

Designing Accessibility Public Spaces in Old City Communities Based on the Outdoor Activity Characteristics of People with Disabilities: A Case Study of Chengxian Street Community in Nanjing

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Abstract

Urban accessibility construction from a global perspective emphasizes the enhancement of inclusiveness and equity in cities. Community public spaces, as central hubs of daily life, serve as crucial entry points for advancing urban accessibility initiatives. With the aging population and a growing number of individuals with disabilities, the creation of barrier-free environments in the older urban areas of Chinese cities has become a focal issue. This involves analyzing the outdoor activity characteristics (frequency, type, and scope) and variations among individuals with differing mobility levels in these communities, as well as exploring the relationship between outdoor activities and community public spaces. Based on these findings, strategies for enhancing accessibility in public spaces within older urban areas can be developed.

This thesis employs questionnaire surveys and in-depth interviews to examine the accessibility needs of community public spaces for individuals with disabilities and propose targeted design strategies. Specifically, it focuses on the Chengxian Street community. First, 35 valid questionnaires were collected through surveys, behavioral observations, and interviews with all disabled residents in the community. Additionally, 78 travel trajectories were recorded and analyzed, with the temporal and spatial distributions visualized using ArcGIS. Second, the research identifies key patterns based on travel frequency, destinations, and needs, uncovering trends in time-sequenced travel, spatiotemporal circulation, and public space usage behaviors. These findings highlight significant challenges in the accessibility of community public spaces. Finally, the study proposes an inclusive design framework for improving public space accessibility, addressing five dimensions: target orientation, standard setting, spatial siting, spatial layout, and accessibility facilities. By considering the behaviors and needs of vulnerable groups, this framework seeks to advance the construction of inclusive, safe, and sustainable cities and communities.

Ultimately, the thesis revisits the social model of disability studies, offering actionable strategies to enhance the accessibility of public spaces for disabled communities and contributing to the broader goal of fostering equitable urban development.

Key words: Community Public space, Accessibility Strategies, Characteristics of outdoor activities, Disability

1. Introduction

According to United Nations statistics, the global population has exceeded 7 billion. Alongside population aging and the increasing prevalence of functional impairments related to chronic diseases and age-related conditions, over 1 billion people worldwide—approximately one-seventh of the total population—are currently living with some form of disability. This number is projected to rise to over 2 billion by 2050 (United Nations, 2022). In this context, developing sustainable and equitable accessibility systems within urban environments to enhance outdoor participation opportunities for persons with disabilities has become a pressing challenge for social inclusion and sustainable development. Numerous studies have confirmed that moderate outdoor activity offers substantial health benefits for individuals with disabilities. It not only improves cardiorespiratory fitness and physical coordination but also alleviates feelings of isolation and promotes mental well-being (Derakhshan, 2024; Hirvensalo, 2000; Ramlagan, 2013). However, people with disabilities continue to face multiple barriers to outdoor engagement, including environmental, social, and personal constraints (Heath, 2012; Derakhshan, 2024). As a result, their frequency and duration of outdoor activities are significantly lower than those of individuals without disabilities (Shelby, 2025), leading to an infringement on their equal right to outdoor participation (Kapsalis, 2022). In everyday life, persons with disabilities often limit their activities to the vicinity of their residences. Consequently, the 500-meter radius surrounding one's home plays a critical role in determining activity opportunities and overall quality of life (Katayama, 2023).

As the most immediately accessible form of public space, community outdoor areas are pivotal in facilitating social inclusion and improving the quality for people with disabilities. Ward Thompson (2013), through an extensive study on the relationship between outdoor environments and population activity levels, emphasized

that when an environment lacks the necessary functional attributes and appeal for specific user groups, their opportunities for activity diminish accordingly. Therefore, outdoor spaces within communities must be systematically designed and functionally organized to serve the needs of disabled populations. Empirical evidence shows that well-designed community spaces can effectively increase daily walking frequency, enhance physical health, and provide greater opportunities for social interaction and mental wellness among people with disabilities (Sara, 2025). However, in China's older urban neighborhoods, community outdoor spaces often fall short in terms of supply, spatial quality, and functional diversity, thus failing to meet the multifaceted needs of disabled users. Enhancing the accessibility of public spaces in these areas is essential to promoting urban inclusiveness and achieving spatial equity.

