

Construction of “Community-Oriented” Residential Facilities for the Aged — A Case Study of Lanting Senile Apartment in Hangzhou

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Abstract—To construct the community-oriented residential facilities for the aged with the combination of medical nursing and elderly support is not only in accord with the fundamental policy of elderly support, relying on urban community, but also an effective approach and inexorable trend in solving the current development predicament of old-age care institutions as well as meeting the elderly's special demands. Taking Lanting senile apartment in Hangzhou as an example, this paper deeply analyzes the design features in the aspects of facility location, functional configuration, and community environment, suitable space for the aged, humanistic service. It is generally aimed at defining how to realize the dynamic integration of medical nursing and elderly support, and how to achieve the communitization of residential facilities for the aged, so as to provide reference basis for constructing the diversified and compound facilities for the aged in the future.

Index Terms—Community-oriented, combination of medical nursing and elderly support, diversification, resource sharing, senile apartment.

I. INTRODUCTION

As World Population Aging 2015 (Report) released, by 2015 the world's elderly population had reached 901 million, and would increase to 1.4 billion in 2030, which revealed that aging of population had become a global issue [1]. China has stepped into the irreversible aging society since 1999. According to “China Report of the Development on Silver Industry 2014”, elderly population in China will rapidly increase to 260 million in 2020 and will encounter the most severe period from 2030 to 2050[2]. How to deal with the huge challenge posed by population aging, and build a comprehensive, livable system of urban facilities for the aged have become vital tasks of present urban planning and architectural design.

The combination of medical nursing and elderly support (CMNES) is a kind of mode breaking the traditional concept of care for the aged which just emphasizes the single service. Based on the elderly's physical and mental characteristics as well as their demands of medical care and pension service, this new mode is a diversified and compound health care system including living care, prevention and healthcare,

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disease diagnosis and treatment, rehabilitation nursing and hospice care. Community is the elemental unit of the urban society. To construct the residential facilities for the aged relying on urban community is an effective approach and inexorable trend in solving the current development predicament of old-age care institutions [3]-[5]. It enables the elderly to continue living in the familiar environment and obtain the care, which correspond to their physical conditions when the health status and self-care ability of the aged have changed [6].

In China, research on the CMNES is still at its preliminary stage focusing on practical exploration which is formed by society spontaneously. Aimed at learning more about this new mode, the paper takes Lanting senile apartment in Hangzhou, a practical project designed by Zhejiang GAD (Green Architecture Design) Company, as an example to analyze the designing characters and experience of community-oriented residential facilities for the aged with the CMNES.

II. PROJECT OVERVIEW

A. Site Features

Lanting senile apartment is located in the south of national highway 320 in Yuhang district of Hangzhou and in the middle between northern Maoshan and southern Linping Mountain. Because of the site features, the apartment has beautiful scenery and convenient traffic condition. As shown in Fig.1, it is about three minutes' drive from downtown area of Linping and around thirty minutes' drive from downtown area of Hangzhou through the connections with national highway 320, provincial road 01 and Hangzhou metro line No1. Besides, the comparative perfect resources system around the apartment including educational facilities, living service facilities, medical and health facilities provides abundant and convenient service for the residents in Lanting community. Specifically speaking, there are Yuhang advanced middle school, Linping primary school, shopping mall, super market, China Post, Yuhang First People's Hospital, Greentown Hospital and so on.

B. Community Planning

The total planning area of Lanting community including west and east two parts is 0.43 million square meters. Its gross floor area is 0.76 million square meters with 4000 households, and its floor area ratio and greening rate respectively are 1.77 and 40%. As shown in Fig.2, Lanting senile apartment is located on the southeast corner of east region which is good

for its external business. To its south is 24 meters wide Zhenxing West Road, to its east is 18 meters wide Yuehe Road, to its west is No.2 Taoyuan residential building, and to its north is group courtyard and the sunken garden just owned by the apartment. In addition to the facility for the aged, there are Mediterranean-style leisure center with 7.6 thousand square meters, children's activity center of one thousand square meters as well as Lanting kindergarten and university for the elderly in the east region. While the west also has rich service facilities, such as leisure center with 4.8 thousand square meters, Mediterranean-style commercial plaza of 20 thousand square meters, and the large area of sports center containing basketball court, table-tennis hall and tennis court, etc. Besides, commuter bus between Hangzhou main urban area and Linping subway station is set up. Thus, it is observed that Lanting community should be the one with the features of open, inter-amalgamation, hospitable and self-contained, which provide an important guarantee for the construction of community-oriented residential facilities for the aged.

