THE IMPACT OF INTERIOR DESIGN ELDERLY CARE FUNCTIONAL SUPPORT IN OLD HOMES FOR THE ELDERLY'S QUALITY OF LIFE

Huiling Liu[1], A. K. Mahbubul Hye[2]

School of Management, Metharath University[1-2]
Thailand[1-2]

Email: huihuilang.lhl@163.com [1-2]

Received: April 5, 2023; **Revised:** October 2, 2023; **Accepted:** October 2, 2023

Abstract

The purpose of this study is to explore the decision of elderly care function planning in the interior design of Old People's Home and examine the support framework of interior design to improve the quality of life of the elderly and try to positively affect the quality of life of the elderly. In this study, based on the comprehensive interior design support theory for elderly care functions, combined with previous studies on the relationship between living environment or elderly care service supply and the quality of life of the elderly, this study conducted a questionnaire survey on 461 elderly people in Taiyuan City, Shanxi Province, China by using qualitative analysis. SPSS was used to analyze the data obtained from the questionnaire statistically. The functional factors of interior design for the elderly that had a significant impact on the quality of life of the elderly were identified. The hypothesis and impact model was verified by structural modeling (SEM).

The results of the study show that the supporting factors of elderly care functions in interior design have a positive impact on the quality of life of the elderly. In addition, the educational background and family status of the elderly play a moderating role. This paper discusses the enlightenment of these research results to the research on the optimization of elderly care functions in the interior design of elderly care institutions and the practice of interior design.

Keywords: Old people's home; Interior design; old people; Elderly care functional support; Quality of life

Introduction

According to the "2021 National Aging Development Bulletin" issued by the Chinese Health and Health Commission, by the end of 2021 in China, the number of elderly adults aged 60 and over has reached 267 million, accounting for 18.9% of the total population. According to the 2019 data of the Ministry of Civil Affairs of China, there are only 34,369 elderly care institutions. Imbalance between elderly care demand and supply: The level of elderly care demand has increased and diversified, forcing the living needs of many elderly people to depend on their living environment. (Chen, 2020) The importance of interior design to the living environment has been widely recognized (Zhang & Zheng, 1991). Research on the living environment for the elderly focuses on: aging-friendly and barrier-free design, elderly care service supply, and design status; currently there is a lack of theoretical and empirical research on the support of elderly care functions from the perspective of interior design.

The “Code for Architectural Design for the Elderly” published by the Ministry of Construction of China in 1999 pointed out that Old People's Home is a group housing specially designed for the elderly, providing social services such as catering, sanitation, medical care, and entertainment. As an index to measure the living environment, the quality of life reflects the state of the elderly's physical, psychological, and social functions, as well as their material and spiritual needs. From the perspective of interior design support for the elderly care function, this article analyzes the questionnaire data and tries to find out the support factors for the elderly care function that have a significant impact on the quality of life, provide a basis for the decision-making of the optimal design of the living environment function, put forward optimization suggestions, and try to provide assistance for the elderly. A living environment that improves the quality of life.

Research Objectives

1. Research on the types of support functions for the elderly that the indoor environment of Old People’s Home should have.

2. Understand the dimensions of the quality of life of the elderly, and discover the supporting factors of the elderly care function in interior design that have a significant impact on the quality of life of the elderly.

3. Decide on the types of supporting functions for the elderly that the interior design of Old People's Home should have, and formulate optimization design suggestions for the elderly care functions in the interior design of nursing homes.

Literature Reviews

Interior Design Theory: Interior design is an extension of architectural design. Vitruvius summed up people's material and spiritual needs for architecture; the three principles of architecture are "Soundness, Functionality, and Attraction". Interior design is the functional planning of the interior space of a building based on the properties of use, creating a safe, functional, comfortable, and beautiful space environment, and providing users with a living environment that meets the material and spiritual needs of functions (Zhang & Zheng, 1991). Human settlements are divided into material function and spiritual function (Ning, Xiang, & Wei, 2002), which can be used as branches of independent variables.

