NEAR EAST UNIVERSITY

INSTITUTE OF GRADUATE STUDIES

DEPARTMENT OF LANDSCAPE ARCHITECTURE

EXAMINING THE EFFECT OF COVID 19 IN THE USE OF OPEN GREEN SPACES IN ABUJA, NIGERIA

M.Sc. THESIS

Faith DANJUMA

Nicosia

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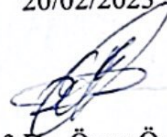
Nicosia

February, 2023

Approval

We certify that we have read the thesis submitted by **Faith Danjuma** titled **"Examining the Effect of Covid19 in the use of Open Green Spaces in Abuja, Nigeria"** and that in our combined opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Applied Sciences.

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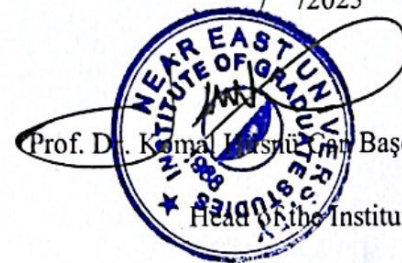
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"I hereby declare that all information, documents, analysis and results in this thesis have been collected and presented according to the academic rules and ethical guidelines of Institute of Graduate Studies, Near East University. I also declare that as required by these rules and conduct, I have fully cited and referenced information and data that are not original to this study".

Faith Danjuma

02/02/2023

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Faith Danjuma

Abstract

Examining the Effect of Covid 19 in the use of Open Green Spaces in Abuja, Nigeria

Danjuma Faith
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In urban open green spaces like parks, residents can interact with nature and engage in recreational activities. The use of these space have proven to be beneficial to man both physically, mentally and psychologically. Outbreaks have disrupted many activities in Nigeria; Abuja is among the ten states that are greatly affected by the pandemic. The research focuses on how covid19 affected the usage and preferences of green spaces in Abuja, Nigeria. The first chapter of the research sets out the aims and problem statement of the study, the second chapter reviewed theories about open green spaces and its classifications, the third chapter examined theoretical reviews of green spaces and Covid19 pandemic, the fourth chapter identified methodology of the study and the selected parks, the fifth chapter consists of analyses, discusses and interpretations of the results, and conclusion and recommendations was provided in the sixth chapter. Ten parks were randomly selected and a questionnaire was conducted with 100 participants. The findings demonstrated that there is insufficient awareness among the residents regarding the health benefits and importance of green spaces and the parks are not easily accessible. An effective exploratory policy and strategies should be prioritized consequently in other to ensure sustainable future of these green spaces and guarantee that they are accessible to a variety of neighborhoods. In addition, since there is high influx of people in Abuja urban area there is a need to provide more open green spaces and park

Keywords: Green spaces, pandemic, parks, questionnaire, Abuja.

Özet

Nijerya Abuja'da Açık Yeşil Alan Kullanımında Covid 19 Etkisinin İncelenmesi

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Yüksek Lisans, Peyzaj Mimarlığı Bölümü
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Parklar gibi kentsel açık yeşil alanlarda, sakinler doğada zaman geçirebilir ve farklı rekreatif faaliyetlerde bulunabilirler. Bu alanların kullanımının insana hem fiziksel, hem zihinsel hem de psikolojik olarak faydalı olduğu kanıtlanmıştır. Salgınlar Nijerya'daki birçok faaliyeti kesintiye uğrattı; Abuja, pandemiden büyük ölçüde etkilenen on eyalet arasında yer almıştır. Araştırma, Nijerya'nın Abuja kentinde Covid19'un yeşil alanların kullanım ve tercihleri nasıl etkilediğine odaklanmaktadır. Araştırmanın birinci bölümü çalışmanın amaçlarını ve problemi ortaya koymakta, ikinci bölümde açık yeşil alanlara ilişkin teoriler ve sınıflandırmaları, üçüncü bölümde yeşil alanlar ve covid19 pandemisi ile ilgili teorik incelemeler, dördüncü bölümde ise araştırmanın yöntemi ve çalışma için seçilen parklar tespit edilmektedir. Beşinci bölüm, sonuçların analiz edilmesi, tartışılması ve yorumlanmasından oluşmakta ve altıncı bölümde ise sonuç ve önerilere yer verilmiştir. Rastgele on park seçildi ve 100 katılımcıyla bir anket yapılmıştır. Bulgular, bölge sakinlerinin yeşil alanların sağlık yararları ve önemi hakkında yeterli farkındalığı olmadığını ve parklara kolayca erişilemediğini göstermiştir. Sonuç olarak, bu yeşil alanların sürdürülebilir geleceğini sağlamak ve mahallelerde erişilebilir olmalarını sağlamak için etkili bir politika ve stratejilere öncelik verilmelidir. Ek olarak, Abuja kentsel bölgesinde yüksek insan akışı olduğu için daha fazla açık yeşil alan ve park sağlanmasına ihtiyaç vardır.

Anahtar Kelimeler: Kentsel yeşil alanlar, pandemi, parklar, anket, Abuja

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CHAPTER I

Introduction

Background of Study

Green open spaces covered with vegetation either natural or intentional which includes parks, gardens in communities, playgrounds, natural areas, trees in street, yards. Rural areas include wetlands, natural resources, agricultural land (Dwiyanti et al., 2021). According to Nur (2022), the main functions of green open space are to provide benefits for sustainable living were green spaces are used to maintain the quality of the ecosystem of an area also the, economical, sociological and cultural sustainability of the area. Despite the tremendous benefits of urban open green space there is a major set park in the planning and designing of them mainly in developing countries, priorities should be given to them by urban planners and landscape designer (Ahmadpoor & Shahab 2021).

Nigeria had her independence in 1960 with Lagos being her capital city, in 1975 a decision to move the capital city to Abuja was made due to the rapid urbanization that took place in Lagos, causing urban problems such as traffic congestion, poor drainage, slums and squatter settlements among many others, Lagos was not able to accommodate the growth. Abuja master plan was created with the help of International Planning Association (IPA) firm New York. The IPA choose the location of the new capital city using strategical means. According to Elleh (2017), the government officially relocated from Lagos to its new Federal Capital Territory (FCT) Abuja on 12 December 1991. Green spaces were predominantly included in the master plan but some were distorted for another use due to rapid urbanization, political and negligence by the authorities involved among others.

The concept of the garden city was used in the design of Abuja master plan similar to the modernist cities. The master plan has 32% of land area allocated to open spaces and parks. In Nigeria the sole responsibilities in developing open green spaces is carried out by officials of government ministries and agencies such as town and country planning agencies, ministry of environment, ministry of urban development, state development and property cooperation among others. The need of urban parks in Nigeria has recently been inculcated ever since Covid-19 pandemic, the government and many stakeholders have

been creating awareness and enlightening the people on how the action could save the country and the planet at large.

Currently, cities like Abuja, Lagos, Port-Harcourt and some large cities or metropolitan areas has been putting an effort in provision of urban parks and open green spaces, the buffer and shrubs and other vegetation of green spaces plays a key role in the environment by the air quality it provides and also in creating and aesthetical environment, on the other hand developers, town planners, architects, builders now design and make efforts to build or develop structures including green spaces in other to meet green spaces regulation in other to provide a conducive atmospheric environment.

Pandemics in epidemiology is referred to by Seker et al. (2020), as a disease that affects people in their, social, economic, psychology, cultural, political, geographical, religious and many more life since ancient times. In 2019 there was an outbreak of corona virus in which the pandemic there is over 33 million confirmed cases and deaths of over 1 million globally, as of 1st October 2020 (Geng, 2021). By and large, open green spaces have been seen to provide a lot of health benefits to its users (Lopez et al., 2021). Venter et al. (2020) is of the option that green spaces have been seen to mitigate the spread of covid19, while according to Pan et al (2021), and Jay et al (2021), green open spaces visitation as a high risk to covid19 transmission.

Nigeria is a fast growing developing country, it recorded its first index case of covid-19 pandemic out break on the 28th February 2020, the first case was in Lagos followed by other states, Abuja had the second highest number of affected cases after Lagos, the government had to impose a total lockdown which had an effect on most open green spaces despite the tremendous benefits and importance it has on physical and mental health of people. Therefore, this study examines the effect of covid-19 pandemic on the use of open green spaces in Abuja, Nigeria.

Aim of the Research

    Aim

The aim of this research is to examine the effect of Covid-19 Pandemic on the use of urban open green spaces in Abuja, Nigeria. Simply, the aim is examining the usage frequency and preference of open green spaces, during and post Covid-19 pandemic.

Research Questions and Objectives

➢ To review the classifications and standards of urban open green spaces.

➢ To examine the effect of pandemic on the use of urban open green spaces over the course of time and how they spread in various places

➢ To examine theoretical reviews on green spaces and covid-19 pandemic

➢ To identify the existing parks and urban open green spaces in Abuja

➢ To analyze the usage frequency and preference of open green spaces in some selected parks in Abuja.

➢ To give appropriate recommendations on how to benefit from the use of open spaces in case of such pandemic in the future.

Statement of Problem

It is human nature to try and adapt to situations and also try as much as possible to find solutions to problems. Following the covid-19 epidemic which puts the whole world in a state of lockdown, people have encouraged a different ways of dealing with crisis, some of which includes the way they mingle with one another in public open spaces such as parks has sparked reaction on the views of individuals for the sake of better understanding and safe offering of urban open green spaces use in the future. It is essential for individuals and nature to interact as urban open green spaces support everyday individual life, group recreation, physical exercise and mental health. Mood will be improved, and also the opportunities to cope with urban life through stress reduction (Korpilo et al., 2021). From various studies carried out around the world has indicated that when people interact with nature it helps in coping with the lockdown caused by the COVID-19 epidemic (Grima et al., 2020; Lopez et al., 2020; Venter et al., 2020).

Despite these benefits, there is need to look at how people view public open green spaces before, during and after the covid-19 pandemic in Abuja. Abuja the capital city of Nigeria is known for its dense population as a result of migration which has made work

and life in Abuja become stressful with most spending most of their weekly days working with little time in weekend for family and other leisure activities. People in Abuja needs to understand that there are a lot of benefits in providing time to explore the urban green open spaces because only by doing so would they be able to enjoy nature, improve their health and regain lost energies from their hectic work schedule. It is on this backdrop that this study is being carried out to find out the effect of covid-19 pandemic on urban open green space in Abuja, Nigeria.

Limitations of Research

The study will be limited with the selection of 10 urban parks within the urban areas of Abuja metropolis, Nigeria. Due to personal reasons some participants did not reply few questions.

CHAPTER II
Urban Open Green Spaces

Definition of Open Green Spaces

Urban open green spaces can be defined as a space that is predominately an open space that includes parks, greenways, and recreational places, among many other things. It may also be described as a length of undeveloped land with perennial wood plants, with trees serving as the primary plant species (Muliasari et al., 2021). Chu et al. (2018), defined urban green spaces as an artificial ecological system that has soil as its matrix, the main body is vegetation and its features is human disturbance and it symbols with the biological community. According to Littke (2015), green areas are defined as all lands not built upon or sealed in and urban area. He also stated that urban green areas function to enhance climate adoption, health, recreation, climate, biological diversity, cultural and educational values. Soltanifard (2019) define urban green space vegetation to absorb CO2 and producing O2, purifying air pollution, reducing noise, improving soil condition and ground water recharge, monitoring of micro climate and reducing heat effect. Chen (2019) described, urban green space to coordinates urban space development by controlling urban sprawl, adjusting the ecological balance, beautifying the landscape and improving the quality of the environment. Due to worldwide urbanization and it causing a lot of environmental problems, this has brought attention to the importance of the role urban green space in cities.

Urban green space is an inclusive area of conservation that users experience (Croy et al., 2020). Hasddin et al. (2022) described green open spaces to reduce emission from cars and also controls greenhouse gases in the urban environment. Green space provides plants domestication and conservation, it also provides livable, sustainable and a very comfortable environment (Dwiyanti et al., 2021). Open green spaces according to Leung (2022), serve in carbon sequestration in urban areas, due to human activities that poses 71%-76% global carbon emission which causes climate change. Chen et al. (2020) described open green space as a very important element in the quality of life in an urban setting he saw it to set different opportunities for physical activities, recreation done outdoor, and therapeutic benefits.

Green spaces have been of great benefit, Liu (2022) from his study in China discovered that there is a correlation between urban parks and positive physical activities and positive mental health benefit, were physical activities restore people's mood, energy level, confidence and interaction with nature. Access to green spaces is a component of urban health (WHO 2017). Barton & Rogerson (2017) in their study are of the opinion that from many other previous study there is a positive correlation between increase in health issues and the absence of open green spaces therefore, access to green spaces within urban areas positively affects individuals.

