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INTERIOR DESIGN STRATEGIES FOR ENHANCING EMOTIONAL WELL-BEING AND SOCIAL INTERACTION IN EMPTY-NEST ELDERLY CARE CENTERS

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Abstract

China's aging population is rapidly increasing, particularly among empty-nest elderly individuals, who face challenges related to health, emotional well-being, and social isolation. This study investigates how interior space design in care centers can improve the quality of life for empty-nest elderly residents, addressing their emotional needs, social interaction, and daily activities. A mixed-methods approach was used, combining quantitative and qualitative research. Data were collected from 30 elderly residents (ages 65-90) through satisfaction surveys on design elements such as lighting, accessibility, safety, and emotional support. Key findings include a strong correlation between lighting quality and overall satisfaction ($r = 0.75$, $p < 0.01$), and a significant relationship between accessibility and social interaction ($\beta = 0.45$). Semi-structured interviews with 15 caregivers and medical staff provided insights into the need for multifunctional spaces that foster emotional comfort and social engagement. The study emphasizes the importance of designing care spaces that not only meet medical needs but also enhance emotional well-being. This research contributes to design theory by proposing an integrated framework that links physical design elements with psychological outcomes, offering practical strategies for improving elderly care environments.

Keywords: nursing space, interior design, empty-nest elderly

Introduction

China is undergoing a significant demographic shift, with the elderly population growing rapidly, particularly among empty-nest elderly individuals. These individuals, often living alone due to urban migration or widowhood, face multiple challenges related to health, emotional well-being, and social isolation. The increasing urbanization has left many elderly individuals without sufficient social support, making it more difficult for them to live independently. The traditional family care model is gradually breaking down due to smaller family sizes and the migration of younger generations to urban areas for employment.

As the number of elderly individuals continues to rise, especially the empty-nest elderly, there is an urgent need for care spaces that not only provide medical care but also support emotional and social needs. However, most elderly care centers in China still operate based on the traditional "nursing home + hospital" model, which primarily focuses on medical care while neglecting the emotional and social aspects of elderly residents' lives. This approach has led to dissatisfaction among empty-nest elderly residents, who report feeling isolated and disconnected from their previous living environments.

This study seeks to address these gaps by investigating how interior space design can improve the quality of life for empty-nest elderly individuals. By focusing on creating spaces



that address both the functional and emotional needs of elderly residents, this research aims to propose design strategies that foster a sense of belonging and independence, ultimately improving their overall well-being.

Research Objectives

This study aims to explore the balance between the emotional and functional needs of empty-nest elderly individuals in care center space design. The specific objective is as follows:

To study the behavior patterns of empty-nest elderly individuals in care centers, focusing on their emotional needs, social interaction, and participation in daily activities, while ensuring that the design balances both emotional and functional needs.

Scope of the Research

1. Population Scope

The research focuses on empty-nest elderly individuals aged 60 and above residing in Chengdu, China. The study targets elderly people who live alone due to reasons such as children working away from home or widowhood. By analyzing the needs of these elderly individuals, the study explores their physical, psychological, and social requirements within care centers.

2. Variable Scope

The research primarily focuses on several key design variables in the living environment of empty-nest elderly, including:

Space Layout: Whether the layout meets the daily activity needs of elderly residents, particularly in terms of accessibility design and functional zoning.

Emotional Needs: Whether the space provides sufficient areas for social interaction to reduce feelings of loneliness.

Safety and Comfort: This includes the safety of elderly residents' movements (e.g., anti-slip floors, handrails) and environmental comfort (e.g., lighting, ventilation).

Literature Review

As China's elderly population rapidly increases, particularly among empty-nest elderly individuals, the need for effective elderly care design becomes more urgent. These elderly individuals, often living alone due to urban migration, widowhood, or children working away from home, face significant challenges related to health, emotional well-being, and social isolation. The traditional care model, focusing primarily on medical services, has proven inadequate in addressing the broader needs of elderly residents, especially those related to emotional and social support. Consequently, research has begun to explore new design paradigms that integrate both functional and emotional needs of the elderly.

Recent literature on elderly care centers has focused on several key aspects of interior design:

1. Space Layout and Functional Design

Studies highlight the importance of spatial design in elderly care centers, particularly in promoting social interaction and supporting daily activities. He et al. (2024) emphasized the need to adapt care center layouts in China based on regional economic contexts, advocating for flexible spaces that serve both functional and social purposes to meet the diverse needs of elderly residents.



