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COVID 19: Are Our Green Areas Enough for People's Well-being?

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ABSTRACT

Malaysians' overall well-being, particularly in urban areas, has been seriously affected physically and emotionally due to the series of imposed lockdowns in the country. The number of mental health problems such as depression, anxiety, and loneliness has increased tremendously during the lockdown period. Various studies suggest that these mental health issues could be coped with if people are allowed to access urban greeneries and public green spaces during the pandemic. However, the degree to how adequate existing green areas are to fulfil an urban community's needs with strict social distancing compliance is still vaguely interpreted in the literature. It is still arguable that the current 10 per cent green area requirement is still relevant to the current context of the COVID-19 pandemic. This study aims to determine the sufficient amount of green areas for people's well-being during the pandemic, based on the local population, accessibility to green areas, and compliance with the new norm of social distancing by a minimum of one meter. Therefore, an urban neighbourhood in Iskandar Puteri, Johor, Malaysia was selected and simulated using GIS spatial analysis based on the highlighted parameters. As a result, the study found that the current size of existing green areas in the neighbourhood is insufficient in terms of compliance with the parameters, especially Malaysia's social distancing requirements. This study could provide a platform for future planning to include pandemic risk reduction into urban planning policies, especially in the context of Malaysia, to cater to future uncertainties

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1. Introduction

People in developing countries, including Malaysia, have realised that quality of life is not necessarily a simple function of the best place to live. The growing awareness of the importance of other aspects, including the social, political, and environmental health of a nation, has embarked to understand the indicators of how far existing green areas adequately fulfil an urban community's needs with strict social and physical distancing compliance when using public open spaces during lockdown. During the lockdown and restrictions placed on public activities and gatherings, quarantine and self-isolation, potential health issues and uncertainty, limited outdoor and social activities, social media exposure to negative news, financial problems and food insecurity, and other

pandemic-driven pressures, have all resulted in adverse physiological and psychological effects on people (Geng et al. 2021). Many symptoms, including fatigue, tiredness, insomnia, posttraumatic stress symptoms, anxiety, loneliness, confusion, depression, and anger have posed a threat to human mental and physical health, as well as social cohesion and resilience (Bo et al. 2020; Brooks et al. 2020; Gao et al. 2020).

1.1 Green Areas in Malaysia

Given the developing situation, green spaces have become one of the only sources of resilience amidst the coronavirus pandemic, due to its positive effects on psychological, physical, and social cohesion, as well as spiritual wellness (Geng et al. 2021). This reflects more effectively on the overall health and well-being of Malaysian citizens. Wolch, Byrne, and Newell (2014) argue that urban green spaces, including parks, forests, green roofs, streams, and community gardens provide critical ecosystem services. Access to urban green spaces in the living environment positively affect people's health (Hillsdon et al. 2006; Maas et al. 2006). Green spaces appear to be more than a luxury good, as they encourage physical and emotional well-being of urban residents. Gustafson (2001) claimed that the relationship between people and their place in daily life is crucial for the quality of individuals' lives and social cohesion.

In Malaysia, the National Urbanization Policy (NUP) set a standard to achieve 2 hectares per 1,000 people by 2020. This is vital in the urban green space planning policy to ensure that each citizen has access to urban green space, and fulfils their social needs, particularly in high-density urban areas. The Federal Department of Town and Country Planning, Peninsular Malaysia (FDTCP), has produced a planning standard guideline to supervise implementing the open space policy in the country (Dali, Yusoff, and Ibrahim 2014). However, Maryanti et al. (2016) argued that this guideline is difficult to be achieved. Among the obstacles are the urbanisation and densification of cities in Malaysia. According to the current Malaysia Town and Country Planning Department (TCPD) Planning Guideline: Open Space and Recreation, Malaysian green spaces are classified based on their size as shown in Table 1. This, however, is debatable. According to Sakip, Akhir and Omar (2014), the main factors for the success of green areas are connectivity, social activities, the image of the area and comfort level. All of these elements have contributed to people's overall well-being.