Person-Environment Fit Theory: Person-Environment Fit (P-E Fit) is used to explain the mutual adaptability between the individual and the environment. American Lawton and Nahemow (1973) applied P-E Fit to explain the influence of living environment on individual aging. The attributes of the elderly group are: weaker physical functions, lower labor capacity, and fewer social relationships. Some older adults are at risk due to lack of relevant environmental support (Lawton, Windley, & Byerts, 1982). Carp's human-environment congruence model (Carp & Carp, 1984) uses the resource support in the living environment to meet and balance individual needs.

Hierarchy of Needs Theory: In 1943, Maslow's hierarchy of needs divided human needs into 5 levels: physiological, safety, social, esteem, and self-actualization. Professor Mu Guangzong of China summed up the evolution law of the upgrading of the needs of the elderly, that is, gradually expanding from the implicit material needs to the explicit spiritual needs.

Elderly Care Service Supply System: Elderly care service is a general term for policy measures adopted by the state, society and individuals, as well as facilities and services provided.

Elderly care service supply is the behavior and result of providing services for the elderly. It involves supply methods, contents, systems, institutions, and facilities (Wang, 2018). This article studies the supply content, including life care, medical care, cultural education, leisure and entertainment, and spiritual comfort.

Quality of Life Theory: The World Health Organization (WHO, 1996) defined Quality of Life (QoL): an individual's perception of a situation or condition in relation to life goals, expectations, standards, etc. It is composed of physiological state, mental state, family relationship, health quality and living environment factors.

According to the research theme, since the “living environment” is repeated with the independent variable indoor environment, the institutional elderly care focuses on the social relationship level, and the "physiological state" is similar to the "health quality". Therefore, the quality of life in this study is defined as three dimensions: physical health, mental health, and social relations.

Theoretical Constructs: Old People’s Home Interior Design’s Functional Support for the Elderly. Carp (1984) used the P-E Fit theory to explain that the use of resource support in the living environment to meet and balance individual needs can help improve the living satisfaction and well-being of the elderly. The elderly care function support in interior design is the spatial function of providing elderly care services, so that the elderly care resource support in the living environment matches the needs of the elderly. According to the level of needs of the elderly, the living environment should meet the functional support of medical care and life care for their physiological needs. Accessible design support for security needs. Functional support of cultural entertainment and spiritual care to meet the spiritual needs of social interaction, being respected, and self-realization.

The above functional support is the 5 dimensions of interior design elderly care functional support. Medical, Daily Care, Barrier-Free are classified as material support. Recreation and Hobby and Spiritual Care belong to mental function support.

Elderly Care Functional Support and the Elderly’s Quality of Life. ‘Active Aging” framework (WHO, 2002): Provide “health, participation and

security" services for the elderly to improve their quality of life. Health is the quality of physical and mental health. This study is reflected in the functional support of medical care and psychological care. Participation is the participation of the elderly in social affairs according to their health and social needs. It is reflected in the provision of spatial functional support to meet social activities and enhance social participation. Security is the provision of security and support for material life. It is reflected in the functional support of life care and barrier-free design. This shows that providing elderly care functional support related to 'health, participation, and security" is conducive to improving their quality of life.

The material function support of the living environment has a significant positive impact on the quality of life of the elderly.

H1: Medical care function has a significant positive impact on physical health.

H2: Daily routine care has a significant positive impact on physical health.

H3: Daily routine care has a significant positive impact on Mental Health.

H4: Daily routine care has a significant positive impact on social relationship.

H5: Barrier-free Design has a significant positive impact on physical health.

H6: Barrier-free Design has a significant positive impact on mental health.

The mental function support of the living environment of the elderly has a significant positive impact on their quality of life.

H7: Recreation and hobby function has a significant positive impact on physical health.

H8: The Recreation and hobby function has a significant positive impact on mental health.