Current research predominantly focuses on infrastructure development (Xia, 2019; Chen, 2023), service accessibility, or community participation (Jin, 2023), while insufficient attention has been paid to improving public space inclusiveness through spatial design and environmental creation. To address this gap, this study selects the Chengxian Street community—representative of older residential areas in Nanjing, China—as a case study. Through fieldwork and analysis of the activity patterns of persons with disabilities, the study identifies the types and characteristics of their daily outdoor activities. Based on these findings, it proposes practical and targeted spatial strategies for accessible public space design, aiming to inform the development of more inclusive and equitable community environments.

2. Research Design

2.1 Study Area

This study selects the Chengxian Street community, located in Xuanwu District, Nanjing, as a typical case study (Figure 1). Covering an area of 0.8 square kilometers, the community is rich in historical and cultural heritage. The surrounding eastern ring area, where Chengxian Street is situated, has been designated as one of the key zones for urban renewal in Nanjing. Before the 1990s, the community primarily served residential and educational functions. With the acceleration of urbanization, commercial services gradually emerged along the street.

In recent years, the proportion of elderly and disabled residents in the community has continued to rise. Statistics show that in 2015, residents aged 60 and above accounted for approximately 24.09% of the total population (Li & Li, 2019), indicating a clear trend of population aging. The community is characterized by narrow streets, dense traditional commercial activities, and an aging built environment, lacking basic accessibility infrastructure. These features reflect the typical spatial characteristics of older urban neighborhoods, making Chengxian Street an appropriate and representative subject for this research.



Fig.1. Scope of the study

2.2 Assessment of Mobility Capacity Among Persons with Disability

According to China's Practical Evaluation Standards for Persons with Disabilities and the national standard Classification and Grading of Disabilities for Persons with Disabilities (GB/T26341-2010), China divides the types of disabilities into six categories, namely, visual disability, hearing disability, speech disability, physical disability, intellectual disability, and psychiatric disability; and each category of disability is divided into four grades according to its severity, with Grade 1 being extremely severe disability, Level 2 being severe disability, Level 3 being moderate disability, and Level 4 being mild disability. Disability, Level 3 as moderate disability, and Level 4 as mild disability.

In this study, to explore the activity characteristics of the disabled group in outdoor public space, it is necessary to reclassify the group in combination with the ability to travel, to more clearly identify the differences in their functional needs for spatial services. Based on the above criteria and combined with the results of field research, this paper classifies the traveling ability of disabled people into three categories: the first category is the group of fully autonomous travelers, which has strong spatial perception and mobility and can complete the travel activities independently, mainly including people with hearing disabilities, speech disabilities, and part of the people with mild physical disabilities. The second category is the limited autonomous traveling group, which has some independent traveling ability but needs to rely on auxiliary tools or environmental guidance to travel, typically represented by people with moderate to severe physical disabilities or people with visual impairment. The third category is non-autonomous or accompanied travel groups, which are difficult to complete travel activities on their own, and usually need to be accompanied by family members, caregivers, or volunteers, and mainly include groups of people with multiple disabilities of the first level of intellectual disability and mental disability. For individuals with multiple disabilities, their ability to travel is assessed based on the most severe of their disabilities (Figure 2).

China Practical Assessment Standards for Persons with Disabilities	Arbitrary level Hearing disability	Arbitrary level Speech defect	Mildly Physically Handicapped	Moderate/Severe Physically Handicapped	Arbitrary level Visually Impaired	Mildly Intellectual/mental disability	Moderate/Severe Intellectual/mental disability
Classification and grading criteria of disability (GB/T 26341-2010)	Level 1 Level 2 Level 3 Level 4	Level 1 Level 2 Level 3 Level 4	Level 3	Level 1 Level 2 Level 3 Level 4	Level 1 Level 2 Level 3 Level 4	Level 3	Level 1 Level 2
Subsidiary Condition	No special assistance required			Assistive devices, barrier-free facilities	Guides/guidance facilities	Acquaintance chaperones, cognitive cues	Requires specialized support, high risk
	Independent Travelers			Limited-mobility Travelers		Dependent/non-mobile Travelers	

Fig.2. Basis and results of classification of persons with disabilities

First, what are the characteristics (frequency, type, and range of activities) and differences in outdoor activities of people with disabilities with different mobility abilities in old communities in old urban areas? What is the relationship between the outdoor activities of people with different mobility abilities and the accessibility of community public space? Through the systematic analysis of the above questions, this paper aims to reveal the interaction mechanism between community space and the daily behavior of disabled groups and provide empirical evidence for the subsequent proposal of targeted barrier-free space creation strategies.