Li et al. (2021) stated that open green space can also be of great benefit to the aged or elderly if their preferences and perception is met in its design such as safety, comfortability, control, aesthetics, convenience, social participation, and also civil, cultural and religious believes. In a bid to describe the distinct benefit of parks Schnell (2019) viewed discrete visit to parks improves wellness and people tend to be connected to nature more than on a social visit, discrete visit is associated with clear thought, positivity, reducing stress, stimulating one's feelings and connectedness to nature. Urban greens are important component of a city it can increase the physical and psychological well beings of humans (Sadeghian, & Vardanyan, 2013; Xing & Brimblecombe, 2020). Therefore, urban planners and landscape designer should consider the quality of green space because it is also important when designing and planning urban space just as access is. Figure 1 below is an example of a walkway in a Park, Nicosia, Cyprus.

Figure 1

Kumsal park, Nicosia
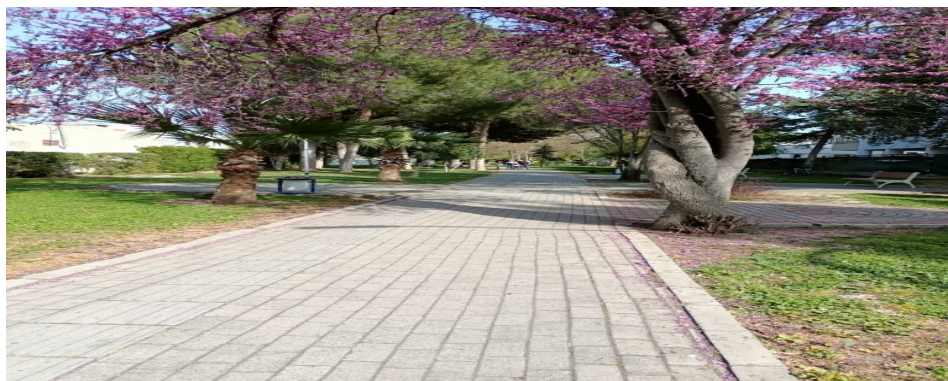
(Author, 2023)

Benefits of Green open spaces

- **Environmental benefits of green spaces**

According to Kiplagat et al. (2022), the ecosystem service of green spaces supports the urban area ecological integrity and protects the health of individuals, were trees in urban areas filter air which reduces pollution by absorbing airborne pollutant from the atmosphere, it moderates temperature by cooling the urban area and reducing heat related illness and providing shades to the urban area. The green areas are capable of creating a cooling effect that extends few hundred meters to the surrounding areas especially in summer time and during the day (Oliveira et al., 2011; Mexia et al., 2018). Cars and industries emits harmful particles such as carbon dioxide, nitrogen dioxide, sulphur dioxide among others which are harmful to human health which has killed about 4 million persons on earth every year, greenery from trees and shrubs help in reducing such death by purifying and removing such harmful gases from the atmosphere (Emechebe, 2019).

The advantages of having green open space in an area include its ability to enhance environmental quality, produce environmental harmony and balance, provide freshness, serve as a location for water absorption, and serve as a part of the city's physical layout (Muliasari et al. 2021). Vieira et al. (2018) described the vegetation in urban green areas as solutions that ameliorate the impact of urban heat effect, air pollution, climate change that causes high rate of premature death on urban population. Vegetation structure, composition and management provides ecosystem services that contribute to air purification and climate regulations of the ecosystem. Parry et al. (2018), stated that human activities such as buildings, roads sidewalks make the residential areas warmer which makes it sensitive to heat wave, the presence of parks moderates the temperature which gives a cooling effect. Due to the moderation parks does to the urban climate, parks should be planned at neighborhood scale for easy accessibility instead of travelling long distance (Tan & Samsudin, 2017).

- **Economical**

Ideally parks generate economic value to the communities and cities. The United Bank of Carbon (2015), revealed that investments and property developments of an area close to green space benefits the economics of the area, employment opportunities are also generated through the management, maintenance and creation of parks. Kiplagat et al.

(2022) in his study he discovered the economic importance of green spaces could be renting out chairs for socio cultural activities, buying and selling of snacks and drinks for users of parks. It is also a place to achieve academic goals.

- **Social**

Green spaces could be areas of social cohesion (Ayala-Azcarraga et al., 2019; Van den Berg et al., 2019). It helps improve social cohesion and reduce loneliness, because unhappy and lonely people becomes naturally attracted to green spaces thereby underlying their significant (Markevych et al., 2017). Lin et al. (2017) stated that social advantage of green spaces could be education because it is an important predictor for the utilization of green areas

- **Psychological and health benefits**

The general functions of green space such as reducing air, noise and heat pollution exposure, restoring capacities like physiological stress recovery, building physical and social activities are all inter related (Markevych et al., 2017). Parks and residential greenery elevate physical and mental health of the residents in urban areas, mobility and mortality is also reduced because green areas provide relaxation psychologically and alleviation of stress (Braubach et al., 2017). Park allows it users enjoy emotional stability and the quality of life and it is said to be beneficial landscape for mental restoration in the urban settings (Zhang, et al 2019). Shoari et al. (2021) described that the childhood and adolescence experience of green space contribute drastically on the mental and physical health of individuals furthermore includes cognitive improvement and it lowers the risk of obesity. Tyrväinen et al. (2014) in their study in Helsinki, the capital of Finland they discovered that even a very short visit to natural areas has a very positive effect in relieving stress. Green spaces curbs obesity rate in children were children that has access to parks are more active compared to children that have no access to parks (Wolch, 2014). Furthermore, Tamosiunas et al. (2014) in their study on cardiovascular disease they discovered that the prevalence of cardiovascular risk and prevalence of diabetes mellitus are extremely low among those that use parks compared to non-park users. Hence, there is recommendation by many scholars for further research on connection between human health, psychology and green space. Figure 2 below is an example of an open green space.

Classification and Standard of Urban Green Spaces

Generally, urban green space is classified according to function type (dwelling unit urban spaces, neighbourhood unit urban spaces, quarter unit urban spaces, city unit urban spaces) and usage type (public spaces, semi public spaces, semi private spaces, private spaces) (Stessens, 2017). Classifications of open green spaces are the foundations of open space planning (e.g., a criterion for per capita open space acreage) such variations are unavoidable because each community has different resources and expectations, and park (Choi et al., 2020). Diverse countries or regions have different set of urban green space administrative regulatory, were their definition and characteristics are inconsistence. Using land scape pattern analysis, urban green space is divided into five categories: residential green space (playground, public bench area, house garden), greenways (land strips, roads, and streams), conservation green space (urban forest reserves), green space for amenities (sports: football field, stadium, golf course), and community green space (public park such as neighborhood garden, district park, regional park, and local park) (Nor & Abdullah, 2019).

However, there are different hierarchies and standards used in classifying parks in different region around the world (Gupta et., 2016) example in table 1 and 3. According to Stessens (2017) described that in the year 1952 following a survey at Stockholm's kindergartens, the Stockholm general plan, which was influenced by the Regional Planning Association of America (RPAA) and a lot of Abercrombie's work, set a standard of 300m as the maximum distance between playgrounds. In 1960s and 1970s different open space standards were proposed for instance the national board of housing building and planning in Sweden, English nature in the United Kingdom, the European common indicators in the EU, and national recreation and playground association in the USA. Nigeria adopted the standard of its colony which is the United Kingdom. Table 1 explains the classifications and standards of open green spaces for different countries. Choi et al. (2020) in his study in the United States discovered that community parks are the largest in size above every other parks and it has the highest social activities.

Table 1

Parks classification and standards for different countries according to city scale

Country	Type	Size
Canada	Parkette (Small Parks)	Below 0.5 ha (1.2 acres)
	Neighborhood park	Above 0.5 ha (1.2 acres)
	District parks	Above 5 ha (12.4 acres)
	City parks	Above 15 ha (37.1 acres)
	Community park	Above 3 ha (7.4 acres)
United States	Mini park	0.4-2 ha (0.99 – 4.9acres)
	Neighborhood park	2-4 ha (4.9 – 9.9 acres)
	National resource area	Variable
	Community park	8-20 ha (ha)
	Pocket parks	Below 0.4 ha (1 acres)
United Kingdom	Small open spaces	Below 2 ha (5-10)
	Local parks and open spaces	2 ha (1.5 acres)
	District parks	20 ha (50 acres)
	Metropolitan	60 ha (150 acre)
	Regional parks	400 ha (aces)

(Choi, 2021)

Classification According to Usage Type

- **Public space**

Since the majority of the world's population now live in urban areas, neighborhood designs, including streets and nearby open, semi-open, and private spaces, are becoming more and more important in determining the city's quality of life. They support the creation of a sense of neighborhood, promote social connection, and enhance people's experiences in urban centers (Swapan et al., 2019). Public green spaces are defined as both naturally occurring or semi-natural settings that are partially or totally covered by vegetation in urban and semi-urban contexts and can be freely accessed by all citizens. Examples include parks, playing fields, public gardens, urban forests, and nature reserves, riverside greenbelts, institutional green spaces, green lines, green squares (Nur 2022; Coventry et al., 2019; You., 2016; De la Barrera et al., 2016). Public green open space are maintained and owned by a district or city government which are used for the benefit of the entire community (Nur 2022).

An important aspect of public space is it enhance or modify thinking content for everyone's daily lived experience includes thought content in some way (Larson &

Csikszentmihalyi, 2014) when one's mind wanders, thoughts might either be closely related to or largely unrelated to their immediate surroundings (Smallwood & Schooler, 2015). The availability of parks nearby, especially those with recreational and sporting interests, is considered to be essential for mental health promotion and mental illness prevention (Coventry et al., 2019). According to Zamanifard, et al. (2019) many corpus of researchers indicates there is a correlation between good public spaces and people's socio-psychological health. Public greenspace availability and access may serve as a "equalizer" between metropolitan regions with high and low socioeconomic status (Farahani & Maller, 2018). Given that going to the park might help people feel better about themselves, city parks may be particularly beneficial public spaces for it increases social cohesion among neighbors and reduces crime (Schnell et al., 2019).

Urban parks are among the main types of public spaces, Konijnendijk et al. (2013) defined urban parks as a delineated open space area, that are mostly dominated by vegetation and water, and generally reserved for public use. They could be delimited based on their function either neighborhood park, district park, regional park, community park. They are either large, or small in shape which can be called pocket parks. It is a purposeful space within an urban park that contains vegetation and an available space for public use such as sport, exercise, culture, social activities, leisure education among others where population preferences has boosted the public interest on parks (Neckel et al., 2020; Mahrous et al., 2018). Parks get to make urban dwellers to have contact with nature (Palliwoda, 2017). See Figure 3 an example of a park in Abuja.

However, Parks may consist water, vegetation's accessibility, shelter, benches, recreation, lightening, litter bins, arts, sculptures, children play grounds as seen in figure 5. among others (Vargas-Hernández et al 2017; Cohen et al., 2021). Parks are generally designed to reduce climate and urban related health risk such as heat wave threats among others (Brown, 2015). The qualities of an urban park are attributed to the urban areas recreational opportunities and access to nature. Analyzing four parks in Shenzhen, China the results demonstrated a spatial overlap of 64.40% between the park areas and cold spot areas of land surface temperature with a considerably park perimeter, area, and shape index were significantly and positively connected with park cooling area. (Peng et al., 2021). In most countries parks are not evenly distributed which has affected residents from enjoying

its benefit for example, Oh and Jeong (2007) analyzed using GIS the total area of urban parks in Seoul is approximately 158km^2 the result of the study indicated that the special distribution of urban parks is inadequately distributed in relation to Seoul development density, land use, and population. Parks are seen as healing or restorative aspects in urban landscapes and provide a range of advantages to people's personal and societal well-being, including social, economic, and benefits to their physical and mental health. (Wang et al., 2015).

Figure 2

National children's park and zoo, Abuja

(Author, 2023)

- **Semi-public green space**

Schertz et al. (2022) in their study on people's thoughts and feelings in semi-public space the discovered that people who interacted with nature had good emotions, an improvement in working memory performance and increased levels of creativity than people who visited only malls, had impulsive feelings at high levels. They are open and green spaces that are of benefits to a particular set of the citizen's military lands, schools, campuses among others because of the ease of access and activities taking place there, some privately held locations are actually turning into semi-public sites in addition to the typical public open spaces. People in many neighborhoods are opening up their properties, especially their yards, for festivities, festivals, art exhibitions, community gardening, and the preservation of native plants. (Swapan et al., 2019) There are relatively little investigation semi-open public spaces, such verges, residential streets and private spaces,

like the front yard for fostering social interactions, creating a sense of community, and promoting sustainability (Swapan et al., 2019). See Figure 2. 4 for an example of semi-public green space in Illinios, Chicago.

Figure 3

Garfield Park Conservatory

(Schertz et al. 2022; and enjoyillinios)

- **Semi-private space**

Semi-private green spaces are open and green spaces that people benefits from partially. All mass housing sites Front yard is a semi-private-public space where important activities takes place (Swapan et al., 2019). Haase et al. (2019), in his study compared private green spaces (front and back yard) of 63 district in Germany and the total public green spaces in 15 of the 63 district they discovered the private green spaces (front and back yard) are more than the public green space therefore the suggested more private green spaces should be built because of it outmost importance for the examination of urban livelihoods and as a tool for thorough urban design that prioritizes ecological services. See Figure 5 for an example of semi-private park is Al-Rehab in Cairo

Figure 4

Al-Rehab Cairo, Semi Private Park.

