

Discussion on the spatial design of elderly care buildings under the concept of ageing-friendly concept

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Abstract. With the development of China's economy, the aging of the population is becoming more and more prominent, and China will enter a stage of deep aging. With the development of social economy and social progress, China's urban residents have put forward higher requirements for social and economic development. Judging from the survey results in recent years, the currently designed buildings are not suitable for the elderly to live in, which is not conducive to improving the quality of life of the elderly. This paper firstly introduces the influencing factors of modern pension building space design, then states the principles of pension building space design, and finally describes the problems and solutions existing in the current design of pension buildings under the concept of ageing.

1 Introduction

China will enter a stage of deep ageing in 2023, and the ageing of the population is bringing enormous pressure on the elderly. In China, owing to the inadequacy of institutions and facilities for the elderly, the responsibility of caring for the elderly is mainly borne by family members and children. However, because of the one-child policy that was popular in the last century, many one-child families have emerged, resulting in many difficulties for children to support the elderly. As a result, the elderly have a great demand for elderly facilities, nursing homes, day care and so on.

2 Influencing factors of spatial design of modern elderly buildings

2.1. Psychological Needs and Characteristics of the Elderly Population

People aged 60 and above are considered to be elderly people. Older adults may lose social members due to the death of a friend or loved one, or become less mobile due to cognitive decline, both of which increase the risk of social isolation[1]. Compared with young people, the elderly are aging significantly, with a marked decline in body function indicators, and their physiological characteristics are quite different from those of young people, so that the quality of life of the elderly is not as good as that of young people. Elderly people have the physiological characteristics of being "slow, sick, weak and frail", which are mainly characterized by a significant reduction in their ability to control their bodies and their mobility, as well as their ability to walk

and lie down. In addition, the physiological indicators of the elderly are not as good as those of young people, which greatly increases the risk of the elderly contracting a variety of diseases and has a great impact on their daily activities, food, clothing, housing, transport and interpersonal interactions. It is important to fully understand the physical characteristics of the elderly to design buildings that are suitable for the elderly. By linking building design with the physical characteristics of the elderly and the current situation of the elderly, it is possible to clearly define the basic requirements for the elderly to live in, of which the main elements are: firstly, the elderly need to receive more social care and support, and at the same time, they also need the help and relief from the strong group forces, which is one of the important links in the progress of contemporary social civilization, and also an important part of the new social pension cause; secondly, the elder's daily life, social life, leisure and recreation should be cared for and assisted by the community and given special care, with the aim of enabling the elderly to have a more social life. When carrying out spatial planning for elderly housing, targeted planning should be carried out according to the physical characteristics of the elderly and the design of the housing should be optimized so as to enhance the experience of the elderly[2].

2.2. Spiritual needs and characteristics of the elderly group

At the stage of old age, people's daily lives become more leisurely, the pace of life of the elderly becomes slower, their scope of activities is more restricted to their homes and neighborhoods, and their interpersonal interactions become increasingly simpler, with their families and neighbors at the centre. And this change in the social

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environment will have a certain impact on the psychology of the elderly, which is manifested in the following: they lack a sense of security and are very prone to negative emotions such as loneliness and a sense of inferiority. Because of their old age, the thinking and memory of the elderly will become sluggish, and it is difficult for them to react quickly to new things, plus their learning ability will also deteriorate, so the elderly are prone to develop some sad emotions. Because of the decline of various bodily functions of the elderly, which leads to their reduced participation in social activities, they will have a greater sense of disparity, and psychologically, they will feel empty and lonely, and they are more eager to be recognized and cared for by the community and their families. If the psychological diagnosis and treatment of the elderly cannot be carried out in time, it will cause great harm to the physical and mental health of the elderly. Therefore, in the spatial planning of elderly housing, according to the psychological characteristics and needs of the elderly, targeted spatial planning[2].

2.3. Behavioral characteristics of older groups

The ergonomics of spaces for the elderly focuses on the correlation between people, products and the environment, a discipline that has a positive impact on the physical and mental development of the elderly. When designing spaces for elderly housing, the size of the elderly living group is a prerequisite for defining the spaces and facilities for each function. The bones of the elderly become more fragile as they get older. In response to this characteristic, barrier-free design aimed at meeting the characteristics of the elder's lifestyle should focus on the layout of supporting facilities appropriate to the elder's lifestyle.

