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ORIGINAL

Design strategies for aging adaptation design of public spaces under the community elderly care model

Estrategias de diseño adecuado para el envejecimiento del espacio público en el modelo de pensiones comunitarias

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ABSTRACT

As the aging population intensifies, the community elderly care model has gradually become an important model for elderly care. The research takes the community elderly care model as the starting point, the public spaces is used as the key research objective. Firstly, the relevant theoretical research and conceptual definition of aging adaptation design are elaborated. Secondly, the excellent practical cases of the construction and renovation of elderly care communities both domestically and internationally are analyzed. The problems in the aging adaptation design of public spaces in China are analyzed. Finally, based on the psychological, physiological, and social needs of the elderly, a design strategy for public spaces that are suitable for aging under the community elderly care model is proposed, namely, “layout consultation spaces at different levels, form leisure spaces that are conducive to communication, and construct kitchen spaces with composite infiltration”. Through reasonable design and planning, the aging adaptation design strategy of public spaces under the community elderly care model can create a livable and enjoyable leisure environment. Elderly people feel the care and support from the community, improve their quality of life, and enhance social well-being.

Keywords: Community Elderly Care Model; Public Spaces; Aging Adaptation Design; Health Management; Spatial Layout.

RESUMEN

A medida que se intensifica el envejecimiento de la población, el modelo de atención comunitaria a las personas mayores se ha ido convirtiendo gradualmente en un importante modelo de atención a las personas mayores. La investigación toma como punto de partida el modelo de atención comunitaria a las personas mayores, y los espacios públicos se utilizan como objetivo clave de la investigación. En primer lugar, se elabora la investigación teórica pertinente y la definición conceptual del diseño de adaptación al envejecimiento. En segundo lugar, se analizan los excelentes casos prácticos de construcción y renovación de comunidades de cuidado de ancianos tanto a nivel nacional como internacional. Se analizan los problemas del diseño de adaptación al envejecimiento de los espacios públicos en China. Por último, basándose en las necesidades psicológicas, fisiológicas y sociales de las personas mayores, se propone una estrategia de diseño de espacios públicos adecuados para el envejecimiento según el modelo de atención comunitaria a las personas mayores, a saber, “distribuir los espacios de consulta en diferentes niveles, formar espacios de ocio que propicien la comunicación y construir espacios de cocina con infiltración compuesta”. Mediante un diseño y una planificación razonables, la estrategia de diseño de adaptación al envejecimiento de los

espacios públicos bajo el modelo de atención comunitaria a las personas mayores puede crear un entorno de ocio habitable y agradable. Las personas mayores sienten el cuidado y el apoyo de la comunidad, mejoran su calidad de vida y aumentan el bienestar social.

Palabras clave: Modelo Comunitario de Atención a las Personas Mayores; Espacios Públicos; Diseño de Adaptación al Envejecimiento; Gestión Sanitaria; Disposición Espacial.

INTRODUCTION

Against the backdrop of an aging population, the physical and psychological needs of the elderly exhibit complexity and diversity.^(1,2) Elderly people need more attention and care, as well as a comfortable, safe, and belonging environment. The aging adaptation design of public spaces is one of the important means to meet this demand.^(3,4) However, there is currently relatively little research on the aging adaptation design of public spaces under the community elderly care model, lacking systematic theoretical and practical guidance.⁽⁵⁾

Therefore, with the topic of "design strategies for aging adaptation design of public spaces under the community elderly care model", the aim is to explore the necessity and design principles of aging adaptation design in public spaces. Corresponding design strategies and suggestions are proposed to provide useful reference and guidance for the aging adaptation design of public spaces under the community elderly care model. There are some problems in the aging adaptation design of public spaces under the current community elderly care model.^(6,7)

Firstly, many public space designs do not fully consider the physical characteristics and mobility of the elderly, resulting in inconvenience or safety hazards for them.⁽⁸⁾ Secondly, many public space designs lack cultural elements and social functions, which cannot meet the leisure and psychological needs of the elderly.⁽⁹⁾ Finally, there is no systematic theoretical and practical guidance. Designers lack reference and guidance during design.⁽¹⁰⁾

