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Research on Decoration and Renovation Design of Old Ward Buildings in Hospitals

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Abstract: ***In recent years, with the rapid development of China's economy, the public's demands for the quality of medical services have been increasing day by day. Due to outdated facilities and backward functions, the old hospital ward buildings are no longer able to meet the demands of modern medical care. This article focuses on the decoration and renovation design of old hospital ward buildings, deeply analyzes the necessity of the renovation, elaborates in detail on the principles that should be followed in the renovation design, and emphasizes a series of implementable, executable and referential renovation design strategies, covering multiple aspects such as spatial layout optimization, facility and equipment renewal, integration of humanized design, color and lighting design, environmental protection and safety considerations, It aims to provide useful references for improving the overall quality of the old hospital ward buildings and meeting the needs of patients and medical staff.***

Keywords: Old hospital ward buildings, Decoration and renovation, Renovation design**.**

1. Introduction

In the current process of increasingly rapid economic development in our country, people have put forward higher and higher requirements for the quality of medical services. Modern medical services need more advanced medical technologies and the corresponding quality of medical services [1]. As the main carrier for providing medical services, the quality of the ward building environment in hospitals directly affects the quality of patients' medical treatment and rehabilitation, as well as the work quality and efficiency of medical staff.

However, there are also many ward buildings that were completed earlier. Due to the economic, ideological and technological conditions at that time, various drawbacks gradually emerged during their long-term historical use. This type of ward building often shows many signs of aging. For instance, the furnishings in some wards are rather outdated. The bedside tables and bed sheets and curtains of patients, the paint in the corners of the walls have aged, the decorative layers on some old walls have peeled off, and some Windows do not open automatically [2]. In addition, the beds are old, the medical equipment of various specialties is relatively outdated, and the water, electricity and piping are old and worn out. These phenomena all seriously affect the progress of medical care work in the ward and are prone to accumulate a small number of accidents over a period of time. Regarding the functional and layout design of ward buildings, compared with the more complex medical workflow of modern times, there is a lack of the efficient demand for professional work during the design process. For instance, some old ward buildings lack central air conditioning, and the design of related HVAC specialties is not perfect. Moreover, their layout design is not clear enough, and there are certain situations where water supply and drainage pipes are occupied. There is still a lack of a complete update mechanism to implement improvements. For some relatively new special job contents and new hospital departments (such as rehabilitation wards and ICU wards), due to architectural structure and space limitations, the functional and layout designs cannot be adjusted for the time being.

Therefore, the decoration and renovation design of old hospital ward buildings is imperative. Reasonable renovation can bring new vitality to the old ward buildings, adapt to the medical and health services of modern hospitals, provide patients with more comfortable, safe and convenient medical services, offer medical staff an efficient and comfortable working space, and thereby enhance the competitiveness and service level of the hospital.

2. The Necessity of Decoration and Renovation of the Old Ward Buildings in Hospitals

2.1 Functional Adaptability

Old ward buildings often have the problem of unreasonable spatial layout. In the early days, the ward Spaces were mostly arranged in rows, with small public living Spaces, which were not convenient for the daily activities of patients and their families. For instance, some old ward buildings do not have Spaces for patients' rehabilitation activities. During the rehabilitation period in the ward, patients lack places to do appropriate rehabilitation exercises, which is not conducive to their recovery. The division of ward space is not scientific. In some wards, the wards are overly dense. After the beds, bedside tables and other facilities are arranged, there is a lack of space for patients and medical staff to move around, which is not conducive to the daily nursing operations of medical staff and the activities of patients. The layout of medical processes is not scientific, and there is a lack of systematic planning among departments. This forces patients to repeatedly cross different floors and areas during various examinations and treatments, which increases their physical exertion and time costs and is not conducive to the rational and effective use of medical resources [3].

Judging from the equipment configuration, most of the medical instruments in the old ward buildings are old-fashioned. The basic instruments are not very accurate in measuring important data and cannot achieve the purpose of guiding medical staff to make correct judgments. For example, they cannot meet the clinical detection requirements for patients' blood pressure, pulse and other indicators. In some

other wards, the oxygen supply, suction and other system equipment are aging and may have unsafe malfunction problems, which may threaten the health or even life of patients at critical moments. In addition, with the rapid update of modern medical technology, many instruments and equipment have begun to be intelligent. For instance, remote medical care that can be connected can achieve information and data sharing. However, the old ward buildings, due to the constraints of their infrastructure conditions, are difficult to be effectively popularized and utilized, which seriously affects the efficiency and level of medical services.