H9: The Recreation and hobby function has a significant positive impact on social relationship.

H10: Spiritual care has a significant positive impact on mental health.

H11: Spiritual care has a significant positive impact on social relationship.

Educational background and family relationship: Wang Yang et al. (2022) found that the possibility of the elderly participating in social activities increases with the increase in the number of years of education, and the educational background has a moderating effect on the social participation of the elderly, indicating that the elderly group has a moderating effect on the quality of life due to different levels of education. Zhang Xiaohua (2021) verified that the elderly with a high level of education will know how to use society and resources better, pursue a healthier lifestyle, and play a role in regulating health status. They will participate in more social activities, have higher requirements on the quality of life, and play a regulating role on the mental state.

He Lin et al. (2022) proved that the support of family intergenerational relationship has a certain degree of influence on the mental status and well-being of the elderly. Family relationship support is the main factor regulating the quality of life of the elderly. The Closer the family relationship, the higher the life satisfaction of the elderly. These studies have shown that the education background and family status of the elderly have a mediating effect on the relationship between environmental resources and quality of life.

H12: The education background of the elderly can positively regulate the relationship between environmental resources and quality of life. A high level of education contributes to the quality of life.

H13: The family status of the elderly can positively regulate the relationship between environmental resources and quality of life. A good family status can promote the quality of life.

Research Methodology

Population: The service target of Old People's Home is the elderly over 60 years old in Taiyuan City, Shanxi Province, China. According to statistics from the Shanxi Provincial Bureau of Statistics in China in 2021, there are a total of 854,500 elderly people.

Sample: The Yamane formula was used to determine the sample size. $n=N / (1+Ne^2)$, n is the sample size, N is the population size, and e is the sampling error assumed as 0.05. The sample size n=854500/ (1+854500 (0.052), is close to 400 people. Therefore, the minimum valid survey sample in this study

is 400. In order to ensure the number of valid samples, 500 questionnaires were distributed, and a total of 461 valid questionnaires were recovered, the effective rate is 92.2%.

Research Instruments: The Research adopts quantitative analysis, and constructs the dimensions and indicators of each variable based on theoretical research. On the basis of referring to the two mature scales of pension service and WHOQOL-BREF, the evaluation method and questionnaire indicators of the elderly care function and quality of life in the living environment are designed in this study. After 5 experts scored the scale, the Item Objective Consistency (IOC) test result was 0.83, which proved that the content validity of the scale was high. The reliability analysis of 108 valid questionnaires was carried out through the pre-test, and the Cronbach's α coefficient was higher than 0.8, indicating high reliability. The exploratory factor was used to test the construct validity, the KMO value was 0.829, greater than 0.6, and the significance of the Bartlett test was less than 0.05. The absolute value of each factor loading coefficient is greater than 0.5, and each index has passed the KMO and Bartlett tests, indicating that the validity of the questionnaire is high.

Data analysis techniques: Through the questionnaire survey, SPSS was used to statistically analyze the collected data of 461 valid questionnaires. Amos was used to establish a structural equation model (SEM), and the model fit was tested.

Results

Correlation Analysis: Correlation analysis is used to discover the degree of correlation of multiple variables. A correlation coefficient of * indicates that there is correlation; otherwise, there is no correlation. A correlation coefficient >0 is positively correlated, and <0 is negatively correlated.

Table 1: Relativity

	Physical Health	Mental Health	Social Relationship	QOL (Average Quality of Life)
Medical Care	0.485***	0.261***	0.423***	0.494***

Daily Routine Care	0.466***	0.300***	0.425***	0.507***
Barrier-Free Design	0.471***	0.283***	0.372***	0.481***
Recreation and Hobby	0.410***	0.303***	0.392***	0.473***
Spiritual Care	0.485***	0.338***	0.415***	0.531***
FS (Functional Support)	0.639***	0.407***	0.558***	0.683***
* p<0.05 ** p<0.01 *** p<0.001				

Table 1: shows that Physical health, Mental health, social relationship, QOL, and all 6 items of Medical Care, Daily Routine Care, Barrier-Free Design, Recreation and Hobby, Spiritual Care, and FS all showed significant correlation. The coefficient values are all greater than 0, indicating that there is a positive correlation between the dimension of quality of life and the five dimensions of interior design elderly care functions.

