

Study on the Rural Aging Adaptation Program under the Model of Aging in Place--The Case of Houkuang Village in Shandong Province

Jiali Song

School of Architecture and Urban Planning, Shandong University of Architecture, China.

2108856563@qq.com

Abstract. With the aggravation of population aging in China, the problems of living environment and quality of life of the elderly population in rural areas are becoming more and more prominent. This paper first analyzes the current situation of Houkuang Village, including the village profile, existing problems and housing structure. Then, based on Maslow's need theory model, it proposes an ageing-friendly renovation plan, with detailed analysis and suggestions on five levels, including physiology, safety, socialization, respect, and personal realization. Based on the existing problems, an ageing-friendly residential retrofit design is proposed, including two specific programs for the different situations of "empty nesters" and "multigenerational cohabitation". Meanwhile, for the overall planning and design of the village, measures such as optimizing the road network and adding public facilities are proposed to improve the convenience and happiness of the elderly. In conclusion, although this ageing retrofit program cannot be generalized, it has some reference value in solving the living environment problems of the elderly in northern villages. Future research and practice should further explore the needs for ageing-friendly retrofitting in different regions and develop more precise and feasible retrofitting programs by combining local cultural, economic and geographic characteristics, in order to promote the well-being of the elderly in rural areas and community development in China.

Keywords: aging in place; ageing in place; Houkuang Village; Maslow's theory.

1. Introduction

According to data from China's 6th national population census, it shows that China's elderly population over 60 years of age has reached nearly 200 million, accounting for more than 13% of the country's total population. Compared with the 5th census, the number of aging population has risen by nearly 3%. It is expected that by 2050, China's elderly population will exceed 420 million, making China one of the most seriously aging countries in the world [1].

It is expected that the elderly population in China will exceed 300 million during the Fourteenth Five-Year Plan period, marking that the aging of China has entered a moderate stage. Urban building design has begun to shift to the direction of aging, but the aging research of rural housing is lagging behind [2]. At present, there are three modes of home care, community care and institutional care in China, of which home care is dominant in rural areas [3].

However, due to the lack of theoretical support, there are very few cases of rural ageing-friendly renovation. Most rural buildings for the elderly are provided by village collectives, leading to a decrease in the safety and convenience of the elderly in their homes [4]. People often neglect the care for the elderly, slow economic development, and insufficient research on the living environment of the elderly, which leads to the poor ageing suitability of rural residences [5].

2. Overview of the Village

2.1 Location status

Houkuang Village is located in the southernmost part of Jiaozhou City, 4.8 kilometers south of Yanghe Township, connected with Qiankuang Village in the south, Shanzhou Reservoir in the west, Aishan Scenic Area in Jiaozhou in the north, and neighboring with Lijiazhuang and Peijiazhuang in the east. The village is built along the highway and surrounded by Qiankuang Village and Dongxiaokuang Village, etc. It is between three big ditches under the mountain slopes and surrounded by mountains on all sides.

2.2 Status of village dwellings

The village has 357 families with 664 people, 186 people over 60 years old and 34 people over 80 years old, the aging rate of the population has reached 28%. Like other villages, most of the villagers work as farmers or go out to work for a living; most of the houses in the village are low-rise cottages common in the north, with a lack of public recreational space and poor quality of living environment; most of the young and middle-aged laborers go out to work, and there is a serious loss of labor force, which makes the problem of the left-behind elders more and more serious, and the problem of aging renovation is imminent.

2.3 Status of Housing

2.3.1 Housing structure

Most of the village houses were first built in the 1880s - late 1800s. With the increase of villagers' income, the village houses were generally renovated to brick and wood structures in the 1980s-early 2000s, which have been in use for about 10-40 years. Currently, the buildings in the village are predominantly brick and wood structures, with a few older adobe structures also present.

Brick and wood structure is the most common building structure system in the north. Traditional red bricks have good load-bearing properties, and have a certain degree of thermal insulation, fire and moisture resistance; window openings are small, with good warmth; wooden structure is convenient to take materials, flexible layout.

