

Problems and Transformation Measures of Urban Parks in the Post-pandemic Era

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Abstract: The outbreak and spread of the COVID-19 pandemic shattered people's peaceful lives, seriously threatened human lives, and sounded an alarm for urban development and public safety and health. In resisting the pandemic, a major public health emergency, public awareness of health has also been raised to an unprecedented level. This study takes Baishamen Park in Haikou city as an example to identify the current problems of urban parks and put forward some transformation strategies based on a pandemic-related perspective. The study discovers that currently, urban parks lack detailed designs for social distance requirements and psychological healing. The infrastructures and intelligent facilities in urban parks are not complete. Urban parks also fail to appropriately deal with visitors with different attitudes toward the infection risks. Then, the study puts forward some transformation strategies and designs, such as: planting some virus-inhibiting plants, adding disinfection facilities, introducing spray disinfection robots, and designing some facilities to control social distance. These transformation measures can be helpful for urban parks to meet the new needs of people's recreation in the post-pandemic era.

Keywords: Urban Park, transformation measures, Post-Pandemic Era, COVID-19

1. Introduction

Since the COVID-19 pandemic broke out in 2020, people's life patterns have experienced dramatic changes. For example, many public places were temporarily closed due to difficulties in meeting safety and pandemic prevention standards during the outbreak [1]. To avoid infection of the virus and prevent the disease from spreading, most people have proactively or have been required to reduce outdoor activities. The pandemic seems to be over, and people worldwide have entered the post-pandemic era. The "post-pandemic era" is an era when the pandemic is controlled. However, people's living habits, health status, and psychological quality have been changed accordingly [2].

In the post-pandemic era, the risk of infection has reduced, and the threat of the virus to human physical health has diminished. However, the psychological stress and mental discomfort that people experienced during the pandemic still need to be relieved in the post-pandemic era.

As an integral part of cities, parks play an important function and role in the daily lives of urban residents, even in the post-pandemic era [3]. The national standard of the People's Republic of China, the Standard of Basic Terminology for Urban Regulation (GB/T50280-98), defines an urban park as "a public green space in a city with a certain land area and good greening and certain service facilities for public recreation" [3]. Urban parks have many advantages, such as providing

activity venues for citizens, promoting environmental protection, cultivating the sentiment, and enhancing the cultural cultivation of citizens [4].

However, the COVID-19 pandemic gives rise to new needs for urban parks, such as sterilization facilities, seating facilities, and reasonable social distance, and leads to a number of pandemic-related problems in the urban parks in the post-pandemic era. The innovation of urban park design is of great significance to improve the utilization rate of parks after the pandemic and to meet various needs of urban residents. For the design of urban parks, the scientific theoretical basis should be followed to reasonably regulate the landscape green space and enhance the cultural and artistic quality of the site [4]. In the post-pandemic era, it is also important to identify what pandemic-related problems exist in urban parks and make appropriate modifications to urban parks to meet people's relevant needs in the post-pandemic era. Therefore, this study takes Baishamen Park in Haikou city as an example to identify the current problems of urban parks and try to put forward some transformation strategies based on a pandemic-related perspective.

2. Background of Haikou City

Haikou is located in the south of China, in the tropics. Belonging to the tropical monsoon climate, it is a southern coastal city rich in the charming natural scenery of the seashore [5]. The climate in Haikou is characterized by strong sunshine, lots of rain and relatively strong wind [6]. Due to the beautiful environment and loose land use conditions in Haikou, eco-tourism, one of the city's pillar industries, has received high attention [6].

Baishamen Park is located in the northern part of Haidian Island in Meilan District, Haikou, and has an area of 60 hectares and ample green landscape, including ecological protection forests and wetlands (Figure 1) [7]. One side of the park is by the sea, with a sunny beach. The park is mainly visited by the elderly and children, and most visitors are nearby residents. The park is always open, even at night. Haikou Baishamen Park is a fully open public welfare ecological park [6].