Therefore, starting from the leisure needs, physical characteristics and mobility abilities of the elderly, as well as community cultural elements, this article explores the necessity and design principles of aging adaptation design under the community elderly care model. At the same time, corresponding design strategies and suggestions are proposed, including creating a convenient transportation environment, providing diverse leisure facilities, and integrating community cultural elements. These strategies and suggestions aim to provide useful references and guidance for the aging adaptation design of public spaces under the community elderly care model. It is expected to provide some beneficial ideas and methods for the aging adaptation design of public spaces under the community elderly care model. At the same time, it is also hoped that more people will pay attention to the quality of life of the elderly and promote research and practical development in related fields.

Research status and problem analysis on aging adaptation design of public spaces under community elderly care mode

Definition of theoretical concepts related to the aging adaptation design of public spaces

The community elderly care model is a community-based elderly care model that integrates various service resources, providing daily care, health management, and cultural entertainment for the elderly.^(11,12) This model emphasizes the joint efforts of families and communities to meet the diverse needs, improving their quality of life and social participation. The community elderly care model is a diversified service oriented elderly care model. Diversified services refer to daily care, health management, and cultural and entertainment services that meet the different needs of the elderly. In the joint role of family and community, the community elderly care model emphasizes the joint efforts of family and community, to better serve the elderly through family and community cooperation. The community elderly care model integrates various resources in the community, including human, material, and financial resources, providing more comprehensive and efficient services. Personalized services refer to the community elderly care model that provides personalized services for the elderly. Corresponding service plans have been developed to meet the personalized needs of the elderly. The community elderly care model relies on the community, integrates various resources, and provides diversified services for the elderly. The purpose is to improve the quality of life of the elderly and increase social participation.

Public space is a sociological term. It refers to public places that are freely accessible and open to the public, which is an important component of the urban environment.^(13,14) Public space is an important symbol of urban development. It not only provides a place for leisure and entertainment for urban residents, but also an important platform for urban cultural and social exchange. The design and management of public spaces are important aspects of urban planning and social management. In urban planning, the design of public spaces

needs to consider factors such as the development direction, population density, and transportation conditions of the city to ensure the reasonable layout and effective utilization of public spaces. In social management, the management of public spaces requires corresponding regulations and systems to ensure the normal operation of public spaces and the legitimate rights and interests of the public. Public spaces play an important role in urban life. It not only provides a place for leisure and entertainment for urban residents, but also an important platform for urban cultural and social exchange. At the same time, public spaces are also an important display window for the city's image and brand. It is an important component of the tourism industry. Therefore, the design and management of public spaces need to fully consider the characteristics and cultural background of the city, creating distinctive public spaces and improving the attractiveness and competitiveness of the city.

Aging adaptation design refers to the transformation and optimization of the living environment based on their living needs and physical characteristics, improving their adaptability and quality of life.^(15,16) Specifically, aging adaptation design is mainly divided into safety design, comfort design, and social design. Safety design is based on the physiological characteristics of the elderly. Safety protection measures such as anti-slip and collision prevention are taken to ensure the safety and reliability of the elderly's living environment. Convenience design provides convenient passages for the elderly, such as establishing accessible passages and setting up handrails. Comfort design focuses on the living habits and needs of the elderly, making comfort designs for the indoor environment, such as adjusting indoor temperature, lighting, noise, etc. Social design provides space and opportunities for elderly people to interact with others, such as constructing public activity rooms and arranging social activities. The aging adaptation transformation aims to improve the quality of life of the elderly and enhance social well-being, which is a significant manifestation of social care for the elderly. At the same time, aging adaptation design is also beneficial for promoting urban environmental improvement and social sustainable development.

The current situation and problems of aging adaptation design in public spaces

With the continuous acceleration of urbanization, the aging population is becoming increasingly severe. Human demands for quality of life continue to improve.⁽¹⁷⁾ In this context, aging adaptation design has emerged. It focuses on the elderly, which is committed to creating a safe, comfortable, and convenient living environment to meet their physiological, psychological, and social needs.

