
THE INFLUENCE OF ELDERLY-FRIENDLY PUBLIC SPACES AND STAKEHOLDER PERSPECTIVE ON THE QUALITY OF LIFE IN URBAN MICRO-DISTRICTS OF FUZHOU CITY, FUJIAN PROVINCE, CHINA

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Abstract

Fuzhou City, located in China's Fujian Province, exemplifies the demographic transformation underway. The city's elderly population is growing, with individuals aged 60 and above constituting 16.76% of its municipal population. This demographic shift, coupled with increasing urbanization, underscores the urgent need to enhance public spaces to serve the requirements of elderly individuals better. This study, therefore, aims to investigate the influence of elderly-friendly public space and stakeholder perspective on the quality of life in urban micro-districts of Fuzhou City, Fujian Province. The quantitative method based on questionnaires is applied. Descriptive statistics such as frequency, percent frequency, arithmetic mean, and standard deviation are introduced. Various inferential statistical methods are used to test the hypothesis, particularly the Independent Samples t-test, the One-way ANOVA, and the Multiple Linear Regression analysis. The results obtained from the study indicate that differences in Gender, Marital Status, Duration of Residence, Living Arrangement, Type of Housing, and Mobility Limitation generate differences in Quality of Life in urban micro-districts of Fuzhou City, Fujian Province. Differences in Elderly Utilization Patterns generate differences in Quality of Life in urban micro-districts of Fuzhou City, Fujian Province. Differences in Stakeholder Involvement in Public Space generate differences in Quality of Life in urban micro-districts of Fuzhou City, Fujian Province. The results obtained from the Multiple Linear Regression Analyses show that there are significant positive impacts of all aspects of Public Space Characteristics (Accessibility, Safety Measures, and Types of Amenities) on Quality of Life in urban micro-districts of Fuzhou City, Fujian Province.

Keywords: Elderly Utilization Pattern, Stakeholder Involvement in Public Space, Public Space Characteristics, Quality of Life, Fuzhou City

Introduction

In 2021, Fuzhou City was officially identified as one of the first pilot urban quarter-hour convenience living circle areas in China. In December of the same year, the Fuzhou Municipal People's Government issued the "Fuzhou City Pilot Program for Promoting the Construction of Urban Quarter-Hour Convenient Living Circle" (Xie et al., 2023). The difficulty of running this program is the significant deficiency in elderly-friendly public spaces, a concern that is becoming increasingly critical as the global and local populations age. This deficiency is particularly pronounced in the urban context of Fuzhou City, where the rapid demographic shift towards an older population is not adequately mirrored by the development of public spaces catering to this age group's needs. The issue's core lies in the existing urban design and public infrastructure, which often overlook the unique requirements of the elderly, such as safe pedestrian pathways, ample resting areas, accessible public transportation, and inclusive recreational facilities. The designation "elderly people" refers to those in the advanced stages of life, typically encompassing individuals aged 65 years or older, while those from 65 through 74 years old are referred to as "early elderly" and those 75 years old or older as "late elderly" (Orimo et al., 2006).

Urbanization is a complex process encompassing the urban population, the expansion of the urban scale, and a series of economic and social changes. Its essence is the change of the urban economic, social, and spatial structures (McDonnell et al., 1997; Pickett et al., 2001; Luck & Wu, 2002). In the process of urbanization and industrialization, the problems of landscape fragmentation and green space isolation are of particular concern, as these weaken the stability of the urban ecosystem. The problem of the urban ecological environment has thus gained wide attention and become the subject of much scientific research. Recognition of the importance of green space in urban ecosystems has led to considerable work on urban green space planning to improve the urban environment and enhance the quality of life (Yu et al., 2012; Jongman, 2008).

The specific challenges identified within the current urban design and public spaces in Fuzhou concerning the elderly population include a lack of safe, accessible walkways that account for mobility challenges; insufficient seating and rest areas; inadequate shade and shelter in outdoor spaces; and a general absence of amenities designed with the elderly in mind. Furthermore, there is a gap in community engagement processes that should inform the planning and development of these spaces, ensuring they are genuinely inclusive and reflective of elderly needs. As a significant city on China's southeastern coast, Fuzhou has a notably representative urban ecosystem (Bao et al., 2022). Under the cover of the urban fabric, Fuzhou has seen many urban villages emerge, leading to a mix of buildings in the main urban area, a continuous reduction

in wetland areas, insufficient and fragmented green space quality (Cai et al., 2019), and significant urban development disparities and environmental issues (Chen et al., 2023). This study is necessitated by the urgent need to address the challenges faced by the elderly population in accessing and enjoying public spaces in Fuzhou. By focusing on the identified gaps and challenges, the research aims to contribute meaningful solutions that enhance the quality of urban life for older citizens. It endeavors to bridge the current divide between urban planning and the actual needs of the elderly, fostering a more inclusive, accessible, and engaging urban environment. Through its outcomes, this research aims to improve Fuzhou's immediate urban landscape and serve as a model for similar urban settings globally, where aging populations are becoming increasingly prevalent.