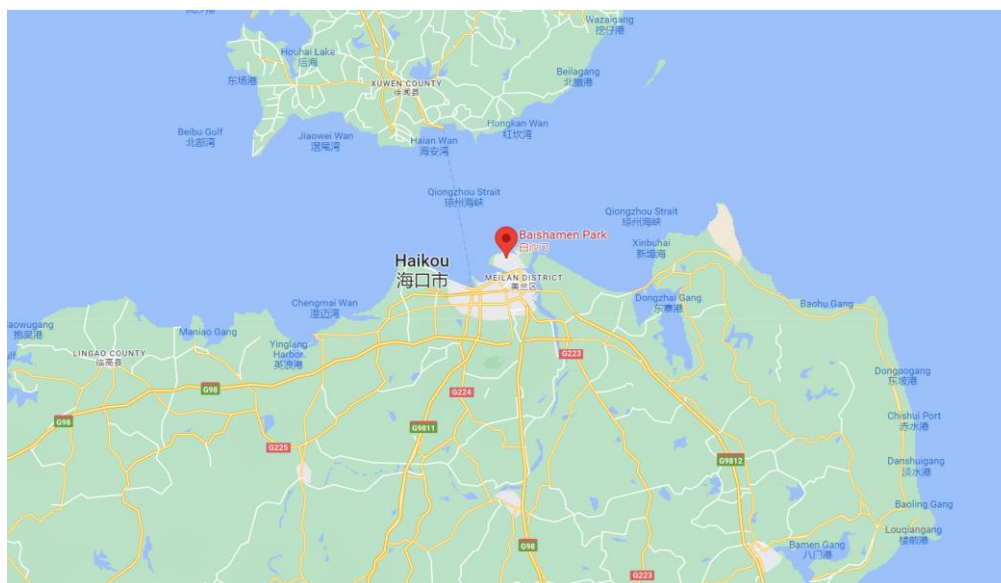


Figure 1: The location of Baishamen Park in Haikou city.

3. Methods

3.1. Theoretical Background of Research Methods

Some existing studies have investigated the relationship between residents' health and urban green

spaces using questionnaires to investigate in depth the changes in residents' use of urban green spaces under the influence of the COVID-19 pandemic [8,9]. This provided a reference for the production and distribution of the questionnaire. Some studies start from the currently existing problems of urban parks and propose methods to build them specifically in terms of functional zoning, plant configuration, road planning, cultural integration, and technology introduction by considering the function of urban parks under the influence of pandemics, people's distance, spirituality, and safety needs [3,4]. However, these studies only proposed renovation suggestions through reality-based hypotheses and case studies, which were not supported by research results and lacked practicality. Data from another study showed residents' increased demand for parks and outdoor green spaces, revealing the important role and benefits of parks during the COVID-19 pandemic [10]. In particular, parks can increase individuals' physical and mental health and social well-being during the pandemic, and we can provide recommendations to park managers and other decision-makers regarding park management and planning and park design and development during a health crisis [11].

These existing studies have explored the changing needs of people for urban park use in the post-pandemic era through big data analysis, questionnaires, in-depth interviews, and case studies, and have proposed reality-based hypotheses and case studies for retrofitting, which are lacking in terms of both research participation and practicality of recommendations. Therefore, implementing an ethnographic research approach can deeply engage the follow-up study, not only by using questionnaires and interviews, but also by capturing the problems reflected by visitors' behavior while using the park through field research and proposing renovation strategies and practical renovation design intentions for the post-pandemic era.

3.2. Research Workflow

The research aims to examine the current problems of urban parks and discuss future renovation strategies based on a pandemic-related perspective. Three research questions are put forward:

- (1) Is park utilization reduced due to the pandemic?
- (2) Is there any mismatch between landscape scene gathering orientation and social distance needs?
- (3) Does landscape content lack personalized design for the pandemic?