2.3.2 House layout

The buildings in the village are all single-story bungalows arranged in a zigzag pattern running east-west. Each building occupies no more than 100 square meters. In the house as a whole, the courtyard occupies a large space, the rooms are distributed around the bedrooms, and the smaller rooms around them take on the functions of storage, kitchen, and so on.

3. Existing Problems

3.1 Incomplete functional areas within the house and irrational planning

Most of the houses in the village were built in the 20th century without careful division of functional areas. Subsequent renovation also did not rationalize the space of each area. Inside the old houses, there are only kitchens and bedrooms, lacking living areas such as bathrooms and living rooms, and most of the functions are realized in the bedrooms. The interior is over-stacked with items, the functions are confusing, and it is particularly inconvenient for the elderly to find things. The architectural structure of the bathroom being outside the house makes it more inconvenient for the elderly in the fall and winter seasons.

3.2 The use of building materials in each functional area of the house is random and not targeted

Most of the old-fashioned housing in the bedroom tiles, the rest of the room using cement flooring. This not only affects the aesthetics, but is also dangerous. The walls of the houses are mostly made of mud and sand. Some of the walls because of the time is too long, has appeared peeling, cracks and other problems, the safety coefficient decreases year by year. Most of the bathroom used for the wooden door, but the bathroom air humidity is large, the wooden door is very easy to be corroded after the moisture, the use of short life. At the same time, wooden doors can not be closed after wear and tear, affecting privacy.

4. Rural Ageing Adaptation Program Based on Maslow's Needs Theory Model

Maslow's theory was developed by American psychologist A. Maslow (AbrahamMaslow) in 1943 in the article "The Theory of Human Motivation", in the form of a pyramid reflecting in order from the low to the high of the human spiritual needs... [6]. Maslow's needs theory divides human needs into five levels, from bottom to top: physiological needs, safety needs, social needs, respect needs and self-actualization needs. Based on Maslow's needs theory to analyze the housing needs of rural elderly people, it can clarify the direction of the aging transformation and provide theoretical support for the transformation [7].

4.1 Physical needs

In terms of living, the irrationality of housing structures and building materials have become important factors affecting the quality of life of the elderly in housing. The lack of medical and commercial areas in the villages also causes inconvenience to the elderly in accessing medical care and shopping.

4.2 Security requirements

Most of the houses in the village have been built for a long time, and even after remodeling, the aging phenomenon is still unavoidable, and there are problems such as cracks on the walls and potholes on the ground. Secondly, Hukuang Village is located in a mountainous area with inconvenient transportation, which makes it impossible to get timely medical treatment in case of illness. These problems need to be solved urgently.

4.3 Socialization needs

As most of their sons and daughters are out of the country, the needs of the elderly to make friends and establish connections spiritually are not met. There is a lack of public recreational facilities and places for public entertainment in the villages, and the original landscape nodes in the villages should be utilized to build places for public exchanges to meet the social needs of the elderly.

4.4 Respect for needs

Older people suffer different degrees of loss in health, economy, social status, and interpersonal relationships due to aging, which leads to damaged self-esteem, decreased self-confidence, and a greater tendency to fall into depression and pessimism, which in turn leads to a further decline in their own evaluation of themselves [8] . The need for respect requires intrinsic psychological fulfillment, i.e., the elderly should be listened to and the individual should be respected when

carrying out remodeling. In the construction of public facilities, the needs of the elderly should be taken into account, and those facilities that are urgently needed should be prioritized.

4.5 The need for personal realization

The need for personal realization is the need to realize one's own value. Although the elderly gradually lose the ability to work, they still have the need for personal realization [9]. Activities such as chess tournaments or painting exchanges can be held to give the elderly a platform to express themselves. Similarly, considering the needs of business and medical care, they can be trained to provide simple jobs and create opportunities for "re-employment". In the overall planning of the village, commercial facilities and recreational areas can be added.