Literature Review

1. Public Spaces

1.1 Urban Planning and the Management of Public Spaces

Urban planning is the process that is applied as a way to organize the dynamics of human actions in cities, with the purpose of stipulating guidelines that order spatial occupation through typological patterns of use, mobility, distribution of equipment, services, and natural areas in the territory, in order to provide uniformity in the distribution of the onus and advantages generated by the development of the infrastructures. The planning aims to announce in advance what can be done in the face of solving problems that may hinder the dynamics of functioning that involve cities. (Eckert & Padilha, 2021) Urban planning is a comprehensive field encompassing cities' design, organization, and development, addressing aspects like land use, transportation, infrastructure, environmental sustainability, and social equity. One critical facet of this discipline involves the thoughtful creation and management of public spaces—areas accessible to the public, such as parks, plazas, and squares. These public spaces serve as vital components shaping the quality of life in urban areas. Land use planning, including zoning regulations, ensures efficient space allocation for residential, commercial, industrial, and recreational purposes. Incorporating green spaces like parks enhances aesthetics and contributes to environmental sustainability. |

1.2 Inclusivity in Public Spaces

An inclusive public open space is one where the needs of every single individual are recognized and respected, affording them a positive experience regardless of their background. (Pansare & Salama, 2023). Public spaces, including recreational and social spaces, are often not prioritized. Inclusive public spaces are fundamental to participation and inclusion in society. Including persons with disabilities in the design and planning of the built environment while applying an intersectional approach supports equal rights and helps identify people's aspirations for inclusive environments. (Patrick & McKinnon, 2022).

The shift to inclusive and community-centric planning represents a contemporary evolution in urban planning philosophies, emphasizing the active involvement of diverse community members in decision-making processes. This transformation has been prompted by recognizing the limitations of top-down approaches and a desire to create cities that genuinely reflect the needs and aspirations of their residents. Inclusive planning strongly emphasizes diversity and equality, seeking to address the needs of various demographic groups within a community. It strives to ensure that the urban environment is accessible and welcoming to people of all ages, abilities, and socioeconomic backgrounds. The access and availability to public spaces can show how public spaces are, or not, an arena for public life: a place for individual and group expression; a forum for dialogue, debate, and contestation; a space for conviviality, leisure, performance, and display; a place for economic survival and refuge; a site for exchange of information and ideas; and a nature setting to exist in the city and to support the well-being of its inhabitants (Mehta & Palazzo, 2020). Public spaces are essential for just, inclusive, and resilient communities—just as they are essential for the future of environmental equity, public health equity, and an equitable right to the city. To establish truly equitable and inclusive public space networks, built environment professionals must consider the design and planning processes, site selection parameters, standards of quality, and funding mechanisms anew and redesign them when necessary. (Odbert, 2022).

A holistic approach to inclusivity extends to public transportation systems, where considerations for accessibility, such as low-floor buses and tactile signage, ensure that everyone can use these services comfortably. Participatory planning processes engage the local community in decision-making and amplify diverse voices and needs. Safety features, well-lit environments, and age-friendly urban design further contribute to the inclusivity of public spaces. Green and nature spaces, designed for accessibility, provide opportunities for relaxation and recreation, fostering a sense of connection with the environment. In prioritizing inclusivity, cities cultivate environments that celebrate diversity, enhance social cohesion, and improve their residents' overall quality of life.

1.3 Characteristics of a Good Public Space

The essential quality achieved in public space is its welcoming character for all the public. According to (Whyte, 1980), in his research work on "The Social Life of Small Urban Public Spaces," he conducted time-lapse video observations in various urban public spaces to understand people's behavior in public spaces. In

his research, he found that the availability of seating space forms the sociability of space. It is a basic tendency of people to sit where there is a place to sit. Children densely use playgrounds, plazas, and squares used by adults; couples use romantic scenic beauty spaces like parks and fountains, and older adults frequently use street corners and neighborhood parks. Later, his research on public spaces continued by establishing an organization called "Project for Public Spaces (PPS)" to create all urban public spaces. This organization worked on over 3000 urban public spaces and observed four key attributes for making urban public spaces great. These are Access and Linkages of the Public Space (Surico, 2023); Legibility/Readability of the Public Space (Lynch, 1964; Ujang, 2012); Comfort and Image of the Environment (Peinhardt, 2023; Francis, 2010; Mahadevia, 2016); Uses and Activities; and Sociability of the space (<https://psychology.tips/sociability/>). Each key attribute is further measured in multiple dimensions.

