

# Research on Aging-friendly Home Space Design Based on Humanization

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**Abstract:** *With the accelerated development of China's aging population, the number of elderly people is growing at a rate of 3% per year, the quality of life of the elderly has become an important issue of social concern, and aging in place is the choice of the majority of elderly people, and the design of the humanized aging home environment is directly related to the physical and mental health of the elderly. This paper puts forward the principles of humanized home design for the elderly by analyzing the physiological and psychological characteristics of the elderly and the status quo of home design for the elderly, in order to improve the quality of life of the elderly.*

**Keywords:** *humanization, aging-friendly, home space design*

## 1. Introduction

With the number of elderly people in China growing at a rate of 3% per year, aging has become a "basic national condition" in China. 2020, the Fifth Plenary Session of the 19th CPC Central Committee proposed for the first time to "implement a national strategy to actively cope with the aging of the population"; In 2022, the Government Work Report proposed to "actively cope with the aging of the population". In October 2020, the Fifth Plenary Session of the 19th CPC Central Committee proposed for the first time to "implement a national strategy to actively cope with population aging"; in 2022, the "Report on the Work of the Government" proposed to "actively cope with population aging, optimize the supply of urban and rural elderly care services, and push forward the high-quality development of the cause of the aging and industry. The quality of life of the elderly has become an important issue of national and social concern. From the current literature research, there is still a gap between China's humanized home environment design for the elderly and the relevant foreign research, and the humanized home environment design for the elderly that can meet the physiological and psychological changes of the elderly and their behavioral patterns still needs to be improved. Aging in place is the choice of the vast majority of the elderly, humanized home environment design for the elderly can improve the quality of life for the elderly to provide a safe, warm, healthy and convenient living environment for the elderly, to show the humanized care for the elderly, directly related to the physical and mental health of the elderly.

## 2. Physiological and psychological characterization of the elderly

Physiological characteristics of the elderly: with age, the body's perceptual system, musculoskeletal, thinking system on the function and organ function gradually decline, for the perceptual system research found that more than 60 years of age, visual and auditory impairments gradually appear, affecting the reception of information on the surrounding environment; 70 years of age and above the decline in visceral function of the elderly, muscle atrophy, can not withstand large-scale strenuous exercise, the flexibility of the action becomes worse; 80 years of age and above the thinking system brain cells began to decrease. Above 80 years old, the brain cells of the thinking system begin to decrease, the brain tissue begins to atrophy, and the speed of nerve conduction decreases, resulting in the slow movement of the elderly, movement disorders, poor reaction ability, especially the decline of attention and memory is particularly obvious.

Psychological characteristics of the elderly: After retirement, the social circle of the elderly becomes narrow and their participation in social affairs becomes lower and lower. The psychological manifestations are a decreased sense of security, weakened adaptability, and a sense of loneliness and emptiness. For example, the decline of short-term memory ability and the deterioration of thinking ability, the acceptance of new things by the elderly is relatively low, the adaptive ability to the social and living

environment is weakened, and it is easy to produce low self-esteem<sup>[1]</sup>.

### **3. Current situation of ageing-friendly home design**

The research on ageing-friendly renovation in foreign countries can be traced back to Scandinavia in the early 1970s, and the common ways of renovation are: (1) ageing-friendly renovation of residential buildings with public welfare policies, such as Denmark and Sweden; (2) ageing-friendly renovation of residential buildings with nursing care insurance systems, such as Germany, Japan, the Netherlands, and Singapore; and (3) ageing-friendly renovation of residential buildings with a combination of public welfare policies and market-oriented renovation, such as the United States<sup>[2]</sup>. The theory and practice of aging and elderly care in China began to be gradually explored in the 1990's. In the 1980's, the main focus was on learning and introducing foreign experience; in the 1990's, with the promotion of housing reform policies and real estate development, the theory and practice of ageing-friendly home design was developed.

Most of the domestic elderly choose to age in place, and there are problems that need to be improved.

#### ***3.1 The age of housing in the living area is on the high side***

Generally around 10~20 years, the space hardware is difficult to meet the needs of the elderly for safety, health and convenience. For example, the floor is non-slip, and handrails are installed in the bathroom.