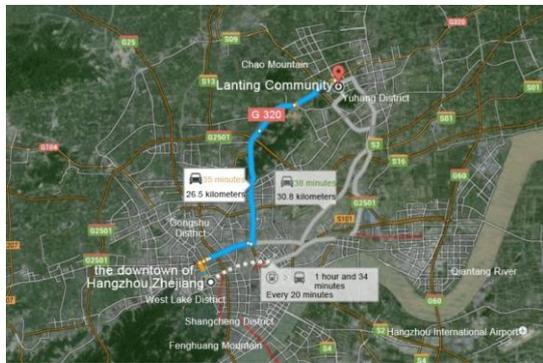


Fig. 1. Location map of Lanting senile apartment.



Fig. 2. General layout of Lanting community.

C. Facility Location

Lanting senile apartment, the first attempt of Greentown's aged industry, belongs to be an embedded residential product for elderly support. As the very important supporting of life service system, function distribution and service location of this apartment had experienced the process of gradual exploration and improvement combining with market operation. At the beginning, it was defined as a commercial residential building, but then remodeled to be an apartment for the healthy elderly due to the consideration of coping with aging problem and creating an appropriate scale (the distance of "a bowl of soup"). Thus, the community has developed under the influence of this project. And in a benign circle, the senile apartment got the benefit from other service facilities in

the community and transformed into the mode which could accommodate the elderly people who need living care and medical nursing. In the process of its operation, the important role of "medical treatment" has been emphasized by the managers who obtained the management right of the facility for the aged from Civil Affairs Department at first and then applied for the management right of medical institution from Health Care Sector. It is an ideological breakthrough. And on this basis, the basic functional modules of medical and rehabilitation are configured so as to provide medical service to both the aged living in the apartment and community residents [7]. In addition, this project is brought into the range of medical insurance which can greatly reduce the cost of the elderly. Therefore, Lanting senile apartment can be seen as a typical representative gathering the cooperation among three departments including civil administration, health and social security.

TABLE I: FUNCTIONAL CONFIGURATION OF PUBLIC SERVICE SPACE IN LANTING SENILE APARTMENT.

Service space	Specific functional configuration	Additional information
Community clinic	Diagnosis and treatment(Chinese medicine, western medicine, dentistry); Disposition(infusion, dispensing medicines, pollutants disposal); Examination(ECG, X-ray, B-scan ultrasonography); Other (casello and pharmacy)	It is operated by Greentown Hospital.
Rehabilitation center	Gait trainer, drawing bed, standing frame, training escalator, finger exercise machine, etc.	It is allocated rehabilitation therapist to provide professional guide.
Bathing center	Two bathtubs in each single-sex bathroom; Automatic bathroom with automatic washing bed; Baby shower	It mainly targets the aged who are totally unable to care for himself /herself.
Recreational and sports center	Mahjong and cards room, reading room, physical exercise room, tearoom, multi-function hall, etc.	It is operated by Greentown property management company.
Dining section	Community canteen(the area for meal selection and eating); Kitchen (the area for cooking and storing)	It is operated by the hotel attached to Greentown.

D. Functional Configuration

Based on the macroscopical principle of CMNES, Lanting senile apartment is divided into three areas. Auxiliary zone is the space mainly including traffic and office. Medical area refers to the service place providing daily basic diagnosis, treatment, disposition and the like, while the living zone mainly consists of dwelling unit and entertainment section. In addition, nursing station deployed in the living zone is in between medical care and elderly support to conduct routine patrol and basic care.

The gross floor area of Lanting senile apartment is 15.4 thousand square meters including ten floors on the ground and one floor basement of two thousand square meters. The

building develops in horizontal orientation because of its large number of bedroom arranged in living unit. Aimed to undertake as supporting rooms, basement is configured containing kitchen, staff canteen and sunken garden. As shown in TABLE I, the first and second floor are public service space, which comprises entrance lobby, community clinic, rehabilitation center, bathing center, recreational and sports center, dining section. In consideration of security and convenience for the aged, there are two hundred beds arranged hierarchically according to elderly's self-care ability from the third floor to the tenth floor. Operated by Greentown Hospital on the third and fourth floor, there are thirty nursing-style rooms with sixty beds for renting, which are designed as ward mode including medical nursing bed, necessary medical equipment and the space of barrier-free accessibility and operation for nursing staffs. They target the aged during the partial and the all-sided nursing stage, such as the elderly who suffer from illnesses and need nursing care. Thus, nursing station is set up in these two floors besides the room. Hotel-style rooms selling to the healthy seniors are configured in the fifth floor and above. There are 86 sets total with two types: double bed and a big bed [8].

III. CONSTRUCTION FEATURES

A. Creating Resource Sharing Community Environment

Open to community residents: Aimed at improving the use efficiency of Lanting senile apartment and providing community residents with more convenient service, the public service area of this apartment in both the first and second floor practises fully open business model to attract more residents by means of hardware device and software service. Therefore, Lanting senile apartment can be seen as the integrated service facility which mainly serves for the aged and also gives consideration to the living needs of other age groups. It is beneficial for elderly's healthy development and the community residents' quality of life.

