

Urban Spatial Strategies and Health Resilience: A Case Study of New Jiangwan City

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Abstract. This study investigates the relationship between built environment characteristics and health resilience during the COVID-19 pandemic, using New Jiangwan City in Shanghai as a case study. Located in Yangpu District—an area with the lowest infection rate among Shanghai’s central districts—New Jiangwan City offers a timely opportunity to evaluate how ecological urban planning, low-density layouts, and flexible public spaces influenced residents’ ability to adapt to and withstand public health shocks. Drawing on Henri Lefebvre’s theory of the production of space, this research examines the alignment between design intentions and actual spatial practices during the pandemic. Using a qualitative methodology, semi-structured interviews were conducted with both urban planners and residents. Thematic analysis revealed that green infrastructure, walkable layouts, and adaptable community spaces played a vital role in supporting psychological well-being, physical activity, and social connectivity under lockdown conditions. The findings highlight discrepancies between planned and lived space, as well as residents’ adaptive use of spatial resources. By triangulating insights from both designers and users, this study contributes to a deeper understanding of how context-specific spatial strategies can enhance urban resilience. The results provide practical guidance for architects and planners seeking to design healthier, more adaptive cities in anticipation of future public health emergencies.

Keywords: Health Resilience, Production of Space, Urban Planning, Environmental Psychology

1. Introduction

The COVID-19 pandemic has fundamentally reshaped people’s understanding of urban resilience, highlighting the critical role the built environment plays in shaping health outcomes and daily practices under crisis conditions. While traditional urban planning primarily focuses on long-term functionality and aesthetic considerations, the pandemic has demonstrated that spatial design significantly impacts immediate health resilience, social interaction, and psychological well-being. In this context, the pandemic has intensified academic and policy interest in how urban form can actively support health resilience. The concept of health resilience encompasses the ability of individuals and communities to anticipate, absorb, adapt, and recover from health-related shocks [1,2].

Emerging research suggests that specific spatial characteristics (e.g., walkability, access to green spaces, and building layouts that promote ventilation and natural lighting) may mitigate some of the negative impacts of long-term lockdown and social distancing measures [3,4]. Zhang and Li further argued that urban parks and other open spaces can help alleviate stress and anxiety during lockdowns, highlighting their potential value for mental health [5]. These findings suggest that built environment design can serve not only as a passive context for daily life but also as an active determinant of resilience and well-being at the community level. However, despite preliminary evidence that built environment characteristics are associated with positive health and psychological outcomes [6,7], the extent to which these benefits are consistent across different urban settings remains unclear. Therefore, case-based, context-sensitive research is urgently needed to better understand how urban planning models perform under stress and which design strategies are most effective in enhancing resilience.

This study will focus on Xinjiangwancheng in Yangpu District, Shanghai, which is representative due to its unique epidemiological and spatial characteristics. According to Fan et al., Yangpu District reported the lowest COVID-19 infection rate among Shanghai's central districts, even surpassing the less densely populated Pudong New Area. This outcome may be partially attributed to its contemporary and systematically planned urban environment [8]. As a typical example of an ecological residential area, Xinjiangwancheng embodies the integrated green space, decentralized services, and health-oriented design concepts emphasized in the post-pandemic era. This study aims to evaluate how the built environment of Xinjiangwan City promotes community health resilience during the COVID-19 pandemic through a case study. By evaluating spatial characteristics related to infection outcomes, accessibility, and resident well-being, this study will provide recommendations for developing more resilient urban design strategies in response to future health crises.

2. Methodology

2.1. Method

This research adopts a qualitative methodology, emphasizing depth, interpretation, and contextual understanding. A qualitative approach is especially suited to explore the subjective and situated experiences of residents and planners during the COVID-19 pandemic. It facilitates exploration of how design intentions are experienced and adapted in practice under crisis conditions [9].

2.2. Interviewee sampling

This study conducted interviews with key planning professionals from Shanghai Chengtou Corporation. Specifically, interviews were held with Ms. Guo, the executive planner for the New Jiangwan City project during its implementation phase, and Mr. Hu, the project manager at the time, both of whom were directly involved in its spatial planning and execution. Their insights provide valuable firsthand perspectives on the original design rationale and subsequent planning adaptations during the pandemic. In addition, a purposive sampling strategy was employed to identify information-rich participants among the residents of New Jiangwan City who had lived in the community throughout the COVID-19 pandemic.

3. Analysis

3.1. Ecological design and green space perceptions

Planners stated that an ecological baseline survey was conducted prior to the development of New Jiangwan City. Due to its unique geographical location (adjacent to the Huangpu River) and the presence of multiple tributaries flowing into the Huangpu River within the planning area, a water system survey was also carried out. Planners believe such surveys are crucial for urban greening, as they enable more precise plant selection.

