

Application of lighting design in nursing home design

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Abstract: In this paper, lighting design as the starting point, through the analysis of the insufficient use of lighting in the interior design of nursing homes, strengthen the construction of humanized nursing homes to meet the actual needs of the elderly. Fully grasp the needs of residential groups for indoor lighting environment and optimize the construction of lighting environment. Through the case analysis to optimize the use of lighting in modern nursing homes and improve. For the design of the light environment for a whole control, to understand the important role of lighting on the indoor atmosphere and emotional expression of the nursing home.

Keywords: Nursing home; Lighting design; Light environment improvement.

1. Research status of interior lighting design for nursing homes at home and abroad

1.1. Analysis of the research status of interior lighting design for nursing homes in China

With the rapid development of social economy, our country is rapidly entering the aging society. In 2011, there were 20 million people over the age of 80 in China. When the proportion of the population aged 65 and over increases from 7% to 14% of the total population, it marks the transition from "aging society" to "aging society". The phenomenon of empty-nesters in our country is aggravating, nursing home is the best place for them to live. However, due to various reasons, the current situation of nursing homes is not optimistic, and some even show an extreme or poor situation. Problems in nursing homes in China:

The quantity is limited. Although there are nursing homes in every city and town, the number falls far short of the actual needs, and the town level nursing homes cannot take care of every village.

The scale is limited. The nursing home beds in each district are about 200-2000, and the town size is smaller, with about 50 beds, which is far from meeting the needs of use.

In our country, the researches on lighting design for nursing homes are few, and the reference and case studies are also few. But some unique insights can be gained by studying the lighting design of similar places. Nursing home is a complex complex. Based on people's emotional needs for light and the atmosphere created by light, the emotional lighting design brings good experience to residents and is beneficial to their health.

1.2. Analyzes the research status of interior lighting design in nursing homes abroad

Foreign countries attach great importance to the problem of the elderly and the aging population, and attach great importance to the places where the elderly live. Nursing homes in foreign countries have different forms, but they pay much attention to the privacy, living environment, medical conditions and spiritual entertainment of the elderly, rather than just to protect the basic needs of the elderly. In particular, developed countries attach great importance to old-age care.

Every year, countries use a lot of financial funds to support their old-age care undertakings. France even spends one third of its national fiscal revenue every year on old-age care undertakings.

The UK will build smart apartments for the elderly, and Japan will provide services for the elderly: welfare facilities for the elderly and fee-paying homes for the elderly; Some countries in Europe and the United States set up homes for the elderly, so that the living standard of the elderly is not lower than that of the local residents; Canada has set up senior citizen apartments, retirement homes, senior figures, nursing homes and other services for the elderly.

The number of beds is more than 50% higher than the average size, that is, it has more than 100 beds; With medical rehabilitation, cultural entertainment, life services and other facilities and specialized service personnel, the average charge is 800 yuan or more per month, the highest up to 1,000 yuan.

2. Light and environment in interior space

2.1. The light needed in the interior space

(1) Influence of indoor light environment composition on nursing homes

Indoor light environment is generally divided into artificial lighting and natural lighting. Artificial lighting is the use of incandescent lamp, fluorescent lamp, mercury lamp and other artificial measures to create lighting environment inside and outside the building in order to meet the needs of work, study and life. Natural lighting is generally day light, which brings sunlight into the room for illumination.

Professor Zhan Qingxuan elaborated the concept of "light environment" in the book "Architectural Light Environment": "The connotation of light environment is very broad, it refers to the physical and psychological environment established by light (illuminance level and distribution, lighting form and color) and color (hue, color saturation, indoor color distribution, color appearance) in the indoor shape of the same aspect.

All kinds of light sources will affect the atmosphere of the indoor environment, such as the number of output power, color, length of time, energy saving and other aspects of the different characteristics, is also the first factor we consider when choosing. For example, we commonly use incandescent

lamp. Incandescent lamp is a kind of thermal radiation source. The energy conversion efficiency of incandescent lamp is very low, only 2% ~ 4% of the electric energy is converted into the light that the eyes can feel. However, incandescent lamp is still widely used because of its good color rendering, continuous spectrum and easy to use.