2.2 Cost-benefit Advantage

Compared with demolition and reconstruction, the renovation and transformation of old ward buildings have obvious economic advantages. This is because demolition and reconstruction often require a huge investment in demolition projects, the purchase of land (if there is a need to expand the area), the construction of new inpatient buildings, and generate a large amount of construction waste, which damages the environment, etc. The renovation and transformation of old ward buildings only involve partial changes to the original building structure and interior decoration, etc., which can significantly reduce the costs of material procurement and construction. According to relevant statistical data, under the same building area and functional requirements, the cost of renovating and transforming an old ward building is only 30% to 50% of that of demolition and reconstruction. For instance, the renovation and transformation of an old ward building by Meishan Maternal and Child Health Hospital cost approximately 8 million yuan. The demolition and reconstruction of this old ward building is estimated to require an investment of more than 25 million yuan [4].

Renovation and upgrading can significantly reduce the impact on hospital operations. The demolition and reconstruction of the old hospital ward building will require all inpatients to move out of the building. Even some departments may need to be relocated or cease operations. This not only makes it extremely inconvenient for patients to seek medical treatment but also reduces the hospital's business volume and income. The renovation and upgrading can be carried out in phases and batches based on the actual situation, minimizing the impact on the normal operation of the hospital as much as possible. For instance, when a certain hospital is renovating an old ward building, one end of the ward building is renovated first. After the renovation is completed, all the inpatients in that ward building are transferred to that part, and then the other end is renovated. As a result, some beds in the ward building could still be used during the renovation process, maintaining the normal operation of the hospital.

3. Design strategies for the Decoration and Renovation of Old Hospital Wards

3.1 Spatial Layout Optimization

3.1.1 Adjustment of the internal space of the ward

For the decoration and renovation redesign of old hospital wards, the first step is to redesign the internal space of the wards to enhance the utilization rate of the space and the comfort of patients. In view of the overly narrow space in the ward, custom-made furniture can be selected, such as built-in bedside tables and wall cabinets. This not only increases storage space but also does not occupy a large amount of floor space. In the ward, the positions of the hospital beds should be reasonably rearranged to ensure that there is space under each bed for medical staff to perform nursing operations and for patients to move freely. Generally, there should be no less than 1.2 meters of activity space around each bed. Changing the previous side-by-side bed layout to an offset layout is conducive to increasing the space for patients and their families to pass through in the ward, and also helps to protect patients' privacy to a certain extent. For some facilities that meet the special needs of patients, such as those with mobility issues who require dedicated care, barrier-free wards can also be provided. The width of the door in the barrier-free ward should be no less than 0.9 meters, allowing patients to enter by wheelchair. The bathroom is equipped with facilities such as handrails and anti-slip floor tiles to ensure the safety of patients [5]. According to the patient's request, a special rest room for family members can also be set up in the ward, with foldable sofa beds and other facilities installed to facilitate family members.

3.1.2 Public Area Planning

Expand and improve public Spaces, and enrich and perfect their functions. An open and bright outpatient hall is set up at the entrance of the ward building, equipped with a guidance desk, rest seats and other facilities, which is convenient for patients and their families who come here for consultation and rest. Rationally arrange the positions and numbers of elevator shafts to increase the passenger capacity of elevators and shorten the waiting time for patients and medical staff. In high-rise ward buildings, zoned elevators can be set up to serve different inter-building sections respectively, thereby increasing the utilization rate of elevators. Add patient activity areas in the public areas of each floor, providing fitness equipment, reading rooms and other facilities to ensure that patients have a place for activities and entertainment during the recovery period. Add public restrooms. The number of squatting positions in men's and women's restrooms should be reasonably set according to the ratio of men to women. Ensure good ventilation in the restrooms and install facilities such as handrails and call buttons to facilitate patients' use of the toilet. In addition, attention should also be paid to the design of the circulation lines in public Spaces. In the design of patient circulation lines, medical circulation lines and material circulation lines, they should be as close as possible to the patients' rest areas without crossing each other, so as to reduce the occurrence of cross-infection and overcrowding of people.

3.2 Update of Facilities and Equipment

3.2.1 Upgrade of medical equipment

In accordance with modern medical demands, a comprehensive renovation and update of the medical facilities in the ward building will be carried out. The first is to update basic medical facilities, such as multi-parameter monitors. More intelligent multi-parameter monitors are adopted to

achieve real-time and precise monitoring of patients' vital signs such as heart rate, blood pressure and blood oxygen saturation, and the monitored data is automatically synchronized to the management terminal of the nurse station, enabling medical staff to monitor patients' conditions. All departments and wards are fully equipped with advanced and stable oxygen supply and sputum suction devices to ensure the continuous and stable supply of medical oxygen. The negative pressure suction is strong and moderate to meet the treatment needs of patients. For some special department wards, such as operating rooms and intensive care units, high-end medical facilities and equipment are provided. For instance, the operating room is equipped with advanced medical facilities and equipment such as digital surgical shadowless lamps, high-definition laparoscopes, and contrast-enhanced ultrasound, which enhance the accuracy of surgeries and ensure the safety of both doctors and patients. The intensive care unit should be equipped with facilities such as extracorporeal membrane oxygenation (ECMO) and continuous renal replacement therapy (CRRT) to enhance the rescue efficacy for critically ill patients. It is necessary to establish a complete system for the inspection, maintenance and repair of medical facilities and equipment, and conduct regular inspection, maintenance and repair of the equipment and facilities to ensure their normal operation.