Table 1 The Hierarchy of Open Space According to Town and Country Planning Department of Malaysia

Type of open space	Minimum required area
Play lot	0.2 hectares
Children's Playground	0.6 hectares
Neighbourhood Park	2 hectares
Local Park	8 hectares
Town Park	4 hectares
Regional Park	100 hectares
National Park	No limit

Source: National landscape Guidelines 2008 & Planning Guidelines, TCPD

As cities are expected to continue growing and in turn increasing in density, the world's population is expected to reach nearly 10 billion inhabitants by 2050; it is widely recognised that the negative impact of urbanisation on biodiversity has led cities to reimagine urban designs to provide better biodiversity support (Panlasigui et al. 2021). Some cities have developed urban biodiversity plans primarily focused on improving biodiversity support and ecosystem functionality within the built environment, through habitat restoration and other types of urban greening projects called the biophilic cities. Biophilic design approaches enhance human well-being by fostering connections between people and nature in the modern built environment (Hayles and Aranda-Mena 2018). It is well-known that the application of biophilic design will reduce stress, stimulate creativity and clear thinking, improve physical and psychological well-being and accelerate healing (Bolten and Barbiero 2020).

1.2 Green Areas for Human Well-Being During COVID-19

After the World Health Organization (WHO) declared the COVID-19 pandemic on March 11, 2020, physical and social distancing techniques were implemented intended to limit virus transmission. The interventions were argued to be deleterious to mental health and well-being (Heo et. al. 2021), which are already hampered under public health conditions. COVID-19 has reshaped people's lives, and one of the most enduring effects may be changes to the way people use and access public open spaces. Physical activity may function as a mediator between exposure to greenspace and mental health. Observing nature can elicit happy emotions and alleviate stress (i.e., stress reduction theory) (Liu et.al 2019).

Nevertheless, a significant difference has been highlighted in people's perceptions of greenery in urban areas. For instance, the difference can be seen in terms of localities (de la Barrera et al. 2016; Riechers et al. 2019), countries (Bertram and Rehdanz 2015; Schipperijn et al. 2010), and cultural backgrounds (Rosley et al., 2014), which influence people's behaviours and attitudes in green areas. Albeit in Malaysia, the lockdown periods during the COVID-19 pandemic have made the crucial role of natural and green spaces even more evident and exposed the limited resources in urban areas, leading to various policy and advocacy responses. Park closures, limiting park opening times and reducing services such as park benches, children's play areas, and sports facilities, has led to the deterioration of people's mental, physical and emotional well-being.

The WHO also highlighted the importance of urban green areas for improving the well-being of people in 2017. These parks have become a place for people to engage and socialise with the community, as well as to develop a sense of belonging with their surroundings (Nam & Dempsey, 2019). Nevertheless, these experiences were impossible due to a series of enforced lockdowns in Malaysia. The biophilic needs were replaced with imitating outdoor greenery into people's homes in order to satisfy people's emotional needs. This mimicry, however, is not an ultimate solution for offering the experience of engaging with

nature. According to Rosley et al. (2014), humans have been bound to their environment intrinsically due to their biological nature, culture and needs.

Due to the restrictions on access to public parks during lockdown, the number of visitors to green areas, particularly in urban settings, is increasing. This trend reflects the importance of green areas for urban dwellers. Green spaces have been proven to provide healing attributes to human well-being, both physically and emotionally, regardless of their size (Neale et al., 2020). However, raises the question "Are existing green areas sufficient to improve people's well-being?" The new norm and, most importantly, the imposition of a social and physical distancing requirement of a minimum of 1 meter could affect how visitors utilise parks. Therefore, this work aims to investigate the capacity of urban green areas based on the projection of people's social and physical distancing within the area.

2. Methodology

2.1 Description of Study Area

The green area of Taman Bukit Indah was selected as the case study of this paper as shown in Figure 1. The strategic location of this residential area between Johor Bahru City centre and Iskandar Puteri has contributed to the robustness of the socio-economic development of the place. This residential area has been recognised as one of the well planned residential areas in Johor Bahru. The existing green areas of Taman Bukit Indah such as Taman Rekreasi Bukit Indah and its green corridors, are well known as one of the important landmarks to the residential area and the jurisdiction of Majlis Bandaraya Iskandar Puteri. This recreational area won several prestigious awards such as the Johor State Landscape Award 2001, the National Landscape Competition 2001 and the Best National Landscape Award 2005. Regardless of this recognition, the study attempts to look at how the park and its green corridors can accommodate the needs of its residents and its nearby whilst discussing the well-being of the people during the COVID-19 pandemic.

The total area of the recreational park and its green corridors are 25 hectares. Based on the Planning Guideline for Open Spaces and Recreation (PLANMalaysia, 2013), a 40 hectares recreational park is typically designated for approximately 50,000 users per time. In this case, it can be assumed that the parks in Bukit Indah could accommodate approximately 31,250 users per time for its residents' activities.