Designing urban spaces for the elderly requires incorporating humanized design strategies that meet their physiological and psychological needs. Good practices in this regard include considering the principles of universal design, ensuring accessibility and safety for seniors, and addressing both functional and aesthetic aspects (Fabisiak et al., 2023). The design of urban spaces should consider the impact on the mood and behaviors of people with mental illnesses and conditions, promoting walkability, free flow, and harmonious interaction indoors and outdoors (Tracada, 2022). Green space is considered as the lungs of the city. It has immense health benefits, mainly for older people. Regular physical activity in green spaces considerably reduces health risks of cardiovascular disease, respiratory problems, high blood pressure, paralysis, diabetes, and other chronic diseases. Besides, it facilitates social interactions and promotes a sense of community among the citizens, which is very important for the health and well-being of people, especially for elderly, because they predominantly suffer from the social isolation problem. (Ali et al., 2022)

Public spaces play a crucial role in urban environments by providing places for vibrant social life, a wide range of activities, and the interaction between people and the city (Ewertowski, 2023). They are accessible and egalitarian, making them valuable areas for research on the relationship between space and culture (Wicaksana et al., 2023). Public spaces contribute to urban well-being, health, and quality of life and are essential for people of all ages, including children, older adults, and urban youth (Kargina et al., 2022). They are essential for active aging and rejuvenating urban life (Fejza, 2022). The key elements that create a quality public space are open, artifact, theatrical (Henaff & Strong, 2001), atmosphere, and moods (Pérez--Gómez, 2016). The quality of being open, artifact, and theatrical are all interlinked with human perception, recognition, and interaction within the public space. Spatial atmospheres that create moods of positive emotions have a direct connection with the inner human spirit.

2. Elderly Utilization Patterns of Public Spaces

Gerontological research on public space utilization underscores the pivotal role of public spaces in shaping the well-being of older adults. A central theme in this research is the recognition of public spaces as key facilitators of social interaction and community engagement for seniors (Buffel, 2016). It highlights the role of public spaces in fostering community engagement and participation among older adults. Events, markets, and activities held in public spaces allow seniors to actively contribute to community life, fostering a sense of belonging (Wiles et al., 2012).

Designing public spaces with a community-centric approach encourages older individuals to participate actively in public life, promoting a sense of purpose and social connectedness. Engaging in social activities in public spaces enhances well-being and addresses issues of social isolation and loneliness commonly experienced by older individuals. The design and planning of public spaces play a critical role in fostering these connections among the aging population. Accessibility and inclusivity emerge as essential considerations in gerontological research on public spaces. Ensuring that public spaces are accessible to individuals with diverse abilities and mobility levels is crucial (Wahl et al., 2012). This includes wheelchair accessibility, clear pathways, and amenities like public seating. Creating environments that accommodate age-related changes enhances the utilization of public spaces by a broader demographic of older individuals. Safety and security perceptions significantly impact older adults' utilization of public spaces. Well-lit and well-maintained spaces contribute to a sense of safety, encouraging seniors to participate in outdoor activities and community events. Addressing concerns related to personal safety is essential for maximizing the utilization of public spaces by the aging population. Cognitive and emotional well-being are also influenced by the design of public spaces. Access to aesthetically pleasing environments, green spaces, and cultural amenities positively impacts mood and cognitive function (Gonzalez & Kirkevold, 2014). Incorporating these elements into public space design contributes to the overall well-being of older individuals.

3. Stakeholder

Stakeholder theory posits that successful urban planning requires understanding and balancing the often conflicting interests of different stakeholders. Engaging stakeholders throughout planning helps create more responsive, equitable, and socially beneficial urban environments (Freeman, 1984). Effective communication and stakeholder collaboration are integral to stakeholder theory in urban planning. By incorporating the input of diverse stakeholders, planners can develop solutions that consider a broad range of perspectives, leading to more sustainable and socially responsible urban outcomes. In urban development, stakeholder theory aligns with principles of participatory planning, community engagement, and inclusive

decision-making. This approach recognizes that a collaborative and transparent planning process is essential for achieving positive urban development outcomes (Reed, 2008).