(Hegazy, 2021)

- **Private green space**

Private green open space, refers to green open space that is held by specific institutions or people and is designed for a small group of people (Nur). The term "private green spaces" refers to outdoor areas found in private urban homes, which are inaccessible unless given permission by the home's owners (You, 2016), driveways, yards, patios, verandas, and balconies, are primarily private open spaces (Swapan et al., 2019) they could include gardens and green roofs, they are are the spaces that are privately occupied, do not benefit the everyone. Historically, gardens have very good green space features. Gardens are usage type of urban space which could be private or semi-private open green space which make up of many urban areas (Cameron et al., 2012). Rosol (2012) defined gardens to be urban open spaces designed by users in accordance with their own requirements and ideals, and they differ from standard parks both visually and functionally in which the residents are responsible for creating and maintaining the open green space in addition to deciding how to use vacant lots. Urban gardening is also a source of food supply (Barthel et al., 2015). Furthermore, Pálsdóttir et al. (2018) considered gardens to improve mood, reduces stress levels and add to the satisfaction and meaningfulness of life. Hanson, et al. (2021) in their study in Leud Sweden they drew the inference that private gardens have the potential to serve as multifunctional spaces, but in order to fully realize this potential, there must a change in the way we plan, build, maintain, and, acknowledge private green space.

Social connections, recreation, interactions with nature, and relaxation are the very important cultural ecosystem services of gardens. See Figure 6 for an example of a private park in Toronto.

Figure 5

Edward private gardens Toronto

(Tour by tourist 2022)

Figure 6

Framework for the human-nature nexus in gardens with six components
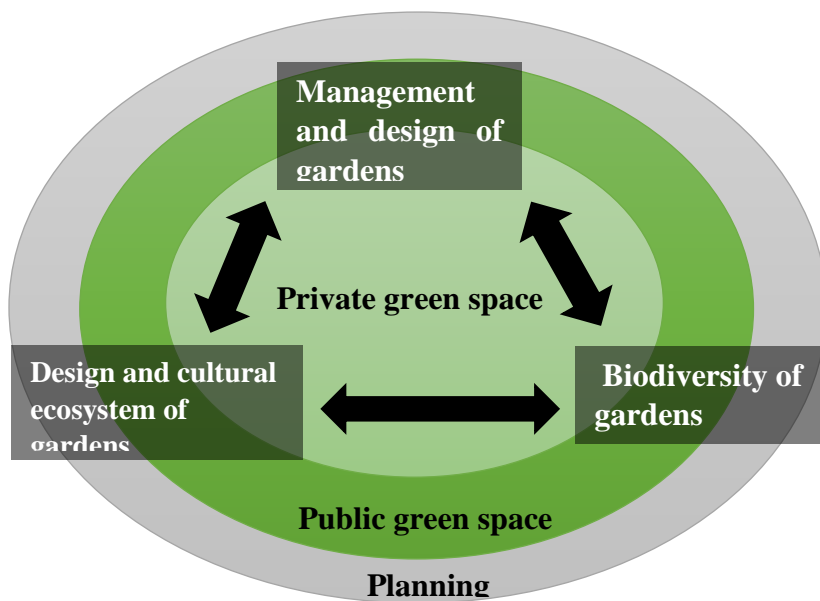
(Hanson et al., 2021)

In Figure 6 there are six parts to the nexus. The first element is the potential for biodiversity in gardens in terms of their usage of land and plants. The perception of the garden owners' cultural ecosystem service is the second factor. Between those two lies a third element, the preferences of garden owners about garden maintenance and design, which affects the availability of garden biodiversity and cultural ecosystem service. In a three-layered circle that links to urban green space, these three elements are contextualized (planning). The garden, also known as a private green space, is the area where garden owners interact with, create, and manage nature. It is located in the inner layer (component four). Public green space interacts with private green space in the middle layer (component five) based on the garden size, design, and contents. We have urban planning on the outer layer (component six), which affects both public and private green space. In the conversation, we emphasize crucial.

Classification According to Function

- **Neighborhood unit urban open green spaces:**

A neighborhood is a group of dwellings that are situated close to one another and is a small-scale community where individuals are acquainted with one another, participate in a variety of similar pursuits, and have a sense of connection. A neighborhood unit open green spaces consist of neighborhood parks, pocket parks and Mass housing greeneries, among others

- **Quarter unit urban open green spaces:**

Quarter unit spaces are spaces that are available to all residents, such as playgrounds, jogging routes, and greenery are frequently seen in residential areas. Referring to this a quarter's full public space is designated as a green space (Jiang & Huang 2022) They consist of port fields, industrial and district parks among others. refers to a gated residential community that has one or more residential buildings and shared public amenities for all residents. In cities with a high population density, it is the most prevalent type of dwelling (Jiang & Huang 2022)

- **Dwelling unit urban open green spaces:**

They green spaces found in a building such as residential, offices, school building greeneries, and green roof gardens among others. Green spaces are signs of healthy housing

units (Deljooy et al. 2015). Evidently, the quality of the dwelling and the neighborhood are influenced by the private domestic garden (Meeesters & Coolen 2011).

- **City unit urban open green spaces:**

City unit green spaces consist of various types of natural elements and usually (Harasimowicz 2018) include, walkways and roads greenery, city parks, cemeteries, botanical parks, corridors, zoo gardens and coastal landscape sites among others. See Figure 8 below as an example of an open green space.

Figure 7

Central Park, Abuja

(Author, 2023)

Table 2 explains the functional level and their standards of green space of different countries corresponding to the size of the area the green space occupy.

Table 2

The functional levels of internationally used green space standards

Standard's name Functional level	Neighbor hood (ha)	District (ha)	City (ha)	Quarter (ha)	Metropolitan (ha)	Standard's max. dist.(dm)
London Authority						
Small open spaces						400
Local parks and open spaces		20				400
District parks	2					1200
Metropolitan parks			60			3200
Regional parks					400	3200
US National Recreation Association						
Neighborhood park				8		800
Playfield						1600
Community park		10				3200
Major park			40			2350
Reservation					400	-
US Local Planning Administration						
Playground	2					400
Neighborhood park		8				800
Playfield				7		800
Community park			40			2400
Major park					200	3527
Reservation						4700
Eindhoven GS Proximity Standard						
Local parks	2					400
Neighborhood park				4.25		800
District park		14				1600
City park			135			3200
National open space guidelines						
Pocket parks						50
Local parks						200
District parks			10			800
Nature areas					1000	-
Stockholm municipal open space guidelines						
Local parks	0.5					200
District parks					5	500
Nature areas				50		1000
Van Herzele						
Residential green						
Neighborhood green	1					400
Quarter green					5	800
District green			10		5	1600
City green				60		3200
Urban or metropolitan Forest					200	5000

(Stessens, 2017)

According to Roy et al. (2012) was of the opinion that urban parks, reserves, recreational areas, streams, floodplains, and other wetlands are examples of urban green spaces which also includes greenways, walkways, and paths, neighborhood common gardens, street shrubs and trees nature conservation areas, as well as less traditional areas like green walls, green alleyways, and cemeteries. See Figure 9. Using social functions, Chen et al., (2018) classified green spaces in Beijing into green buffers, public parks, subsidiary green space. Parks are seen to provide ecosystem services (Sikorska et al., 2020) such as biodiversity, enhance quality of life and regulating climate (Vargas-Hernández et al., 2017). Wolch (2014) stated that green spaces are not evenly distributed within cities and the reason is because of philosophy of the design of the park, history of people's class and their ethno-racial inequality, land development history, and the changing concept of recreation and leisure.

Figure 9

The different types of green areas by hierarchy scales

Region	Heritage natural areas 　　　　Dams 　　　　　Rivers, creeks 　　　　　　water bodies, canyons　　　　　　　agricultural lands		
City	Urban parks　　　　　　　　　　　　　　farmlands 　　Fair park zoo　　　Green corridors　　　golf courses Channels　　　　　　　　　　　　　tourist development Sports city　　　　brooks　　　　　　industries Civic square　　　cemeteries　　　　　cemeteries		
District	Playgrounds 　　　　District park　　　　　　　　Nurseries Sidewalks　　　　　　　Commercial centers　　Sport clubs Roundabout　　Sport Centers　　　Industrial parks 　　Streets　　　　　　　Corridors commercials Boulevards		
Building	Green areas surroundings governmental & educative buildings　　Green areas surroundings offices or educative centers　Residential gardens and backyards Hotels open spaces		

PUBLIC
PIVATE

(Pena-Salmon, & Rojas-Caldelas 2009)

Accessibility of Urban Open Green Spaces

According to Lee and Hong (2013) many countries park accessibilities varies by localities which is an important element in planning of urban parks, the accessibility to urban parks is adequate if the spatial distribution of parks is in harmony with the population of the urban area. There is no consensus by scholars on how to measure accessibility of green spaces most scholars use GIS based models to access green spaces Parks are heterogeneous, their size, quality, diversity of amenities, accessibility to organized activities, and user perceptions of safety are all differentiating factors for parks. (Wolch, 2014). Geographical Information System (GIS) is useful tool in determining the accessibility of parks in terms of the demand and supply of parks services. Lara-Valencia & García-Pérez (2015) used geographical information system to determine the availability and accessibility of parks in Hermosillo, they discovered that the number of public park is substandard and its distributed in a pattern of spatial inequity which affects residents in poor neighborhoods primarily. Meanwhile Chang and Liao (2011) also used GIS and spatial analysis models to determine accessibility in parks were results showed unequal regional spatial development which affected mismatches between the services in urban parks.

Scholars have used different methods in measuring accessibility such as distance and cost i.e. the number and proportion from a given travel time that is accessible from an origin to park, utility based measure i.e individual level of estimating accessibility, and gravity measures that is estimating accessibility when travel time to destination increases there is a gradual decrease in accessibility have been. Therefore, there is no single best approach of measuring accessibility to parks. Parks also have a reputation that reflects their use, standard, maintenance, and level of design. There is an ethic, racial and class diversity in access to parks, where the socio cultural (poverty, and cultural preferences) and socio-spatial determinants (for example., distance to parks, and the features in parks) are associated to the non -use of parks (Wolch, 2014).

Furthermore, Zhang et al., (2011) in their study based accessibility to parks by residents on it special configuration, its number and its spatial distribution across neighborhood areas or regions, using the measure of spatial access to parks, population-weighted distance (PWD) to parks, (combines the benefits of existing park access strategies

and incorporates the information processing theory and probability access surface model to more precisely quantify the potential spatial access to parks of the residential population), in United states parks and population they discovered that on the average, US residential populations travels 6.7 miles to access their local neighborhood parks with the urban area residents having higher access to parks than the rural areas.

History of Open Green Spaces in Nigeria

Historically green spaces started in Nigeria in the precolonial era, in western Nigeria green spaces function as places for open markets, festival and recreations, in eastern Nigeria they function as areas for wrestling, debating places and community meetings, in northern Nigeria they function as areas for Durbar, horse riding, market place (Emechebe, 2019), all these green areas occupied a very large open space with trees, abundant foliage and spread branches (Alabi, 2020).

Alizadehtazi et al. (2020) stated that there is no strong correlation between park users and the spread of covid19. He also supports the view that parks provide ecosystem service despite the pandemic. In other to minimize the spread of disease during an epidemic in colonial period in Nigeria the town and country planning ordinances of 1928 encouraged the importance of open green spaces in Nigeria and open green spaces were set up in Government Reserved Areas (GRA), the 1992 town planning law decree 88 also encouraged setting aside of open green spaces (Emechebe, 2019).

Table 3

Standards of functional type of open space in Abuja, Nigeria.

Function name	Area for 1000 population/hecter	Area coverage (ha)		Radius of areas served (km)
		Standard	minimum	
Neighborhood park	0.8	4.0	2.0	0.5
District park	0.80	40.00	80.00	3.0
Regional park	6.0	200.00-400.00	varies	10.0
Community park	1.40	4.00	1,60	2.0
Playground	0.60	1.60	0.80	0.5
Playing field	0.60	2.00	4.0	1.5

(Investor's guide 2007)

In Table 3 the functional (neighborhood park, district park, regional park, community park, playground, playing field) standards of open green spaces in Abuja.

Figure 10

Existing parks in Abuja Municipal

Figure 10 above is the all the parks in Abuja municipal, 24 parks are located in Abuja Municipal area. They are all concentrated, as it reflects in the figure above. They consist of Millennium park, BMT African garden, City park, Jabi lake park, Magic Land Amusement park, Rabby recreational park and garden, Acropolis Park, Central park and Suncity park,Villa park and garden, the stone park, the secret garden, Soho 24 spot park, Orange park and garden, Monaliza amusement park, Maitama amusement park, Julius Berger waterfont park, Joy elegance park, JD Leisure park, Durumi recreational park, Diplomat park and gardens, Bolevard park, Abuja Municipal park.