The aging adaptation design of public spaces is an important issue currently facing society. There has been some progress in research and practice in this field both domestically and internationally. In foreign countries, some developed countries have established relatively complete design norms and standards in the aging adaptation design of public spaces, such as the Lelingyi Plan in Singapore. In 2012, the Singaporean government launched a project aimed at comprehensively improving the aging status of residents' housing. The project is named "Lelingyi Plan".⁽¹⁸⁾ The "Leling Yitong" project covers three major parts, ground anti-skid, handrail, and slope transition. Since its implementation, the project has been widely welcomed. The plan aims to encourage social forces to participate in elderly care services and establish community service centers in public institutions. The Singaporean government has demonstrated their concern and care for the elderly through this project, making significant efforts to improve their living standards. In addition, countries such as the United States and Europe also have relatively mature practical experience in aging adaptation design of public spaces. In recent years, the aging adaptation design in China has received increasing attention domestically. Like Shanghai Affinity Source Elderly Care Community, it is a retirement institution dedicated to providing comfortable, safe, and meaningful living environments for the elderly.⁽¹⁹⁾ The community is located in Kangqiao Town, Pudong New Area, Shanghai. The design of the entire community is accessible, including complete facilities such as elderly apartments, health clubs, elderly care homes, public service buildings, catering centers, and landscape gardens. Coupled with convenient living, healthy, and happy "butler style" services, this makes it different from traditional nursing homes. It has become an independent and open elderly living community. In addition, some communities have also carried out renovations, such as installing elevators and improving public facilities. These measures have to some extent improved the living environment of the elderly. However, there are still some issues, such as inconsistent design standards and uneven construction quality.

In the past development, Chinese society has not given enough attention to the needs and rights of the elderly, resulting in insufficient attention and investment in the design of public spaces.⁽²⁰⁾ The problems faced by the aging adaptation design of public spaces in China mainly include the following points. Firstly, the facility coverage is low. In many public places, such as cultural venues and tourist attractions, it is difficult for elderly people to enter. At the same time, the prevalence of accessible facilities for disabled elderly people and those with vision, hearing, and physical impairments is relatively low. These elderly people face many inconveniences in their daily lives. Secondly, the public space lacks systematization. The home environment is not suitable for the elderly, which can easily cause problems such as falls during bathing, living, and walking. Old and unhygienic living environments are also detrimental to the physical and mental health of elderly people. The

aging adaptation design of public spaces should be coordinated with furniture, supplies, cabinets, bathrooms, and other aspects. The lack of refined design can make it inconvenient for elderly people to use. Finally, the aging adaptation design of public spaces lacks humanistic care. The design of the spatial environment does not consider the privacy needs of the elderly, nor can it achieve conflict coordination. In addition, the design taste of some public spaces is vulgar and lacks aesthetic appeal, which cannot meet the needs for a high-quality life.

In summary, the main problem in the aging adaptation design of public spaces in China is the low coverage of facilities. The aging transformation of digital public cultural services urgently needs improvement, inadequate systematic organization and insufficient humanistic care in reconstruction design. These issues need to be taken seriously and addressed to improve the quality of life in public spaces.

The demand of elderly people for aging adaptation design of public spaces

The demand of the elderly for public spaces is an important consideration factor in the aging adaptation design under the community elderly care model. With the intensification of aging, the demand for public space among the elderly is receiving increasing attention. This study will explore the needs of elderly people for public spaces from three aspects, physiological, psychological, and social needs.

With the decline of physical functions among the elderly, their physiological needs for aging adaptation design in public spaces mainly include four aspects, sound, temperature, light, and safety. Older people are more sensitive to sound. Therefore, the noisy environments and sudden noise should be avoided. In the design of public spaces, soundproofing materials should be used to reduce noise interference. At the same time, background music can help create a comfortable environment and meet the quiet needs of the elderly. Elderly people have poor sensitivity to temperature. Therefore, it is necessary to maintain a stable indoor temperature and avoid overcooling or overheating. In the design of public spaces, equipment such as underfloor heating and central air conditioning should be considered to ensure appropriate temperature. Light has an impact on the vision of elderly people. Therefore, the lighting in public spaces should be sufficient and soft. In the design, natural light should be used and lighting fixtures that adjust the light should be considered. Elderly people need public spaces to provide a safe environment. For example, monitoring equipment, emergency call systems, etc. need to be established in public spaces to ensure the safety of the elderly. In addition, public spaces need to be equipped with anti-slip, fire prevention and other facilities to prevent accidents.

