Journal of Civil Engineering and Urban Planning (2023)
Clausius Scientific Press, Canada

DOI: 10.23977/jceup.2023.050509
ISSN 2616-3969 Vol. 5 Num. 5

Analysis of the Inner Epidermis Design of Elderly Care Buildings

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Keywords: Elderly care building, inner skin design, environmental influencing factors, design suggestions

Abstract: With the arrival of China's aging society, the demand for old-age care facilities construction is becoming increasingly prominent. Aging building facilities and elderly care services have become research hotspots. The aging building is the elderly building, the residential buildings and public buildings for the elderly, should provide convenient facilities and services for the elderly. The skin design in the aging building is very important to create a living environment suitable for the elderly. Through the study of the physiological and psychological characteristics of the elderly, the paper extracts eight environmental influencing factors. The skin design of aging buildings is related to eight influencing factors, such as man-machine interface interaction, indoor thermal environment, light environment, acoustic environment, air environment, wet environment, color environment, color environment, and inner skin hygiene and cleanliness. This paper discusses the association between eight influencing factors and epidermis design in aging buildings, and gives detailed design suggestions.

1. Introduction

With the intensification of the aging population, the demand for elderly care buildings is also increasing. Human factor engineering is a very important consideration in the design of elderly care buildings. Human factor engineering is a discipline that studies the interaction between humans and the working environment, and its purpose is to improve work efficiency and safety by optimizing the working environment [1]. Human factor engineering can play an important role in the design of the interior and exterior surfaces of elderly care buildings. First of all, the design of the inner and outer skin of the elderly building should consider the special needs of the elderly. For example, the vision and hearing of the elderly may decline, so designers should adopt bright colors and clear logos to help the elderly identify and navigate. In addition, the physical function of the elderly may decline, so the designer should take into account the mobility of the elderly, for example, the stride length and step height of the elderly should be taken into account when designing stairs. Secondly, the interior and exterior skin design of elderly care buildings should take into account the safety of the elderly. For example, the protection needs of the elderly should be taken into account when designing exterior walls.

2. Factors Affecting the Interior Skin Design of Elderly Care Buildings

Elderly care buildings are buildings with elderly people as the main users, and the physiological and psychological characteristics of elderly people should be fully considered to make their lives more comfortable and convenient. The interior skin design of a building refers to the decoration and design of the interior of a building, which has a great impact on the comfort and safety of the elderly. The following will be discussed in detail from eight aspects such as human-machine interface interaction, indoor thermal environment, indoor light environment, indoor sound environment, indoor air environment, indoor wet environment, indoor color environment, inner skin hygiene and cleaning.

2.1. Human-machine Interface Interaction

The vision, hearing and memory of the elderly are gradually degraded, and the use of ordinary electronic equipment will have certain difficulties and obstacles. Therefore, in elderly care buildings, elderly friendly electronic equipment should be used, with a simple interface, easy operation and clear fonts. Avoid overly rich graphics and colors, and try to use black and white fonts and simple ICONS. In addition, the living habits and needs of the elderly should be considered, and some practical functions should be added, such as voice prompts and health reminders.

2.2. Indoor Thermal Environment

The elderly have poor thermoregulation ability and are easy to feel cold. Therefore, the indoor thermal environment of elderly care buildings should be kept warm to avoid cold wind and cold bridge phenomenon. In the design of the heating system, the needs of the elderly should be fully considered, not only to solve the temperature problem, but also to avoid dry air and increase humidity.

2.3 Indoor Light Environment

The indoor light environment of elderly care buildings should be kept bright and soft to avoid too harsh light. Older people's vision gradually declines, and too much light or too low can affect their visual experience and health. Therefore, when designing the lighting system, the appropriate lighting should be selected according to the physiological characteristics of the elderly to avoid reflection, flicker and strong blue light.

2.4. Indoor Sound Environment

The indoor sound environment of elderly care buildings should be kept quiet and comfortable to avoid noise and overly stimulating sounds. The hearing of the elderly is also gradually declining, and noise and stimulating sounds will make the elderly feel uncomfortable, affecting their life and rest. Therefore, when designing the indoor sound environment, soundproofing measures should be taken to maintain a quiet environment. In addition, some soft background music or natural sound effects can be added to increase the comfort of the elderly.