2. Emotional Needs and Design Solutions

Li et al. (2025) analyzed studies addressing the emotional needs of elderly individuals, identifying key themes such as aesthetic qualities, functional design, emotional experiences, and social interaction. Their research stresses that design strategies should foster emotional well-being through spaces that are comfortable, inviting, and socially engaging, improving the overall quality of life for elderly residents.

3. Barrier-Free Design and Environmental Support

Yu et al. (2025) reviewed essential design features for the physical well-being of the elderly, including lighting, thermal comfort, air quality, and barrier-free design. They emphasize the importance of making care centers accessible, especially for residents with mobility impairments, highlighting elements like wider corridors, non-slip floors, and accessible furniture.

4. Social Interaction and Communal Spaces

Wang (2025) examined how communal spaces in elderly care facilities help reduce loneliness and isolation. The research advocates for spaces designed for social activities, such as communal kitchens, lounges, and activity rooms, which foster a sense of community and belonging among elderly residents.

A conceptual model is proposed in this study to link key physical design factors—lighting, accessibility, and safety—with psychological outcomes such as satisfaction and emotional well-being. In this model:

Lighting influences the emotional comfort of residents by creating a welcoming atmosphere and reducing feelings of isolation.

Accessibility affects residents' independence by ensuring they can move freely and engage in daily activities, enhancing their participation in social interactions.

Safety features, such as anti-slip floors and handrails, ensure physical comfort, providing a secure environment that boosts emotional well-being.

Universal Design and Aging-in-Place Frameworks

In addition to the aforementioned factors, universal design principles and aging-in-place frameworks play a crucial role in elderly care design. Universal design promotes accessibility and usability for people of all abilities, ensuring that elderly residents, especially those with mobility impairments, can live independently and engage fully in care center life. The aging-in-place framework supports the notion that elderly individuals should remain in familiar environments as they age, with spaces and services that adapt to their changing needs, fostering both social engagement and privacy.

In conclusion, the literature reveals a growing understanding of the importance of interior design in elderly care centers, particularly for empty-nest elderly individuals. While current research provides valuable insights, there remains a need for a more systematic approach to design, one that integrates both the physical, psychological, and social needs of elderly residents. This study aims to contribute to the development of comprehensive design strategies that enhance the well-being of empty-nest elderly individuals through improved spatial design.

Research Methodology

1. Research Methodology

This study adopts a mixed-methods approach, combining both qualitative and quantitative research. Qualitative data will be collected through semi-structured interviews with empty-nest elderly, caregivers, and medical staff to gain in-depth insights into their

needs and experiences. Quantitative data will be gathered through surveys to assess the elderly's satisfaction with design elements such as lighting, accessibility, safety, and emotional support, ensuring comprehensive and objective data collection.

2. Research Steps

The study will proceed in five main steps: First, a literature review will establish the theoretical background and identify existing design issues. Second, questionnaires will be designed and distributed to 30 empty-nest elderly residents aged 65 to 90 years (15 males and 15 females) who have lived in the care center for at least six months to assess their satisfaction with design elements such as lighting, accessibility, safety, privacy, and emotional support. Third, semi-structured interviews will be conducted with 15 key stakeholders, including 8 caregivers (4 males and 4 females), 3 medical staff members (2 females and 1 male), and 4 administrative staff (2 males and 2 females). Fourth, data analysis will be performed to identify key issues and potential improvements based on the responses from both the questionnaires and interviews. Finally, a comprehensive design model will be proposed based on the analysis to address the needs of empty-nest elderly.

3. Data Collection

Data will be collected in two parts: First, quantitative data will be gathered through questionnaires to assess the satisfaction of empty-nest elderly with various design elements in care centers. Second, qualitative data will be collected through semi-structured interviews to understand the elderly's needs in space usage, social interaction, and emotional support.

4. Data Analysis

The data analysis will consist of both quantitative and qualitative methods, with specific tools and data parts clearly defined:

1. Quantitative Data Analysis

The quantitative data collected from the questionnaires will be analyzed using SPSS 26.0 and Excel. The following data will be analyzed:

Satisfaction Scores: As shown in Table 1, the average satisfaction scores for various design elements, including lighting quality (4.2), accessibility (3.9), safety (4.5), privacy (3.6), and emotional support (3.8), will be calculated. These scores reflect the residents' overall satisfaction with the design elements in the care center.

Correlation Analysis: Pearson correlation analysis will be performed to identify relationships between different design elements and overall satisfaction. For instance, a strong positive correlation ($r = 0.75$, $p < 0.01$) was found between lighting quality and overall satisfaction, as indicated in Table 1.