Enjoying community resources: As mentioned above, Lanting village is an open one-stop community with the core topic of realizing resource sharing. For the aged living in the apartment, service space in the community including leisure center, activity center, and university for the elderly, courtyard landscape are also very important. Extending the service content and spatial place to the whole residential area is aimed to guide the old people to go out and prompt them to contact with society, participate in community activities as well as enhance the sense of belonging.

B. Creating Diversified and Interactive Atmosphere

Spatial layout for promoting intergenerational exchanges: Arranging the baby shower next to the bathroom which targets the aged who are totally unable to care for himself /herself is not only considering the centralized arrangement of water equipment and pipes, but also can boost interaction and communication between old and young. Research found that the usage frequency of open baby shower is very high, which means the feasibility and importance of setting this function in the community. Meanwhile, the aged living in the apartment could feel some vigor and vitality from the children's voice.

In addition, Lanting kindergarten, children's activity center and central green space near the apartment will also help to promote intergenerational exchanges to a great degree.

Optional multi-level communication place: In the public service area, entrance lobby, mahjong and cards room, multi-function hall and dining room are arranged to provide service and create exchange opportunities for the aged. As shown in Fig. 3, living zone is not only the resting area but also the indispensable space for communication including intimate bedroom balcony and the room for nursing staff, together with the relatively open leisure place in the middle corridor and at the corner, which can impel the interaction between the elderly as well as the elderly and the service staff.



Fig. 3. Optional multi-level communication place.

Organizing abundant recreational activities: The whole community is closer to nature and peaceful where we can see kids playing and elderly walking. Various kinds of activities for promoting harmonious development of neighborhood are organized, such as the Kite Festival which was being held during our investigation. Besides, Lanting senile apartment also organizes activities and recruits social volunteers to make the holistic cultural atmosphere more active, so as to enrich the life of the elderly. It centralizes all the female seniors to take pictures on Mother's Day, and establishes many kinds of interesting clubs containing painting and calligraphy, song and dance, and health maintenance, etc. Some collective activities and evening parties on holidays are organized as well.

C. Shaping the Suitable Environment for the Aged

Architectural design: As shown in Fig. 4, Lanting senile apartment possesses bright and light architectural elements in Mediterranean-style based on the steady and elegant form, and matches its surroundings so well. The living atmosphere with flavor of culture accords with the aesthetic, physical and mental characteristics of the elderly. In terms of shape, considering the abundance of building facade along the street and the enclosing of courtyard, two-story podium building on the west side is used as entrance lobby, and the two-story independent podium building on the east side is extended to the north. Beyond that, brilliant use of the relative independent space of community clinic which is considered as matched office primitively can minimize interference from outside clinic clients. As for the house design, it adopts the gallery-type design method which often appears in hotels and makes room for rest and talk in the appropriate place. In connection to vertical traffic, five elevators and four escape stairs are set up in view of the complexity of people flow. There are two public elevators (-1F-2F) and two ordinary elevators for passengers (-1F-10F). On the latter, one is designed mainly for the use in the fifth floor and above of hotel-style rooms, another is the medical elevator with large

depth used for nursing-style rooms in the third and fourth floor. In terms of transverse traffic, the main entrance on the west side is designed with awning to facilitate vehicle parking, while the east entrance near the crossroad is convenient for people's in and out.



Fig. 4. Lanting senile apartment in Mediterranean-style.

Outdoor landscape: As basic unit of the community planning, courtyards with enclosed and semi-enclosed form are designed to organize residential groups, and then to constitute a complete community. This progressive spatial relationship could help create a pleasant atmosphere with the sense of belonging and security. Combining with the central garden, natural ecological landscape, and running water image of Moorish garden, along with proper surrounding porch and overhead, the Mediterranean patio courtyards are adopted to foil the strong aesthetic feeling of the architecture and to embody the group space combination. And on this basis all-around interactive space between people and the environment, and neighbors is created. In the west, the natural water system is transformed to throughout community green nodes, while the courtyard space in the east is constructed by green space of residential cluster, in order to build a graceful and pleasant community with Mediterranean-style courtyards. As for the landscape construction of Lanting senile apartment, it mainly emphasizes the sense of identification of the two entrances facing the street on the east and west, and uses tree planting method to isolate with sidewalks so as to create a relatively stable internal environment. As shown in Fig.5, in the north, the all-in-one sunken garden with leisure, recreation, view and admire not only forms a certain isolated interface but also enables the underground space of Lanting senile apartment to obtain adequate sunlight and landscape.



Fig. 5. Sunken garden owned by Lanting senile apartment.