Stakeholder theory recognizes that urban planning decisions have significant implications for the well-being and quality of life of the people living in a city. It encourages identifying key stakeholders, understanding their concerns, and actively involving them in planning. This can be achieved through public consultations, workshops, focus groups, and other participatory methods that seek input and feedback from those whom the urban development initiatives will directly impact. Ozdemir et al. (2023) state that in the current business environment, collaborations with various stakeholders allow organizations to access information and knowledge, reduce costs and risks, and quickly increase their opportunities to develop new products and services.

4. Quality of Life and Public Spaces

The connection between public spaces and urban environments' overall quality of life is profound. Well-designed public spaces, fostering social interaction and community engagement, contribute significantly to residents' sense of belonging and cohesion. Accessibility measures, including ramps and designated seating, enhance inclusivity, positively impacting the satisfaction of diverse individuals. Green spaces within urban areas directly influence mental well-being, providing residents with opportunities for relaxation and recreation. Prioritizing safety, cultural and recreational amenities, economic viability, and environmental sustainability in public spaces collectively contribute to an enriched urban experience, promoting a higher quality of life. Thoughtful urban planning that considers these factors ensures that public spaces become integral to residents' well-being, satisfaction, and overall sense of community.

The urban quality of life is the outcome of man's interaction and the urban environment (Das, 2008). The satisfaction level with the urban environment is one of the indicators of quality of life (Nasution & Zahrah, 2018). One of the urban environment's elements is public open space. Thus, the satisfaction level of public open space influences the satisfaction with the urban environment and affects people's quality of life. Public open space, both as a physical structure and a place for many kinds of activities, significantly benefits the quality of life, especially in fulfilling people's needs for health, recreation, and a high-quality urban environment. Trees and gardens as public open space features may give relaxation and restoration effect just by seeing them (Ulrich, 1979) and decreasing stress (Nasution & Zahrah, 2018). As a place for many activities, public open space provides some advantages for quality of life, such as psychological and physical health, recreation benefits, and the fulfillment of the need for a pleasant urban environment (Maller et al., 2009; Kaplan and Kaplan, 1989).

4.1 Elderly Needs and Preferences for Public Space

Meeting the needs of the elderly in public spaces is a multifaceted endeavor that requires careful consideration of various factors. First and foremost, accessibility is paramount. By universal design principles, ensuring wheelchair-accessible paths, ramps, and elevators facilitates easy navigation for individuals with varying physical abilities (World Health Organization, 2007). Clear signage with easy-to-read fonts and symbols enhances wayfinding, contributing to a more navigable environment for seniors. Safety measures such as well-lit pathways, handrails, and non-slip surfaces mitigate hazards, creating a secure space for elderly individuals to move freely.

An age-friendly approach extends beyond physical considerations to encompass programming and community engagement. Designing public spaces with age-friendly events and activities in mind fosters social engagement among older individuals. Outdoor fitness classes, cultural events, and recreational programs cater to the interests and abilities of seniors, promoting a vibrant and inclusive community atmosphere (World Health Organization, 2007). Safety from environmental elements is another crucial aspect of creating elderly-friendly public spaces. Designing spaces that offer protection from extreme weather conditions, such as shaded areas, shelters, and well-ventilated spaces, ensures the comfort and safety of older individuals during various seasons. Lastly, acknowledging the increasing role of technology in the lives of older adults is essential. Integrating technological features, such as smart benches with charging stations or informational kiosks, enhances the experience of older individuals in public spaces, aligning with this demographic's evolving needs and preferences (World Health Organization, 2007).

4.2 Elderly Well-being and Social Inclusion

Beck (2009) states that numerous small-scale research studies have examined the benefits of high-quality public spaces regarding their economic, social and environmental value. However, a national evidence base to inform policy agendas relating to well-being and liveability is lacking. Urban environments profoundly influence individuals' well-being, shaping physical health, mental health, and overall quality of life. Access to green spaces, such as parks and gardens, has been associated with improved mental health and reduced stress, providing opportunities for relaxation and physical activity (Bowler et al., 2010). However, challenges like air and noise pollution in urban areas can harm respiratory and cardiovascular health, highlighting the need for strategies to mitigate these negative impacts (Stansfeld & Matheson, 2003; World Health Organization, 2018).

Urban design and walkability are pivotal in promoting physical activity, reducing traffic-related stress, and enhancing community connectivity. Well-designed, pedestrian-friendly environments with accessible

sidewalks contribute to a more active and healthier population (Sallis et al., 2016). Additionally, social connectivity and community design are crucial factors influencing well-being. Urban planning that fosters social interactions, community engagement, and inclusivity contributes to enhanced well-being by reducing feelings of isolation (Dye, 2008).

