The present situation and the trend of development of urban public green space in the post-pandemic era

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Abstract. COVID-19 has become one of the most dangerous viruses in the world since 2019. After long-time debate and a large amount of experiments, quarantine and self-isolation were claimed as the main measures of prevention. However, the policy of forcing people to stay at home limited their access to outside of their homes while also lowering the intensity of their usual exercise. As a result, public green space has become more important than ever for hosting people's outdoor activities. This paper aims to highlight emerging questions at COVID-19 and public green space. This paper aims to confirm that the existence of improvement trend of importance of public green space after COVID-19 period. And aims to make out a new kind of public space design model. It can be concluded that the rational construction of public green spaces is of great significance to improving the living environment of residents.

Keywords: Green Space, COVID-19, Public Green Space, Neighbourhood.

1. Introduction

There are countless unprecedented restrictions on public space around the world because quarantine and self-isolation seems to be the only way to keep people away from virus carrier in the post-epidemic era. It seems like everything seems to be unfamiliar when we have the chance to go outside meaning that form of relationship between people and the public place had been changed already [1]. What exactly people feel during the epidemic quarantine is the key factor present situation investigation. So this paper made a questionnaire and spread it out on the social media to show off the figure and try to reach a conclusion aims to make predictions for future development and make suggestions for possible problems.

2. Research method

The result come out over 900 pieces of questionnaires. The psychological survey of residents in my hometown during the epidemic. Table 1 shows the content of the questionnaire.

Table 1. Communication and activity mode investigation during the epidemic containment period.

How do you feel during the epidemic quarantine 1. relax and happy 2. lonely 3. Depressed 4. Anxious 5. Indifferent
Are you satisfied with the pattern about interact with people during the epidemic quarantine 1. Yes, I'd love to 2. No, I'm eager to communicate with people face to face 3. Indifferent
Do you like staying at home or visiting the gardens during the epidemic quarantine 1. I'd rather stay at home 2. I'm eager to visit the gardens in their residential areas 3. Indifferent
How do you think about the importance of landscape in residential areas during the epidemic quarantine 1. Think highly about that 2. Think nothing about that
You live in 1. High-rise residential houses 2. Multi-storey buildings 3. Villa area
Frequency of the use of the green space Never ----------- day to day 1-------------------5
Attitude to green space Unsatisfied ---------- satisfied 1-----------------------5

3. Results and analysis

The quarantine revealed that 61.81% of them felt lonely, depressed and anxious; 41.93% of people was eager to interact with people face to face; 64% were more eager than before to visit the garden and square near their neighbourhood; and 57% confirmed the landscape in their neighbourhood to be important for maintaining their physical and mental health during the home quarantine.
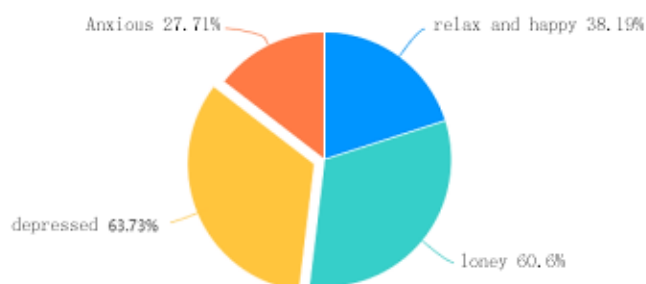

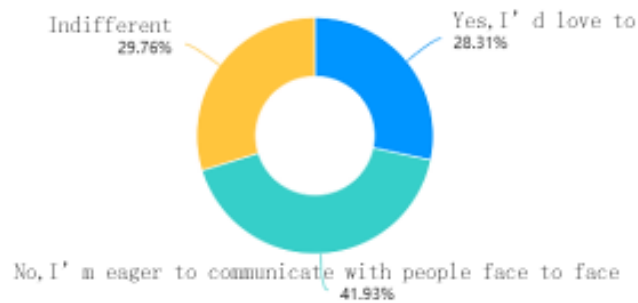**Figure 1.** Feelings during epidemic quarantine.

Figure 2. Communication tendency during quarantine.

As is shown in Figure 1 and Figure 2, the psychological survey of residents in my hometown during the epidemic quarantine revealed that 61.81% of them felt lonely, depressed and anxious; 41.93% of people were eager to interact with people face-to-face; 64% were more eager than before to visit the garden and square near their neighbourhood; and 57% confirmed the landscape in their neighbourhood to be important for maintaining their physical and mental health during the home quarantine.

It is widely known that public green space provides a variety of 'ecosystem services' to the community, which include the reduction of the heat island effect [2]. Public green space can also reform the climate through the transpiration of plants [3]. The existence of plants can clean up some of the pollutants, like the dust floating in the air, trash on the ground, and toxic chemical ingredients in the water. The roots of the plants can prevent water runoff during intense rain events. Public green space is a kind of supporter of plant and animal biodiversity, the provision of food, and the provision of culture and entertainment. For urban dwellers, public green space represents "oases of peace" where people can relax, do physical activity, observe nature, etc. Observing nature is necessary for kids to form their own worldviews. Staying underneath the woods is part of human nature, which is hidden under your genes and makes you relax. Sitting on the grassland and having a panic is one of the most popular events. There is no doubt that an environment near nature can reduce stress and be good for physical and mental health.

We all know that space seems to have a kind of natural carrying capacity [4]. It is not hard to find out that people would gather in a public place, and the total number of them would hover around a certain maximum. That means each space has a certain carrying capacity, like a bottle that contains water. When the bottle is full, the water will run out. When the number of people reaches its maximum capability, people will choose to stay away from the place unconsciously. Each of us has an intuitive sense of how "too many people" feel, which varies by gender, age, personality, or cultural norms. But we believe that the COVID-19 crisis could change our natural sense of the number of people "crowded' in a particular space.