There are three methods to solve the above questions: questionnaires, interviews, and sketches of typical behavior. Then, the research workflow is as follows:

- (1) Use observation and sketches to obtain typical paradigms of visitor behavior in urban parks in the post-pandemic era.
- (2) Use interviews and questionnaires to collect visitors' opinions on the spatial transformation needs of urban parks in the post-pandemic era.
- (3) Analyze some pandemic-related design deficiencies in urban parks based on survey results and summarize the design needs of urban parks.
- (4) Given the above findings, propose suggestions for future park design to meet the needs of the post-pandemic era, and provide a design intention for renovation.

3.3. Research Methods

3.3.1. Questionnaire

The author designed and distributed an online questionnaire through social software on February 17th, 2023. By March 4th, 2023, 224 participants, including the urbanite of all ages, have answered the online questionnaire.

The questionnaire was designed to assess three main types of information: basic information of participants, the use of urban parks, and people's needs. Basic information was related to individual profiles, which could reflect the use of urban parks. Participants were also asked about their needs regarding the reconstruction of urban parks for pandemic prevention and whether visiting urban parks has psychological healing effects on visitors' moods in the post-pandemic era.

Other questions in the questionnaire are as follows: After the pandemic has eased, do you still intentionally practice social distancing when visiting urban parks? If so, in which specific area of the urban park? Do you still wear a mask at urban parks? After the pandemic is released, does the distance you can accept from your home to an urban park increase or decrease? What are the benefits of visiting urban parks in the post-pandemic era? Do you think visiting urban parks has a healing and soothing effect on negative emotions in the post-pandemic era? Do you think adding disinfection facilities in urban parks makes sense in the post-pandemic era? In the post-pandemic era, what technological artifacts in urban parks do you think can reduce risk of infection?

3.3.2. Interview

Considering that online surveys may not completely or comprehensively collect information on various groups of people, this study conducted on-site investigations to obtain more authentic and effective information. The interviews were conducted in nearby urban parks to further understand people's opinions and attitudes toward urban parks in the post-pandemic era.

Given the many concerns of the interviewees, the author asked each interviewee only one question: please list one suggestion for improving the urban park. In this way, some effective responses were obtained.

3.3.3. Sketches of Typical Behavior

This method means selecting urban parks as samples to conduct behavioral observations of park visitors on weekdays and weekends to explore typical behavioral paradigms that reflect the design flaws of urban parks in the post-pandemic era. This method can help visually express visitors' needs for urban park renovation and provide strong support for design suggestions. The main steps are as follows.

(1) Photo shooting. Select the observation point, take a clear picture of the typical people, and export the photos to classify the needs of different ages and issues in detail.

(2) Photo repainting. The photos are re-drawn in a minimalist way, showing only people and key environmental elements.

(3) Evaluation and analysis. Summarize and sort out the sketches and analyze the current problems and causes.

4. Results

4.1. Results of the Questionnaire

The authors analyze the results based on different age groups for the questionnaire information. According to the results, participants of almost all ages still keep social distance in urban parks, and nearly half of the people still wear masks at parks. 66.7% of park visitors still care about pandemic prevention and control in the post-pandemic era.

In addition, as for the reasons for visiting urban parks, 66.2% of participants choose physical exercising and 89.3% of participants choose soothing. They agree that urban parks have a healing effect on negative emotions.

As for technological artifacts in urban parks, 76.4% of participants express the need for handy disinfection facilities, which can reduce the risk of infection.

4.2. Results of Interviews

According to a vast of answers collected from interviewees, the author creates a word cloud, from which words such as “pandemic”, “disinfect”, “green spaces”, and “social distance” are mentioned the most frequently. The frequency of mentions of words reflects how much people care about these things.



Figure 2: Word cloud of keywords in the post-pandemic era.

Interviewees also provided some new and interesting improvement ideas. For example, some visitors argued to adopt simple pandemic prevention and control in the post-pandemic era, instead of paying too much attention to the pandemic. In addition, some think that urban parks should not remove the signs of social distance, which still matter to keep social distance to avoid infection. Some believe some virus-suppressing vegetation can emit beneficial substances into the air. Gardeners need to grow more plants of this type in urban parks. Some call for improving the accessibility of disinfection facilities because people still need to pay attention to health. Moreover, some argue to take advantage of modern technologies at urban parks. For example, introducing spray disinfection robots could achieve safer and more efficient intelligent disinfection.