Elderly people need public spaces to provide opportunities for social, cultural, and recreational activities to promote their mental health and well-being. For example, social areas and tea rooms can be set up in public spaces to provide a platform for elderly people to exchange and share experiences. In addition, public spaces can also host various social activities, such as volunteer activities, group dances, etc., which can enhance the social connections and sense of community belonging of the elderly. For cultural needs, public spaces should provide opportunities for cultural activities. For example, public spaces can be equipped with facilities such as libraries, calligraphy and painting rooms, providing a place for elderly people to learn and entertain. In addition, public spaces can also host various cultural activities, such as lectures, exhibitions, etc., to meet the needs of the elderly to pursue spiritual and cultural life. For entertainment needs, public spaces should provide opportunities for entertainment activities. For example, public spaces can be equipped with fitness facilities, swimming pools, and other facilities, providing a place for elderly people to exercise and maintain vitality. In addition, public spaces can also provide various entertainment facilities, such as mahjong rooms, chess and card rooms, to meet the entertainment needs.

The social needs of the elderly are an indispensable part of the public spaces. To maintain the social status and sense of value of the elderly, public spaces need to provide opportunities to participate in social activities. For example, communities can involve elderly people in community planning and construction by holding public hearings, public opinion surveys, and other means to meet their sense of participation and belonging. In addition, public spaces also need to provide opportunities for social interaction. For example, public spaces can be equipped with communication platforms and activity centers to promote interaction and communication between elderly people and other residents, making them feel cared for and supported in the community. In addition, public spaces also need to organize various social activities, such as volunteer activities, community services, etc. Elderly people can be more energetic. At the same time, elderly people feel that they can still contribute to society to meet the needs.

The needs of elderly people for public space are diverse, including physiological needs, psychological and social needs. In the community elderly care model, the aging adaptation design of public spaces needs to fully consider the needs of the elderly. Corresponding strategies are developed to meet their needs, improving the quality of life.

Design strategies for aging adaptation design of public spaces under the community elderly care model

Layout of consulting spaces at different levels

As an important facility in the community elderly care model public space, the consultation office provides

a place for elderly people to obtain information and solve problems. Therefore, the layout and design of consultation offices have a significant impact on the quality of life and social activities of the elderly. The color matching of the consultation space hall should focus on comfort and warmth. Beige, gray, or blue can be chosen to create a peaceful and relaxed atmosphere with constant temperature and color tone. These colors can also play a psychological impact. Elderly people can experience a sense of relaxation. As a core element of the consultation space, the consultation desk should be designed with full consideration of the consultation requirements of the elderly. The height of the consultation desk is moderate, making it convenient for the elderly to stand or sit for diagnosis. The width and depth of the consultation desk should be appropriately increased to make it suitable for elderly people to sit and lie comfortably. In the consulting space, seat design is also an important factor. Elderly people generally need to sit and wait for consultation for a long time. They can choose seats with good support and comfortable seating experience. The seat height and armrest design should meet the requirements of the elderly. In the consulting space, staff is a major factor. They need good communication skills, professional knowledge, and patience to provide high-quality consultation services to the elderly. The design diagram of the consultation space under the community elderly care mode is shown in Figure 1.