2.5. Indoor Air Environment

The indoor air environment of elderly care buildings should be kept fresh and clean to avoid harmful gases and odors. Older people's physical functions gradually decline, detoxification ability is also poor, and sensitivity to air pollution is higher. Therefore, when designing the indoor air

environment, ventilation should be strengthened to maintain fresh air in the room. In addition, harmful gases such as formaldehyde should be avoided to ensure good indoor air quality.

2.6. Indoor Wet Environment

The indoor wet environment of elderly care buildings should be kept appropriate to avoid dryness and excessive humidity. The skin of the elderly is gradually dry, prone to wrinkles and itching and other problems, therefore, in the interior design should consider adding some humidity to avoid dry skin. At the same time, you should avoid excessive humidity in the room to avoid the growth of mold and bacteria.

2.7. Indoor Color Environment

The indoor color environment of elderly care buildings should choose comfortable and natural colors to avoid too harsh and too bright colors. The vision and mental state of the elderly gradually change, and the choice of color will have a certain impact on their mood and health. Therefore, when designing the interior color environment, soft and comfortable colors should be chosen to increase the sense of security and comfort of the elderly.

2.8. Inner Skin Hygiene and Cleaning

The inner skin of the elderly care building should be kept in good condition to avoid stains and bacterial growth. The immunity of the elderly is gradually declining, and it is easy to be infected with viruses and bacteria, so when designing indoor skin, it is necessary to choose materials that are easy to clean and strengthen health and epidemic prevention measures.

3. Analysis of Inner Skin Design of Elderly Care Building

The interior skin design of the elderly care building refers to the design of the interior walls, ground, ceiling and other parts of the building, including the selection of materials, the collocation of colors, the creation of artistic effects and other aspects, aiming at creating a comfortable, safe and beautiful living environment for the elderly. This article will explain in detail from human-machine interface interaction, indoor thermal environment, indoor light environment, indoor sound environment, indoor air environment, indoor wet environment, indoor color and inner skin hygiene and cleaning.

3.1. Human-machine Interface Interaction

Human-machine interface interaction refers to the process of information interaction between people and devices and systems in the indoor environment. In the design of the inner surface of the elderly building, it is necessary to consider the special needs of the elderly, such as easy-to-read signs, large fonts, easy to use switches and so on. In addition, the elderly care building should also be equipped with intelligent equipment, such as intelligent access control system, security monitoring system, emergency call system, etc., so that the elderly can more easily live and communicate [2].

As a special user group, the elderly are different from young people in their cognitive and understanding ability and hand coordination ability. Therefore, the special needs of the elderly need to be taken into special consideration when designing the human-computer interaction interface. The following are some elderly friendly human-computer interaction interface design suggestions:

1) Conspicuous fonts: The elderly have weakened vision and need to make the size and color of the font more readable.

2) Intuitive icons: Use clear, intuitive, motion-oriented icons to represent actions so that seniors can quickly find the options they need.

3) Simple interface: Avoid too complicated interface, should be clear and simple, easy to understand.

4) Obvious buttons: Use large size buttons that are easier for the elderly to click with their fingers.

5) Page turning function: Use page turning function instead of scroll bar, so that the elderly can easily see the entire page.

6) Clear feedback information: Every action should have feedback so that the elderly know whether their action was successful or not.

7) Easy to access location: Put commonly used options in an easy to access location, such as the home page or top menu.

8) Operation tips: Add operation tips to the page so that the elderly can better understand and learn how to use the application.

9) Exposit-style education: Provide exposit-style education for older users, through video or text, to explain how to use the app in more detail.

10) Good accessibility: Provide convenience for elderly users with disabilities or special needs, such as using screen readers, voice commands, etc.

The above is the elderly friendly human-computer interaction interface design suggestions, designers can be based on the needs of users and the characteristics of special groups for comprehensive consideration and design.

3.2. Indoor Thermal Environment

Indoor thermal environment refers to the comprehensive influence of indoor temperature, humidity, wind speed and other factors. The health and comfort of the elderly should be considered in the design of the interior surface of the elderly building. The building should have sufficient thermal insulation performance, the use of appropriate wall materials and insulation materials, and a reasonable indoor temperature control system to ensure the comfort of the elderly in different seasons and time periods.