4.3. Results of the Sketches of Typical Behavior

According to the phenomena the author observed at Baishamen Park in Haikou, the observation results involve six aspects.

Firstly, some stores at Baishamen Park are closed, which means that stores are not being operated. When visitors see these closed stores, they are likely to feel a sense of desolation, thus negatively influencing visitors' moods. Secondly, there is a lack of disinfection objects, such as handy disinfection facilities, near public hand-washing sinks at Baishamen Park. Thirdly, many visitors still wear masks, and some attempt to keep social distance. For example, when visitors sit and rest on a park bench, they tend to separate themselves from the next tourist by a distance. Some visitors sit in the opposite direction from the person next to them on the bench. Fourthly, some signboards at the park show the map and information for visitors, to evacuate visitors during emergencies. However, these signboards, which are not equipped with lights, cannot be seen at night, causing some inconvenience for visitors. Since Baishamen Park with a large area welcome visitors of various age groups day and night, the unreadable signboards can led to elderly people's or children's getting lost in the park. Fifthly, there are varieties of children recreation facilities, such

as the electric sightseeing mini-train. However, few visitors play with those recreation facilities even at weekends when more children are likely to visit the park. Correspondingly, the operators of recreation facilities have nothing to do but sit alone when no one comes to experience the recreation facilities. Sixthly, many people do activities on the grass area in the park. For example, some families set up tents on the grass for picnics, and some visitors were chatting, walking, or exercising. However, most of people on the grass did not wear masks or keep social distance from others (Figure 3).



Figure 3: The phenomena observed at the Baishamen Park.

5. Problems of Urban Parks in the Post-pandemic Era

According to the research results, the problems of urban parks in the post-pandemic era can be classified into five broad categories.

5.1. Lack of Detailed Landscape Designs for the Social Distance Requirements

People have different opinions on social distance, so it is necessary to consider more specific landscape designs in urban parks for visitor groups with different needs in the post-pandemic era. However, urban parks seem to have not considered designs of this type yet.

5.2. Lack of Psychological Healing Designs

A certain part of visitors agree that the experiences in urban parks have a healing effect on negative emotions. However, the closed stores and the low utilization rate of children's recreation facilities can be disappointing scenery that causes negative effects on people's moods.

5.3. Incomplete Instruction Signs and Disinfection Facilities

The signboards unequipped with lights do not work well at night. In addition, there is a lack of disinfection facilities in urban parks, which are public areas where the risk of infection exists. For instance, it is hard for visitors to find facilities in the park to disinfect hands.

5.4. Incomplete Intelligent Facilities

Intelligent facilities that enable park management to be more convenient and intelligent are not enough. Although plenty of vending machines are distributed everywhere in urban parks, they

cannot replace the stores operated by humans that provide more diverse goods and more humane service. Intelligent facilities can decrease the costs of hiring people who work in urban parks. They can also do some mundane work better than human employees.

5.5. Lack of Secure and Decentralized Spaces

A majority of urban park visitors still need to keep social distance. But some visitors are unwilling to keep social distance or wear masks because they think the infection risk is very low in the post-pandemic era. Then, it can be a problem to deal with visitors with different attitudes toward infection risks appropriately. Currently, urban parks lack secure and decentralized spaces to cover various needs.

6. Transformation Methods

This study puts forward some transformation strategies and designs regarding the problems.

6.1. Lighting Facilities

Urban parks should equip themselves with reasonable evacuation guidance, effective personnel control, and LED signs to ensure tourists see instructions at night. It can help guarantee that visitors can read the information and follow the instructions on the signboards in urban parks at night. With some LED lights on the signboard, the urban parks can also strengthen their capability of evacuating visitors during emergent accidents (e.g., fires) at night, thus increasing the degree of safety of urban parks.