Path Analysis: Structural Equation Modeling (SEM) is based on the variable matrix to analyze the relationship between variable features and features. Using SEM, establish the model relationship between multiple variables, analyze the data, verify the path coefficient, and the influence relationship between each factor.

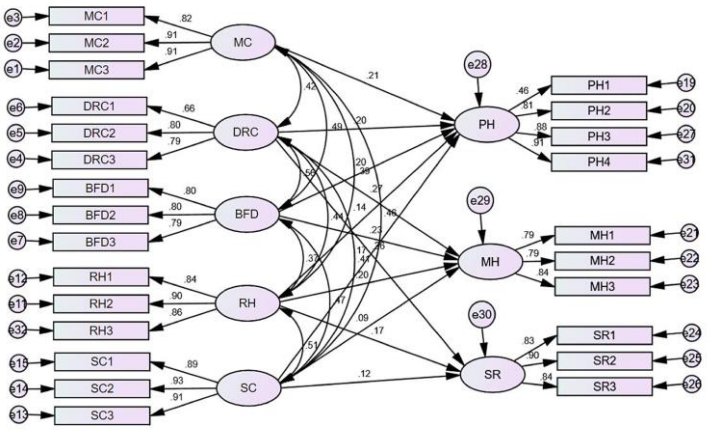

Figure 1: Coefficients

Table 2: Model fitting Index

Common Index	χ^2/df	GFI	RMSEA	RMR	CFI	NFI	NNFI
Criterion	<3	>0.9	<0.10	<0.08	>0.9	>0.9	>0.9
Value	1.7	0.933	0.039	0.059	0.976	0.944	0.972

First, analyze the model fitting. The chi-square degree of freedom ratio χ^2/df is less than 3, and most of the other indicators have good fitting effects. Passing the test values shows that the model effect is good.

Table 3: Path Coefficient

No.	Paths			Standard Coefficient	Non-standard Coefficient	S.E.	C.R.	P	Result
	Y		X						
H1	Physical Health	<--	Medical Care	0.259	0.105	0.022	4.776	***	Accepted
H2	Physical Health	<--	Daily Routine Care	0.293	0.163	0.033	4.896	***	Accepted
H3	Mental Health	<--	Daily Routine Care	0.146	0.169	0.08	2.122	0.034	Accepted
H4	Social Relationship	<--	Daily Routine Care	0.267	0.226	0.056	4.022	***	Accepted
H5	Physical Health	<--	Barrier-Free Design	0.2	0.079	0.021	3.674	***	Accepted
H6	Mental Health	<--	Barrier-Free Design	0.054	0.044	0.049	0.904	0.366	Rejected
H7	Physical Health	<--	Recreation & Hobby	0.138	0.057	0.022	2.617	0.009	Accepted
H8	Mental Health	<--	Recreation & Hobby	0.172	0.148	0.051	2.898	0.004	Accepted
H9	Social Relationship	<--	Recreation & Hobby	0.24	0.15	0.033	4.55	***	Accepted
H10	Mental Health	<--	Spiritual Care	0.228	0.29	0.087	3.345	***	Accepted
H11	Social Relationship	<--	Spiritual Care	0.274	0.254	0.058	4.377	***	Accepted

Table 3: shows the p-value and the Standard Coefficient, which determines whether there is a direct linear effect on the path (X—>Y). If the P value is less than 0.05, there is a significant relationship between the variables. The results in Table 3 verify the research Hypothesis, H1, H2, H3, H4, H5, H7, H8, H9, H10, H11 are Accepted. H6 is Rejected.

