Denmark, and Japan [J]. *Southern Architecture*, 2013(2): 77-81.
- [7] Zhang Jing. Tokyo Tama Felio Nursing Home [J]. *Chinese Residential Facilities*, 2014(3): 10-19.
- [8] Ma Weidong, Jiang Lijun. "Carea" — A New Concept of Elderly Care in Japan [J]. *Era Architecture*, 2012(6): 54-57.
- [9] Chen Xin, Xi Liaoliao, Qiao Qian. Research on the Utilization of Urban Institutional Elderly Facilities — A Case Study of Xi'an City C Elderly Service Center [J]. *New Architecture*, 2013(6): 133-135.
- [10] Zhou Bo, Fan Yue, Lu Wei, et al. Comparative Study on the Morphology of Interaction Spaces in Chinese and Japanese Institutional Nursing Homes [J]. *Architectural Journal*, 2011: 164-167.
- [11] Wang Molin, Li Jianhong. Preliminary Exploration of Public Space Design in Elderly Facilities in Haixi Region [J]. *Huazhong Architecture*, 2011(08): 164-167.