Examples of Open Green Spaces

Since the beginning of recorded urban history, green areas have been created in cities, primarily for aesthetic and food security reasons (Pietrzyk-Kaszyńska 2017), now city dwellers have opportunities to connect with nature and it can only occur with the presence

of green areas (Dickinson & Hobbs 2017). Examples of urban green spaces in cities such as London. New York, Chicago and Germany.

Table 4

Examples of open green spaces

S/N	Name	Description	Type	Location	Area Covered
1	Millennium Park	a recreational area, a fountain and many urban furniture's	Public Park	Chicago United states	10 ha
2.	Lene-Voigt-Park	Recreational, activities such as skating and hiking with a lot vegetation	Public Park	Leipzig Germany	11 ha
3.	Central Park	Has eight water bodies and a man made, sculptures, a lot of arts	Public Par	Manhattan New York	341 ha
4.	Gunnersbury Park	sport activities jogging, cycling tourist and museum	Public Park	London United Kingdom	75 ha

- **Millennium Park, Chicago**

Millennium Park is a great public green space that is situated in Chicago's Loop neighborhood it total land cover is covers a 24.5-acre (10 ha) (Al-Kodmany, 2019; Du, 2016). Millennium Park became the top tourist attraction green space in 2017 and among the top ten (10) tourist attraction in the whole of United States. The park is situated on top of a commuter rail millennium station, railroad yard and a parking garage, it is a green roof park and the largest in the world. Most importantly, the numerous visitors to these recreational areas feel rejuvenated Anthony, & Al-(Ansari, 2013). Al-Kodmany (2017) stated that the park contributes to a more active social life in the city, offering a variety of benefits such as lowering the "Urban Heat Island Effect," purifying the air, and catching

rainwater to lessen flooding. The drastically, increase of tourist to the park has added to its economy value.

According to Al-Kodmany (2020) the millennium park in Chicago consist of diverse urban furniture's with high artistic merit and enormous popularity which attract and interest people because of it aesthetic and functions, such as the Jay Pritker Pavillion, British petroleum (BP) Bridge, Wrigley Square, boeing galleries, the chase promenade, millennium monument crown fountain, cloud gate, Lurie garden, among others. It became an attraction for all kinds of people with different ages, cultures and interests because of its image and comfort. The variety of activities provides something to interest its visitors as well as the locals. Millennium park create sense-of-place for people sitting on the loans regardless of their nationality (Al-Kodmany, 2017). An aerial view of the park is seen in Figure 11

Figure 11

Millennium Park, Chicago

(aecom.com, 2023)

- **Lene-Voigt-Park Germany**

Lene-Voigt-Park in Leipzig, Germany was established on a former brownfield site (Ali et al., 2020). Pueffel et al. (2018) in their study, using MapNet smart phones app identified

that, brownfields play a special role in the set of urban green spaces by offering chances for recreation, relaxation, and seclusion. Lene-Voigt-Park was built on top of a former railway industrial area in the year 2000, it was created to raise the neighborhood's standard of living (Ali et al., 2020). According to Kabisch et al. (2021) the 11 hectare Lene-Voigt-Park has a vegetation cover that is relatively sparse (78% overall, 14% trees 8m or taller). However, the park also has a number of playgrounds, sports facilities, including basketball/soccer courts and beach volleyball courts, an urban gardening area, as well as a high density of exclusively paved pathway that are popular with skaters and bikers. In order to reduce potential conflicts, such as those between neighborhood homeowners walking their dogs and children playing in the playground areas, the natural elements such as hedges were used as barriers (Kabisch, 2019). Figure 11 is an example of a public park

Figure 12

Lene-Voigt-Park

(leipziggruen.de, 2022)

- **Central Park Manhattan, New York**

The 840-acre Central Park is located in the center of Manhattan and is arguably the most well-known park in the area, if not the entire world. It was also one of the first parks in America to use landscape architecture in its design. Yes, the park is artificial. It was designed by landscape architect Frederick Law Olmsted and architect Calvert Vaux.

Central Park is a historical urban recreational landmark park (Reichl 2016) that is surrounded by some of the most expensive and densely inhabited real estate in the world, covering 843 acres, or 153 city blocks it is made up of impermeable surfaces. Additionally, Central Park is the most frequented urban area in the United States, with an estimated 42 million people per year. Central park is a man-made "naturalistic" urban landscape infrastructure with eight waterbodies in the park (Muldowney, 2022).

The landmark Central Park offers a wide range of ecosystem services to New York City that are highly valuable economically. The sculptures in the park follow conventional formats and are placed on pedestals, to improve visitors' perceptions of the park's cultural landscape, sculptures supplied a prestigious cultural atmosphere. Cushing and Pennings (2017) in their research on public arts suggested that the public arts in Central park should be designed and coordinated to ensure the visitors experience align with the benefits of public art. See Figure 13 for an example of a fountain and its surrounding green areas in Central park, New York. Central park is a 341 ha area cover it consist of ponds, wood areas brush and its highly populated environment. Rainwater (2017) in their study on raccoons discovered that raccoons in Central Park are probably implicated in the environmental occurrence and possible disease transmission of a number of infectious and noninfectious diseases that are harmful to the health of people, wildlife, and domestic animals.

Figure 13

Central park, New York

(wikivoyage.org, 2022)

- **Gunnersbury Park, London**

Gunnersbury Park in West London, is a 75 hectares' park in suburban West London. The neighborhoods are suburban areas, which is dominated by semi-detached housing The activities that take place in the park is mostly exercise, relaxing, leisure, dog walking, jogging, cycling, children playing and various sports activities. Gunnersbury Park is also a heritage site and tourism site because it has a history museum since the year 1929. It was converted from a private estate to a public park in 1926. The park contains 22 historic buildings and it is listed as a landscape of national significance (Smith, 2021). Figure 14 is an example of Gunnersbury Park, London.

Figure 14

Gunnersbury Park, London

(slow.org.uk, 2022)

CHAPTER III

Pandemic and Green Spaces

History of Pandemic

Throughout history, there have been many infectious diseases with that have emerged and spread regularly, such as cholera, HIV, plaque, flu, Ebola, the middle east respiratory syndrome coronavirus (MERS-Cov) and the severe acute respiratory syndrome coronavirus (SARS-CoV) have had different effects on people. According to Huremović (2019) plaques such as ZIKA (2015–2016), Disease X, Ebola Outbreak (2014–2016), "Swine Flu" or H1N1/09 Pandemic (2009-2010), Severe Acute Respiratory Syndrome (SARS) (2003), Smallpox Outbreak in Former Yugoslavia (1972), HIV Pandemic (1981), "Spanish Flu" Pandemic (1918–1920), The Black Death (1334), The Justinian Plague (mid-16th century AD), The Antonine Plague (165-180 AD), The Athenian Plague of 430 B.C. (430 BC) has been experienced throughout history. However, the recent pandemic the world is facing is the new corona virus disease 2019 (COVID-19) pandemic.

Pandemics in epidemiology is referred to by Seker et al., (2020), as a disease that affects people since ancient times where life is affected economically, socially, psychologically, culturally, politically, religiously, geographically and many more. The word "pandemic" is derived from the Greek words "Pan" and "demos." Pan means everyone, whereas demos is "people.". The disease has been declared a pandemic and global emergency by the World Health Organization (WHO) since the 28th of February 2020, declaring the risk of spread to be very high at the global level, WHO encourage keeping 1m physical distancing from each other, avoid hand shake, touching of mouth, eyes and nose, washing of hands or using hand sanitizer, and using face mask. (WHO, 2020). The covid-19 pandemic has resulted in over 33 million confirmed cases and over 1 million deaths globally, as of 1st October 2020 (Geng, 2021). This pandemic that was erupted from Wuhan in China in December 2019 has reshaped the societies by influencing everything in the world (Lee, 2020; Gorifith, 2020). Historically all outbreaks of pandemics have decimated the whole world, wiped populations, brought innovations and also a new height in science (Scheidel, 2017). When you may have been exposed to covid-19 you will be quarantined for a certain period of time and when you exhibit the symptoms of the

disease you will be isolated in other to prevent the spread of the disease and Many countries in the world such as United Kingdom, America Germany among others declared lockdown to reduce the transmission rate (Metilelu, 2021). An example of people taking a walk in a park in Figure 15.

Figure 15

A park during covid-19 pandemic
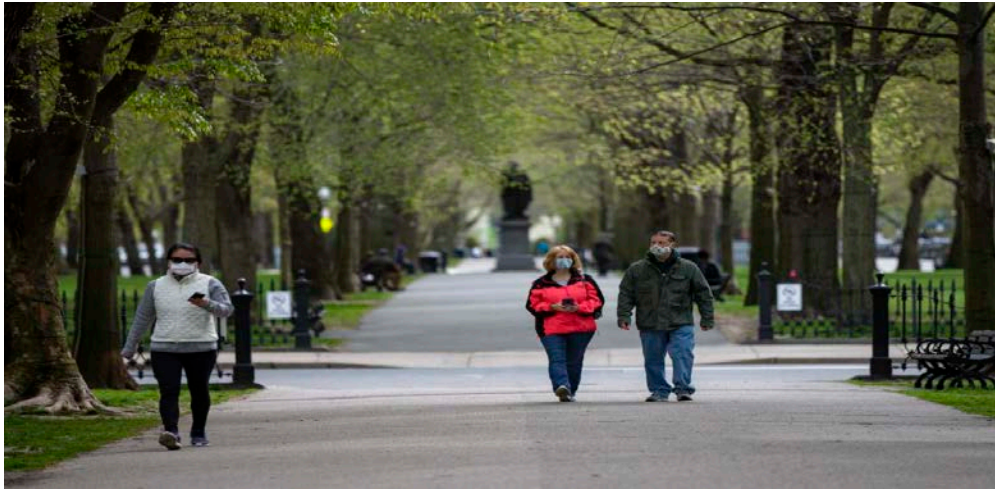
(wubr.org 2021)

Theoretical Reviews of Previous Research on Open Green Space and Covid19

According to Alabi (2020) due to the high rate of urbanization, development and sprawl has encroached in green open space has caused the risk of diseases because open areas is improving the quality of life, harmony and balance of the environment also green spaces are a medium in mitigating many diseases (Muliasari et al., 2021). Reinwald et al., (2021) described urban green spaces during the pandemic as periodically overcrowded and used for recreational purpose therefore he suggested a need for more green spaces most especially during situations like the pandemic and climate related heat period. Volenec et al (2021) in their study in New Jersey discovered parks declined during the lock down and those that were open during the lock down increased in visitation and the parks visitation increased when the lockdown was lifted, many parks were shut down in New Jersey due to the fear of transmission of covid-19 during the pandemic, also they discovered that parks provide crucial services to people most especially in stressful times.

Due to the expansion of the pandemic and the adoption of social distancing, the number of visitors to neighborhood parks in numerous Seoul districts has increased by 3 to 6% since the COVID-19 outbreak (Park et al., 2021). Reinwald et al. (2021) reported most urban parks to be overcrowded in densely built cities due to many individuals used it for recreational activities during the pandemic he also said there is need for different disciplines such as health workers, urban planners, landscape planners and vegetation technology scientist to make use of this opportunities that rises from this crisis. An adjustment should be made and green open spaces are important assets that plays a vital role in in people's lives (Han et al., 2022) because there is a relationship between information on green space use and the perception of the benefits of its use (Croy et al., 2020). Ahmadpoor and Shahab (2021) examined green space to be highly prioritized and appreciated after the pandemic, community gardens will benefit all citizens after covid-19 and green spaces should be created in cities. There is a major setback in the traditional method of measuring park use (Jay et al., 2021)

The lockdown is correlated with more visitations to parks (Geng, 2021) in many countries in the world such as United Kingdom, America Germany among others declared lockdown to reduce the transmission rate in other to avoid or reduce transmission of SAR-CoV-2 (COVID_19) regulations were set against the use of public spaces, many citizens mostly the elderly that live alone often visit parks for social interaction, to ease emotional stress, isolation and mitigate loneliness (Metilelu, 2021). Urban parks, most especially neighborhood parks in residential areas, serve as a significant haven and place for recreation for urban residents in the case of a pandemic disaster like COVID-19, and as a result, they must be adequately stocked and maintained (Park et al., 2021) because they are not equally situated in every individual neighborhood, during the pandemic people found it difficult to visit due to distance the closer the park the increase in visitation while the farther the park the decrease in visitation (Kalayci et al., 2021). The restrictions in social gathering, indoor recreational spaces, parks increased Since the outbreak of covid19 pandemic the demands for resident parks and outdoor green open spaces has increased drastically (Geng, et al., 2021). See Figure 16 were the elderly are taking a work during covid-19.