Residents consistently acknowledged the benefits of the neighborhood's green spaces. Several interviewees described daily practices that incorporated interaction with nature:

Even without the pandemic, I often go downstairs for a walk after dinner. It's a great way to relax and unwind after a long day, isn't it?

At that time, if you lived on the first floor, you could directly see the green space, which was quite pleasant.

Environmental and landscaping issues have always been important topics in urban planning. In recent years, an increasing number of studies have shown that adequate and appropriate green spaces have a positive impact on residents' health.

Since the start of the pandemic, the greening conditions in Jiayuguan (a neighborhood within New Jiangwan City) have significantly deteriorated. When I first moved in, the greening was diverse, with fruit trees, various other trees, and flowers. However, after the pandemic, the number of trees has decreased.

Another resident called for more thoughtful maintenance: I believe that if the landscaping could be pruned more reasonably—I am not suggesting more or less, but rather a more balanced approach—it would be better. For example, if the shrubs and lawns on the ground could be tidied up, it would be more aesthetically pleasing.

Planners stated that to maintain the overall green space coverage in the area, they have provided detailed recommendations to real estate developers. For instance, they offered suggestions on plant selection and how to coordinate with the green belts outside residential areas to achieve visual consistency. Residents also said that accessible trails, especially those along the riverbank, provide convenience for residents' daily exercise and community exploration. Many people prefer to walk in the nearby wetlands rather than walk in the community, which shows that the community has a more flexible use pattern of green space. Overall, the integration of natural elements has had a clear positive impact on residents' physical and mental health during the epidemic.

3.2. Commercial development and community amenities

Planners acknowledged that high green space density limited the scale and distribution of commercial infrastructure in New Jiangwan City. In the early phases of development, few businesses established a presence in the area, contributing to a perception of limited commercial access among residents.

There is only one shopping centre nearby, and no particularly large supermarkets. In fact, if conditions permit, I believe adding a large supermarket would make shopping more convenient.

There are few shops open in the evenings, and few areas are well-lit.

During the pandemic, most people chose to reduce the frequency, distance, and duration of their outings. As a result, community residents preferred to purchase sufficient daily necessities in the shortest possible time.

There are few shops open at night, and few places are lit up.

Many residents interviewed said they felt anxious about the supply of goods during the pandemic lockdown. However, this was not necessarily due to a lack of commercial facilities in the surrounding area.

Shopping at supermarkets is not convenient, so we mainly rely on online shopping. We purchase fresh produce through platforms such as Pinduoduo and Meituan, which has not significantly impacted our daily lives.

Planners acknowledged that residents' concerns about limited commercial facilities were anticipated, given New Jiangwan City's relatively remote location and its designation as a primarily residential area. The emphasis on green space and strict control of floor area ratios further restricted commercial development. However, during the pandemic, the low population density became an advantage, and the community's proximity to Wujiaochang Square ensured stable access to essential goods. Planners emphasized that urban planning must remain flexible and responsive to evolving needs. However, some residents have expressed concerns about the increase in commercial facilities, claiming that many previously open green spaces have been occupied, affecting the walking experience.

As facilities increase, the natural environment has lost some of its original charm. Now, there are too many elements, such as tents, and too many enclosed structures on the water, like boats.

For example, you might want clear zoning, such as having children of the same age group in the same area. Currently, we have a recreational area where elderly people, older children, younger children, children riding bicycles, and children playing ball are all active in the same space.

Some respondents expressed a desire for more facilities within the community that cater to different target groups, believing this would help create a more orderly and inclusive environment. They noted that activities such as mutual aid, group purchasing, and shopping had increased during the pandemic, along with more frequent neighborhood interactions. However, assessing the impact of commercial and public facility development on residents' health resilience during the pandemic remains a subtle and complex issue. On one hand, the lack of essential commercial facilities led to material shortages and psychological stress; on the other hand, certain excessive remedial measures negatively affected some residents' experiences of using community spaces, potentially triggering emotional or mental distress. These responses reveal underlying tensions between ecological preservation and infrastructure improvement, and highlight the importance of user-centered spatial planning in enhancing community resilience.

3.3. Community cohesion and residential privacy

Community cohesion is crucial for maintaining individual emotional well-being, and timely information exchange can significantly mitigate certain risks, such as infection or other external threats. A significant proportion of respondents reported that community cohesion improved during the pandemic, bringing numerous benefits (e.g., mutual assistance with supplies).

It definitely increased—mutual help, group buying, shopping—communication is definitely more frequent now.

Of course, some residents expressed annoyance with certain behaviors of their neighbors and anxiety about how these behaviors might affect them. Most of these concerns can be addressed through better indoor soundproofing. Research shows that sound privacy significantly impacts residents' perception of privacy in their living spaces.