3 Principles of spatial design of buildings for the elderly

3.1. Principle of accessibility

A barrier-free built environment enables people with disabilities to move about safely and freely and to use the facilities within the built environment[4]. As the agility of the elderly decreases, it causes a lot of inconvenience to their daily life, and the barrier-free design of the living environment for the elderly is precisely to reduce or eliminate these inconveniences, so as to improve the comfort of the living environment for the elderly. The spatial layout of elderly flats should be simple and clear to enhance the accessibility and convenience of each functional area; in order to prevent the uneven ground from bringing potential safety hazards to the elderly, the ground surface needs to be leveled and the slope should be small; in order to guarantee the basic living needs of the elderly, the functional space should be configured with the corresponding protection of accessory equipment.

3.2. Principle of security

With the decline of the physical function and health state of the elderly, it makes the life of the elderly with many hidden safety hazards, therefore, the design principle of safety is particularly important in the design of the elderly building. Based on the frail physical characteristics of the elderly, safety protection is provided to the elderly, such as adding safety handrails and non-slip floors to the elderly, improving the safety performance of home equipment and home appliances during operation.

3.3. Principle of ageing

The life of the elderly is unique, so the spatial design of the building should be integrated with the physical and mental characteristics of the elderly to create a building space that is suitable for their life. In terms of health care, the health care areas and medical workers should be reasonably allocated according to the different health care areas to meet the health care needs of the elderly. In terms of daily life, in addition to providing high-quality housing, various forms of public activities and recreational facilities should also be provided to meet the daily life needs of the elderly[5].

4 Deficiencies in the current design of buildings for the elderly under the concept of ageing in place

If the society has the opinion that older people should work longer and should take care for themselves than, in the built environment, and particularly in the housing process, we have to note that the elderly have different requirements of health than young people[6]. Because the elderly are older, so a reasonable design of the space in the buildings where the elderly live can improve their physical quality. However, from the actual use of the current situation, there are still a lot of problems that need to be further improved. The problems lie in the following, ageing-appropriate facilities for senior citizens' space design, which is already relatively mature internationally, the designers only refer to some international successful experiences without making their own modifications, and, when designing, they only consider the aspect of daily necessities for the elderly without giving more consideration to the mental health and travelling space of the elderly[7].

5 Improvement methods for the spatial design problems of elderly care buildings

5.1. Space design for the overall plan

Currently, most of the homes for the elderly are nursing homes. Therefore, when designing the space of nursing home buildings, designers need to comprehensively intervene in the whole process of building nursing home

buildings, and carry out scientific spatial design of nursing home buildings as a whole, so that nursing home buildings can maximize their overall function. It is specifically reflected in the following: first, the designer should pay attention to separate the elderly living floor and the dining room, to avoid the impact of the fumes on the respiratory system of the elderly. Also in the middle of the two buildings, a corridor can be built so that the old people can eat on time in bad weather; secondly, when the design is carried out, it is necessary to carry out a kind of barrier-free design for the indoor and outdoor spatial structure, which can allow the old people to walk around in the building, and also when they exercise outside the building, they don't have to walk, or cross the obstacles before they walk again, so that the old people who have poorer physical fitness can get very good protection. For the outdoor natural landscape layout area of the nursing home, and the ageing-friendly physical exercise area, the designer should combine the physical condition of the elderly, design the exercise equipment that suits their needs, and provide comfortable ageing-friendly services for the elderly, so that they can enjoy the beautiful scenery in the nursing home, and help the elderly to recover as early as possible. And some tables, chairs and cushions can be set up in the road area where the old people are active without any obstruction, so that when the old people are tired of walking and finished with their activities, they can sit down and rest in the area; thirdly, in the surrounding area of the nursing home, it is necessary to have a hospital or a purchasing centre for some necessities, so as to guarantee the survival of the old people, and at the same time, if the old people fall ill, they can be sent to the hospital for treatment in time.

5.2. Interior detailing of space design

The architectural space design of ageing-friendly nursing homes should also be based on the internal environment of the entire building, so as to give the elderly comprehensive care for their old age, in this way the elderly can conveniently carry out their daily life in terms of food, clothing, housing and transport, and at the same time form a harmonious relationship with other elderly people, so that the elder's souls can be enriched and they can receive love and care, thus possessing an optimistic attitude towards life. In addition, it also enables the elderly to receive high-quality health care. This is reflected in the following: firstly, in the specific design of the interior, the designers can use warm colors of paint on the interior walls, so that when the elderly see such colors, they can feel the warmth and care from the nursing home; secondly, on the doors of the rooms where the elderly live, they can use bright colors and bigger numbers to indicate the names of the elderly, and stick on the photographs of the elderly, so that the elderly can find their names precisely in the building after they go out or have their meals. This will enable the elderly to find their own accommodation accurately after going out or having a meal in the building. After that, the designers can design observation holes on the doors of

the rooms where the elderly live to facilitate the management to check the health condition of the elderly, so that the staff members of the nursing home can detect and treat the elderly who are sick in time during their daily regular visits[8].