3.2.2 Renovation of water, electricity and HVAC systems

All the old water, electricity and heating systems in the ward building will be renovated to ensure that all the equipment in the ward building operates normally and in an energy-efficient and environmentally friendly manner. First, in terms of the electrical system, the wires and cables should be re-laid, and multiple different distribution boxes should be set up. At the same time, the configuration quantity of switches and sockets in each area should be set according to the actual power consumption situation to ensure that there is sufficient power supply for electrical use and the power supply is safe. Adding a backup power supply system, which can be an uninterruptible power supply (UPS) or diesel power generation, can ensure the operation of important medical equipment and safeguard the safety of patients in case of power outages and other emergencies. Second, in terms of the water supply and drainage system, severely aged and rusted water pipes should be replaced with new types of pipes that are less prone to corrosion and deterioration, such as stainless steel pipes or PP-R pipes, to reduce water pollution. The drainage of the bathroom and washbasin should be redesigned rationally to prevent clogging of the sewer pipes and the generation of unpleasant odors in the toilet. In addition, water-saving appliances should be installed, such as sensor faucets and water-saving toilets, to conserve water resources. Thirdly, in terms of the HVAC system, energy-saving air conditioning equipment can be adopted for the electrical system, such as multi-split air conditioners or ground source heat pump air conditioners [6]. According to the different functions and time periods of each area in the ward building, the HVAC system can be controlled by different zones and time periods, so that energy can be fully utilized. In addition, attention should be paid to the ventilation system of the ward building. The air circulation inside the wards needs to be basically guaranteed to prevent the reproduction and survival of bacteria and viruses indoors. The ventilation system of the bathrooms should be given even more attention, especially the bathrooms in the outpatient area. A fresh air system can be set up inside the ward, with an air change rate of no less than 6 times per hour.

3.3 Humanized Design Integration

3.3.1 Accessibility Design

Fully consider the requirements of barrier-free design to facilitate the free movement of patients with limb functional impairments within the ward building. A barrier-free ramp should be set up at the entrance of the ward building. The slope of the ramp should not exceed 1:12 and its width should not be less than 1.2 meters. Barrier-free handrails should be installed on both sides. The elevators in the ward building must be barrier-free elevators. The size of the car must meet the requirements for wheelchair access. The height of the buttons in the elevator should be suitable for patients in wheelchairs. The elevator should be equipped with a voice prompt system and Braille indication signs. In wards, toilets, public activity Spaces and other areas, install a sufficient number of handrails, with a height ranging from 0.85 to 0.9 meters. The materials should be anti-slip and easy to hold. The floor should be paved with anti-slip materials, especially in areas where water often accumulates such as toilets and corridors. The anti-slip grade should comply with the relevant regulations. Barrier-free parking Spaces should be set up to facilitate patients with limb defects to drive for medical treatment. The number of barrier-free parking Spaces should be determined based on the scale of the hospital and its own conditions, and should not be less than 2% of the total parking Spaces.

3.3.2 The identification system is complete

Design and produce clear and definite indication signs to facilitate patients and their caregivers to reach the destination quickly. The font of the signboards should be large and the contrasting colors should be bright to facilitate recognition by people with various visual needs [7]. Directional signboards should be set up at the entrances of the ward building, elevator lobbies, corridors, and doors of various departments and rooms to indicate the directions and locations of each area. Set up floor index signs in the elevators on each floor to indicate the locations of the departments included on each floor. Directional signs are set up in the corridors of the ward building, placed at clear locations at regular intervals to help patients find different areas of wards and various functional zones. Set up functional indication signs to clearly mark functional areas such as restrooms, stairwells, and emergency exits. The material of the signboard should be durable, easy to clean, placed in a prominent and reasonable position, and not blocked by other obstacles.