Hence, peri-urban green spaces have been neglected by landscape planners which has made it to loss its sense of place due to the COVID-19 epidemic, people have supported other methods of handling crises, some of which include how they interact with one another in open public settings (Žlender & Gemin, 2020).

Figure 16

The elderly walking in a Park during the Covid19 pandemic

(timesofisrael.com)

Covid-19 pandemic in Abuja, Nigeria

The infection covid-19 started in Nigeria towards the end of February 2020 in Lagos then spread to different states in the country (Ladan, 2020). According to Metilelu (2021) at the initial stage of covid19 a 14 days' lookdown was announced in Nigeria, the center for disease control (CDC) announced physical distancing where keeping physical distancing was one of the measures for mitigating the spread of covid-19 also the state and federal government declared shut down of social gatherings to reduce the spread of covid19, regulations were set against the use of public spaces such as parks.

According to Nigeria Centre for Disease Control (NCDC) there have been cases 266138 confirmed cases, 25450 discharged cases, active cases 3523, and 3155 deaths in Nigeria from 2020 to 2022 with Abuja having 29504 confirmed cases, 29240 discharged cases, active cases 44 and 249 death. In Nigeria, covid-19 affected hospitality industries (Okon, 2021), small and medium (SME) business (Enesi, 2021). Nzediegwu (2020) stated that in Abuja Nigeria due to the indiscriminate disposal covid-19 was said to have been

transmitted by someone dumping a hand glove he used in burial of a covid-19 patience in the Gudu cemetery according to the public health department of Nigeria. Notwithstanding Covid-19 brought transformation of many sectors and policies in Nigeria such as the Solid waste management (SWM) and domestic waste disposal which its importance was understated (Nzeadibe, 2020). Hubbard et al. (2021) in his study discovered that there was psychological distress on participant that had no assess to green spaces during the covid19 pandemic and mostly younger people and females. Millán-Jiménez et al. (2021) conducted an online survey on medical and architectural undergraduates where they discovered that during the lockdown the absence of open spaces in the environment had a negative effect on the comfort and health of medical and architectural undergraduate students of university. Pérez-Urrestarazu et al. (2021) in their research persons that didn't not mostly correlate with plants contacted covid19 which was mostly females and young ones therefore they correlated plant with emotions. Covid19 has widened the sense of belongings on the use of green spaces and also widened socio special disparities (Pipitone & Jović, 2021).

According to Umar et al. (2020), Nigeria cities were found vulnerable in the spread of covid19 due to the inadequate green areas, inadequate housing for the urban poor which led to slums and squatter settlement, ineffective urban planning, high population density, economic fragility. He suggested that cities and their economic should be fortified in other to mitigate future occurrence. See Figure 17 were a covid-19 notice is placed on the entrance of a park in Abuja.

Figure 17

Covid-19 rules at the entrance of Millennium Park Abuja

(Author, 2023)

Effects of Covid-19 Pandemic on Open Green Spaces

Musah-Abdul (2020) stated that people are unable to engage in active exercise to keep fit as a result of the lockdown of the cities. He added that parks had social, physical environmental, and health benefits that improves urban dwellers life but the lockdown has made people not to get health benefits from parks in their neighborhood where they can exercise, interact and socialize, where he recommended parks should be opened during cases like this but social distance should be enhanced. The visit urban parks generally improve health and social interaction therefore urban parks provide residence with a safe outdoor activities and social interaction in a green environment and a buffer area to get a favorable quality of health and life during pandemic (Xie et al., 2020).

Alizadehtazi et al. (2020) also expressed that there is no strong correlation between park users and the spread of covid19. He also supports the view that parks provide ecosystem service despite the pandemic. Venter et al. (2020) considered green areas to indirectly mitigating the spread of covid-19 were it facilitated social distancing, he described urban nature as a value to resilience infrastructure during times of Crisis, in his study in Oslo he believed greens to be a path to urban planning for future sustainable cities. Despite the attributes documented for the benefits that parks contribute to people's lives, public green spaces are tools to management of health and psychological wellbeing of people such as serving as recreational environment during covid-19 (Volenec et al., 2021), in agreement to this Geng (2021) stated that green spaces became the only source of resilience amidst the pandemic due to their positive effect on human wellness.

Dipeolu et al. (2021) in their research in Lagos Nigeria discovered that individuals that visited green spaces in Lagos, Nigeria had positive influence in their mental, psychological and physical health. Using mobility data from smart phones devices crossed referenced with park location data base he discovered that there was a major use in parks from January 2018 to November 2020 and it started declining from March to November 2020 because of the restrictions and lockdowns in about 44 to 50 most populous parks in USA (Jay et al., 2021) as well as Geng (2021) in his study, using googles community mobility report and Oxford corona virus government response tracker discovered that in most countries the number of park visitors has increased compared to prior to the pandemic. The health systems in densely populated areas or built-up areas around the world do not

have the capacity to address this health issues such as physical and mental health that are emerging in a very rapid pace. In an effort to address this issues planning and designing of urban areas has gained more attention whereby covid19 has reminded people that there is a failure in green spaces whereby the scarcity of green spaces has not been addressed for ages whereby, only those who lived near green spaces where able to access it due to the lockdown in many countries whereby proximity to green spaces is very important to children, the disabled and the elderly people (Ahmadpoor & Shahab, 2021).

Li et al. (2021) currently the outbreak of covid-19 has brought challenges to urban planning and architectural design. However, Hariyani, and Pratama (2021) viewed that people avoided using open space because of fear of covid-19 virus transmission. In their research they discovered that parks have been facing inequalities and people got to discover it during the covid19 pandemic that is not everyone that had access to parks were the wealthiest areas had more parks compared to minority backgrounds also during the covid19 pandemic there have been many petitions to keep parks open for public use because they saw green spaces crucial for humans well-being. According Han et al. (2022) close contact in an outdoor environment is safer than close contact in an indoor environment. So promoting physical activities and maintaining safety to meet with the needs of people is an important topic. People's attention has been placed on physical and mental health since the outbreak of covid19 therefore the need for natural environment improved drastically. Pan et al, (2021) on the other hand explained that higher accessibility to green space increases the risk of contracting covid-19 due to the raised possibilities of people encountering each other. He also demonstrated in his study that if a uniform measure is only applied on social distancing other factors such as infrastructure and social conditions may lead to higher spread of covid-19 while Venter et al. (2021) in his research on the first year of covid19 in 153 countries debunk it by discovering that temperature, wind spread, humidity and ambient air pollution doesn't have enough effect to spread covid19 only an ultraviolet radiation is a strong environmental mitigation to the spread of covid19. He also discovered that no evidence that increased visit to parks increased covid19 transmission. In his study discovered that there was psychological distress on participant that had no assess to green spaces during the covid19 pandemic and mostly younger people and females.

Kalayci et al. (2021) From history every epidemic has found a way to bring innovation to urban planning and updates to the lifestyles of people therefore recently (Dwiyanti et al., 2021) enhancing green open spaces and their buffers has gain diverse recognition. The special capacity consideration in responding to pollutant, carrying capacity and landing capacity must be put in place in the planning of an open green space (Muliasari et al, 2021). Funding for parks should be kept at high priorities because there was a mental break down during the lockdown (Hariyani, & Pratama, 2021). There should be importance in having a strong network, collaboration, partnership and understanding dynamics between stakeholders in solving any dilemmas in green spaces (Keleg et al., 2022). For example, in sub-Sahara Africa the perception and attributes of residence towards the benefits, challenges and qualities of parks is neglected (Yeshitela, 2020). Croy et al., (2020) stated parks to needs investment to continue to provide economic, cultural, social and environmental benefits. Due to urbanization and the awareness of parks after covid-19 the demand for parks is increasing there should be more investment in public parks by policy makers, and legislators and ensure they are accessible and available in diverse neighborhoods (Volenec et al., 2021). Amerio et al. (2020) suggests, housing policies and strategies should focus on building living spaces close to green spaces. Lopez et al. (2021) also viewed that policies and strategies on the use of urban green spaces should be put in place in case of future occurrences because during times of crisis such as pandemic urban green spaces provides health benefits to urban dwellers.

CHAPTER IV
Materials and Methods

Study Area

The Federal Capital Territory (FCT), Abuja, is the capital city of Nigeria, in West Africa. It has a total landmass of 7,315km^2 formed in 1976 which is bordered by Niger to the west, Kaduna to the northeast, Nasarawa to the east, and Kogi to the south Abuja is at an elevation of 840 m (2760 ft.) above sea level, and lies between latitude 9.04N and longitude 7.29E. Today, Abuja is the fast expanding city in African (Iliyasu et al., 2022). The city has experienced a huge population growth as a result of Squatter settlements and slums that have developed rapidly on the fringes. See Figure 18 were Abuja is located in Nigeria.

It now consists of six local councils, including Abuja Municipal, Gwagwalada, Kuje, Bwari, and Kwali, as well as the city of Abuja. The population is estimated to be at 2,238,800 persons (Sawyerr et al., 2017). Unlike other states in the country which is headed by a state governor, Abuja is headed by a Minister appointed by the President. It is the eight most populous city in the country. Figure 19 shows Abuja Municipality were the parks were selected from.

Figure 18

Abuja in the context of Nigeria, Abuja Land use

(QGIS 2022)

Figure 19

Abuja Municipal

(QGIS 2022)

Figure 20

Abuja Land use map

(QGIS 2022)

Climate

Using Koppen's climatic classification, Abuja falls within the Aw region experiencing three weather conditions annually: Warm, humid rainy season and dry season. In between the aforementioned climate exist a brief interlude of harmattan caused by the Northeast trade wind, characterized primarily by hazy dust and clear skies.

The wet season lasts for around 5 to 6 months (April - October). The daytime temperature ranges from 280°C to 300°C and the nighttime ranges from 220°C to 230°C during the rainy season. In contrast, the dry season is marked by cold nighttime temperatures of around 150C and hot midday temperatures of over 400C (Aliyu, 2016). Furthermore, the city is defined by two renowned rock -the Zuma Rock and Aso rock, with the former known as the "Gateway to Abuja" and the later a 400m monolith left b water erosion is located at the head of the Abuja city which extends southwards from the rock making the city having a cooler climate and less humidity as in the case of Lagos. The high altitudes and undulating terrain influence the weather of the city as it is located on the windward side of Jos plateau.

Figure 20

Visual image of Abuja

(Author, 2023)

Abuja Master Plan Provision for Green Spaces

Figure 20 above is the land use plan of Abuja, according to Olukoya and Olukoya (2018) Abuja was built based on the garden city concept. In this regard, the Federal Government of Nigeria hired International Planning Associates (IPA) to create the city's layout, and the Master Plan's full implementation began in the early 1980s. The Abuja Master Plan included green places that may be developed or left undeveloped. Jibril (2010) listed the developable green spaces as open areas, leisure centers, parks and gardens, playgrounds for children, outdoor games, sport facilities, stretches of vegetation along valleys, riverbeds, mountainous areas, and a few sporadic open spots. The undevelopable green spaces were also provided, and developers occasionally attempted to further create them. Unfortunately, residential and commercial construction has mostly eliminated Abuja's designated green spaces. See Figure 21 for a view of Abuja Metropolis.

The criteria's used to design a park in Abuja, Nigeria includes:

i. All parks created for dense public usage, excluding those to which users walk in less than five minutes, should feature drinking fountains and restrooms.

ii. To protect users from traffic hazards, highly trafficked facilities, such as tot lots and playgrounds, must be walled in or have other natural barriers available.

iii. Enough lighting should be provided to extend use and aid in ensuring personal safety.

iv. Resilient materials must be used to pave playgrounds.

v. Where necessary for safety reasons, suitable labeling, signposting, line-of-sight clearance, and similar actions must be taken into consideration.

vi. Buffers must be installed to ensure that noise levels don't go above 68dB.

vii. Activities that are incompatible must be segregated, and possible sites of conflict must be clearly noted.

viii. Trail uses for motorized and non-powered activities must be separated.

ix. All aquatic facilities must include boat launch ramps and sufficient parking spaces.

x. Energy conservation must be taken into account during the planning, building, use, and maintaining of park facilities.

xi.   All park facilities should be designed to make them accessible to people with disabilities and the elderly.

xii.   Formal parking spaces should hold no fewer than 50 automobiles and, if the facility's capacity allows it, no more than 1,200 cars.

Brief Descriptions of the Parks

The 10 selected parks are identified in Figure 21, there are several parks and green areas in the city with Millennium Park being the largest which was designed by Manfredi Nicoletti and was opened by Queen Elizabeth II of England. Other parks include: BMT African garden, City park, Jabi lake park, Magic Land Amusement park, Rabby recreational park and garden, Acropolis Park, Central park and Suncity park among others. These selected parks are all located in Abuja Municipal.