2.4 Research Program

This study adopts diversified research methods, mainly including field observation, questionnaire research, and semi-structured interviews. Before the formal research, the research team first made several field visits to the

Chengxian Street community in Nanjing to sort out the public spaces within the community where people with disabilities can carry out outdoor activities, and the screening criteria included whether there were basic facilities such as benches and walking paths. A total of 34 representative outdoor public spaces were identified and categorized into three categories based on their spatial form and service radius: unit-port spaces, small activity venues, and centralized activity venues (Figure 3). The study collected information on the outdoor activities of people with disabilities through activity logs, which were used to analyze their activity characteristics and differences. The activity logs cover dimensions such as respondents' basic information, start and end time of the day's outdoor activities, activity content, destination, and mode of travel. The survey was conducted in July and October 2024 under suitable weather conditions (sunny days and 20-30°C). In the activity log survey, this research process is user-centered and guides the respondents to review the previous day's outdoor activity matters, time, and route to restore their life events as much as possible. The researcher supported the recording through notes and audio recordings to enhance the completeness and accuracy of the data. At the community level, with the assistance of the Chengxian Street Community Service Center, the person in charge of this study called 55 people with disabilities in the Chengxian Street community to participate in the research; 55 questionnaires were distributed, with 54 validly recovered, and activity logs were issued to 35 of them who are now living in the Chengxian Street community. After the data collection, the authors analyzed the characteristics of the frequency, type, and scope of outdoor activities of the disabled according to the content of the questionnaires and activity logs.



Fig.3. Distribution of public spaces in the study area

3. Characterization of Outdoor Activities for People with Disabilities

3.1 Social Characteristics of the Disabled Population

This study collected outdoor activity logs from all individuals with disabilities residing in the Chengxian Street community. Among them, 24 individuals belonged to the fully autonomous travel group, 25 to the limited autonomous travel group, and 5 to the non-autonomous or accompanied travel group. Given the difficulty in obtaining analyzable outdoor activity trajectories from individuals who are entirely immobile, this paper focuses on the first two groups—those with some degree of travel capability—for analyzing the behavioral characteristics and patterns of their outdoor activities.

The social profile of the surveyed disabled population is summarized in Table 1. The results indicate a marked aging trend within the disabled community of Chengxian Street, with individuals aged over 60 accounting for more than 60% of the total. Among those under 60, only 16.7% are capable of independent travel, suggesting that even the younger segment of the disabled population includes a considerable proportion of individuals with severe impairments.

In terms of age distribution, individuals aged 60–69 comprise the largest group of those able to travel

independently. Regarding gender, male participants generally demonstrate stronger mobility capabilities than their female counterparts. As for household structure, the majority of persons with disabilities live with their spouses or children—an arrangement associated with higher levels of mobility. Additionally, nearly 80% of respondents have lived in the community for more than eight years, and among them, 38.9% possess the ability to travel independently.

Table 1 Statistics on Social Characteristics of Respondent Population with Disabilities

Classification	Subcategory	All persons with disabilities		Independent Travelers		Limited-mobility Travelers		Dependent/non-mobile Travelers	
		Quantities	proportions	Quantities	proportions	Quantities	proportions	Quantities	proportions
Totally	—	54	100	24	44.4	25	46.3	5	9.3
Age	Below 60	21	38.9	9	16.7	7	13	5	9.3
	60-69	20	37	13	24.1	7	13	0	0
	70-79	10	18.5	2	3.7	8	14.8	0	0
	≥80	3	5.6	0	0	3	5.6	0	0
Gender	Male	34	62.9	14	25.9	16	29.6	4	7.4
	Female	20	37.1	10	18.5	9	16.7	1	1.9
Housing Structure	Living with a partner's son or daughter	43	79.6	19	35.2	19	35.2	5	9.2
	Living alone	6	11.1	4	7.4	2	3.7	0	0
	Other	5	9.3	1	1.9	4	7.4	0	0
Duration of Residence	1-3 years	5	9.3	2	3.7	2	3.7	1	1.9
	4-7 years	6	11.1	1	1.8	5	9.3	0	0
	More than 8 years	43	79.6	21	38.9	18	33.3	4	7.4

3.2 Classification of Outdoor Activities of People with Disabilities

To collect data on outdoor activity patterns, this study adopted and adapted the structure of the Activity Log Questionnaire for Beijing Residents developed by Chai Yanwei et al., supplemented by insights from preliminary observations. Outdoor activities were categorized into three main types, further divided into 12 subcategories. Daily activity logs were compiled accordingly, recording the start and end times, travel locations, and specific content of activities (Table 2).