Access to healthcare and essential services is another determinant of well-being in urban settings. Proximity to healthcare facilities and educational institutions ensures that residents can access necessary resources, contributing to improved health outcomes (Carpiano, 2009). Similarly, diverse employment opportunities in urban areas positively influence economic well-being, job satisfaction, and overall life satisfaction (Oswald & Wu, 2010).

Safety and security in well-lit urban environments contribute to residents' feelings of comfort and well-being. Enhanced safety measures and reduced crime rates positively impact mental well-being (Gatersleben & Griffin, 2017). Moreover, cultural and recreational opportunities, such as access to events and entertainment options, enhance the overall quality of life in urban settings (Holt et al., 2019).

Research Methodology

The population of this research is elderly people in Fuzhou City, Fujian Province, the People's Republic of China. According to the World Population Review, Fuzhou City, Fujian Province, the People's Republic of China is forecasted as approximately 3,998,754 persons in 2024. Elderly persons in Fuzhou City, Fujian Province, are recorded as about 16.76% (60 and above) or about 11.72% (aged 65 and above). The population of this study based on those aged 60 and above is therefore equal to 639,800 persons, that is, $((3,998,754 \times 16) / 100 = 639,800)$. The method for calculating the sample size in this study is based on the formula of Yamane (1967), $n = \frac{N}{(1+N)(e^2)}$ where n represents the sample size, N is the total number of population, and e is the sampling error at the critical level of 0.05. Fuzhou City, Fujian Province, the People's Republic of China, is estimated at about 639,800 persons. Therefore, the total sample is about 400 units. The convenience sampling technique was employed to determine the sample size, which is particularly effective in capturing a diverse representation from different districts, age groups, and socioeconomic backgrounds among the elderly population. A total of 400 valid data obtained are analyzed by using an advanced statistical program. The validity under the IOC (Item-Objective-Congruence) method and reliability of the questionnaires based on Cronbach's alpha coefficient are satisfactory. To describe the data, the research selected the most appropriate descriptive statistics, such as absolute frequency, percent frequency, arithmetic mean, and standard deviation. Inferential Statistics, namely, Independent Samples t-tests, One-way ANOVA, and Multiple Linear Regression Analysis are also used for testing the hypothesis.

1. Descriptive Statistics

1.1 Demographic Factors

Table 1: The Frequency and Percent Frequency Classified by Demographic Factor

Demographic Factor	Classification	Frequency	% Frequency
1. Gender	Male	192	48.00
	Female	208	52.00
2. Marital Status	Single	104	26.00
	Married	235	58.75
	Divorced	61	15.25
3. Age	60 but less than 65 years old	58	14.50
	65 but less than 70 years old	161	40.25
	70 but less than 75 years old	110	27.50
	75 years old and more	71	17.75
4. Education Background	Junior High School	62	15.50
	High School	86	21.50
	Diploma / Certificate	107	26.75
	Bachelor Degree	95	23.75
	Master's Degree and Ph.d	50	12.50
5. Residential District	Gulou District	118	29.50
	Cangshan District	135	33.75
	Taijiang District	147	36.75
6. Duration of Residence	Less than 1 year	64	16.00
	1 but less than 5 years	90	22.50
	5 but less than 10 years	129	32.25
	10 years and more	117	29.25
7. Living Arrangement	Alone	75	18.75
	With Partner	63	15.75
	With Friends	78	19.50
	With Family	93	22.25

	Others	91	22.75
8. Type of Housing	Shared Residence	79	19.75
	Apartment/Condominium	84	21.00
	Senior Living Facility or Retirement Community	51	12.75
	Single-family Home	99	24.75
	Others	87	21.75
9. Mobility Limitation	No	239	59.75
	Yes	161	40.25
Total		400	100.00

Table 1 shows that in the study, slightly more women (52%) than men (48%) participated. Most participants are married (58.75%), with singles at 26% and the divorced at 15.25%. The 65 but less than 70 age group is the largest (40.25%), followed by those aged 70 but less than 75 (27.5%), 75 and older (17.75%), and 60 but less than 65 years old (14.5%). In terms of education, most have a Diploma/Certificate (26.75%), followed by a Bachelor's Degree (23.75%), and few have a Master's or Ph.D. (12.5%). Most live in Taijiang District (36.75%), with others in Cangshan (33.75%) and Gulou Districts (29.5%). Most have lived at their current residence for 5 but less than 10 years (33.25%). Most live with family (22.25%); the most common type of housing is a Single-family Home (24.75%). Few live in Senior Living Facilities. Nearly 60% do not have mobility issues, while 40% do have.