Figure 22

Location of selected parks in Abuja municipal

(QGIS 2022)

Table 5

Ten (10) selected parks in Abuja

S/N	Name	Description	Type	Location	Area Covered
1.	Millennium Park	has a recreational area, a swimming pool, fountain and varieties of plants and trees	Public Park	Abuja Metropolis	80acres
2.	Central Park	A public park for Recreational, sports Karting etc	Public Park	Abuja Metropolis	540sqm
3.	Magic Amusement Park	Has a lot of arts, playground and urban furniture's with a conducive environment	Semi-Public Park	Abuja Metropolis	80acre
4.	City Park	Has playground for children, tracks for racing	Public Park	Abuja Metropolis	200sqm
5.	Jabi Park	A public park for recreational, social activities tourist site	Public Park	Abuja Metropolis	1300ha
6.	BMT Africa Park	Has green vegetation, mini zoo, playgrounds, sporting facilities and library	Semi-Public Park and garden	Abuja Metropolis	6000sqm
7.	Rabby Recreational Park	recreational activities possess mini zoo, garden and relation area	Recreational park	Abuja Metropolis	20000sqm
8.	Tobix Recreational	Possess green lawns, sculptures and support sporting activities.	Recreational park and garden	Abuja Metropolis	8000sqm
9.	Suncity Neighborhood	Fresh natural landscape accessible to wheel chair	Neighborhood park	Abuja Metropolis	500sqm
10.	Acropolis Park	A unique environment with rocky topology	District Park	Abuja Metropolis	800sqm

- **Millennium Park**

The Millennium Park, which is situated in the Maitama neighborhood of the city, is Abuja's largest public park. It is located between latitude 9° 4'14.60"N and longitude 7°29'58.85"E. It has an area cover of a total of 80 acres (32 ha), with a mean temperature of 29.49 °C across the buffer zones (Chibuike et al., 2018) and features bodies of water and a variety of vegetation. The Park's one half is devoted to pristine nature, the highland vegetation, savanna, deciduous woodland, rainforest, brushwood, and greenhouses for butterflies and tropical birds are all found on a system of terraces at various levels (Sufiyan, et al., 2015). Mala et al. (2020) stated that the park is one of the many tourist attractions in Abuja which is regarded as one of Nigeria's economic development tool bringing thousands of people together every day. It has a recreational area, a swimming pool, fountain and varieties of plants and trees such as the Ravenala madagascariensis palm holy wool tree palm trees among others. Mohammed et al. (2021) in his study on tourist attraction discovered that the majority of tourists that visited millennium park, thought that the parks' amenities were of a very high caliber. The Park, was designed and planned by Manfredi Nicoletti, an Italian architect, On December 4, 2003, the former Nigeria president Olusegun Obasanjo, the former United Kingdom Prime Minister Tony Blair and the late Queen Elizabeth II commissioned the park by planting the Ravenala madagascariensis palm giving birth to the Park.

Figure 23

Google map of Millennium park

(Google earth)

Figure 24

Millennium park, Abuja

(Author, 2022)

- **Central Park Abuja**

It is located at central business district in Garki, Abuja, within   There are activities for everyone in the park, such as a beautiful art and flower gallery, a children's playground, the 500-meter Go-Kart race course, a 9-hole mini golf course, cycling trail for toddlers, kids and adults, paintballs, arcades, axes and roses water park slides, swimming pool, well-manicured lawns and different gardens for events among others.

Figure 25

Google imagery of Central Park Abuja

(Google earth)

Figure 26

Central park, Abuja

(Author, 2022)

- **Magic Land Amusement Park**

They have amusement equipment for fun. It is situated beside Abuja city gate between latitude   9°2'36.10"N and longitude 7°27'7.98"E. It has a resort with beehive of different activities. It is full of nature mostly greens and rocks, it has a lot of arts, urban furniture, children's playground among others. It was built in 2007 by the then president Olusegun Obasanjo. It was formally called wonderland park. It was once closed for a while due to the insecurity in the country.

Figure 27

Google map of Magic land park, Abuja

(Google earth)

Figure 28

Magic land park, Abuja

(Author, 2022)

- **City Park**

The park is located between latitude 9°4'37.43"N and longitude 9°4'37.43"N. 12.8 hectares. There is a playground for children, a go-kart track for racing, and a paintball field, which is played in a group. It is filled with nature. They have adequate parking space, a good layout landscape and highly ventilated, the park has an adequate parking space.   The lack basic facilities like rest room.

Figure 29

Google map of City park, Abuja

(Google earth)

Figure 30

City park, Abuja
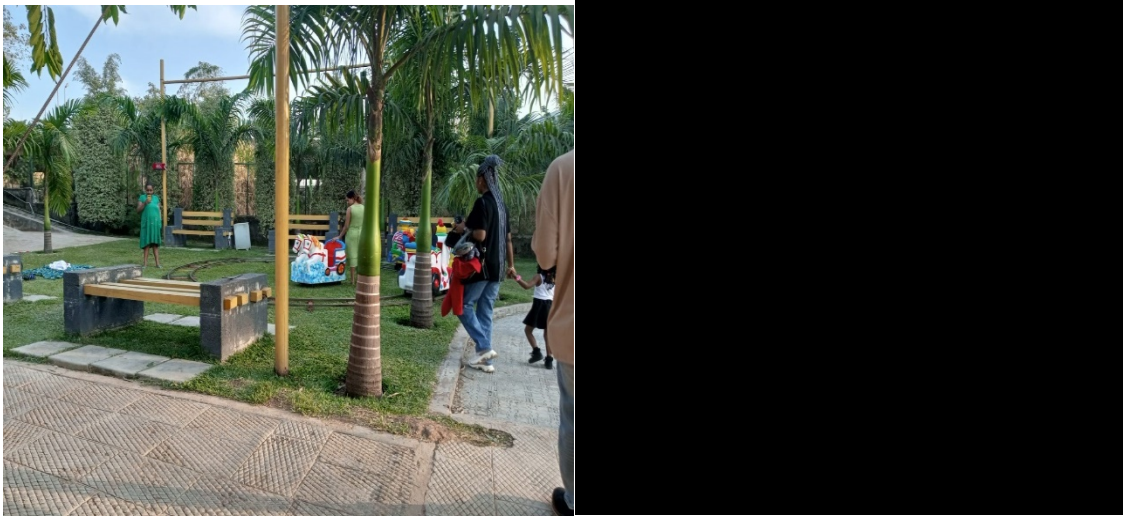
(Author, 2022)

- **Jabi Lake Park**

Jabi Park is located between the Kado and Jabi district of the Federal capital city Abuja between latitude 9° 4'15.36"N and longitude 7°24'53.09"E. It was created in 2007. It located beside a manmade lake and it is closed to the city center of Abuja. It is a tourist location because of the lake. The pack is mostly used for recreational purposes and social activities. The total surface area which includes the lake is 1,300 hectares (3200 acres).

Figure 31

Google map of Jabi Lake, Abuja

(Google earth)

Figure 32

Jabi Lake, Abuja
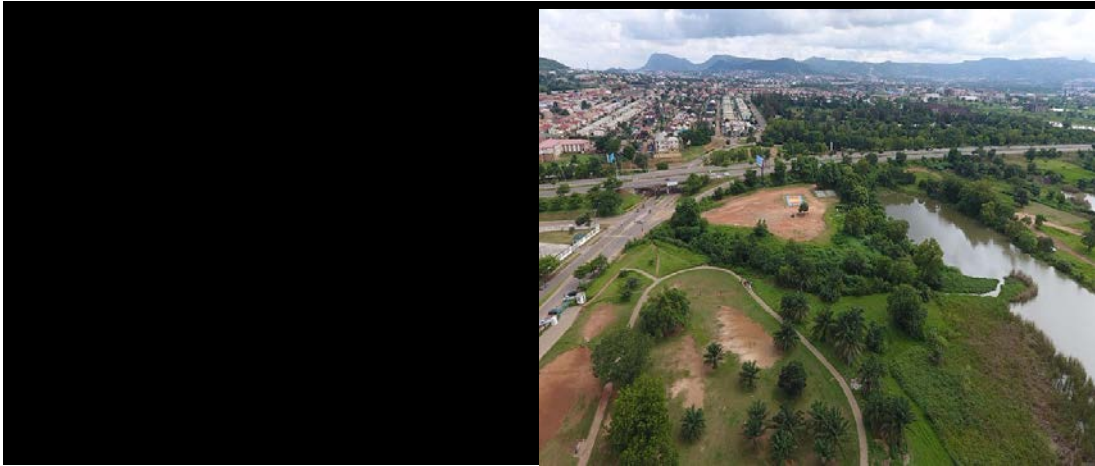
(Author, 2022)

- **BMT Africa Park:**

It is situated in Wuse II Abuja within latitude 9°4'52.90"N and longitude 7°28'55.26"E, it has a lot of green vegetation and easily accessible it has a mini zoo, the park has children's playground it has a swimming pool, a football pitch, health facilities, many art, recreational facilities, aesthetical green vegetation and trees, it has a mini library were people borrow books and study at the green areas.

Figure 33

Google map of BMT African Garden, Abuja
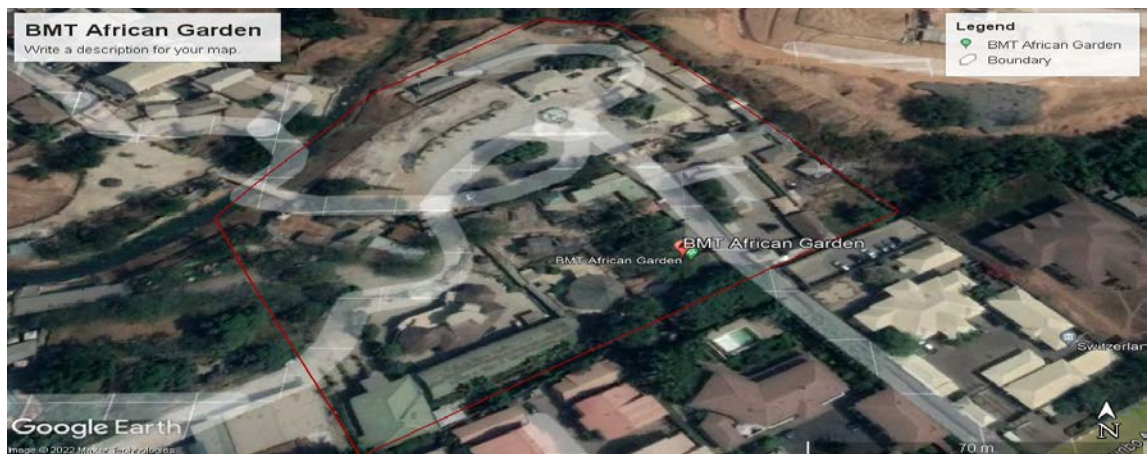
(Google earth)

Figure 34

BMT African Garden, Abuja

(Author, 2022)

- **Rabby Recreational Park**

The Rabby garden located between latitude 9° 5'10.34"N and longitude 7°22'36.47"E. its area cover is about 20000sqm, is a lovely garden with a variety of outdoor exercise areas, which includes a mini-football field, a basketball court, a tennis court, and children playground with bouncy castles. A beautiful recreation area with a variety of attractions, including a stunning arena, a gym, a little zoo with ostrich, peacocks, parrots and antelopes among others, a garden, a sports arena, and relaxation areas, among others. It is having a very calm and serene environment filled with nature They are in compliance with COVID 19 because they have built disinfection tubes at the entrances, where you may be cleaned up before entering the event space or using any of the other amenities on the property.

Figure 35

Google map of Rabby garden

(Google earth)

Figure 36

Rabby garden, Abuja

(Author, 2022)

- **Tobix Recreational Park and Garden**

A very quiet and serene environment with manicured lawn and easily accessible located in Kado district Abuja between Latitude 9° 5'8.99"N and longitude 7°26'33.73"E. It was built in 2012. It has a relaxing environment, a playground, art and sport activities center. The park is a work of art of lovely and practical landscape elements including evergreen

lawns, walkways, topiaries of various shape, sculpture, waterfall, fountains, ponds, rock gardens, gazebos of various sizes, exotic trees, palms and flowers. It is renowned for its stunning scenery and large amount of visitor space for events.

Figure 37

Google map of Tobix Recreational Park and Garden

(Google earth)

Figure 38

Tobix Recreational Park and Garden, Abuja

(Author, 2022)

- **Suncity Neighborhood Park**

It has latitude and longitude 8°59'23.24"N and longitude 7°25'47.79"E It is located at Suncity neighborhood Abuja. The park is easily accessible, people do hold events in the park, it is a neighborhood park, it has parking space, it is accessible for wheel chair, it has a fresh and natural landscape.