For example, when our children are reading or doing homework in their rooms, we feel a bit constrained if we're watching TV in the living room, so we try to keep the volume down or

something.

3.4. Transportation safety and environmental impact

Transportation emerged as another key factor influencing perceived health resilience. Some residents raised concerns about fast-moving vehicles within the community:

Traffic is heavy at times, and we're worried about letting our children go to school alone.

According to the World Health Organization, road traffic noise accounts for approximately 60–80% of urban environmental noise and has been linked to a range of negative health outcomes, including cardiovascular disease, sleep disturbance, and increased stress levels [10]. Nonetheless, several residents in New Jiangwan City reported minimal disturbance from road noise within their homes—likely due to favorable spatial layouts, adequate sound insulation, or distance from main traffic corridors.

However, some residents have mentioned that traffic noise can somewhat affect their mood when walking in the community.

I have heard many people complain that while they initially found the area quite peaceful, the increasing number of passing vehicles has made the area feel more chaotic, with traffic noise being a significant issue. This has led them to avoid walking there. This also makes them feel uneasy about letting their children go to and from school alone.

Although residents did not mention issues such as commuting time or air quality, interviews suggest that traffic-related noise and safety were the most pressing transportation-related concerns.

4. Findings

The findings of this study highlight the complex and multidimensional role that the built environment plays in shaping health resilience under pandemic conditions. Although the initial planning intentions for Xinjianwan City—such as high ecological quality, integrated public services, and moderate residential density—laid a solid foundation for health resilience, the pandemic revealed profound insights into how these planning intentions were interpreted, experienced, and tested in practice. A key takeaway is that when ecological infrastructure is systematically planned and spatially accessible, it not only contributes to environmental sustainability but also has positive effects on residents' emotional and psychological resilience. Green spaces are not merely background elements but are actively used for stress relief, physical activity, and visual comfort. This validates theories in environmental psychology linking green landscapes and biophilic design to mental health. Another key point of discussion is the role of commercial and service infrastructure in supporting resilient urban living. Although planners prioritized ecological and low-density spatial layouts, the lack of commercial facilities was particularly evident in the early stages of regional development. However, proximity to external urban centres and digital retail networks partially compensate for this. Research findings suggest that resilient communities should strike a balance between green spaces and the accessibility of embedded services, particularly for essential goods.

The built environment has, in some cases, facilitated interaction—through walkable streets, open courtyards, and waterfront paths—but these are often enhanced by spontaneously formed mutual aid networks, informal communities, and digital communities.

Spatial privacy issues, particularly acoustic privacy, have emerged as a subtle yet important dimension of resilience. Lockdown measures exacerbated residential density, exposing deficiencies in indoor layouts and soundproofing measures. While urban design typically emphasises public spaces and social interaction, this finding suggests that architectural design must pay greater

attention to indoor comfort—especially in multi-unit residential models, where flexibility and retreat spaces are critical under stress.

Overall, this study demonstrates that health resilience in urban environments is not a static attribute but a dynamic process shaped by planning foresight, resident participation, ecological logic, and social infrastructure.

5. Discussion

This study reveals key mismatches between urban planning intentions and their actual use. For example, roads designed to restrict external traffic still experience congestion, and planners' intention to limit commercialization clashes with residents' desire for more services. Such discrepancies highlight the gap between planned expectations and real community needs. The spontaneous renovation and use of riverbank spaces by residents during the pandemic show how ambiguous areas can be activated in meaningful ways, promoting physical and mental well-being while enhancing community cohesion. This reflects the importance of respecting local ecological and social dynamics. The findings emphasize that social resilience depends not only on spatial configuration but also on residents' adaptability, mutual support networks, and responsive governance. The built environment provides the foundation, but it is people's everyday actions that truly shape resilient communities. Therefore, future urban design must be flexible, participatory, and continuously informed by lived experience through feedback loops between planners and residents.

6. Conclusion

This study has examined the relationship between built environment characteristics and health resilience during the COVID-19 pandemic in New Jiangwan City, Shanghai. Drawing on qualitative interviews with both planners and residents, the research highlights how spatial strategies intended to foster ecological sustainability, public health, and community life were received, experienced, and transformed under crisis conditions. Research has found that when green infrastructure is systematically integrated, it can provide significant psychological and behavioral benefits to residents under long-term social restrictions. Similarly, walkable environments and open space networks support safe travel and informal social connections. Limitations of this study include its focus on a single planned community in Shanghai, which may limit generalizability to other urban contexts with different cultural, social, and planning frameworks. The qualitative approach provides rich insights but cannot quantify the relative impact of specific built environment features on health outcomes. Future research should expand to diverse urban settings, employ mixed methods combining qualitative and quantitative data, and explore longitudinal impacts of urban design on community resilience beyond the pandemic context.

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