5. Residential Retrofit Design Based on Ageing

5.1 Residential retrofit design based on ageing

The houses in Hukuang Village have been in use for a long time without reasonable repairs, and the aging phenomenon is serious, posing potential safety hazards, which is the first problem that needs to be solved; secondly, there is insufficient detailed division of residential functions inside the houses. The houses in the village are mainly of brick and wood structure, with the surrounding walls bearing the weight and the internal walls can be removed and redesigned. Depending on the demographic structure, they can be categorized into empty-nester dwellings and multigenerational cohabitation dwellings.

5.1.1 Adaptive design for "empty-nester" housing

Empty Nest Elderly Residence refers to a house in which only elderly people live. For this type of house, we chose the house No.19 of the first grid of Houkuang Village as the object of remodeling design. The house was built in 1960, the man is 80 years old, the woman is 75 years old, and the two old people are in good health. The house has two bedrooms, a storage room, a kitchen, a dry toilet and a poultry pen in the yard.

The housing meets the basic needs of life, but lacks a detailed functional division. The living room and bedroom share the same space, so the elderly lack private space; the kitchen is located at the entrance of the house and lacks good sanitary conditions; the outdoor dry toilet lacks bathing facilities and drainage pipes. The toilet is located outside the house, some distance away from the bedroom, which is not convenient for the elderly to go to the toilet; the indoor floor is paved with cement, which is poorly non-slip and poses a safety hazard; the ground in the courtyard is dirt, which poses a potential hazard in rainy days when the road is muddy.

According to the description of the above problems, the house was retrofitted for ageing. The storage room was separated into two rooms, north and south; the kitchen was moved to the north side, and items were placed on the sunrise south side to prevent moisture; the living room was moved to the entrance of the house and embellished with greenery; the toilet was moved to the north side of the second bedroom, with bathing facilities and unblocked piping, and the interior of the house was paved with anti-slip flooring to provide a non-slip effect; and the yard was paved with cement to prevent mud in rainy days.

5.1.2 Ageing-friendly design for "multigenerational" dwellings

"Multi-generational cohabitation" refers to the type of housing where three generations of grandparents and grandchildren live together. This type of remodeling needs to consider the living

habits of both the elderly and the young. We chose the house No. 50 in the first grid of Houkuang Village as the object of study. This house was built in 1990 and has been in use for a long time, and it also lacks careful design for aging. The family consists of an 85-year-old man in good health, a 54-year-old male head of the household and a 53-year-old wife of the head of the household, both of whom are capable of working, and a 14-year-old male child who is a school student. There are three bedrooms in the house, a storage room in the courtyard, a kitchen, a pen, a dry latrine, and a manually operated pressurized water pump.

The internal facilities of the residence meet the basic needs of life, but lack ageing-friendly renovation. For example, the elderly and children live in the same room; there is no partition wall between the children's bedroom and their parents' bedroom; the dry toilets in the courtyard are far away from the elderly's bedroom; and the pressure pump is located between the bedroom entrance and the toilet, which is prone to freezing in the winter, and there is a risk of falling when using the toilet in the night, and so on.

Based on the above problems, we carry out ageing adaptation: a partition wall is added between parents' and children's rooms to minimize their mutual influence; children's study space is moved to the north of their own rooms to provide privacy for the elderly; and a bathroom is installed on the north side of the elderly's rooms to make it easier for the elderly to solve their hygiene problems.

5.2 Rational planning of residential areas and building materials to improve the convenience and happiness of life

Replace the wooden doors and windows with anti-burglary stainless steel doors to improve security and keep warm in the fall and winter seasons. The bedroom is divided into functional areas, and a separate small bathroom and living room are set up to facilitate the elderly's toilet and washing in the fall and winter seasons. The living room can be used for entertaining guests and meeting the needs of the elderly for making friends. Repair houses with cracks or aging, and brush waterproof coating on the wall surface. Add ceramic tiles to the floor of the room, which is more beautiful and sturdy compared to cement, and is also more environmentally friendly.