Analysis of activity duration data for the three major categories reveals a consistent temporal pattern in outdoor activity among persons with disabilities. On average, participants engaged in 2–3 outdoor trips per day, primarily concentrated in three-time windows: 8:00–10:00, 14:00–16:00, and 19:00–21:00. Total daily time spent outdoors typically ranged from 6 to 8 hours, with activities most commonly involving leisure exercise, grocery shopping, and other basic errands (Figure 4). These findings indicate a certain degree of regularity and continuity in the outdoor activity needs of this population.

According to the questionnaire data, most individuals with disabilities rely on family members for accompaniment during outdoor activities, though there are notable individual differences in travel capacity. Among the first group

(fully autonomous travelers), 62.5% reported that they could complete outings independently. Their average duration per trip exceeded two hours, and they went out more than seven times per week. Their activities were relatively diverse, including shopping, walking, and completing daily errands—reflecting a broad range of functional needs for public space.

In contrast, individuals in the second and third groups were more dependent on companions or assistive devices during outings, and their mobility was closely linked to environmental safety, infrastructure accessibility, and community support systems. These contrasts highlight a marked differentiation in how people with varying mobility capacities interact with and rely on community public space services (Figure 5).

Table 2 Classification of behavioral activities of persons with disabilities

Type of activity content	Activity content subcategories
1. Recreational Activities	1-1 Walking
	1-2 Chatting(sunbathing)
	1-3 Playing Chess, Cards, and Mah-jongg
	1-4 Dancing, doing exercises
	1-5 Sports (fitness equipment, hiking)
2. Productive Activities	2-1 Work
	2-2 Go home
3. Life- Service Activities	3-1 Grocery Shopping
	3-2 Shopping and spending, errands
	3-3 Picking up and dropping off children
	3-4 Taking care of parents
	3-5 Hospital Visits

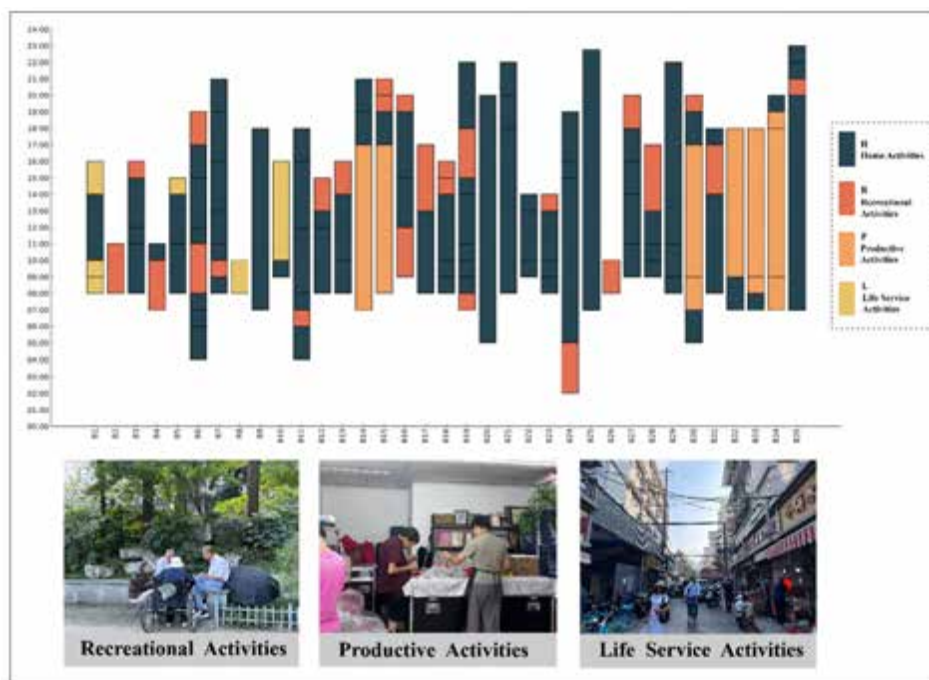


Fig. 4. Schematic diagram of activity sequence statistics for persons with disabilities in residential areas

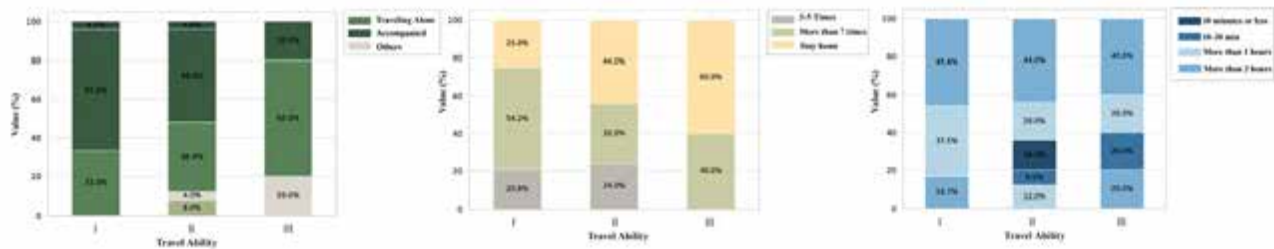


Fig. 5. Characteristics of activities of persons with disabilities of different mobility