The design of the light environment in the nursing home must be conducive to the physical and mental health of the elderly. In order to achieve high quality lighting, there must be advanced technical means, to achieve high quality lighting environment must have the following conditions: must have high quality light source, first of all, to ensure that the light source emitted by the luminous body is harmless to the elderly. We must have advanced lighting technology to achieve the maximum utilization rate and high efficiency of light. We must ensure the combination of natural lighting and artificial lighting to ensure the comfort of the elderly.

(2) Different influences of different indoor light environment lighting methods on nursing homes

Different Spaces require different lighting patterns, which affect light intensity, area, shadows, and personal experience. The lighting methods of indoor light environment are generally integrated lighting, partial lighting and mixed lighting (excerpt from Light and Design). Holistic lighting refers to the lighting method used to illuminate the whole space without considering local factors. In the lobby area of the nursing home, the public activity area can adopt the way of overall lighting. Local lighting is lighting designed to meet a specific area setting in an interior, highlighting something or an area. Mixed lighting is mainly used in activity areas or some places of study, which requires the use of point light sources to illuminate the whole environment.

2.2. Creates the artistic conception of indoor light environment

2.2.1. Meet the most basic spatial functional requirements

In interior design, designers use light to create basic living needs, and in nursing home design, the rational use of light can improve the quality of life of the elderly. The positioning of lighting design should be people-oriented, whether it is visual comfort, or psychological or spiritual comfort. To achieve the most basic functional requirements, to take into account the indicators of lighting, such as: illuminance, brightness, color temperature and other elements, reasonable illuminance and illuminance uniformity, appropriate brightness distribution and light color temperature, will affect the lighting of indoor function, atmosphere demand.

Illuminance can determine the brightness of the space, and too high illuminance will affect people's vision. For example, in the indoor public activity area of the nursing home, large ceiling is used to illuminate the whole activity area, and French Windows are set up to increase the light area, so that the whole activity area has no dark dead corners, and the security of the activities of the elderly can be ensured. And in the bedroom and other private space, illumination is generally very mild, more suitable for rest and sleep.

2.2.2. Improve the aesthetic effect of space

The formation of indoor atmosphere mainly comes from people's feelings for indoor environment. For example, people appear excited when they are in a comfortable environment that brings back memories. So creating a place that can provide people with subjective feelings is the main purpose of indoor light environment design. Liu Yijun

mentioned in his Research on Visual Design of Integrated Light and Space that "for designers, the basic problem is not to provide light, but to control and change the light source". Therefore, how to use light to arouse people's emotions and form the needed indoor atmosphere makes us discuss the problem.

3. Elderly people's need for indoor light environment

3.1. Physiological needs of the elderly for light environment

According to the different living conditions of the elderly, the Code of Architectural Design for the Elderly can be divided into three types: the elderly who take care of themselves, the elderly who provide assistance, and the elderly who provide care. With the increase of age, the body's various tissue structure and organ function gradually decline, including eyesight, memory, taste and smell dull, motor coordination and so on. In addition, the psychological characteristics of the elderly are shown in the decline of psychological security, weakened adaptability, a sense of loss, inferiority, loneliness and emptiness. Due to the limitations of physiological conditions, such as the decline of short-term memory ability and the degeneration of thinking ability, the elderly are less receptive to new things, it takes longer time to learn and understand a new thing, the ability to adapt to the social and living environment is weakened, and they are prone to inferiority.

Through the study of the physiological characteristics of the elderly, fully understand the physiological needs of the elderly, targeted to provide medical, leisure, entertainment, communication and other aspects of services for the elderly, as far as possible to create a meeting their needs, comfortable, healthy, safe living environment.

3.2. Psychological appeal of the elderly to light environment

Common psychological problems in the elderly

(1) psychological loneliness - the elderly retired at home, left their colleagues for many years, their children cannot often around, for a long time in this lack of love in the environment, more or less will be some of the heart lonely.

(2) Psychological emptiness -- caused by sudden retirement that took them from a stressful environment to a relaxed one.

(3) mood changes - many old people are alone at home, no one to talk with, mood will be irritable, lonely and angry.