6.2. A Healing Function System

Planting suitable species with a high survival rate is suggested to create a healing function system. According to relative research, there are some plants, such as Sorbus Nigra and Pomegranate Tree, which can emit corresponding beneficial substances into the air, protect human health, and promote air purification and water conservation [4]. In the post-pandemic era, it can inhibit viruses. Additionally, the different locations of urban parks can meet different weather and climates. Therefore, when choosing the specific types of plants, managers and gardeners need to use tree species with a high survival rate in line with the regional climate to make the urban park a complete system of healing functions.

6.3. Disinfection Facilities

Urban parks need to improve outdoor hand-washing sinks and temporary isolation and disinfection areas in parks to protect everyone's safety and allow tourists to disinfect themselves. Enough handy disinfection facilities should be installed in public areas of urban parks. For example, they can be installed near the hand-washing sinks, at the exit of public toilets, and in visitor-intensive areas. In this way, not only can people be reminded to do some disinfection, but visitors' needs for disinfection facilities can also be met.

6.4. Intelligent Facilities

Introducing spray disinfection robots can provide safer and more efficient intelligent disinfection of urban parks, reducing costs, and risk of cross-infection. They can walk along paths in urban parks and spray disinfection medicine, which can help urban parks to achieve daily disinfection work and allow for appropriate savings in labor costs. Moreover, using intelligent robots can reduce the

number of staff in urban parks to some extent, reducing the density of crowds in parks and thus further reducing the risk of infection.

Abandoned shops could also be transformed into public working cabins or lounges to improve the psychological healing effect of the park on tourists. Considering the closed stores leaving a number of abandoned houses, it is suggested to transform these houses into public-used spaces, such as public working cabins and public indoor lounges.

6.5. Methods for Controlling Social Distance

The design of tent classrooms is suggested to help visitors maintain a safe social distance, reduce social pressure, and improve air circulation. It can also insulate some noise from the outdoors, improve daylight and ventilation conditions, and help alleviate the dilemma of social, physical and psychological depression during the pandemic [1]. People can study or work in a relatively quiet tent classroom and enjoy the fresh air and natural scenery in urban parks.

The design of circle carpets is suggested to separate people by a distance of two meters in an intuitive form. Open spaces in the shade also allow for social distancing. This design can better cater to some visitors' social distancing needs.

A new transparent frameless grid dome can be installed as a new isolation device in the open space. For example, yoga and fitness activities can be held outdoors while respecting social distancing measures. The facilities like these could meet people's desire to exercise in the park while maintaining social distancing.

The control of social distance can be reflected in the design of facilities, and the design of street furniture can create distance between people to maintain the effect of social distance. For example, designers can design park benches divided into two sections, or set up a small flower bed in the middle part of a bench, to help keep people sitting on the bench at a social distance. This is also a way to meet the needs of some visitors better to maintain social distance.

7. Conclusion

COVID-19 has greatly impacted urban parks, with phased outbreaks of the pandemic causing varying degrees of problems in park operations. Residents feel deeply about the relationship between the environment and health, and urban parks are important places to soothe the soul and talk about stress reduction after public health events with large-scale impact.

After the pandemic, from the perspective of the future park development in the city, the park needs to be given more functions to meet the needs of people's daily life and activities for recreation, as well as the new needs related to the pandemic. Nowadays, urban parks in the post-pandemic era still have some issues regarding the pandemic, such as the lack of detailed landscape design for the social distance requirements, failure to meet people's strong demand for the psychological healing effects, and not enough intelligent facilities for unmanned management.

In the post-pandemic era, the innovation of urban park landscape design is all the more important to gain insight into its changes from the subtleties, to truly adjust to follow the needs and innovate to meet the times. The design of urban parks in the post-pandemic era needs to be in detail according to the distance needs of the pandemic, create the spiritual position of urban parks, introduce science and technology, and meet the differentiated needs of various groups of people.

In the post-pandemic era, urban planning and governance need to adhere to the principles of people-centeredness and health-first, and meet the diverse needs of residents.

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