1.2 Public Spaces Characteristics

Table 2: The Mean and Standard Deviation of Public Spaces Characteristics

Classification	Mean	Standard Deviation	Mean Rank	Meaning
1. Safety Measures	3.7992	.76231	1	High Level
2. Accessibility	3.7646	.76567	2	High Level
3. Types of Amenities	3.6938	.76828	3	High Level
Overall	3.7525	.68043	-	High Level

As shown in Table 2, it is indicated that Safety Measures are the most important aspect of Public space characteristics, with a mean of about 3.7992, followed by Accessibility and Types of Amenities, the means of which are about 3.7646 and 3.6938, respectively. Overall, the mean score of Public Spaces Characteristics is about 3.7525, which is high.

1.3 Quality of Life

Table 3: The Mean and Standard Deviation of Quality of Life

Classification	Mean	Standard Deviation	Mean Rank	Meaning
1. Elderly Needs and Preferences for Public Spaces	3.8149	.62155	1	High Level
2. Elderly Well-being and Social Inclusion	3.7627	.70610	2	High Level
Overall	3.7888	.63396	-	High Level

As far as the Quality of Life is concerned, Table 3 indicates that Elderly Needs and Preferences for Public Spaces are more important than Elderly Well-being and Social Inclusion. Overall, its mean is about 3.7888 which is evaluated as in the high level.

2. Inferential Statistics

2.1 Differences in Demographic Factors Generate Differences in Quality of Life

2.1.1 Differences in Gender Generate Differences in Quality of Life

$$H_0 : \mu_1 = \mu_2 \text{ and } H_a : \mu_1 \neq \mu_2$$

Table 4: The Independent Samples t-test of the Gender Factor

Items	Gender	N	Mean	S.D.	t-value	p-value
Quality of Life	Male	192	3.8641	.62848	2.199	.028**
	Female	208	3.7244	.63985		

The results obtained from the Independent Samples t-test shown in Table 4 indicate that the p-value of Quality of Life classified by Gender is about .028, much lower than the critical value of 0.05. Therefore, the null hypothesis H_0 is rejected, meaning that differences in Gender generate differences in Quality of Life.

2.1.2 Differences in Marital Status, Age, Educational Background, Residential District, Duration of Residence, Living Arrangement, Type of Housing, and Mobility Limitation Generate Differences in Quality of Life

$$H_0: \mu_i = \mu_j$$

$$H_a: \mu_i \neq \mu_j \text{ at last one Pair where } i \neq j.$$

Table 5: The One-way ANOVA of the Marital Status, Age, Educational Background, Residential District, Duration of Residence, Living Arrangement, and Type of Housing

Factors	Items	SS	df	MS	F=value	p-value
Marital Status	Between Groups	4.660	2	2.330	5.873	.003*
	Within Groups	157.477	397	.397		
	Total	162.136	399			
Age	Between Groups	1.291	3	.430	1.059	.366
	Within Groups	160.846	396	.406		
	Total	162.136	399			
Educational Back-ground	Between Groups	2.036	4	.509	1.256	.287
	Within Groups	160.100	395	.405		
	Total	162.136	399			
Residential District	Between Groups	2.036	4	.509	2.960	.053
	Within Groups	160.100	395	.405		
	Total	162.136	399			
Duration of Residence	Between Groups	7.483	3	2.494	6.387	.000*
	Within Groups	154.654	396	.391		
	Total	162.136	399			
Living Arrangement	Between Groups	21.619	4	5.405	15.193	.000*
	Within Groups	140.518	395	.356		
	Total	162.136	399			
Type of Housing	Between Groups	26.880	4	6.720	19.625	.000*
	Within Groups	135.256	395	.342		
	Total	162.136	399			

The results obtained from the One-way ANOVA shown in Table 5 indicate that the p-value of Quality of Life classified by Marital Status, Duration of Residence, Living Arrangement, and Type of Housing are about .003, .000, .000, and .000, respectively, which are much lower than the critical value of 0.05. Therefore, the null hypothesis H_0 is rejected, meaning that differences in Marital Status, Duration of Residence, Living Arrangement, and Type of Housing generate differences in Quality of Life. On the contrary, the p-values of Quality of Life classified by Age, Educational Background, and Residential District are about .366, .287, and .053, respectively, much higher than the critical value of 0.05. Therefore, the null hypothesis H_0 cannot be rejected, meaning that differences in Age, Educational Background, and Residential District generate no differences in Quality of Life.