The physical function of the elderly gradually declines, and the ability to adapt to indoor temperatures becomes less. In general, the elderly have a lower tolerance for heat and are more prone to fever. Therefore, in terms of indoor temperature, we recommend that the elderly keep the indoor temperature at about 24℃. At the same time, the elderly in hot weather, should maintain adequate drinking water, and avoid physical activity in high temperatures [3].

In addition, it is also very important to provide suitable indoor ventilation and air conditioning equipment for the elderly. Consider installing equipment such as air conditioners, fans, and dehumidifiers to keep the indoor environment fresh and dry. In short, in the living environment of the elderly, it is necessary to pay attention to the problems of appropriate temperature, ventilation and fresh air to ensure the health and comfort of the elderly.

3.3. Indoor Light Environment

Indoor light environment refers to the comprehensive influence of indoor lighting, lighting and shading factors. In the design of the inner surface of the elderly building, it is necessary to reasonably control the indoor light intensity and light quality to meet the health and activity needs of the elderly. Especially in the living areas of the elderly, it is necessary to make full use of natural

light and reasonable artificial lighting to ensure adequate and soft lighting for the elderly, while avoiding strong light and strong contrast.

The eyes of the elderly will gradually become more sensitive and fragile with age, so more attention needs to be paid to the design and choice of indoor light environment. The following are some suggestions:

1) Light balance: In order to reduce the burden on the eyes of the elderly, the brightness of the indoor light should be more balanced and avoid strong contrasts. Some shading devices can be used to control the intensity and direction of the light.

2) Avoid glare: The adaptability of the elderly's eyes is relatively weak and easy to be stimulated. Therefore, in interior design, avoid the use of high-reflectivity materials, avoid strong reflection, and avoid using too bright or too harsh lights.

3) Natural light priority: Try to use natural light to make the room spacious and bright, while using the right curtains or blinds to control the intensity and direction of light.

4) Use soft lighting: the elderly's eyes are more adapted to soft light, so you should choose soft lighting as much as possible, such as warm bulbs or the use of bedside lamps.

5) Consider fluorescent lights: the elderly eyes need more light to see things, so you can consider using fluorescent lights, which are softer and can provide enough light for the elderly to see objects.

In short, in the design and selection of the indoor light environment, it is necessary to consider the elderly's eye sensitivity and adaptability, avoid light and glare that stimulate the eyes, use soft lighting and shading equipment, and constantly optimize the indoor light environment [4].

3.4. Indoor Acoustic Environment

Indoor acoustic environment refers to the influence of indoor noise levels, noise sources and acoustic properties. In the design of the inner skin of the elderly building, it is necessary to control the indoor noise level to avoid the excessive sensitivity and influence of the elderly to the noise. In addition, the elderly care building should make full use of the advantages of sound to design music, telephone ringtones and other appropriate sound environment to create a pleasant and warm living atmosphere. The hearing of the elderly is gradually getting worse, and more attention needs to be paid to the design and choice of indoor acoustic environment. Here are some suggestions:

1) Reduce noise levels: Older people's ears are more sensitive to noise, which can easily cause physical and mental discomfort. Therefore, the noise level should be reduced as much as possible in the interior design, such as choosing low-noise electrical equipment to avoid indoor overcrowding or excessive noise during exercise.

2) Use soft materials: Soft materials can absorb noise, such as carpets, curtains, fabric sofas, etc., can reduce volume and echo.

3) Consider hearing aids: The elderly have poor hearing and need to use hearing aids such as hearing aids or TV headphones.

4) Increase music and natural sounds: Low music or natural sounds, such as the sound of running water or birdsong, can help the elderly relax, relieve stress, and improve the body's immunity.

5) Avoid sudden noise: Sudden noise will cause discomfort to the elderly, and close contact with noisy sounds should be avoided as much as possible to avoid unnecessary sounds.

In short, in the design and choice of indoor sound environment, it is necessary to consider the hearing and health of the elderly, reduce noise levels, use soft materials, increase music and natural sounds, and avoid sudden sounds [5].