Figure 39

Google map of Suncity park

(Google earth)

Figure 40

Sun city park, Abuja
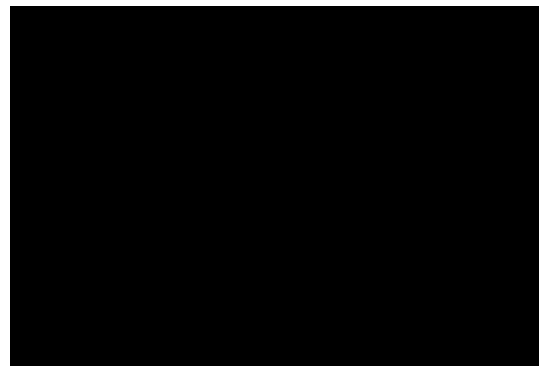
(Author, 2022)

- **Acropolis Park**

It has a very unique landscape with a rocky topology. It is located in Apo District between latitude 8°59'19.88"N and longitude 7°30'10.29"E, therefore it is a district park, with a lush green. It has a Greece feature or theme. It has many arts, serene environment. It has a rocky environment.

Figure 41

Google map of Acropolis Park

(Google earth)

Figure 42

Acropolis Park, Abuja

(Author, 2022)

Research Design

        The method of research for the thesis is based on administering of a questionnaire on site. During the survey a total number of 10 parks were visited within the Abuja Municipal. The participants consisted of 10 people from 10 different parks whom provided the needed information as they were told their answers would strictly be used for research purposes; it took three weekends in three weeks and from 12 noon to 6pm in a day was used to complete the field survey. 100 individuals were selected randomly in order to obtain data for measuring the effects of covid19 pandemic in the use of open green spaces in Abuja.

        The questionnaire used includes a set of questions that is divided into three sections (A, B, C). **Section A** which is titled as "socio-demographic data includes six questions. **Section B** "open green space usage frequency" investigating participants' usage frequency of urban open green space in Abuja, includes five questions; Likert scale was adopted in four questions, (strongly agree, agree, unsure, disagree, and strongly disagree). **Section C** "preferences of urban open green space" investigating the choices or perceptions of urban open green space in Abuja, includes six questions; Likert scale was adopted in four questions, (strongly agree, agree, unsure, disagree, and strongly disagree).

Data Collection and Analysis

        From the data collected, the general situation of the urban open spaces is observed while the participants' data is gathered from the questionnaire. In order to evaluate the respondent's data, the survey findings are analyzed using SPSS software, and presented in tables and charts.

CHAPTER V

Findings and Discussion

Findings

The followings tables and charts below are the percentages of the questionnaire results in Abuja. Each question has a table and a chart indicating the percentages of the participants' answers.

Section A Findings: Socio-Demographic Data

Section A.1: Gender

36.0% of the 100 participants were female and 63.0% were male.

Table 6

Participants responses about "Gender" (%)

	Gender		
	Characteristics	Frequency	Percentage
Valid	Male	63	63
	Female	36	36
	No response	1	1
	Total	100	100

Figure 43

Participants responses about "Gender" (%)
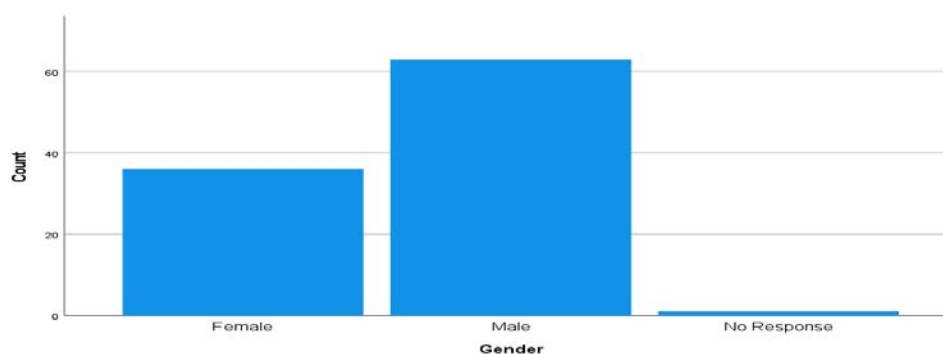
Section A.2: Age

71% are age 26-40, 19% are 16-45 years, 6% are 41-55, 2% are 56-65 and 1% are 66 above.

Table 7

Participants responses about "Age" (%)

	Age		
	Characteristics	Frequency	Percentage
Valid	18-25	19	19
	26-40	71	71
	41-55	6	6
	56-65	2	2
	66 above	1	1
	No response	1	1
	Total	100	100

Figure 44

Participants responses about "Age" (%)
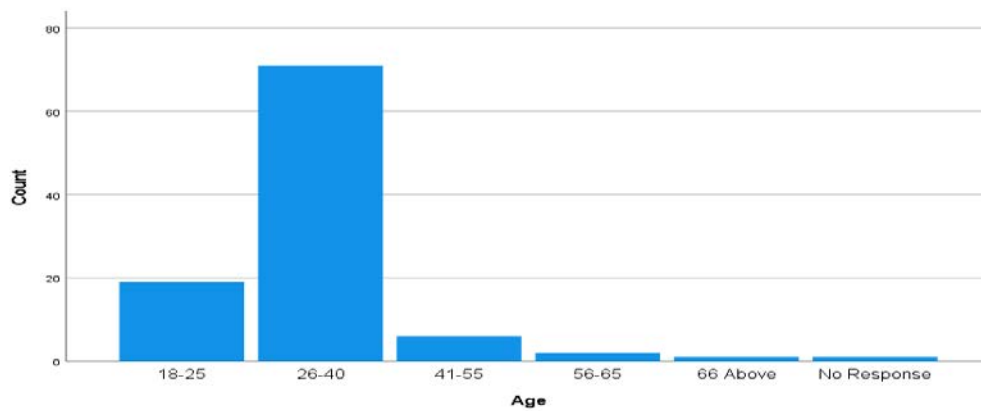
Section A.3: Participants Status

70% are resident of Abuja, 24% are non-resident and 4% are tourist.

Table 8

Participants responses about "Participants Status" (%)

		Participants Status	
	Characteristics	Frequency	Percentage
1	Resident	70	70
2.	Non-resident	24	24
3.	Tourist	4	4
4.	No response	2	2
	Total	100	100

Figure 45

Participants responses about "Participants Status" (%)
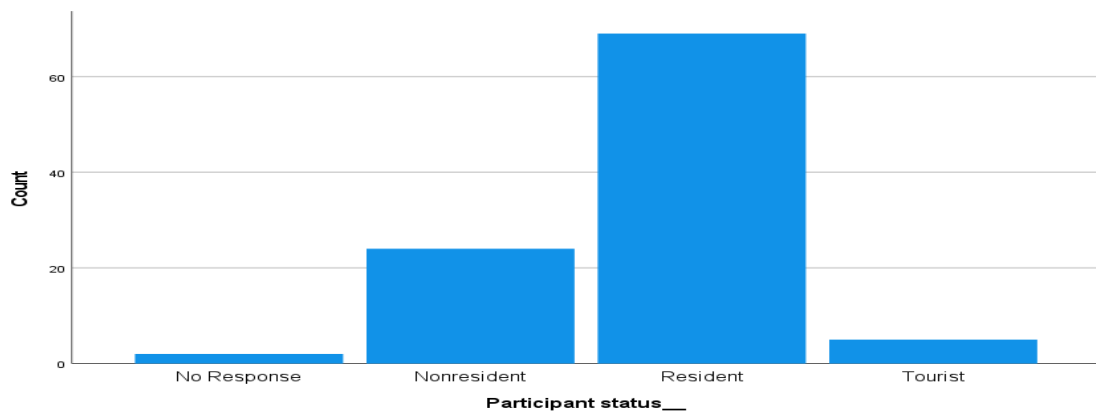
Section A.4: Accommodation years

31% have stated in Abuja for 1-5 years, 21% for less than a year, 20% for 6-10, 16% for
20 years above and 7% for 11-20 years.

Table 9

Participants responses about "Accommodation years" (%)

	Accommodation years		
	Characteristics	Frequency	Percentage
Valid	Less than 1 year	21	21
	1-5	31	31
	6-10	20	20
	11-20	7	7
	Above 20	16	16
	No response	5	5
	Total	100	100

Figure 46

Participants responses about "Accommodation years" (%)
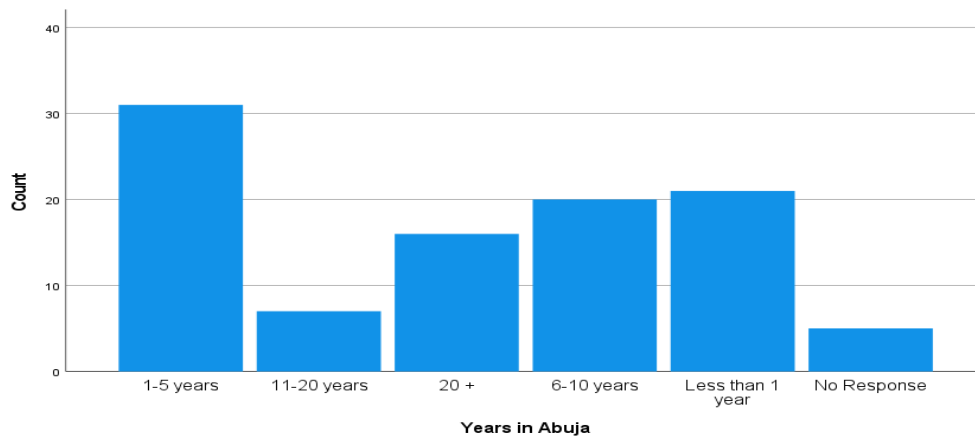
Section A.5: Occupation

58% are employed, 13 % are unemployed, 13% are students, 8% are self-employed, 1% are into business, 1% are visitors and 1% are doing nothing, 1% teaching, 1% resource owners.

Table 10

Participants responses about "Occupation" (%)

	Occupation		
	Characteristics	Frequency	Percentage
Valid	Employed	57	57
	Unemployed	13	13
	Student	13	13
	Self-employed	8	8
	Business	1	1
	Visitation	1	1
	Teaching	1	1
	Business owner	1	1
	Resource person	1	1
	None	1	1
	No response	3	3
	Total	100	100

Figure 47

Participants responses about "Occupation" (%)
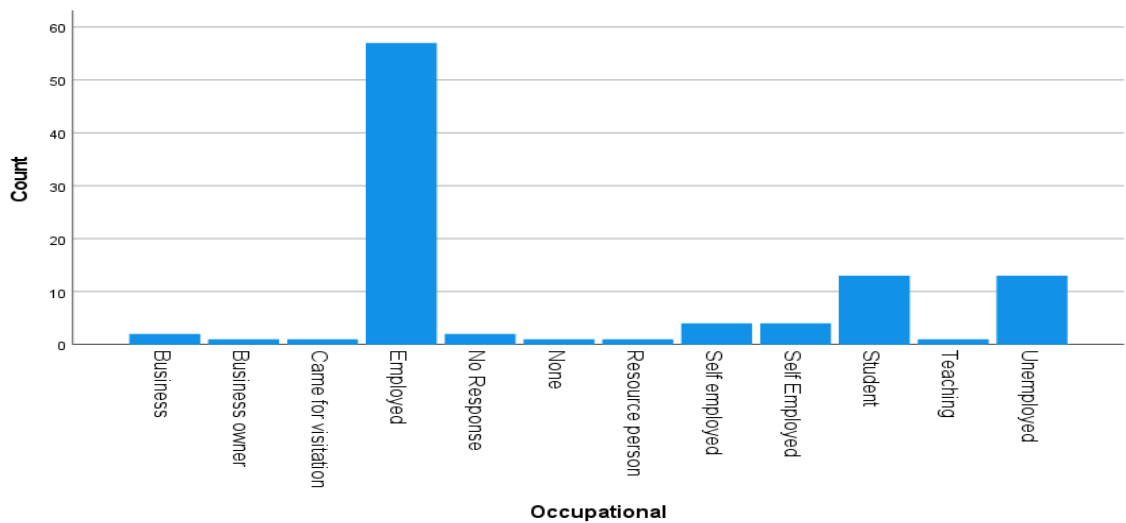
Section A.6: Household Financial Status

29% income is 51000-100000 naira, 24% income is above 250000 naira, 20% income is 101000-150000 naira, 15% is 30000-50000 naira, 11% income is 30000-50000 naira.