An obvious potential consequence of COVID-19 is the general aversion to large population-gathered events among citizens living in the community when virus carriers are spotted near the area they used to stay. But will the public be permanently disgusted by large public gatherings? The answer could be important because it will influence the pattern of our urban design in the near future. Large flexible spaces can be seen as a valuable resource as they have so many uses, like an evacuation site during an earthquake or other kinds of catastrophe [5]. In Vancouver, New York, and London, large green spaces and convention centers have been transformed into emergency field hospitals. Blockade measures and stay-at-home measures may change the way children and adolescents develop attachment and intimacy in public places, making their pattern of behavior different from that of their older brothers and sisters. The places that attach closely to children and young adults, like river banks, parks, alleys, and squares, seem to be less attractive compared with the old days because of their absence. Maybe keeping isolated in the flesh and attaching to the virtual world like chat rooms on the internet is not a bad choice for the younger generation, while outdoor activities are so important for teens as they grow up.

4. Analysis of Proposals for Future Public Green Space Facilities

4.1. Size and distance of the proximity of green space

Similar to other public goods, public parks will be underfunded without interventions in the market. In other words, since public parks do not have monetary value and take up large swaths of land, there is little incentive for self-interested private developers to provide them within a free market without government intervention. So the size of the green space mainly depends on the policies of local governments and residents' demands [5].

Public green space lying in the residential area could be important because it could be the only place available during the time people are isolating themselves in their neighborhood. If they are forced to stay at home and shut themselves off, public green space can still be visible, which may ease their anxiety.

According to research in Italy, about 80% of usual visitors visited green spaces farther than 200 m from home (and around 50% were able to go even farther than 500m) [6].

So the distance between green space and residential districts should be within a proper range. Walking in the park in the neighbourhood might become a daily routine but exploring the unknown is in the nature of humanity. So that the urban public space is even more valuable during the epidemic quarantine for citizens.

4.2. The quality of public green space

We build public green spaces in order to make people feel like they are staying in the natural space of the urban city. Just imagine how cool it could be to stand in a place without artificial things near downtown. Here are some factors that affect the quality of public green space.

The quality of public space depends on the cognition of its users. Maybe it is not possible for all of them to say something professional. But their subconsciousness, like the overall impression of the microclimate and the percentage of shade, will lead them to give an assessment.

The quality of public space depends on its accessibility. The distance between public green space and the main traffic stream (railway stations, bus stations, etc.) and the space crowd (residential areas, downtown department stores, etc.) mainly determines whether it is convenient to travel. The road inside the public green space mainly affects the sense of direction and overall recognition of it.

The quality of public space depends on its history. There is no doubt that public space will be popular if loads of collective memory exist in it. Both social media and individuals will be concerned about it when it loads on some social event.

Concerning the irregular outbreak virus, the social demographic variables of the park concerned are significant. Doing sports regularly could be a challenge during the epidemic era. In other words, a crowded public green space in the post-epidemic period is qualified to be thought of as a high-quality space.

4.3. Strategies for Improving Landscape

Most people go to public spaces for exercise, so building activity spaces of various characteristics to meet the residents' demands for fitness cannot be neglected. Gym facilities in the public green space should be kept in good condition to ensure citizens' rights to do sports.

People go to public green places not only to get their bodies fitted but also to communicate with others. Creating secondary spaces for social contact to meet residents' demands for socializing is one of the most essential parts of landscape architecture design. Leisure facilities in public green spaces like armchairs and seats might be a good choice to help people define empty spaces. Squares and playgrounds are indispensable factors in public spaces to allow communication to begin. Notice boards, newspaper corners, or other places to get information can also encourage discussions.

Plant design is a basic part of landscape architecture. Building plant spaces for healing to meet residents' demands for rest and relaxation Creating microclimates to decrease the chances of severe weather like heat and blizzards occurring and different patterns of spaces make plant design

irreplaceable. Indigenous plants should be considered at first to show off regional characteristics and humanistic concerns.

5. Conclusion

The relationship between human and public had already changed during the epidemic era [6]. This paper aims to confirm that the existence of improvement trend of importance of public green space after COVID-19 period. And aims to make out a new kind of public space design model. According to the conclusion of questionnaire maintained in the paper, COVID-19 crisis changed our natural sense of natural carrying capacity of a particular space because of the psychological hint of isolation. The severity of the epidemic will determine the activity area of citizens. So build up and renew the public green space can ease the conflict of isolation and gathering activities during the post-COVID-19 era. We sent off questionnaires for having an insight to what the residents need and had a discussion of size and distance the proximity of green space and made out a proper standard of public green places' quality in agreement as the cognition of its users, accessibility, history, social demographic variables. We made several strategies to Improve it such as building activity spaces of various characteristics for meeting the residents' demands of fitness; Creating secondary spaces for social contact to meet residents' demands of socializing; Building plant spaces for healing to meet residents' demands of resting and relaxing.

The deficiency of the paper is the deviation of data acquisition because of the boundedness of internet-supported questionnaire.

The future of cities is not predetermined which will be the result of shaping the interests, power relations, priorities, and negotiated decisions in the public space. We hope that the public space of the post-coronavirus world will continue to be valued by the possibilities of socialization, entertainment, claims, community building, and identity formation. Given the pace, scale, and diversity of ongoing changes around the world, measuring changes in the use and perception of public space over the coming months will be crucial to guide future planning and design.

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