Moderator effect analysis: Multiple regression analysis was used to test the regression effect of the interaction term of the independent variable and the moderator variable on the dependent variable, and to verify the moderation effect of educational background (EDU) and family status (FAM).

Table 4: Adjustment Model Coefficient Summary (EDU), (FAM)

		Dependent Variable: QOL	
		M1 (EDU)	**M1** (FAM)
Constant		-0.056	-0.025
Independent Variable	FS	0.693***	0.688***
Moderator	EDU / FAM	0.034	-0.024
Int	FS×EDU / FS×FAM	0.164*	0.259***
	R^2	0.474	0.510
	F	137.472	158.208
	P	0.000	0.000

p<0.05， * p<0.01, ** p<0.001, ***

Table 4: shows that the coefficient of determination R^2 of the model is 0.474 and 0.510 respectively, which means that the part of the dependent variable that can be explained by the regression equation is 47.4% and 51%. The overall significance of the regression model is tested, and the significance of the F value is less than 0.05, reaching the significance level, indicating that the established regression model is effective.

The t-test significance of FS is less than 0.05, and the regression coefficient is greater than 0, indicating that FS has a significant positive impact on QOL. The t-test significance of the interaction items of FS×EDU and FS×FAM is less than 0.05, and the regression coefficient is greater than 0, indicating that EDU and FAM have a significant positive regulatory effect.

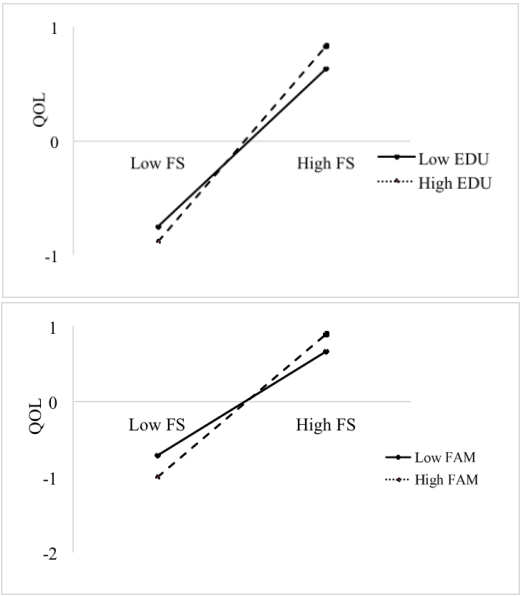

Figure 2: Moderator analysis (EDU), (FAM)

The results of multiple regression analysis verified the Hypothesis, and H12 and H13 were Accepted. The Educational background (EDU) and Family status (FAM) of the elderly, as Moderators, can positively adjust the relationship between living environment and quality of life. A high level of education and good family relationships can significantly improve the quality of life.

Discussions

According to the data results, it is concluded that the functional dimension of the elderly in interior design has a significant impact on the quality of life of the elderly (Table 5). Medical care, Daily Routine Care, Barrier-Free Design, Recreation and Hobby functions have a significant impact on the physical health of the elderly. Medical care, Recreation and Hobby, and Spiritual Care functions have a significant impact on mental health. The functions of Daily Routine Care, Recreation and Hobby, and Spiritual Care have a significant impact on the social relationship of the elderly.

Table 5: Interior functional Dimensions affecting the quality of Life of the elderly

Quality of life dimension	Influencing factors
Physical health (PH)	Medical care (MC)
	Daily Routine Care (DRC)
	Barrier-Free Design (BFD)
	Recreation and Hobby (RH)
Mental health (MH)	Daily Routine Care (DRC)
	Recreation and Hobby (RH)
	Spiritual Care (SC)
Social relationship (SR)	Daily Routine Care (DRC)
	Recreation and Hobby (RH)
	Spiritual Care (SC)

From the perspective of interior design, it can be summarized as follows:

Among the material functions of the living environment, it has the functions of medical care, Daily Routine Care, and Barrier-Free Design, which can improve the physical health quality of the elderly. Daily Routine Care can also improve their mental health and social relationships. Among the mental functions, it has the function of Recreation and Hobby, which can improve the physical health, mental health and social relationship of the elders. Having Spiritual Care can improve their mental health and social relationship (Table 6).