3.5. Indoor Air Environment

Indoor air environment refers to the influence of factors such as indoor air quality, ventilation

and air humidity. In the design of the inner surface of the elderly building, it is necessary to reasonably design the ventilation system and air purification system to ensure the health and safety of the elderly. In addition, plants, materials and other means should be fully used in the elderly building to adjust the indoor air humidity to ensure that the air humidity is appropriate.

The immunity of the elderly gradually declines with age, so the choice and management of indoor air environment is crucial to their health. The following are some suggestions about the elderly and indoor air environment:

1) Indoor ventilation: In order to ensure the fresh indoor air, you can often open the window to ventilate and let the air circulate. If the air pollution is serious, you can consider opening the air purifier.

2) Avoid chemicals: As far as possible, avoid the use of home decoration and cleaning products containing harmful chemicals, such as formaldehyde and ammonia.

3) Reduce indoor debris and dust: indoor debris and dust will affect the health of the elderly, therefore, it should be cleaned and organized in time to keep the room clean.

4) Low sensitivity materials: Use low sensitivity home decoration materials, such as leather furniture, to reduce allergic reactions.

5) Manage the indoor humidity: Keep the indoor humidity as appropriate as possible, and regularly check whether the pipeline leaks or has other water problems.

In the design and management of indoor air environment, attention should be paid to the health of the elderly, to keep the indoor air fresh, to reduce harmful chemicals and dust, to keep the room clean, the use of low-sensitivity materials, and reasonable management of indoor humidity [6].

3.6. Indoor Wet Environment

The indoor wet environment refers to the combined influence of indoor relative humidity, water distribution, and droplet diffusion. In the design of the inner skin of the elderly care building, it is necessary to reasonably design the indoor water source and drainage system to avoid the growth of moisture and mold, and design a suitable water collection and drainage system to prevent the elderly from slipping.

The elderly's physical function declines, the ability to adapt to indoor humidity will also decline, and the elderly are generally more susceptible to humidity than young people, so the management of indoor humidity is particularly important. The following are some suggestions on the elderly and indoor wet environment:

1) Keep the indoor humidity suitable: the indoor humidity of the elderly should be kept between 40%-60%, too high or too low humidity will cause physical discomfort.

2) Avoid humid environment: The elderly are more likely to feel uncomfortable in a humid environment, and it is also easy to breed harmful substances such as bacteria and mold. Therefore, you should try to avoid living in places that are too humid.

3) Regular ventilation: ventilation is one of the important measures to keep indoor humidity appropriate, and regular window ventilation can help indoor air circulation and reduce humidity.

4) Use dehumidifier: In a humid climate, you can consider using a dehumidifier to adjust the indoor humidity, especially in the rainy season and areas with more rain, often using a dehumidifier can prevent moisture intrusion into the room.

5) Check water pipe leakage: Water pipe leakage will lead to an increase in indoor humidity, especially in humid environments such as basements and bathrooms, you should regularly check whether water pipes leak.

The elderly pay more attention to the management of indoor humidity, keep indoor humidity appropriate, avoid humid environments, regularly ventilate, consider using dehumidifiers, check

water leakage and so on [7].

3.7. Interior Color

Interior color refers to the interior color and color matching scheme. In the design of the inner surface of the elderly building, it is necessary to pay attention to the softness and harmony of the color, to avoid the color is too strong and produce excessive stimulation. At the same time, according to the different needs of different functional areas, appropriate color matching, such as light blue, light yellow and other colors have a calm and comfortable feeling for the elderly.

The gradual deterioration of the eyesight of the elderly will have an impact on the color of the room. Therefore, in the choice and design of indoor color environment, it is necessary to pay special attention to the needs of the elderly, the following are some suggestions:

1) Choose the right color: After the elderly's eyesight declines, the sensitivity to brightness and color decreases, so the appropriate color should be chosen. Light, light and medium bright colors are more suitable for the elderly. The dark color will make the room appear dark, which is not conducive to the visual health of the elderly.

2) Avoid overly complex patterns: overly complex patterns, especially high-contrast patterns, are detrimental to the visual health of the elderly and easy to cause visual fatigue. It is recommended to choose a simple, low contrast pattern [8].