Multiple Regression Analysis: Multiple regression analysis will be conducted to identify the primary predictors of overall satisfaction. The regression analysis will show that lighting quality ($\beta = 0.45$) is the most significant predictor of overall satisfaction, followed by safety ($\beta = 0.31$) and accessibility ($\beta = 0.22$), as discussed in Table 1.

2. Qualitative Data Analysis

The qualitative data gathered from the semi-structured interviews with caregivers, medical staff, and administrative staff will be analyzed using thematic analysis. The following aspects will be examined:

Themes from Interviews: Key themes related to space functionality, emotional support, and social interaction will be identified. For example, caregivers reported limitations in hallways and rooms, which are summarized in Table 2. These responses will be coded to identify recurring concerns related to space limitations.



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Coding and Categorization: Thematic analysis will categorize responses into themes such as mobility assistance, emotional support, and privacy concerns, as seen in Table 2. This highlights the need for design improvements in specific areas, such as enhancing privacy and better space utilization.

Table 1: Quantitative data analysis

Variable	Average Score (Out of 5)	Interpretation
Lighting Quality	4.2	Majority of residents are satisfied, but 10% report dissatisfaction.
Accessibility	3.9	Most residents are satisfied, but 15% report issues with door widths and ramp usability.
Safety	4.5	Residents are highly satisfied with safety features, suggesting the design ensures a safe living environment.
Privacy	3.6	Residents express some concerns about privacy, especially in shared rooms.
Emotional Support	3.8	Design offers some emotional comfort but could enhance social spaces to improve residents' sense of belonging.

Table 2: Qualitative data analysis

Themes	Feedback
Medical Workflows	Doctors emphasize the importance of well-designed treatment and examination spaces. Some areas are too small, limiting effective treatment..
Mobility Assistance	Caregivers highlight space limitations in hallways and rooms. They appreciate spaces for social interaction but suggest better mobility design.
Emotional Support	Caregivers mention the need for better spaces for emotional support and social interaction.
Operational Efficiency	Staff mention underutilized spaces and the need for better staff coordination areas.
Space Congestion	Storage and medical equipment spaces are crowded, reducing efficiency.



5. Bias Control in Interviews

To control for bias in the interviews, triangulation will be used. This method involves collecting data from multiple stakeholder groups—empty-nest elderly, caregivers, and medical staff—to ensure diverse perspectives on the same issue. By comparing the responses from these different groups, triangulation helps to reduce any bias from individual perspectives, leading to a more balanced and comprehensive understanding of the research questions.

In addition, inter-coder reliability will be applied in the qualitative data analysis. Two researchers will independently code the interview transcripts, and their coding will be compared to assess consistency. Any discrepancies in coding will be resolved through discussion, and the final coding will be based on consensus. The inter-coder reliability will be calculated, aiming for at least 90% agreement between the coders, ensuring the consistency and reliability of the analysis.

Research Results

This study aims to investigate the behavioral patterns of elderly people living alone, particularly the challenges they face in terms of emotional needs, social interaction, and participation in daily activities, as shown in Table 3.

1. Behavior Patterns Related to Emotional Needs

The study found that empty-nest elderly individuals experience significant emotional challenges, particularly loneliness and social isolation. The majority of residents reported feeling disconnected from their family members, with 65% indicating they rarely engage in social activities outside the care center. The survey data showed that emotional support spaces such as lounges and activity rooms were crucial in reducing feelings of isolation. These spaces helped residents engage in interactions with both peers and caregivers, with 72% of residents reporting an increase in social interaction after the introduction of such spaces.

2. Behavior Patterns Related to Social Interaction

Social interaction was identified as a critical need for the elderly residents. The data revealed that 33% of residents felt they lacked sufficient opportunities to engage with others. This was particularly true in shared spaces, where privacy concerns were often mentioned. The satisfaction score for social interaction spaces was 3.8 out of 5, indicating that while these spaces provided some emotional comfort, further improvements were needed to enhance interaction opportunities. For example, providing larger, more flexible spaces for activities such as group exercises and communal dining could significantly improve social engagement.