3.3 Behavioral Characteristics of Outdoor Activities Across Different Mobility Impairment Groups

To further investigate differences in daily activity patterns among persons with varying levels of mobility impairments, this study selected three representative individuals from the research community and analyzed their behavior across five key dimensions: trip duration, travel destinations, travel modes, types of activities, and whether they traveled alone or with others.

The results reveal significant distinctions in both activity patterns and spatial use among the three mobility groups. Individuals in the first group (fully autonomous travelers) demonstrated high variability and diversity in their daily movements. Their activities primarily included life-related and leisure tasks such as square dancing, walking, chatting, playing cards, or chess. These activities covered a broad spatial range, were highly mobile, and were predominantly carried out on foot. Their preferred activity locations were large public spaces, such as Pearl River Plaza and Heping Park.

In contrast, individuals in the second group (limited autonomous travelers) exhibited more regular and constrained activity patterns. Their activities were largely confined to the community or its immediate surroundings, typically following a fixed routine path between their residence and workplace. Recreational and daily living activities were relatively infrequent. Common activities included light exercise, walking, and sitting, usually conducted along accessible routes near residential areas, such as the banks of the Pearl River.

For the third group (non-autonomous or accompanied travelers), daily activity was markedly limited. Their outings occurred infrequently, usually lasting no more than two hours, and were concentrated during morning or evening hours. Their activity spaces were confined to the immediate vicinity of their buildings—such as the area downstairs or open spaces between buildings. These activities were mostly sedentary, including sunbathing or sitting quietly. The limited spatial mobility and low interaction frequency highlight the significant challenges this group faces in accessing public space and engaging in daily social interaction.

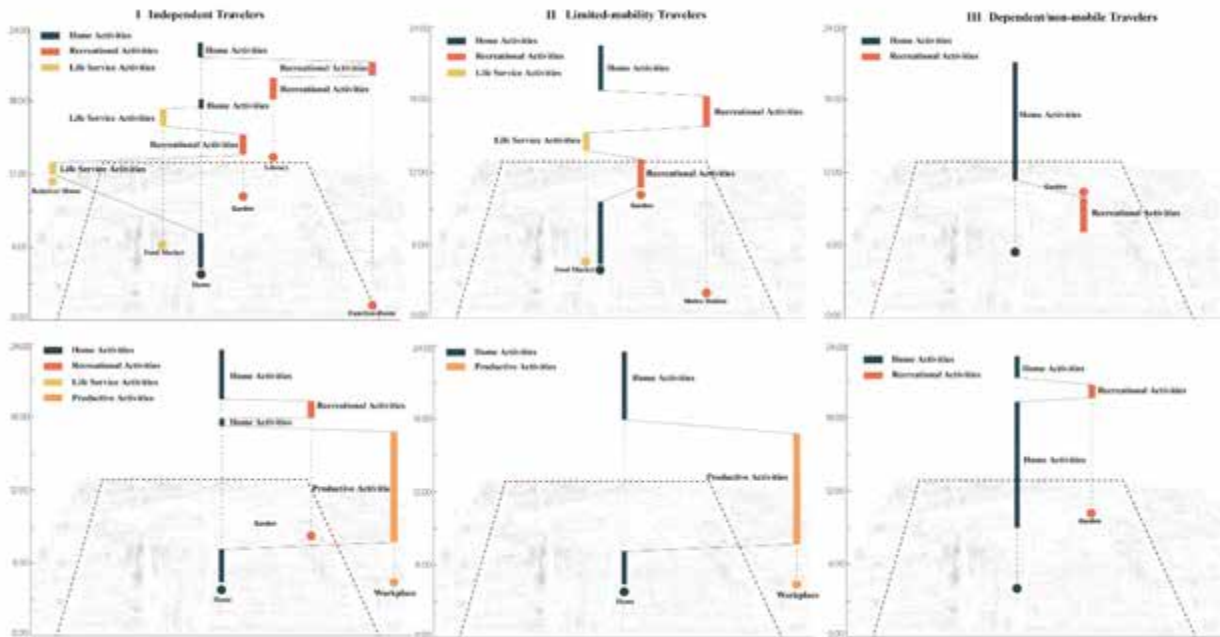


Fig. 6. Schematic diagram of behavioral path analysis for three groups of persons with disabilities