#### ***3.2 Unreasonable space layout***

With the decline of physiological functions of the elderly, there is often a need to get up at night, the functional layout of the space design, the bedroom is far from the bathroom, the elderly night rise inconvenient, need to prevent accidents such as falls.

#### ***3.3 Intelligent home equipment operation difficulties***

Some intelligent home appliances on the market, the enterprise is not humanized enough for the intelligent system design, the equipment operation is complicated, the elderly are difficult to operate, the utilization rate is not high, and it is easy to misoperate, resulting in safety risks.

#### ***3.4 Emotional needs are neglected***

Contemporary young people are busy and bustling for their livelihoods, leaving many elderly people alone at home. Although they may have no material worries, their spiritual world often feels empty. They frequently experience feelings of loneliness and solitude. Elderly individuals with poor physical health may also experience anxiety. When their emotions are not comforted for a long time, emotional fluctuations can easily affect their physical and mental well-being. In view of the above problems, it is possible to put forward the principle of elderly-friendly home design from the perspective of humanization.

### **4. Humanized home design principles for the elderly**

#### ***4.1 Principle of safety***

The important foundation of elderly home design is safety<sup>[3]</sup>. First of all, it is necessary to ensure basic functional requirements, such as fall prevention, slip resistance, collision prevention and reminders for the elderly; the distance between the bedroom and the bathroom should be as close as possible to facilitate night time movements; improvements should be made to the interfaces and furniture in the indoor living space, using flexible materials for edges and corners, reducing the use of glass or metal edges; safety sockets should be installed; the ground floor should be covered with non-slip floor or tiles; accessibility modifications should be made to ensure even ground surfaces; the number of indoor steps and height differences should be minimized, with stair treads having a width of at least 300mm and a height not exceeding 150mm; the kitchen should be remodelled with an ergonomic layout, adopting an L-type or U-type design to allow wheelchair users to have sufficient turning space and easy movement;

safety handrails should be installed in corridors, next to toilet seats, and in bathrooms to reduce the risk of falls and injuries for the elderly; the door frames of living rooms should be widened; residential fire prevention and emergency rescue facilities should be installed.

#### ***4.2 Easy to operate principle***

Smart home products through intelligent facial or voice recognition can better help the elderly to start or close the switch, smart home products choose to simplify the design of easy to understand, to help the elderly to quickly master the practical operation of the product skills, to avoid the use of the process of error, and the emergence of safety hazards. For example, electronic door locks household appliances intelligent identification, intelligent toilet and so on.

#### ***4.3 Emotional principle***

Home design to meet functional needs on the basis of focusing on the emotional appeal of the product, to create a safe, comfortable and warm environment. Aging-friendly furniture design should take full account of the physiological situation of the elderly, furniture design as simple as possible to avoid complex memory operations, balconies and indoor adequate natural lighting; bedrooms have sound insulation design; The room as small as possible to accommodate the activities of the elderly and wheelchairs, choose colours to avoid high brightness, high brightness and avoid visual stress.

#### ***4.4 The principle of environmental protection***

"The concept of healthy housing" has always been a concern. To create a home environment conducive to good health, we need to choose high-quality green decoration materials, so that the interior decoration does not produce pollution harmful to health, and can meet the residential life of the elderly.

#### ***4.5 Intelligent***

In recent years, the development and application of the Internet of Things has led to the development of intelligent home appliances. The realisation of remote control of home appliances, and the emergence of intelligent home systems, intelligent home appliances and furniture on the market, which can be integrated into daily life according to the needs of the elderly. For example, intelligent shoe cabinet with deodorising, sterilising, drying; intelligent lighting control, remote control of lights on and off; intelligent toilet that can be cleaned automatically; intelligent bathing facilities; intelligent security monitoring system; these intelligent home design is not only convenient for the elderly life, but also through the monitoring of the elderly around the clock physical state, which can help the elderly physical condition, timely access to medical care to get a more effective and reasonable help.

### **5. Case study of home adaptations for older people**

The project design is a 55m<sup>2</sup> small house renovation programme for a female homeowner, living with her parents to create an age-friendly home environment that is more comfortable, safe, convenient and practical, while saving money on renovation. Details of the project home improvement programme are as follows:

#### ***5.1 Project remodelling saves on refurbishment costs***

Appliances and the master bedroom desk will be retained, and the position of the master bedroom desk will be fine-tuned to the actual situation to improve space utilisation.