Figure 1. Design diagram of consultation space suitable for aging

In Figure 1, the design focuses on the color of logs to enhance the visual effect of elderly people entering the hall. Buildings with semicircular arches are adopted to enhance the familiarity and comfort of the elderly in the space. The rounded shape avoids sharp edges and reduces the probability of injuries to the elderly. In terms of spatial design, a large area glass curtain wall is used to ensure good lighting in the room and a wide view. This makes the indoor space appear more transparent. The elderly also has the opportunity to enjoy the scenery outside the window. The design of the consultation desk adopts a high and low inquiry desk, which is convenient for patients to bend down to inquire and consult with wheelchair elders. The staff communicates with the elderly in a comfortable area. Elderly people can also freely choose to stand or sit for consultation based on their own needs and physical condition. In addition to the improvement of hardware facilities, the front desk staff patiently answers various questions raised by the elderly with a friendly, warm, respectful, and considerate spirit, providing professional and responsible opinions and support.

In summary, the aging adaptation design of the consultation space under the community elderly care model needs to consider multiple aspects such as the color matching and spatial layout of public spaces. Through reasonable design and planning, a comfortable, warm, open, and accessible consultation environment is created to provide better services and experiences for the elderly.

Forming a leisure space conducive to communication

In the community elderly care model, the comfortable leisure space in the aging adaptation design strategy of public spaces is one of the important needs of the elderly in their daily life. Firstly, leisure spaces can

provide a relaxed and comfortable environment for the elderly. Elderly people relax their bodies and mind, communicate with friends, rest, read, and so on. Therefore, designers need to create a comfortable and pleasant leisure space in public spaces. Secondly, the leisure spaces should focus on comfort. Elderly people usually need a quiet and warm environment to relax their body and mind. Therefore, designers can set up soft lighting, comfortable seats, soft cushions, etc. in leisure spaces to create a comfortable and pleasant environment. In addition, some books, magazines, board games, etc. can also be placed in the leisure space to enrich the leisure activities of the elderly. At the same time, the design of leisure space also needs to consider the physical characteristics and activity habits of the elderly. Elderly people usually need some convenient and practical facilities to help them better engage in leisure activities. Therefore, designers can set up convenient facilities such as chairs, armrests, and wheelchairs in leisure spaces. The design diagram of leisure space suitable for aging is shown in Figure 2.



Figure 2. Design diagram of leisure space suitable for aging

In Figure 2, in the design of leisure space, the leisure and entertainment room is located in a quiet and comfortable area. At the same time, the direction of the leisure and entertainment room is southeast, which can fully utilize natural light to ensure sufficient lighting and good visibility. This design uses soft and natural lighting, and sets up different brightness lights such as reading and writing lights to meet the different activity needs. The leisure and entertainment room is equipped with a large screen, high resolution, clear sound TV, and an intelligent remote control suitable for the elderly. At the same time, the TV position avoids direct light reflection, ensuring the viewing effect for the elderly. The seats in the leisure space are made of comfortable and soft materials, with adjustable height and tilt angle. At the same time, the seat arrangement ensures the communication and TV viewing needs of the elderly. The layout of the leisure and entertainment room is simple, lively, spacious, and bright, avoiding excessive decoration and debris. The layout of furnishings and facilities is convenient for elderly activities and passage. The sufficient space is reserved for elderly walking and wheelchair access.

In summary, the aging adaptation design of leisure space under the community elderly care model needs to consider the leisure needs, physical characteristics, mobility, and community cultural elements of the elderly. Appropriate strategies are designed to create a leisure environment suitable for the elderly to live in. Elderly people feel care and support within the community.

Constructing a kitchen space with composite infiltration

In the community elderly care model, the aging adaptation design of kitchen space should fully consider the physiological, psychological, and cognitive characteristics of the elderly to ensure that they feel comfortable, safe, and convenient when using the kitchen. Good lighting is an essential element in the kitchen, especially for the elderly, who may experience decreased vision. Therefore, the kitchen should have sufficient lighting and avoid glare. As people age, their mobility may decrease. Therefore, kitchen design should have sufficient