3.4 Public Space Accessibility: Supporting Factors Influencing Outdoor Activities

To further examine how public space accessibility supports or constrains outdoor activity among different categories of people with disabilities, this study combines sample interviews with spatial path analysis to track and document the actual travel trajectories of individuals with disabilities in the Chengxian Street community. By integrating the activity logs of 78 disabled residents and mapping their movement patterns and trajectory densities using ArcGIS, the analysis reveals that travel routes significantly influence the selection of activity destinations. High-frequency paths include Nicco Lane, Tiger Bridge, Xiaosajiao Lane, and Chengxian Street, where adjacent public spaces exhibit a strong capacity to attract activity.

Further analysis highlights clear differences in path selection and activity clustering across mobility groups. Fully autonomous travelers show a wide distribution of paths, with activity points primarily located along the Pearl River and in Heping Park. Limited autonomous travelers tend to cluster around accessible nodes along the Pearl River that are closer to residential areas. Non-autonomous travelers, however, demonstrate low path density, with activities largely confined to the empty spaces beneath or between residential buildings—underscoring their restricted spatial accessibility.

Field observations revealed that one of the main constraints limiting outdoor activity among persons with disabilities is the incomplete and poorly connected system of accessibility infrastructure within the community. On one hand, the Chengxian Street community has implemented some basic barrier-free facilities (Figure 7), including ramps and handrails at entrances to banks, supermarkets, and parks, which generally meet design standards. On the other hand, problems persist, such as irregularly installed ramps, missing or loose handrails in inter-building spaces, and broken pathways that compromise the functionality of the infrastructure. Moreover, blind walkways are often obstructed or discontinuous—affected by parked vehicles, encroachment from non-motorized vehicles, or a complete absence along major thoroughfares—making it difficult for individuals with disabilities to safely and smoothly access public activity spaces within their daily walking range.

Overall, while the Chengxian Street community has made preliminary efforts to establish basic barrier-free infrastructure, the overall connectivity, continuity, and human-centered design of these facilities remain

insufficient. Deficiencies in inter-building links, path integration, and infrastructure usability continue to limit the travel radius and frequency of outdoor activities for certain groups of people with disabilities, adversely affecting their quality of daily life.