3) Increase lighting: The elderly have a higher demand for light and need more adequate lighting. In the interior design should consider increasing lighting facilities, such as adding floor lamps, desk lamps, wall lamps, etc.

4) Consider contrast: the visual contrast of the elderly is low, so the contrast of wallpaper, wall paint and home furnishings should be considered in interior design. The contrast of the color is low, which can reduce the visual pressure of the elderly when looking at indoor items and avoid excessive fatigue.

5) Consider the aesthetic needs of the elderly: the elderly have their own aesthetic life, should respect their interests and aesthetic needs, and fully consider their needs and preferences in home furnishings and decoration.

In the choice of indoor color environment, we should pay attention to the visual health of the elderly, choose the appropriate color, avoid overly complex patterns, increase lighting, consider contrast, and respect the aesthetic needs of the elderly [9].

3.8. Inner epidermal Hygiene Cleaning

Inner epidermal hygiene cleaning refers to the cleanliness and hygiene of indoor surfaces. In the design of the inner skin of the aged care building, it is necessary to pay attention to the easy cleaning and anti-toxicity of the surface material, and pay attention to the cleaning of the pattern is not easy to expand and easy to clean. In addition, the elderly care building should be equipped with corresponding sanitation facilities and cleaning tools to ensure the health of the elderly.

The skin of the elderly is more fragile, vulnerable to stimulation and pollution of the external environment, so special attention needs to be paid to indoor skin hygiene and cleaning. The following are some suggestions on the elderly and indoor skin cleaning:

1) Regularly clean the ground: dust or bacteria on the ground will harm the health of the elderly, and the ground should be cleaned regularly, especially in the kitchen, bathroom and other damp places, which can be cleaned with disinfectant.

2) Washing bedding: Bedding such as sheets, quilt covers, etc., should be regularly replaced and cleaned to keep the bedding hygienic and clean.

3) Regular cleaning of indoor items: indoor items such as furniture, wall hangings, electrical

appliances, etc. should be cleaned regularly. The elderly in particular need to be aware that dust and bacteria on the surface of furniture and appliances can affect their health.

4) Keep indoor ventilation: indoor humidity is too high or too low will affect the skin health of the elderly, should keep indoor ventilation, so that indoor air circulation.

5) Moderate sun exposure: Sun exposure can enhance the immunity and skin health of the elderly, but it is necessary to control the time appropriately to avoid skin damage caused by excessive sun exposure.

In the indoor surface hygiene and cleaning, it is necessary to regularly clean the floor, wash the bedding, regularly clean indoor items, maintain indoor ventilation, moderate exposure to the sun, etc., to create a sanitary, clean and comfortable living environment, which is conducive to the physical and mental health of the elderly [10].

4. Conclusions

To sum up, the interior surface design of elderly care buildings is a comprehensive systematic project, which needs to consider multiple factors. In the design, the special needs and health status of the elderly need to be fully considered. The design of the inner surface of the elderly building should take comfort and safety as the main considerations, so as to provide a warm, safe, comfortable and healthy living environment for the elderly. In terms of internal design, the living habits and activities of the elderly should be considered, such as installing handrails in areas such as stairs, corridors and toilets, adopting barrier-free access design, providing adequate light and natural ventilation of the indoor environment, ensuring the freedom and comfort of the elderly's activities, and avoiding unnecessary injury. In terms of material selection, pollution-free, low-sensitivity, wear-resistant floor materials, environmentally friendly, good texture wall materials, easy to clean, antibacterial, non-slip toilet materials, etc., should be used to provide a healthy, safe, comfortable and beautiful living environment for the elderly. In short, the goal of the design of the interior surface of the elderly care building is to provide a comfortable, safe, healthy and easy to maintain living environment for the elderly, through scientific and reasonable design and material selection, to provide better living experience for the elderly in the elderly care institution.

The disadvantage is that, limited by space, this study only discusses eight influencing factors of the epidermis design of elderly care buildings, and puts forward corresponding design suggestions. The research method is a qualitative analysis and lacks a quantitative analysis. However, this paper can point out the direction for the subsequent research, and provide some guidance and suggestions for the epidermis design and related problems of elderly care buildings.

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