In recent years, there has been a serious lack of spiritual support for the elderly, and empty-nesters and left-behind elderly people have become synonymous with the elderly. Some mental diseases and psychological problems among the elderly are becoming more serious. I deeply regret and worry about this.

3.3. Behavioral appeals of the elderly to the light environment

When the elderly enter the old age, not only the psychological and physical aspects have changed, but also bring some obstacles in life, behavior activities are seriously hindered. This can also have a negative impact on the elderly. They were less active in making friends, and their outgoings began to decline. This is not conducive to the healthy development of the elderly.

This is best demonstrated by an American experiment in which elderly people were exposed to natural, bright sunlight in a garden between 8am and 10am. The study found that those exposed to sunlight for 30 minutes or more a day slept more at night and less during the day. Exposure to sunlight can significantly prevent sleep problems and adjust their circadian rhythms. And is beneficial to the treatment of various chronic diseases.

It shows that light is very important for the body of the elderly. However, as the elderly go out less often, the lack of light will cause some problems for the elderly. How to solve these problems? In my opinion, for the problem of circadian rhythm caused by lack of light, we can make up for the lack of light by creating a light environment for 100 days, so as to restore the natural circadian rhythm of the elderly, which is of great help to the elderly with poor sleep and physiological function decline.

4. The practice research on the effect of lighting on interior design atmosphere of nursing home

4.1. Deficiencies in the design of nursing home in our country

(1) There are shortcomings in hardware construction

The backward design of the elderly and inadequate service facilities restrict the scale and service quality of the nursing home. Although the elderly care service market has developed rapidly in modern times and the number of nursing home beds has increased rapidly, it is still difficult to adapt to the increasing speed of the elderly population and the rapid growth of service demand, with a large gap and a large contradiction between supply and demand. In terms of construction design, few nursing homes can fully meet the standards and meet the requirements, and the corresponding service facilities are uneven, with a low proportion of configuration, inadequate functional design, insufficient localization, external image, especially the lack of supporting facilities to meet the spiritual and cultural needs, and serious problems such as ignoring the actual needs of the elderly.

(2) Inadequate funding is a common problem in nursing homes everywhere.

The capital income of public nursing homes mainly comes from the government appropriation and the elderly's own contribution. The government appropriation is also mainly in the early stage of the construction of the nursing home, but less after the completion of the construction. The standard of government subsidy is also different for different regions. The economic income of the nursing home can be said to be almost no, the income is mainly used for daily expenses and staff salaries. In addition to the institutional Settings of the nursing home itself, the most basic is the rest facilities, catering, the most basic living needs of the elderly. Slightly better conditions are administrative, daily care, entertainment and other sectors.

(3) Nursing home staff

The first is the quality of the staff. The staff of the nursing home are mainly from some unemployed people nearby or slightly older people, so as to reduce the cost of staff. It can be said that this can absorb the labor force, but it also brings a lot of problems: the nursing staff is older, less educated, lack of professional background, etc.

The turnover of staff is more obvious in the nursing homes

in central cities. For example, the private nursing homes in Beijing have a large turnover of staff, and the nursing homes cannot retain people, especially young people. Because of low wages and heavy workloads, retaining useful people in central urban nursing homes is also an urgent problem.

4.2. Japanese nursing home guide design, humanized design, present home atmosphere

In nursing home design, in addition to the most basic functional design, guide design is also very important. It can effectively guide the elderly, facilitate the elderly to participate in various life activities in an orderly manner, and strengthen the communication between the elderly.



Figure 1. Door plate guide

Photo source: Primavera Huosi Design Group

One of the unique designs is on the door plate. If we look carefully at each door number, the numbers are designed to tilt outwards, so that the elderly people in wheelchairs can clearly see the room number. This is a very humanized design, which is not noticed in many nursing home designs, and it is worth learning from. (As shown in Figure 1).

The guide design of this nursing home removes the cumbersome logo, does not need words, and uses simple symbols to identify the function of a certain area, even if the elderly cannot read and understand, to take care of the mood of each elderly. (As shown in Figure 2).