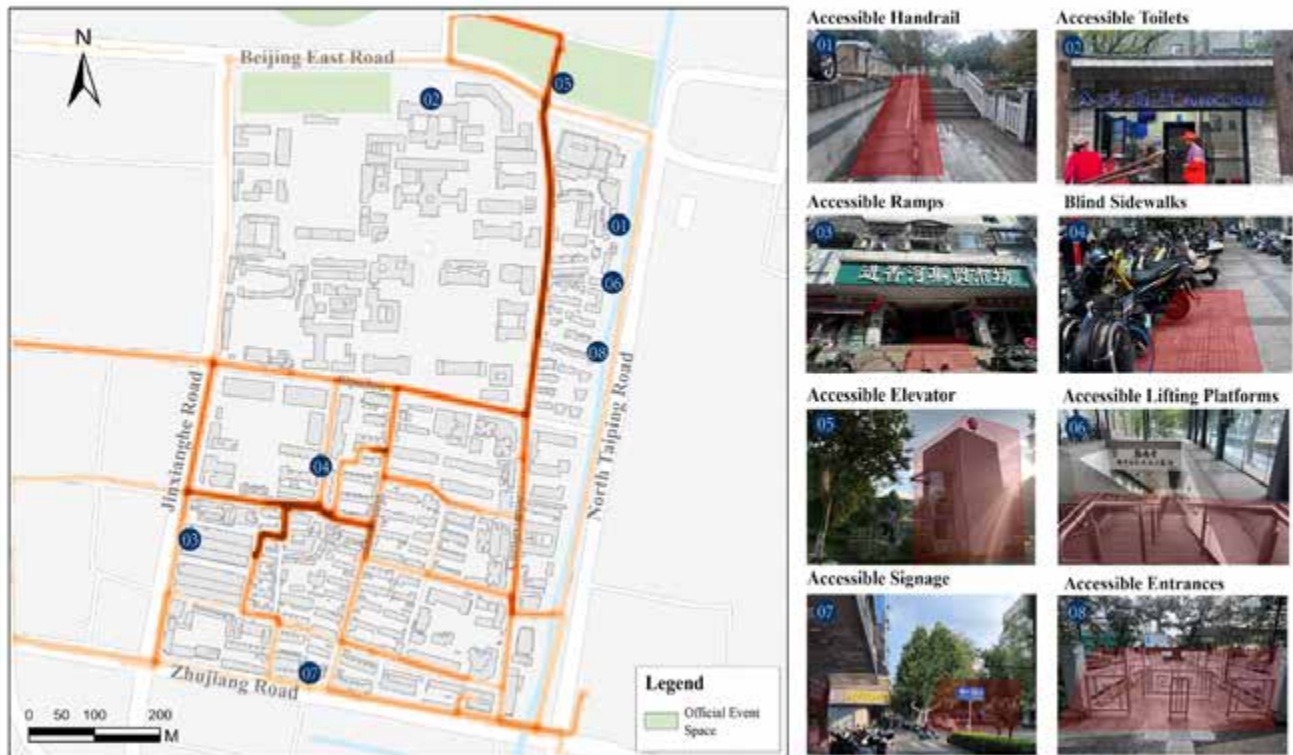


Fig.7. Distribution of Barrier-free Facilities in Chengxian Street Community

4. Accessibility Design Strategies for Community Public Spaces in Old Urban Areas

As the primary setting for daily activities among persons with disabilities, the accessibility of community public space is not only a matter of individual well-being but also a critical indicator of spatial inclusiveness and urban equity. In older urban areas, challenges such as limited space, outdated infrastructure, and fragmented layouts often hinder the ability of community public spaces to effectively meet the diverse needs of people with disabilities.

Based on the behavioral analysis of disabled groups with varying mobility capacities in the Chengxian Street community, this study identifies distinct patterns of stratification and spatial circling in outdoor activities. The extent to which individuals are restricted from participating in public space activities varies considerably depending on their level of mobility. Improving accessibility in old urban neighborhoods requires solutions that are feasible under constrained conditions. The design focus should shift from merely providing accessible facilities to establishing a holistic, adaptive relationship among people, activities, and environments.

Targeted and precise design strategies not only serve a wider range of users but also improve the cost-effectiveness of renovation investments, ensuring that the benefits of urban renewal are distributed more equitably among all persons with disabilities. Based on the research findings, this paper proposes a set of strategies for improving accessibility in community public spaces within old urban areas.

4.1 Clarify positioning goals and respond to the needs of special groups

Currently, communities in old urban areas often fail to adequately address the specific needs of persons with disabilities in the planning of outdoor activity spaces. Poor site compatibility and incomplete facilities significantly

limit the feasibility, frequency, and comfort of their daily outdoor activities. For instance, residents are frequently required to bring their tables and chairs for chess and card games, and rehabilitation and exercise equipment is insufficiently provided, which restricts regular participation.

It is recommended that, based on the observed activity types among people with disabilities—and considering the overlapping needs of the elderly—community parks, plazas, fitness corners, and overhead floors of residential buildings should undergo systematic upgrades with barrier-free design principles. Key design considerations include: Installing accessible entrances, ramps, and continuous handrail systems to ensure smooth mobility for wheelchair users and individuals with walkers; Providing appropriate facilities such as seating, shading structures, and level, non-slip surfaces to support the creation of micro-activity spaces that promote rest, interaction, and social engagement.

4.2 Categorize Configuration Standards to Improve Space Suitability

Beyond fitness activities, most daily community activities lack clear spatial allocation standards, leading to a mismatch between facility supply and actual user demand. To address this issue, targeted spatial and facility configuration strategies should be developed based on the nature of different activity types. For space-dependent activities—such as chess, card games, and rehabilitation exercises—the required area can be estimated using the formula: activity unit area $\times$ number of participants. Essential equipment (e.g., tables and chairs) should be provided in group-based units to support such interactions.

For activities with high spatial sensitivity but low facility dependency—such as sitting, strolling, and informal leisure—designers should focus on optimizing spatial qualities. Key considerations include: Route continuity, to ensure seamless movement; Microclimatic comfort, such as adequate shading, ventilation, and sunlight exposure; and Visual accessibility, which contributes to safety, comfort, and the psychological ease of navigation for people with disabilities. By categorizing activity types and aligning spatial standards accordingly, the suitability and effectiveness of public space configurations can be significantly enhanced.

4.3 Layered Distribution Strategy to Optimize Spatial Allocation

Findings from this study indicate that outdoor activities among persons with disabilities exhibit distinct spatial circling characteristics. Individuals with full mobility tend to have a wider activity radius and greater spatial mobility, those with limited autonomy are primarily concentrated around the periphery of residential areas, while non-autonomous individuals are largely confined to spaces immediately adjacent to their homes—such as ground-floor areas and inter-building open spaces. In the context of spatial renewal in old urban areas, it is essential to recognize these mobility-based differences and apply layered and circle-based design principles to improve the efficiency and equity of space utilization.