Detail treatment: In terms of barrier free design, because of the elevation difference between north gate in west lobby and courtyard in the community, a special barrier-free path is installed to connect the two parts except the steps, so that the wheelchairs and children carts could pass freely. In addition, the adopted width of entry gate, room door and aisle are a little larger than common senile apartment so as to facilitate the pass of wheelchairs and stretcher. Aimed at making the

elderly easy to move and exercise, handrails on both sides of aisle and stairs, and in the elevator and washroom are set up. On the external angle of the wall, it takes anti-collision measure to avoid the damage to old people. In regard to materials, non-skid floor tiles and composite wood floors with features of easy to clean and comfort are selected respectively in the pubic region and bedroom.

In terms of suitable configuration, there are a series of small objects designed for the aged including telephone, nail clipper, magnifying glass and anti-crack gloves, as well as the proper furniture and equipment for the wheelchair users, such as height adjustable chair, switch button at the appropriate location, and the platform leaving space for putting legs and feet. Furthermore, many kinds of tools assisting the elderly to walk and to take articles are also allocated, such as walking aids with shopping basket.

In terms of privacy design, brushing card management system is installed at the door open to the yard in west lobby, which enables owners of the community to get in and out of the senile apartment with the induction card while the outcomers could not enter freely. From the third floor to the tenth floor, it installs visual inter-conversation system at the place from elevator lobby to the middle corridor in each floor, and thus the visitors could only enter under circumstance of calling the owner. Besides, it is learned that the old people worry about being disturbed and value the privacy from the previous interview. Hence, as shown in Fig.6, some two-bed rooms and curtains between two beds are designed to create personalized private space for the aged.



Fig. 6. The curtain between two beds.

In terms of family-mode design, the elderly can choose the appropriate room type according to their own requirement and economic condition. Interior furniture and all sorts of small objects can be carried and arranged by the aged themselves, and the bedroom can be built as home-like environment atmosphere [9]. Moreover, mailboxes in the elevator lobby of each floor, and display wall and leisure chairs in the aisle are set up to let the old people feel a deep sense of belonging and intimacy.

D. Humanized and Diversified Service with the CMNES

In terms of medical nursing: The community clinic of Lanting senile apartment is aimed to establish health record, as well as to provide diagnosis and treatment of common diseases, functional rehabilitation exercise, emergency service and palliative care to the aged living in the apartment and community residents. The nurses take temperature and blood pressure, and send medicines for the elderly at a certain time every day, and they also keep a record and carry on nursing according to the check result. Specifically, when

discovering the old who have a higher blood sugar, the diet will be adjusted to a more suitable menu promptly. Besides, the service of keeping the aged in proper posture, changing posture and transfer nursing are supplied in order to lay the foundation for sports and occupational therapy, which can facilitate the recovery of integrated functions of somatic movement. Other nursing services like passive movement, maintenance massage and joints traction are also provided to the old people for preventing various kinds of secondary dysfunction and complications. Moreover, it also pays great attention to psychological rehabilitation care. Aimed at common psychological problems of the elderly, nurses adopt the psychological approach including consolation, inspiration, counseling and implication, and also organize collective psychological discussion to help the old man establish the right attitude.

In terms of living care: As for the aged who are totally unable to care for himself /herself, the specialized nursing staff will take care of their daily life hierarchically containing taking a shower, washing hair, hair cutting, manicure, bedmaking, oral care and cleansing, etc. Starting from 7:00 in the morning, breakfast will be delivered to the elderly's room, then love shopping cart will be pushed into the room at 10:00 am, and finally medical care personnel will conduct evening patrols at 11:00 pm. In addition, there also are some services of accompanying the old people to stroll no less than one hour weekly, and providing housekeeping two hours a month. In the bathing center, handrails, washing beds, wheelchairs, anti-skid slippers and seats are prepared to meet the needs of the elderly to bathe. Some caregivers will help the aged who are bed-ridden or have difficulty in moving to ensure their safety. The apartment managers organize various activities in accordance with the interests of different old people. Except the interesting clubs and collective activities, there are someone specializing in reading the newspaper for the aged one hour every morning to help them know the daily news.

IV. CONCLUSION

Propelling the development of CMNES is an important way to alleviate the current problem of aging and to meet the multiple requirements of the elderly who are disabled, solitary and diseased. Lanting senile apartment in Hangzhou is a typical primary facility for the aged with the CMNES. From the development and operation model at the macro level to architectural planning strategy in the medium level and then to the spatial layout and furniture setting on a micro level, all of them reflect the positive exploration and wisdom crystallization in the aspect of CMNES. In the process of evolution, Lanting senile apartment and its community are entirely interpenetrative and accelerated to each other. And on this basis, a healthy and sustainable development model is formed, which could provide important references for the exploration and innovation of residential facilities for the aged in the future.

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