6. Rural Master Planning and Design Based on Ageing

By analyzing the distribution of transportation and infrastructure in the village, the design of age-adapted retrofitting was carried out for the whole Haukuang Village. In the design, the safety, convenience and socialization needs of the elderly are taken into account at the same time.

6.1 Planning for basic village transportation

Utilizing the original road texture in the village, the road network was re-planned. The village roads were divided into two categories, one for main roads and one for branch roads. Among them, the main roads are mainly used for agricultural machines and small trucks, and the original main streets can be expanded and the road surface can be repaired [10].

Branch roads are used for pedestrians, and most of these roads are not in a position to be extended, so road leveling can be carried out. Barrier-free handrails are installed at ramps and stone steps are cut to ensure the safety of the elderly in their travels.

6.2 Planning village public facilities

The village public facilities were remodeled and necessary facilities such as pavilions, fitness equipment, pharmacy clinics, etc. were added to ensure a healthy and happy life for the elderly in the village.

7. Concluding Remarks

In summary, this paper takes Houkuang Village as an example to design the rural ageing-friendly retrofit program. Firstly, through the investigation and research on the houses of the elderly in the village, the design of ageing-adapted renovation is carried out from the perspective of ageing at home; then, taking Maslow's demand theory as the theoretical basis, the renovation of houses, roads and public facilities is carried out from the perspective of the five needs of the elderly, namely physiological, safety, socialization, respect, and personal fulfillment, so as to achieve the following effects: the indoor renovation is able to satisfy the majority of the needs of the elderly While continuing the transportation texture of the village, the road network has been improved to meet the needs of the elderly for travel safety; and the public service space has been improved to meet the dual pursuit of the elderly's physical and mental health.

Due to the differences in folklore, living styles, and geographic locations in different regions, although this paper's aging-friendly retrofit program is not universally applicable to all places, it can solve some of the aging-friendly retrofit challenges for northern villages. Therefore, this study has some reference value in exploring the rural aging retrofit program.

References

- [1] Zhang Siqi. Research on the design of aging-adapted renovation of rural courtyard type residential space in Guanzhong area [D]. Xi'an University of Architecture and Technology, 2022.
- [2] DOI:10.27393/d.cnki.gxazu.2022.000023.
- [3] Lu Yuechi. Research on Ageing Adaptation Retrofit of Rural Residences in Xiangxi under the Home Care Mode [D]. Wuxi: Jiangnan University, 2020.
- [4] HAN Zhuoru. A study on the residential aging transformation of the rural elderly living alone under the model of home care[J]. Residence,2022,(35):8-10.
- [5] NING Shangyu,KONG Yufa. Design of rural aging-adapted renovation under the model of aging-in-place - the example of civil affairs villages in Heilongjiang Province[J]. Residential Science and Technology,2022,42(11):38-41+48.DOI:10.13626/j.cnki.hs.2022.11.004.
- [6] Li Jin-Xin. Research on progressive aging adaptation and design of traditional villages in Luoyang area [D]. Jilin Architecture University,2022.DOI:10.27714/d.cnki.gjljs.2022.000103.
- [7] Tong Limin. Geriatric social work [M]. Shanghai: East China University of Science and Technology Press, 2006:91.
- [8] Hao Wenqi, Song Rui. Research on Aging Adaptation in Cuandi Village Based on Maslow's Theory [D]. Beijing: Northern Polytechnic University, 2022.
- [9] Li Sijia. A case study of senior products based on the hierarchy of needs theory[J]. Science and Technology Innovation,2019,(18):156-157.
- [10] Liu Yunsi,Sun Zhenning. Research on the design elements of outdoor gardens in elderly settlements based on evidence-based design concepts[C]// Chinese Society of Landscape Architecture. Proceedings

of the 2015 Annual Conference of the Chinese Society of Landscape Architecture. Tianjin Urban Construction University;,2015:4.

- [11] Zheng Yutong. Research on aging-adapted updating strategy of residential space for the rural elderly living alone under the model of aging in place [D]. Xi'an University of Architecture and Technology,2023.DOI:10.27393/d.cnki.gxazu.2023.000962.