Figure 1 Study area in Taman Bukit Indah , Johor Bahru Malaysia

2.2 Data Collection and Processing

The data was collected from (i) aerial images and (ii) a secondary GIS database. To validate the existing GIS database, a series of flight missions using Phantom 4 standard drone were conducted for two days in the residential area of Bukit Indah, from 4 March to 6 March 2021. Two hundred aerial images of the area were processed using Agisoft Metashape Photoscan. This software was used to combine all the images into a single orthomosaic image, which was later used as a reference map to validate the existing secondary GIS database.

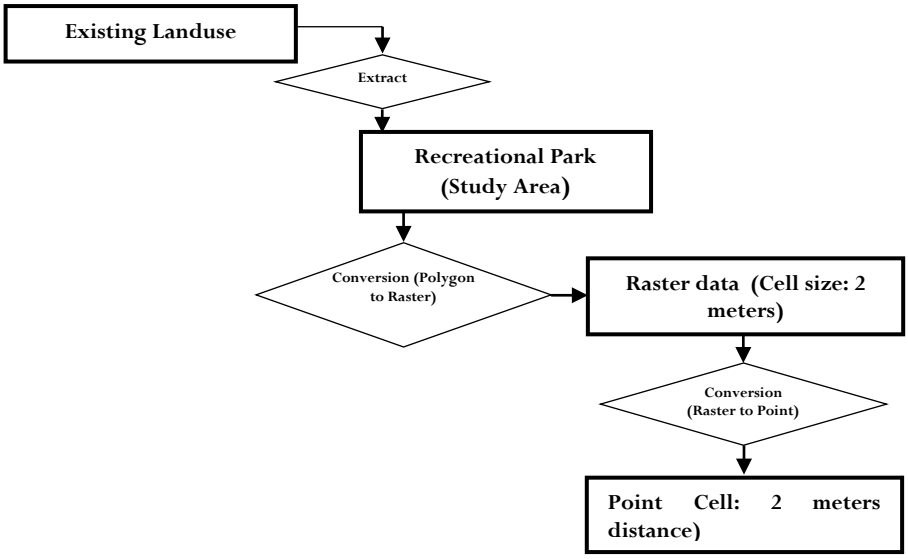

Figure 2 The Analysis Process of GIS mapping simulation

This data processing aimed to analyse the capacity of the Bukit Indah Recreational Park and its green corridors to accommodate the users allowed at one time, especially during this pandemic condition. The flow of analysis processes is shown in the Figure **2.**

The analysis process was conducted using ArcGIS 10.6 by extracting data on Bukit Indah Recreational Park and its green corridors. Overall, the recreational areas covers less than 7 per cent of the total development of the residential area as shown in Figure 3. The area can be divided into four different green areas, which are (1) the centralised park, (2) neighbourhood park, (3) green corridor, and (4) open lawn.

The four different green spaces in Bukit Indah Recreational Park and its green corridors were later analysed by generating several users using points in the raster analysis. These points were generated within the boundaries of the green areas with a minimum 2 meters distance between points as shown in Figure 4. The 2 meters of point distance were assumed to be more relevant to be tested in this study than the minimum requirement of 1 meter social and physical distancing, as addressed by the Malaysian authorities. The reason for this is to ensure that the users are theoretically and comfortably able to have their own space to move within if the area was crowded. Similar simulations were carried out by indicating that 2 meters of social and physical distancing are only a minimum distance for one to conduct physical activities within their own territory in an open space.