#### ***5.2 Extend the use area***

Without affecting the architectural structure of the house, the kitchen balcony is widened to expand the size of a circle to increase the working area of the kitchen; large sliding glass windows are used to bring more natural light into the kitchen, making it brighter and more pleasant.

### **5.3 Bathroom remodelling**

Bathroom is an important part of home remodelling, aiming to realize wet and dry separation. The bathroom should be remodelled to have a smooth, even floor with non-slip floor tiles; safety handrails should be installed in corridors and next to the intelligent toilet; the bathtub should be installed with handrails above it, and the shower area should have a linear drain to reduce the risk of falls and injuries for the elderly; the door frame should be widened; emergency rescue telephone facilities should be installed. The partition wall between the bathroom and the kitchen should be demolished, and a glass half-wall should be constructed to improve the use of space and make the bathroom more spacious and comfortable.

### **5.4 Kitchen remodelling**

In order to meet the needs of the elderly for cooking delicious food in the kitchen, install a fume purification system to effectively solve the problem of cooking fumes, and ensure smooth movement between the kitchen and dining table.

### **5.5 Dining room remodelling**

The dining room is not large, usually 2-3 people eat, guests need a bigger dining table when visiting, choose the folding table to meet the needs of different occasions.

### **5.6 Bedroom remodelling**

According to the customer's requirements, the bedroom does not do floating windows. Considering that the family members sleep separately, the bedroom bed will be designed as a 1.5 m size. For the elderly like using iPad on the sofa at night, a foldable intelligent sofa will be purchased to accommodate their preferences, an intelligent lamp will be placed near it as a reading light, with adjustable settings for switching on and off at specific times; night lights with intelligent voice sensor recognition will be installed at the bottom of the bedside cabinets to prevent the elderly from falling when getting up at night; the bedroom does not have a suspended ceiling, and recessed lights will be installed above the headboard of both bedrooms to enhance the lighting and comfort of the bedroom.

### **5.7 Entrance remodelling**

The entrance door of the original house type is facing the door of the side bedroom, which is not conducive to Feng Shui, so it will be changed to a side door; the entrance landscape will be enhanced; the lighting effect of the second bedroom will be improved, and the door position of the master bedroom will be adjusted to ensure a good north-south ventilation. An intelligent switch will be installed at the entrance to allow the elderly to easily turn off lightings or air conditionings and other electrical appliances with a single button when leaving home.

### **5.8 Storage remodelling**

Cabinets or ready-made bookcases will be placed in the living room; according to the customer's preference, care will be taken to ensure that they do not affect the ventilation and comfort of the living room by placing the cabinets on the left side; the storage space will be designed under the bed, and wardrobes will be added to both bedrooms; balcony full of cabinets for storage: considering the limited floor space in this project, the balcony space will be utilized for storage, and a full of cabinets for storage will be designed on the right side of the balcony to provide more storage space.

### **5.9 Pet kennel conversion**

You have a small dog and a cat at home, the pet kennel provides a safe and comfortable resting place for the pets, with a design that matches the furniture.

The remodelling programme revolves around safety, accessibility, intelligence, and practicality. For example, levelling the tripping hazard floor; installing safety grab bars near the smart toilet and in the bathroom; laying non-slip floor tiles; widening the door frames in the living room; redesigning the operating table in the kitchen room; replacing the outdated indoor electrical wiring and configuring the

safety sockets; installing smart sensors, energy-saving lamps and other smart equipment; adopting a rounded corner design for all furniture, painting the living room roof and interior walls, etc. The programme won the client's praise after implementation.

## 6. Conclusion

As the elderly grow older, their physical functions weaken and their mobility decreases, the ageing-friendly home design should follow the physiological and psychological characteristics of the elderly, respect their individualized living habits, scientifically solve the existing problems, focus on safety, create a safe, warm, healthy and convenient living environment for the realization of the overall health of the elderly in both physical and psychological aspects, enhance the sense of well-being of the elderly in their homes, and give them peace of mind and stability in their old age.

## References

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