Figure 2. Wall sign

Photo source: Primavera Huosi Design Group

Handrails will be set up on each wall of the corridor and on each door to facilitate the elderly with poor legs and feet to walk freely, enhance their autonomy and make them feel happier.

5. The development trend and future prospect of lighting design in the interior design of nursing home

5.1. The development trend of lighting design in the interior design of the nursing home

It is the most important to construct the aging healthy lighting design in line with the national conditions of our country. It is the most important to obtain the information of the building geographical location and investigate the actual situation of the actual residents. The design is people-oriented, and the design of the nursing home should be based on comfort, comfort and warmth to achieve the best design. Secondly, it is necessary to understand the characteristics of all behaviors and living habits of the elderly. When the elderly enters the old age, their psychological and physical changes have taken place. It is the king to make the nursing home comfortable for the elderly. Once the lamps and lanterns are selected, they will not be updated for decades. Therefore, designers should have the ability to predict ahead of time, so as to better complete the comfort of the light environment. When choosing lighting fixtures, we should not only consider the current use of these residential groups, but also take into account more negative factors brought by the growth of age, which is what we call empathy, in order to serve people perfectly.

Accidents caused by improper maintenance of lamps and lanterns are common. The installation and maintenance of lamps and lanterns is also very important. Comfortable and suitable luminaire illuminance can avoid a lot of hidden dangers, at least not because the light is too dark or too much of the dark side of the situation caused by wrestling bump and even life-threatening accidents, especially in the nursing home where the elderly are mostly, there is also need to pay attention to the glare hidden dangers, the ability of the elderly to accept light is not the same as that of the young, too strong light is easy to cause some unnecessary injuries. To sum up, the safety lighting of nursing homes cannot be ignored, can be said to be the basic point of design.

Intelligent control lamps are now available. With the development of science and technology, the most common things in life are also developing in the direction of intelligence. Traditional mechanical switches, whether on or off, require a person to stand up and operate. The intelligent lamps break the awkward situation of "turn on the light in the dark, turn off the light in the dark". Whether it is used for auxiliary lighting induction lights, or only need to operate through remote control or WIFI, lighting equipment can be easily managed.

5.2. The future prospect of lighting design in the interior design of the nursing home

As for the future prospect of lighting design in the interior design of nursing homes in China, there are several principles that can be achieved in the future: miniaturization, detailed design, internationalization, intellectualization (humanized, dynamic, physiotherapy), integration, high efficiency, meeting international standards, reducing cost (humanized), and so on. It is a long way to go.

6. Summarize

The construction of nursing home not only depends on the perfection of function, but also reflects in the design concept of "human care". Appropriate adjustment of nursing home construction elements can improve the overall satisfaction of the elderly and reduce the frequency of anxiety, depression and other negative emotions in their lives. Based on this, people are more and more aware of the link between light and health, and gradually raise the attention to the needs of day and night lighting for the aged. Proper lighting design is more conducive to the physical and mental health of the elderly, and suitable light environment is more conducive to improving the comfort of living groups.

As an indispensable element in learning and life, light has been applied to various fields to understand the influence of various elements and forms of light on indoor environment. Specially to understand the most basic function of nursing home, atmosphere, aesthetic impact. The "people-oriented" design thought into the design of modern nursing homes to strengthen the construction of nursing homes.

References

- [1] Ren Chao. Study on the Residential Space Design of the elderly in Xi 'an under the Institutional pension Mode [J]. Xi 'an University of Architecture and Technology.2015(12).
- [2] Hou Zhenli. Research on the Artistic Conception of Interior Space in Light Environment Design [J]. Southwest Jiaotong University, 2018.
- [3] Qin Yi. Research on Emotional Interior Light Space Design [J]. Changchun University of Technology.2019.
- [4] Li Hong. Analysis of Modern Hospital Lighting Design [J]. Silicon Valley, 2015(2): 176-176.
- [5] Liang Kai. Research on Lighting Design of Residential Buildings for the Elderly. [D]. Beijing University of Technology.2016.
- [6] Gong Suning. Research on the Development Factors of Contemporary Interior Lighting Design [D] Southeast University.2004.