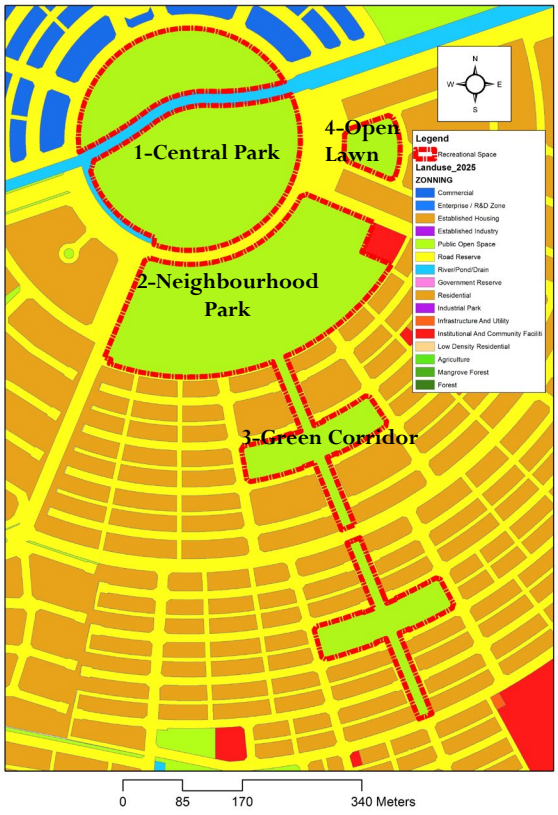

Figure 3 The boundaries of the areas in Bukit Indah

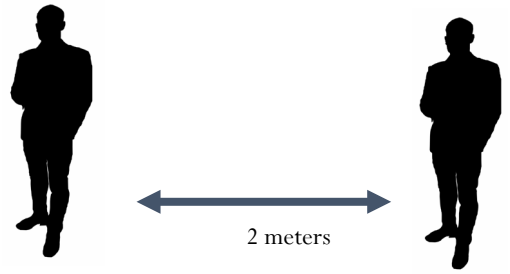

Figure 4 Distance simulation

3. Results and Discussion

Based on the generated points, each area of the Bukit Indah Recreational Park and its green corridors could accommodate a different number of users at once, with a strict adherence to 2 meters of social and physical distancing, providing an individual space in the open area. The number of users that could accommodate each area in Bukit Indah Recreational Park and its green corridors is tabulated below.

Table 2 The Capacity of the Green Areas in Bukit Indah

Area	Number of users
Central park	*15,801*
Neighbourhood park	20,350
Green corridor	1,450
Open lawn	3,799
Total	41,400
Predicted no of users	31,250

Based on the generated map by the GIS, the capacity of the green areas based on the number of users is higher compared to the predicted number of users based on the existing Planning Guideline for Open Spaces and Recreation (refer to Table 2).

It is worthy to note that factors such as type of outdoor activity, space functionality, existing hardscape and softscape park area, as well as the design layout were excluded in the analysis (refer to Figures 5, 6 and 7). The analysis investigated the capacity of the park in general as a typical, open green area. The definition of the need for the green area provided by the Planning Guideline for Open Spaces and Recreation (PLANMalaysia, 2013) is indeterminate. These findings highlight the contribution of the implementation of this guideline in landscape design.

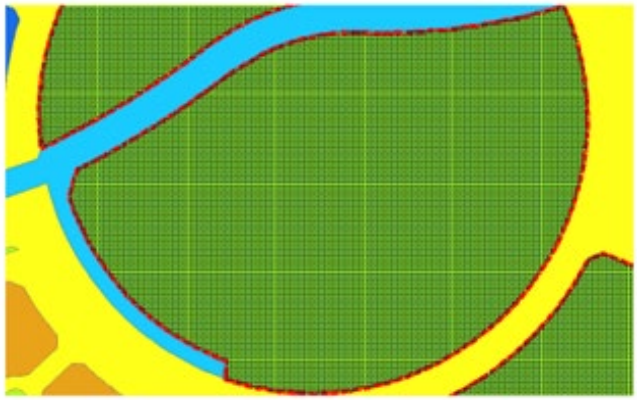

Figure 4 The Results of 2-meter physical distancing in the central area

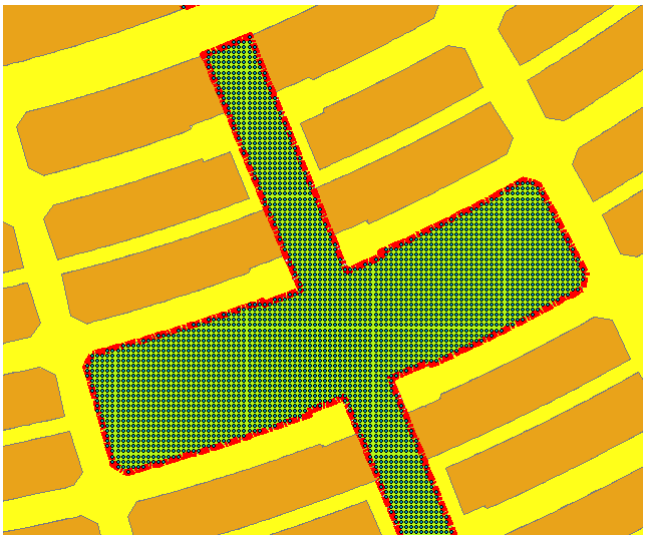

Figure 5 The Results of 2-meter physical distancing in the neighbourhood area

From the overall planning viewpoint, the existing green areas in Bukit Indah are sufficient to cater to people's needs. This can be seen on the provided GIS simulations, projecting the maximum number of the users based on the park's capacity and social distancing parameters of a minimum of 1 meter.