3.4 Color and Lighting Design

3.4.1 Color Matching

Create a pleasant visual environment for the ward building by using colors that conform to the principles of color psychology. The color of the ward building should be based on tones that make people feel comfortable, warm, quiet and

at ease. This can have a calming and soothing effect on patients' minds, helping them maintain a peaceful state of mind and enhancing the brightness of the room. The walls and ceiling are best in the same light tone with a very small color difference. The floor color can be slightly darker than the wall color to create a sense of space and also reduce the mirror reflection of the floor, avoiding the light from irritating the patient's eyes [8]. For different departments and wards, their colors can be slightly adjusted according to their functions. For pediatric wards, some bright and lively colors such as pink and yellow can be added to enhance the warm and interesting atmosphere of the room and reduce children's fear of diseases. The rehabilitation ward can be slightly green. Green gives people a sense of vitality and has the meaning of recovery and rehabilitation, which to a certain extent gives patients some confidence. For public space sections such as lobbies and corridors, different functional separation areas can be created through changes in color tones, and unity and overall coordination can also be taken into consideration. The end or turning point of the corridor can also be slightly distinguished from the overall tone by color. The color can be appropriately changed according to the color of the corridor to achieve the visual purpose and the directional effect.

3.4.2 Lighting Design

The design of hospital lighting should meet the needs of different functional areas and a comfortable visual environment. The lighting in the ward is divided into overall lighting and local lighting. The overall lighting should choose soft natural light colors to evenly illuminate the entire ward. It should not be too bright or too dark, which may affect the patients' eyes [9]. The lighting beside the hospital bed should choose local lighting fixtures that can adjust the brightness and Angle of the light. The lighting in the bathroom should have waterproof and anti-fog performance, and the installation position of the lamp body should not affect the generation of glare. In public areas, when designing lighting, emphasis should be placed on guidance and safety. The lighting in the hall should be bright and grand. Chandeliers, downlights and other fixtures can be combined for illumination, making the entire area appear spacious and comfortable. The lighting in the corridor should be continuous and there should be no blind spots. Recessed downlights or light strips can be chosen for lighting. Emergency lighting and evacuation indication signs can be set up at locations such as stairwells and elevator shafts So as to facilitate the evacuation of personnel in emergency situations. In addition, natural lighting can be fully and reasonably utilized. By scientifically designing the size, position, orientation and other aspects of Windows, a certain amount of natural light can be incident in the wards and public areas. This not only saves energy but also brings a good visual experience to patients and medical staff.

4. Conclusion

With the in-depth implementation and advancement of medical reform policies in modern society, the decoration and renovation design of old hospital wards is of vital importance to the development of hospitals. Under the premise of ensuring the optimal utilization of resources and controlling costs, renovating old wards can enhance the resource utilization rate of hospitals [10]. Through effective measures such as optimizing spatial layout, updating equipment and facilities, integrating personalized design, and strengthening color and photo design, old wards in hospitals can be given a fresh look, providing patients with a comfortable and convenient medical environment. It can also better enhance the work efficiency of medical staff, save costs for the hospital and improve its overall image.

References

[1] Chen Peng, Meng Fanpeng, Dong Taiping, et al. "Dual Carbon" Empowering Hospital Green Old Renovation Diagnosis System [J]. Chinese Hospital Directors, 2020, 21(11):70-73.
[2] Yang Zhenhong. Research on the Renovation and Transformation Strategies of Existing Hospital Areas under the Background of Urban Renewal [J] Fujian Architecture, 2025, (05):30-36.
[3] Ma Junyi, Zhang Man, Gong Puyue, et al. Evidence-based Practice on Improving the Healthy Light Environment in Hospitals [J]. Jiangsu Building Materials, 2025, (02):127-129.
[4] Yu Ziqi. Analysis of the Main Factors of Interior Design of Existing Hospital Ward Buildings [J]. House of Residence, 2025, (10):119-121+156.
[5] Wang Jing, Zhou Tao. Urban organic update under the perspective of the hospital building reconstruction problems and design strategies [J]. Journal of urban architecture, 2025, 22 (4): 160-164.
[6] ShiXueQun. Hospital building energy audit and energy saving carbon reduction analysis [J]. Journal of Shanghai energy conservation, 2024, (9): 1550-1555.
[7] zhao. Hvac hospital buildings design method [J]. Journal of engineering construction and design, 2024, (4): 59-61.
[8] Long Hao, Chen Guoliang, Zhu Xi, et al. Hospital Building Redesign in Urban Renewal [J]. Contemporary Architecture, 2023, (05):8-15.
[9] Chen Ricai. Analysis and Discussion on the Necessity of Energy-saving Renovation of Hospital Buildings in China at Present [J]. Residential and Real Estate, 2024, (23):20-23.
[10] Lu Zhenjian Analysis of Decoration and Renovation Design during the Use of Hospital Buildings [J]. Building Materials and Decoration, 2019, (20):119-120.