5.3. Spatial design details of the toilet and living room for the elderly

The bathroom and living room are the places where the elderly move most frequently, so extra attention should be paid to their detailed design (Figure.1.), as follows: first, focus on the careful production of toiletries. In the bathroom no threshold can be set, indoor floor needs to have a certain slope to prevent the accumulation of water, the floor material needs to have non-slip characteristics. And around the wall, some railings should be set up to facilitate the activities of the elderly who are not in good health, so that the elderly can carry out a variety of activities. Plus the elderly are weak and they often need to go to the bathroom, so to ensure the health of the elderly, the bathroom must be set around their living room; Secondly, some details of the living room, it should be sunny, well ventilated, the interior should be large, do not place too many decorative items, so that the elderly have sufficient space for activities. Regarding light, curtains and awnings with good shading should be designed so that elderly people who have different needs for sunlight can make adjustments according to their needs.



Fig. 1. Bathroom detailing.

5.4. Detailed design of activity space, medical space and transport space

The detail design of activity space, medical space and traffic space is very important in the spatial design of elderly buildings, as follows: firstly, the physical and mental needs of the elderly should be taken into account when planning the venues for activities, such as chess and card rooms, mahjong rooms, dance rooms, etc., so that the elderly can give vent to their negative emotions that have been pent up in the nursing home; secondly, in the design of the hospital, a ward should be set up on each floor and a medical staff should be arranged, so that if the elderly have any discomfort, they can easily enter

the ward for a medical check-up. Thirdly, the design of the transport system is mainly for the stairs (Figure.2.), and the lifts. For the stairs that the elderly walk on, the staff of the nursing home should frequently test them to see if there are any obstacles, and once there are, they should be removed immediately to ensure that the area is barrier-free. Lastly, in terms of the spatial design of lifts, they should be designed with greater clearance in the lifts so that when the elderly take the lifts, they can have a greater foothold and avoid injuries caused by overcrowding. And in a spacious room, if an elderly person is sick, the wheelchair he uses, as well as other medical equipment can be sent to the ward unimpeded, buying more time for the patient's treatment [9].

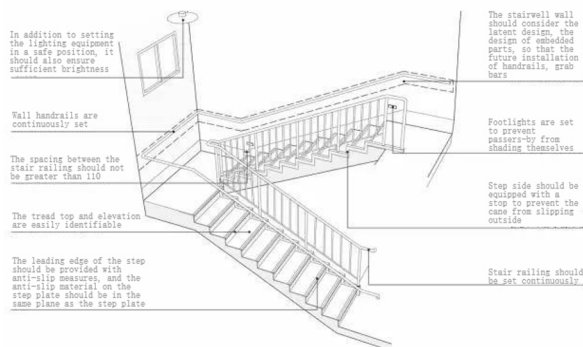


Fig. 2. Age-friendly staircase design

5.5. Other functional design of interior spaces

Residential land is one of the most crucial basic land for the elderly to live on, and it is also the place where the elderly have the most urgent need for privacy protection. According to the reality, as many different living spaces should be chosen as possible, no matter it is one-bedroom or two-bedroom, single room or multi-room, the specific configuration should be unfolded according to a certain ratio, so that all kinds of needs of the elderly in life service can be fully solved, and the quality of life of the elderly can be upgraded. This is specifically manifested in; first, the service desk, including laundry, restaurant, hairdresser and other basic living facilities, in the arrangement of the service desk, the access between the lower floor and the first floor should be put together as far as possible in the form of passages and so on connected to other places, in order to facilitate the daily use of the elderly[10]. It should be pointed out that, due to the chronological and cluster nature of restaurants, it is necessary to provide restaurants with space for dining and enhance the utilization rate of the restaurants, and they can also be used as a place for the elderly to communicate, and during non-dining times, they can also be used as a place for the elderly to drink tea, chat and other recreational activities, at the same time hand-washing counters, toilets and other equipment should be set up; Second, medical rehabilitation space is an indispensable part of a sound retirement community. As the elderly get older, their body functions will slowly decline, and they will face a variety of diseases at this time, and a good set of medical equipment can ensure

that the elderly can be treated in a timely manner in the event of a sudden illness or accident, preventing them from delaying their condition, which may lead to greater losses. A good environment for recuperation is needed. In addition, medical check-ups are helpful to the physical and mental conditions of the elderly during their stay. Because of the change in the mentality of the elderly, they are much more fearful of illness than the general public[11].

6 Conclusion

To meet the living needs of the elderly population, the design should follow the idea of being suitable for the elderly and create a barrier-free, safe and age-friendly environment, so as to meet the dwelling and living needs of the elderly through the fine design of the living space, public space and transport space, to provide the elderly with a better life and to build a more harmonious society.

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