flexibility. This includes spacious kitchen entrances for wheelchair access. The height and depth of the operating platform should be moderate, making it easy for elderly people to sit and stand for operation. A large amount of items, such as food, utensils, and cooking utensils, need to be stored in the kitchen. Therefore, designing reasonable storage space and cabinets is essential. Considering that the height and arm length of elderly people may be shortened, the height of cabinets and storage racks should be moderate to facilitate their operations. In addition, the cabinet design should make it easy to open and close to avoid difficulties for the elderly when using it. Especially for the elderly population, the kitchen poses a potential risk area. Therefore, safety is considered a crucial consideration in the design. Firstly, each type of electrical equipment should choose a model with safety characteristics, such as leakage prevention and fire prevention equipment. Secondly, sharp edges and protruding parts should be eliminated or protected to avoid collisions or scratches on the elderly. In addition, to ensure air circulation in the kitchen and reduce cooking fumes and odors, a suitable ventilation system can be installed in the kitchen. The design diagram of catering space suitable for aging under the community elderly care mode is shown in Figure 3.



Figure 3. Design diagram of catering space suitable for aging

In Figure 3, the LED lighting fixtures with a simple design that is not easily oiled create a soft and uniform indoor light environment. The height of the operating platform is between 750-850mm, and the depth is between 500-550mm. In addition, in countertop work areas such as washing pools and stoves, sufficient knee space is left for the elderly, with a clear height of around 600mm below the table. This design can facilitate cooking and washing work for the elderly. The kitchen is equipped with complete kitchen utensils. The lightweight and easy to operate utensils suitable for the elderly are selected, such as cookware with longer handles and tableware with anti slip function. These tools are placed in easily accessible locations so that elderly people can easily use them. The refrigerator is one of the important electrical appliances in the kitchen. Elderly people usually store leftovers, meals, and some medicines in the refrigerator. High capacity refrigerators with moderate height are chosen for use. Elderly people are most comfortable to use when the height is between 700mm-1400mm. It stores leftovers, meals, and some medicines that elderly people usually store in the refrigerator. The location and size of the refrigerator are suitable for the needs of the elderly. The refrigerator should be placed close to the kitchen console so that elderly people can easily open and close the refrigerator door. In addition, the height and depth of the refrigerator are also suitable for the physical characteristics and usage needs of the elderly. The cabinet design should consider the usage needs and physical characteristics of the elderly. The height is between 700mm and 1400mm, which is suitable for the height and arm length of the elderly, making it easy for them to retrieve items. In addition, the mechanical ventilation and smoke exhaust equipment in the kitchen creates a healthy and good air environment for the elderly.

In summary, the aging adaptation design of kitchen space under the community elderly care model needs to

fully consider the physiological, psychological, and cognitive characteristics of the elderly, to ensure that they feel comfortable, safe, and convenient when using the kitchen. Designers should have a deep understanding for the needs and preferences of the elderly. Combining ergonomic principles and accessibility design concepts, public spaces suitable for the elderly are designed and optimized.

CONCLUSION

Based on the needs of the elderly, this research delves into the physiological, psychological, and social characteristics and corresponding needs of the elderly in the community elderly care model. The impact of these needs on the design of various functional spaces is thoroughly analyzed. A design strategy for aging adaptation spaces is proposed, namely, "layout consultation spaces at different levels, form leisure spaces that are conducive to communication, and construct kitchen spaces with composite infiltration". In the community elderly care model, the aging adaptation design of the consulting space needs to comprehensively consider color matching and spatial layout. Through reasonable design and planning, a comfortable, warm, open, and accessible consultation environment can be created to provide better services and feelings for the elderly. When designing public spaces for community elderly care models, the leisure needs, physical characteristics, mobility, and community cultural elements of the elderly should be fully considered to create a leisure environment suitable for their living. Elderly people can feel the care and support of the community, thereby improving their quality of life and social well-being. In the community elderly care model, the design of kitchen space must fully consider the physiological, psychological, and cognitive characteristics of the elderly to ensure that they feel comfortable, safe, and convenient when using the kitchen. In this study, the designer thoroughly analyzes the various needs and preferences of the elderly, while applying the concept of ergonomics to perfectly integrate accessibility design. This unique integration makes the design more practical and user-friendly, creating a more comfortable, safe, and convenient living environment for the elderly. It is expected to raise people's attention to the quality of life and happiness of the elderly, promoting the development of related research.

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