2.1.3 Differences in Mobility Limitation Generate Differences in Quality of Life

$$H_0 : \mu_1 = \mu_2$$

$$H_a : \mu_1 \neq \mu_2$$

Table 6: The Independent Samples t-test of the Gender Factor

Items	Mobility Limitation	N	Mean	S.D.	t-value	p-value
Quality of Life	No	239	3.7857	.65621	-.218	.828
	Yes	161	3.7999	.61049		

The results obtained from the Independent Samples t-test shown in Table 6 indicate that the p-value of Quality of Life classified by Mobility Limitation is about .828, much higher than the critical value of 0.05.

Therefore, the null hypothesis H_0 cannot be rejected, meaning that differences in Mobility Limitation generate no differences in Quality of Life.

2.2 Differences in Elderly Utilization Pattern (Activities Engagement, How Usually Visit, How Often Visit, Time Spent, and Visiting Partner) Generate Differences in Quality of Life

$$H_0: \mu_i = \mu_j$$

$$H_a: \mu_i \neq \mu_j \text{ at last one Pair where } i \neq j.$$

Table 7: The One-way ANOVA of Elderly Utilization Pattern (Activities Engagement, How Usually Visit, How Often Visit, Time Spent, and Visiting Partner)

Factors	Items	SS	Df	MS	F=value	p-value
Activities Engage- ment	Between Groups	50.372	4	12.593	44.507	.000*
	Within Groups	111.764	395	.283		
	Total	162.136	399			
How Usually Visit	Between Groups	4.926	3	1.642	4.136	.007*
	Within Groups	157.210	396	.397		
	Total	162.136	399			
How Often Visit	Between Groups	27.841	4	6.960	20.472	.000*
	Within Groups	134.295	395	.340		
	Total	162.136	399			
Time Spent	Between Groups	7.477	3	2.492	6.381	.000*
	Within Groups	154.660	396	.391		
	Total	162.136	399			
Visiting Partner	Between Groups	17.238	4	4.309	11.748	.000*
	Within Groups	144.899	395	.367		
	Total	162.136	399			

The results obtained from the One-way ANOVA shown in Table 7 indicate that the p-value of Quality of Life classified by Elderly Utilization Pattern, namely, Activities Engagement, How Usually Visit, How Often Visit, Time Spent, and Visiting Partner are about .007, .000, .000, .000 and .000 respectively which are much lower than the critical value of 0.05. Therefore, the null hypothesis H_0 is rejected, meaning that differences in Elderly Utilization Pattern (Activities Engagement, How Usually Visit, How Often Visit, Time Spent, and Visiting Partner) generate differences in Quality of Life.

2.3 Differences in Stakeholder Involvement (Sufficient Challenges and Opportunities, Comprehensive Problem Identification Involvement, Community Needs, Voice Opinions, Public Consultation, Collaborating with Other Stakeholders, Community Organization Projects Participation) Generate Differences in Quality of Life

$$H_0: \mu_i = \mu_j$$

$$H_a: \mu_i \neq \mu_j \text{ at last one Pair where } i \neq j.$$

Table 8: The One-way ANOVA of Stakeholder Involvement (Sufficient Challenges and Opportunities, Comprehensive Problem Identification Involvement, Community Needs, Voice Opinions, Public Consultation, Collaborating with Other Stakeholders, and Community Organization Projects Participation)

Factors	Items	SS	Df	MS	F=value	p-value
Sufficient Challenges and Opportunities	Between Groups	4.975	2	2.487	6.283	.002*
	Within Groups	157.161	397	.396		
	Total	162.136	399			
Comprehensive Prob- lem Identification	Between Groups	5.434	2	2.717	6.884	.001*
	Within Groups	156.702	397	.395		
	Total	162.136	399			
Community Needs	Between Groups	18.738	2	9.369	25.939	.000*

	Within Groups	143.398	397	.361		
	Total	162.136	399			
Voice Opinions	Between Groups	20.056	2	10.028	28.020	.000*
	Within Groups	142.080	397	.358		
	Total	162.136	399			
Public Consultation	Between Groups	15.136	2	7.568	20.439	.000*
	Within Groups	147.000	397	.370		
	Total	162.136	399			
Collaborating with Other Stakeholders	Between Groups	12.221	2	6.111	16.182	.000*
	Within Groups	149.915	397	.378		
	Total	162.136	399			
Community Organization Projects Participation	Between Groups	12.078	2	6.039	12.820	.000*
	Within Groups	187.009	397	.471		
	Total	199.087	399			

It is evident from Table 8 that the p-value of Quality of Life classified by Stakeholder Involvement, namely, Sufficient Challenges and Opportunities, Comprehensive Problem Identification Involvement, Community Needs, Voice Opinions, Public Consultation, Collaborating with Other Stakeholders, and Community Organization Projects Participation are much lower than the critical value of 0.05. Therefore, the null hypothesis H_0 is rejected, meaning that differences in Stakeholder Involvement (Sufficient Challenges and Opportunities, Comprehensive Problem Identification Involvement, Community Needs, Voice Opinions, Public Consultation, Collaborating with Other Stakeholders, and Community Organization Projects Participation) generate differences in Quality of Life.