First, high-intensity activity spaces should be preferentially located near community service nodes—such as fresh markets, senior centers, kindergartens, and green areas—to enhance spatial efficiency and encourage shared use across different population groups. Second, for low-mobility groups, micro-space design should be strengthened through targeted improvements in resting spots, including better seating, ground surfacing, and shading systems in frequently used areas like ground-floor terraces and building entrances. Finally, when larger open spaces such as parks and plazas already exist within proximity to the community, spatial resources should be functionally integrated through enhanced pathway accessibility and wayfinding systems. This approach avoids redundant construction while improving the connectivity and coherence of the overall spatial system.

4.4 Optimize the Functional Layout and Enhance Flexibility of Use

Outdoor activities are often accompanied by a variety of behavior combinations, placing higher demands on the multifunctionality and adaptability of public space. Traditional barrier-free design tends to focus solely on the primary activity areas while overlooking the continuity and support of adjacent activity zones and auxiliary facilities. This fragmented approach frequently results in reduced usability and limited participation opportunities. It is recommended that, from a holistic spatial planning perspective, barrier-free design should encompass three

interrelated types of functional spaces: firstly, Primary activity areas – the central spaces where most community activities occur; Secondly, Related activity areas – supporting zones such as spectator seating, resting areas, and access points connected to transportation; and thirdly, Auxiliary function areas – spaces that house public service facilities, such as restrooms, water stations, or information kiosks.

The accessible design of these spaces should be planned as an integrated system to ensure continuity, coherence, and flexibility. Enhancing the interconnection between these functional components will improve spatial usability, especially for persons with disabilities, and foster more inclusive and engaging community environments.

4.5 Improving system integration and enhancing accessibility continuity

As communities in old urban areas are limited by uneven distribution of facilities, narrow scale, spatial fragmentation, and other problems, people with disabilities face the barrier of being accessible but not connected in the process of using public space. To address this problem, the layout of barrier-free facilities should be optimized at the system level to build a continuous and clear barrier-free access network, covering infrastructure such as passages, ramps, and blind corridors; to enhance the accessibility of paths between activity nodes and residential areas, with particular attention to the height of the curb, lighting, and signage systems; and to promote the design of barrier-free transitions between buildings and open spaces, eliminating obstacles such as height differences, steps, and thresholds, to ensure travel Continuity.

5. Conclusion

Taking a typical residential community in the old urban area of Nanjing as a case study, the study focuses on the behavioral characteristics of outdoor activities of the disabled group in the community public space, identifies three main types of activities through a combination of activity logs and questionnaires: leisure activities, productive activities, and living activities, and further explains the differences in the characteristics of outdoor activities of the disabled in terms of the dimensions of demographic attributes, activity time, and spatial distribution. It is found that people with disabilities have a high dependence and sensitivity to the venue environment in the process of participating in outdoor activities and that there are significant deficiencies in the accessibility, comfort, and adaptability of facilities in the existing public spaces in old urban areas. Based on the results of empirical research, this paper proposes accessibility design strategies for community public spaces in old urban areas from five aspects: clarifying the target positioning, formulating configuration standards, optimizing the spatial distribution, improving the flexibility of the functional layout, and reinforcing the integration of the facility system. The strategy emphasizes the starting point of the difference in mobility of people with disabilities and takes into account the needs of other mobility groups such as the elderly, and improves the overall efficiency and fairness of the use of urban space while guaranteeing the right to basic activities. By building a more inclusive community public space system, accurate support for diverse groups can be realized under limited resources, avoiding the waste of resources and management burden brought by exclusive facilities.

This study proposes a preliminary strategy based on a sample of communities in the old city of Nanjing, which is of practical significance for understanding the pattern of outdoor activities of people with disabilities and guiding the renewal of spaces. However, due to the significant differences in the demographics, spatial patterns, and social support systems of people with disabilities in different cities, the characteristics of their outdoor activities may be diverse. In the future, the study can further expand the sample area, pay attention to the dynamic changes of the needs of people with disabilities in different periods, and explore how to acquire the outdoor activity needs of people with disabilities in advance and flexible adaptation strategies, to respond to the needs of diversified groups of people more effectively. Through the construction of an adaptive and sustainable human-centered spatial system, it is expected to promote the transformation of public space from basic barrier-free construction to a higher level of comprehensive inclusion and to realize a more socially equitable and sustainable path of urban renewal.

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