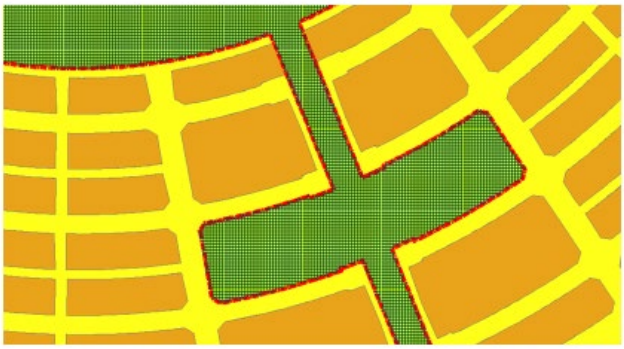

Figure 6 The Results of 2-meter physical distancing in the green corridor area

However, as there are no other parks in the immediate vicinity, this park's actual number of users may be larger than the

stimulated number. Provisionally, this park has been regarded as an important green area for many people who live in or around Bukit Indah Johor. Hutan Bandar Johor Bharu, a nearby local park, is about 20 kilometres from Bukit Indah and its neighbourhoods. In this context, there is a need to improve the current general guideline for open space and recreation, particularly to cope with people's needs during the COVID-19 pandemic. Issues such as depression and other physical and emotional problems during this unprecedented pandemic could be reduced if people are permitted to access outdoor greenery in public areas. (Liu et.al 2019) pointed out that greenery in the neighbourhood has been linked to improved mental health while the association between greenness and well-being is mediated through facilitating walking and social cohesion.

Recently, vaccination has became a worldwide agenda to increase the human's immune system against the pandemic of Covid-19. However, it is still early to conclude that people are now free from the virus. Even if Covid-19 becomes an endemic due to the vaccination program, it is not guaranteed that people no longer have to practice social distancing and isolation in the next two to three years. Thus, issues on the needs of green areas in relation to public well-being, especially during the pandemic, are vital. The finding of this study revealed green areas in Bukit Indah Recreational Park able to accommodate a huge number of users even while practising social distancing.

A green area should be considered an extended space that connects people to nature. As suggested in prior work (Wan Ismail, 2019), every neighbourhood should have access to green facilities such as public open spaces and recreational areas. It has to be flexible to accommodate the different needs of the community residing in the area. A green area is a place that could offer a sense of individualism and community within the same compound. Thus, this unique attribute should not be compromised, but needs an enhancement to adapt to the new norm, whilst discussing people and place interaction in the green area. Based on the results, this study suggests that the existing social distancing requirement, which is a minimum of 1 meter, has to comply with other important aspects related to the characteristics of green areas. From the viewpoint of landscape design and place making, the results do not represent the essence of people and place interaction and the existing functions of green areas.

Other aspects that need to be considered in the park utilisation during COVID-19 pandemic are facilities such as synchronise entry and exit points and good signage that orients public activities, movement and awareness. In detail, every niche of spaces within the park should be well organised to avoid conflict of activities and overcrowded at certain spaces in the park. Stratification of the spaces and activities will formulate a systematic scenario of utilising the park and could prevent any possible infection of COVID-19. This situation should have remained a vital SOP until the end of the pandemic, and contiguity enforcement should be in place even in the post-covid period. Awareness and physical distancing in the park should remain critical factors to break the infection's dispersionn.
Correspondingly, the role of urban form and service provision in supporting health and well-being should be the centre of attention in urban policy development. As prior work (Badland et al., 2014; and Lowe et al., 2015) suggested, creating sustainable well-being and enhancing public health could assist policymakers in achieving their policy goals in providing a sustainable future.

Inevitably, this study foresees that the definition and classification of green areas based on the existing guideline need to be improvised. The green areas should be defined according to their functions, activities, accessibilities, infrastructures and connectivity. These are some of the essential elements that contribute to the success of urban-based green areas. In embracing the new norm, green area spatial planning and design, particularly in urban settings, should be sensitive to safe social and physical distancing requirements. Thus, these considerations will allow us to understand the carrying capacity for green areas in a far better manner.

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