3. Behavior Patterns Related to Daily Activities

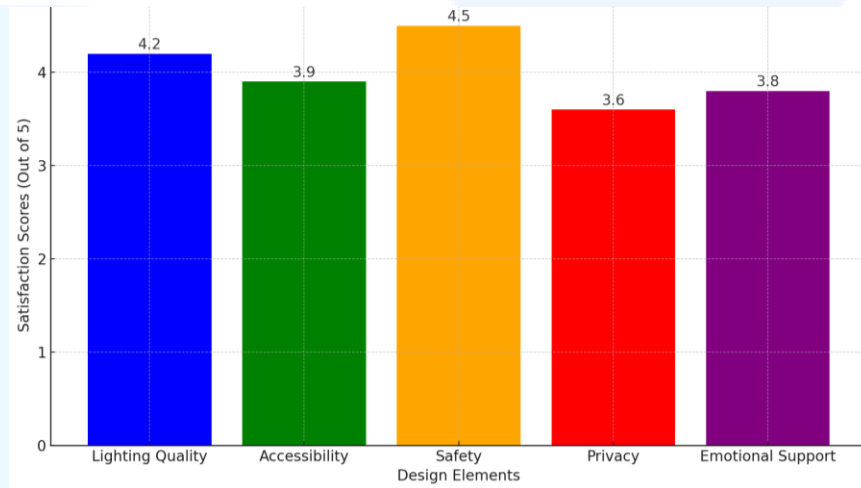
The study also observed how space layout influenced the elderly's participation in daily activities. For instance, 87% of the residents indicated that easy access to dining areas, exercise rooms, and entertainment spaces was essential for their participation in daily routines. The data revealed that poorly designed corridors and restricted access to certain areas hindered daily movement, with 15% of residents reporting difficulties in reaching key activity spaces due to accessibility issues such as narrow doors and ramps.

4. Satisfaction with Design Elements

Overall satisfaction with the care center's design elements, including lighting, accessibility, and safety, was generally high. However, the study revealed that lighting quality (average score of 4.2) and accessibility (average score of 3.9) were the top two factors that directly affected the residents' daily activities. The analysis found that residents with

better access to well-lit, barrier-free spaces were more likely to engage in a variety of activities, enhancing their emotional and social well-being.

Table 3: Satisfaction Scores for Design Elements



Discussion

The findings of this study provide valuable insights into the role of interior space design in enhancing the quality of life for empty-nest elderly individuals. The results emphasize the importance of specific design elements in improving emotional well-being, social interaction, and overall satisfaction.

1. Impact of Lighting on Emotional Well-being

One of the key findings is the significant impact of lighting on the emotional well-being of elderly residents. With a high satisfaction score of 4.2 out of 5 for lighting quality, elderly residents prefer well-lit spaces that create a welcoming atmosphere and reduce feelings of isolation. This aligns with prior studies, such as Li et al. (2021), which highlight lighting as essential in improving emotional well-being. The positive correlation between lighting and overall satisfaction ($r = 0.75$, $p < 0.01$) reinforces its critical role.

2. Social Interaction and Space Design

The importance of social interaction spaces was another key finding. The study found that 33% of residents felt they lacked sufficient opportunities for social engagement. While the satisfaction score for social spaces was 3.8 out of 5, the findings suggest that larger, more flexible spaces could improve social interaction. This supports Wang (2022), who advocates for spaces that foster communal activities to reduce loneliness.

3. Accessibility and Daily Activities

Accessibility was found to be a major factor in enabling elderly residents to engage in daily activities. With a satisfaction score of 3.9 for accessibility, improvements such as wider corridors and ramps could enhance mobility and participation. This aligns with He et al. (2020), who stress the importance of barrier-free design to promote independence.

4. Privacy and Personal Space

Privacy concerns were also highlighted, with a satisfaction score of 3.6. The results suggest that shared living spaces often fail to provide the personal space needed for maintaining dignity. This finding is consistent with Lee et al. (2021), who emphasize the importance of private areas for elderly residents to ensure autonomy and privacy.



5. Limitations of the Study and Future Research

While the study provides valuable insights, it is limited by a small sample size. Expanding the study to include more diverse populations would provide a broader understanding of elderly care needs. Future research could also explore additional environmental factors such as air quality and noise levels.

6. Limitations of the Study and Future Research

Based on the findings, several design principles can be translated into specific, actionable guidelines for practice:

Prioritize Lighting: Ensure sufficient lighting in communal and private spaces to enhance comfort and reduce isolation.

Design Flexible Social Spaces: Create adaptable areas for group activities and informal social interactions to foster community.

Enhance Accessibility: Focus on barrier-free design, ensuring that corridors and doorways are wide enough for easy movement.

Improve Privacy: Incorporate private spaces and flexible room layouts to meet residents' need for autonomy and control.

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