Table 6. The influence of providing for the aged function in the Design of living Environment.

Environment	The pension function of living environment	Impact on the dimension of quality of life
Material Function Support	Medical care (MC)	Physical Health (PH)
	Daily Routine Care (DRC)	Physical Health (PH) Mental Health (MH) Social Relationship (SR)
	Barrier-Free Design (BFD)	Physical Health (PH)
Mental Function Support	Recreation and Hobby (RH)	Physical Health (PH) Mental Health (MH) Social Relationship (SR)
	Spiritual Care (SC)	Mental Health (MH) Social Relationship (SR)

New Knowledges

The elderly care functional support of Old People's Home interior environment will play a positive role in improving the elderly's quality of life. According to the multi-level needs of the elderly, improve and refine the functional space and facilities of public services such as medical care, daily care, barrier-free design, recreation and hobby, and spiritual care. Use these elderly care resources to meet and balance the problem of individual aging.

Conclusions

The article builds a theoretical framework based on literature research and clarifies multiple dimensions of research variables. According to the data analysis results, the significant factors affecting the quality of life of the elderly in terms of indoor environment elderly care function are summarized. These influencing factors can be used as the basis for functional planning decisions in Old People's Home interior design. According to the research theory, the influencing factors are analyzed and inferred, and the optimization suggestions for the functional planning of the living environment that are conducive to improving the quality of life of the elderly are summarized. Around the research topic, from the perspective of elderly care function support in the design of residential environment, it provides ideas for improving the quality of life of the elderly. It is hoped to provide theoretical basis and empirical research results for the practical work of elderly living environment design.

References

Carp, F.M., A. Carp, A. (1984). **A complementary/congruence model of well-being or mental health for the community elderly.** Elderly people and the environment, 1984(7), 279-336.

Chen K. (2020). **Research on the demand for elderly care services in institutions for the elderly and the current situation of service supply in elderly care institutions-Taking the urban area of Jinan as an example** (Doctoral dissertation). Shandong University, Jinan City.

He L. (2022). **Research on the influence of intergenerational relationship on the subjective well-being of the elderly** (Master dissertation). University of Chinese Academy of Social Sciences, Beijing.

Lawton, M.P., L. Nahemow, L. (1973). **Ecology and the aging process, in the psychology of adult development and aging.** Washington, DC, US: American Psychological Association, 619-674.

Lawton, M.P., Windley P.G., Byerts T.O. (1982). **Aging and the environment: theoretical approaches**. New York: Springer.

Ning Y.M., Xiang D., Wei L. (2002). **A Study on the Human Settlement Environment of Small Towns-Taking Three Small Towns in the Suburbs of Shanghai as Examples.** Urban Planning, 2002(10).

Organization W. H. (1996). **WHOQOL-BREF: Introduction, administration,** scoring and generic version of the assessment (field trial version).

Wang X. J. (2018). **Research on the supply of elderly care services** (Doctoral dissertation). Central Party School of the Communist Party of China, Beijing.

World Health Organization. (2002). **Active ageing: A policy framework.** World Health Organization. Noncommunicable Disease Prevention and Health Promotion Department.

Wang Y., Wu Z. D., Chen G. (2022). **Study on the predictive effect of education level on the university participation rate of the elderly** (Master dissertation). Aging Science Research, 10(10): 1-15.

Zhang Q.M., Zheng S.Y. (1991). **Collection of Interior Design Materials.** Beijing: China Architecture and Building Press.

Zhang X. H. (2021). **The impact of education level on the health of the elderly in China-Evidence based on CHARLS data.** Shandong University, Jinan.