2.4 The Influence of Public Spaces Characteristics on Quality of Life

In order to find out the influence of Public Spaces Characteristics on Quality of Life, in this study, 3 Multiple Linear Regression analyses are applied not only for the overall Quality of Life but also for its components, namely, the Elderly Needs and Preferences for Public Spaces, the Elderly Well-being and Social Inclusion.

2.4.1 The Elderly Needs and Preferences for Public Spaces

$$H_0: \beta_i = 0$$

$$H_a: \beta_i \neq 0 \text{ (} i=1, 2, 3 \text{)}$$

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where Y = the Elderly Needs and Preferences for Public Spaces

X_1 = Accessibility

X_2 = Safety Measures

X_3 = Types of Amenities

ε = Error

The results obtained from the study in terms of the predicted value of Y (\hat{Y}) can be seen in equation (1).

$$Y = .493 + .490X_2 + .396X_3$$

(.000) (.000) (.000)(1)

Adjusted $R^2 = 0.924$

From equation (1), it is evident that Measures are more important than Types of Amenities since the coefficient of the former is about .490 while that of the latter is only .396. The Adjust R^2 of this Multiple Linear Regression is approximately .924, which is very high.

2.4.2 The Elderly Well-being and Social Inclusion

$$H_0: \beta_i = 0$$

$$H_a: \beta_i \neq 0 \text{ (} i=1, 2, 3 \text{)}$$

$$\hat{Y} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where Y = the Elderly Well-being and Social Inclusion

X_1 = Accessibility

X_2 = Safety Measures

X_3 = Types of Amenities

ε = Error

The results obtained from the study in terms of the predicted value of Y (\hat{Y}) can be seen in equation (2).

$$\hat{Y} = .444 + .298X_1 + .105X_2 + .487X_3$$

(.000) (.000) (.002) (.000)(2)

Adjusted R² = 0.771

From equation (2), it can be concluded that the types of Amenities are the most important factor influencing Elderly Well-being and Social Inclusion, with a coefficient of about .487, followed by Accessibility and Safety Measures, the coefficients of which are about .298 and .105 respectively. The Adjust R² of this Multiple Linear Regression is approximately .771, which is relatively high.

2.4.3 The Quality of Life

$$H_0: \beta_i = 0$$

$$H_a: \beta_i \neq 0 \text{ (i=1, 2, 3)}$$

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \varepsilon$$

Where Y = Quality of Life

X₁ = Accessibility

X₂ = Safety Measures

X₃ = Types of Amenities

ε = Error

The results obtained from the study in terms of the predicted value of Y (\hat{Y}) can be seen in equation (3).

$$\hat{Y} = .467 + .158X_1 + .293X_2 + .437X_3$$

(.000) (.000) (.000) (.000)(3)

Adjusted R² = 0.898

It can be concluded from equation (3) that Types of Amenities are the most important factor influencing Quality of Life with a coefficient of about .437, followed by Safety Measures and Accessibility, the coefficients of which are about .293 and .158, respectively. The Adjust R² of this Multiple Linear Regression is approximately .898, which is very high.

Conclusion and Discussion

This study examined the impacts of public space characteristics, elderly utilization behavior, and stakeholder involvement on the quality of life for the elderly in Fuzhou's urban micro-districts. The findings revealed that the elderly frequently visit public spaces for exercise and social interaction, highlighting the importance of accessible and safe environments. Stakeholder involvement significantly enhances these spaces, particularly through public consultations and community projects. Key public space characteristics such as safety measures, accessibility, and amenities positively influenced the quality of life.

The results align with existing literature emphasizing the importance of well-designed public spaces for elderly well-being. Studies by Chen (2023) and Zhang et al. (2023) highlight the necessity of amenities and infrastructure that cater to the elderly, such as weatherproof features and fitness facilities. Furthermore, as Zhang et al. (2022) noted, the social and psychological benefits of engaging in public spaces stress the need for environments promoting social interactions. Overall, the study underscores the critical role of inclusive and accessible urban planning in enhancing the quality of life for the elderly, suggesting that continued efforts in this area are essential for fostering age-friendly communities. To align with China's "14th Five-Year" plan for new urbanization and reforming the rural collective property rights system, Fuzhou urgently needs to adjust and address urban villages' environmental problems and reasonably promote urban stock optimization. (Chen, et al., 2024).

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