Table 11

Participants responses about "Household Financial Status" (%)

	Household Financial Status		
	Characteristics (Naira)	Frequency	Percentage
Valid	30 – 50	15	15
	51 – 100	29	29
	101 – 150	20	20
	151 – 250	11	11
	Above 250	24	24
	No response	1	1
	Total	100	100

Figure 48

Participants responses about "Household Financial Status" (%)
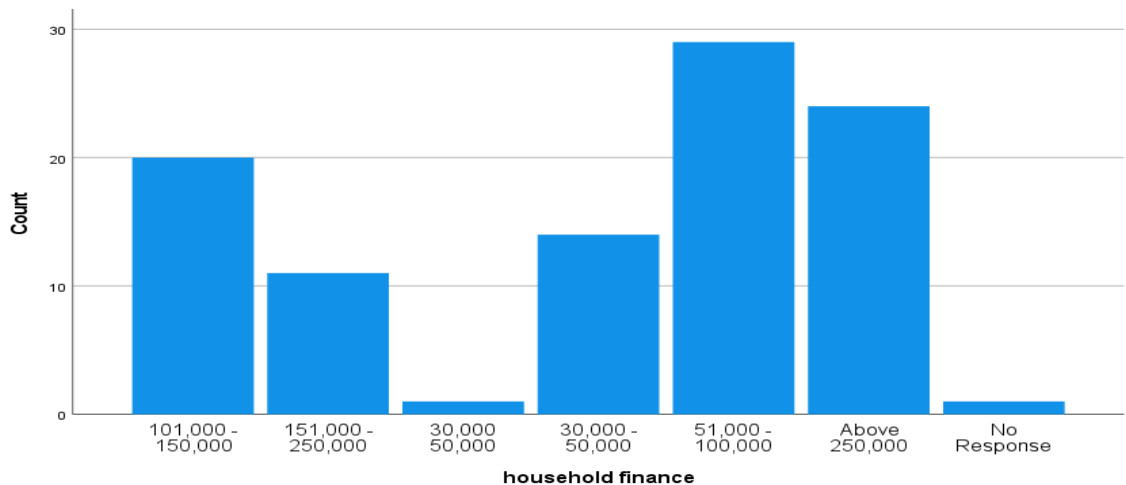
Section B Findings: Urban Open Green Space Usage Frequency

Section B.1: My usage of open green spaces would increase if I had more green spaces nearby

33% of the 100 participants strongly agreed, 30% agreed, 18% were unsure, 9% disagree and 7% strongly disagree.

Table 12

Participants responses about "My usage of open green spaces would increase if I had more green spaces nearby" (%)

My usage of open green spaces would increase if I had more green spaces nearby			
	Characteristics	Frequency	Percentage
Valid	Strongly Disagree	7	7
	Disagree	9	9
	Unsure	18	18
	Agree	30	30
	Strongly Agree	33	33
	No response	3	3
	Total	100	100

Figure 49

Participants responses about "My usage of open green spaces would increase if I had more green spaces nearby" (%)
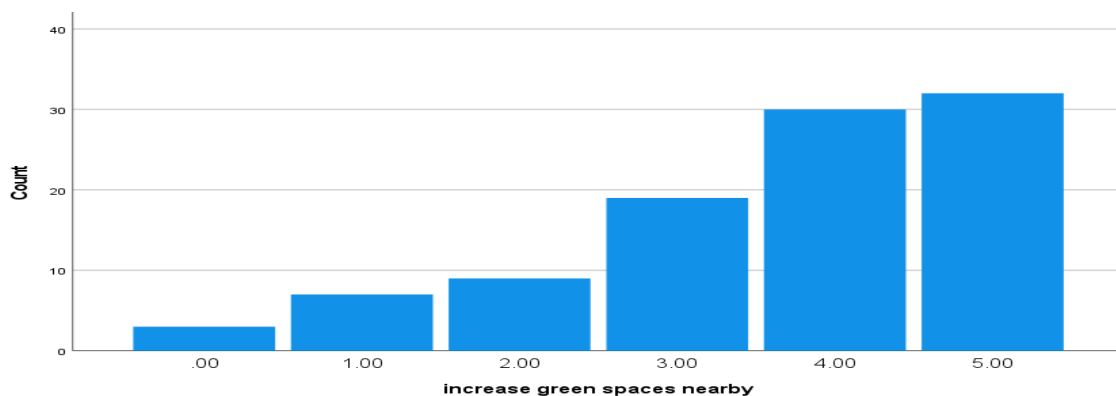
Section B.2: My visit to open green spaces has increased after Covid-19

28% are unsure whether their usage of urban open green spaces increases after the Covid19, 25% agreed that their visit to open green spaces has increased after covid-19, 24% disagreed, 10% strongly disagreed while 9% strongly agreed**.**

Table 13

Participants responses about "My visit to open green spaces has increased after Covid-19" (%)

	My visit to open green spaces has increased after Covid-19		
	Characteristics	Frequency	Percentage
Valid	Strongly Disagree	10	10
	Disagree	24	24
	Unsure	28	28
	Agree	25	25
	Strongly Agree	9	9
	No response	4	4
	Total	100	100

Figure 50

Participants responses about "My visit to open green spaces has increased after Covid-19" (%)
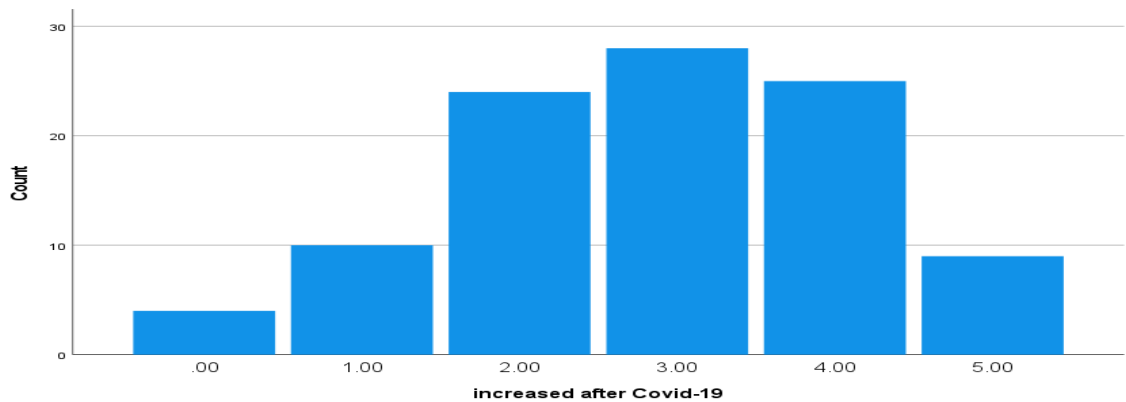
Section B.3: Having easy access to open green spaces nearby during Covid-19

25% are unsure whether they have easy access to open green spaces near-by during covid-19, 22% strongly disagree, 21% disagree to not having easy access to open green spaces during covid-19, 17% agreed to having easy access and 6% strongly agree to having easy access to open green spaces during covid-19.

Table 14

Participants responses about "I have had easy access to the open green spaces nearby during Covid-19" (%)

	I have had easy access to the open green spaces nearby during Covid-19		
	Characteristics	Frequency	Percentage
Valid	Strongly Disagree	22	22
	Disagree	21	21
	Unsure	25	25
	Agree	17	17
	Strongly Agree	6	6
	No response	9	9
	Total	100	100

Figure 51

Participants responses about "I have had easy access to the open green spaces nearby during Covid-19" (%)
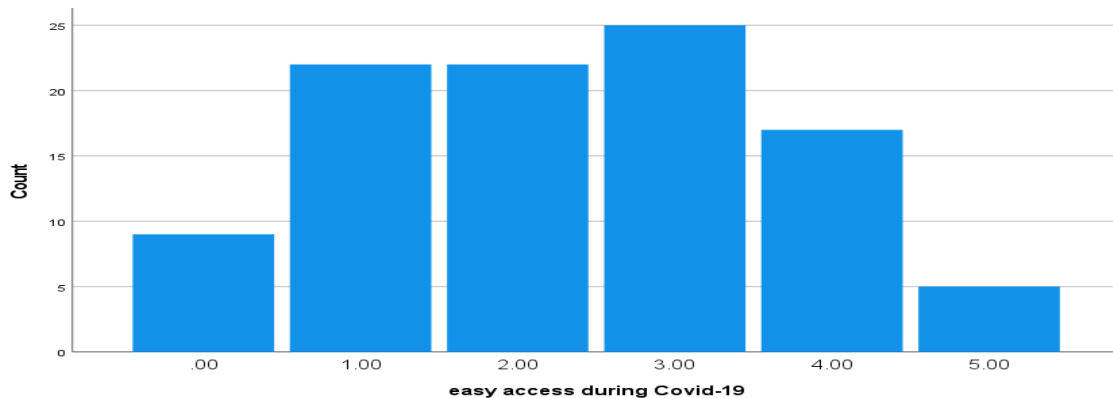
Section B.4: Increase in other residents visit rate to green spaces after Covid-19

26% were unsure whether other residents visit to open green spaces increased after covid-19, 20% agreed, 19% strongly agreed to the increase, 17% disagreed and 10% strongly disagreed.

Table 15

Participants responses about "I believe the other residents' visit rate to green spaces has increased immensely after Covid-19" (%)

	I believe the other residents' visit rate to green spaces has increased immensely after Covid-19		
	Characteristics	Frequency	Percentage
Valid	Strongly Disagree	10	10
	Disagree	17	17
	Unsure	26	26
	Agree	20	20
	Strongly Agree	19	19
	No response	8	8
	Total	92	100

Figure 52

Participants response about "I believe the other residents' visit rate to green spaces has increased immensely after Covid-19" (%)
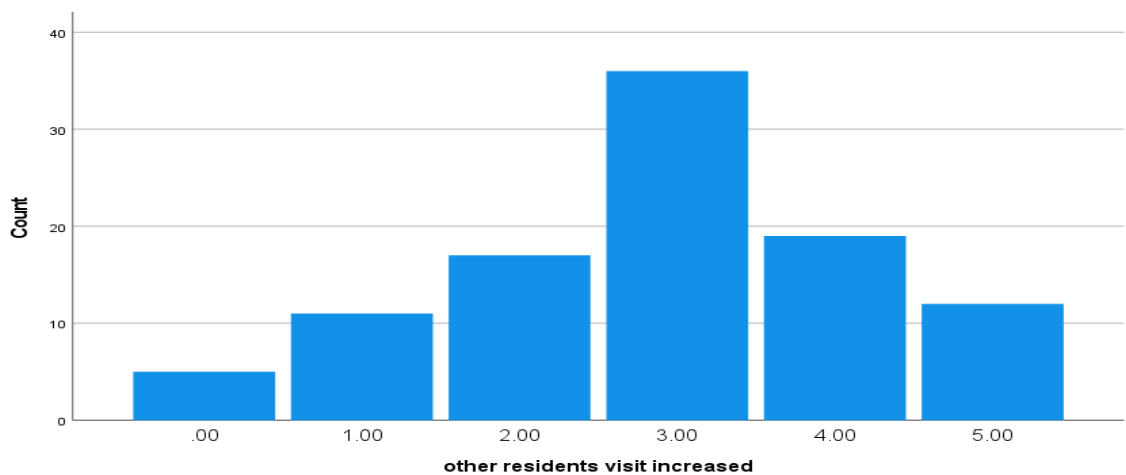
Section B.5: How often do you use the green spaces nearby

35% use urban open green spaces once or several times a month, 20% infrequently visits parks and urban open green spaces, 19% visit parks once or several times a week, 16% don't use parks and 9% visit parks every day.

Table 16

Participants responses about "How often do you use the green spaces nearby?" (%)

	How often do you use the green spaces nearby?		
	Characteristics	Frequency	Percentage
Valid	I don't use	16	16
	Infrequently	20	20
	Once or several times a month	35	35
	Once or several times a week	19	19
	Everyday	9	9
	No response	1	1
	Total	100	100

Figure 53

Participants responses about "How often do you use the green spaces nearby?"
(%)
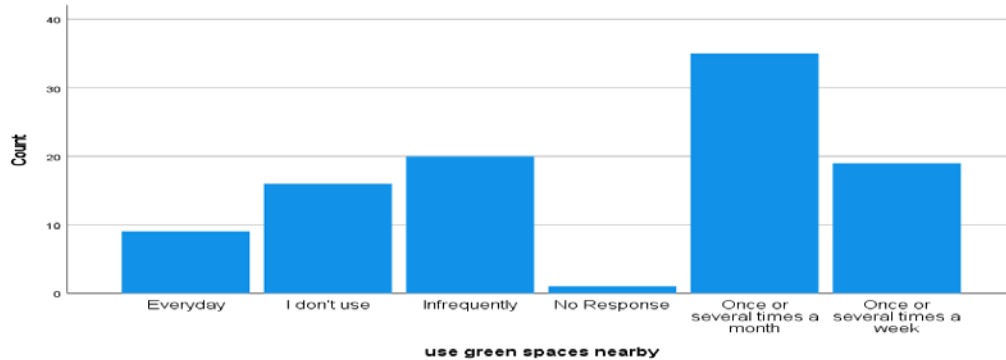
Section C Findings: **Urban Open Green Space Preference**

Section C.1: There are safe and comfortable urban open green spaces in my neighborhood

28% agreed that there are safe and comfortable urban open green spaces in their neighborhood, 23% disagree, 21% were unsure, 13% strongly agree while 10% strongly disagreed.

Table 17

Participants responses about "There are safe and comfortable urban open green spaces in my neighborhood" (%)

	Safe and comfortable urban open green spaces in my neighborhood		
	Characteristics	Frequency	Percentage
Valid	Strongly Disagree	10	10
	Disagree	23	23
	Unsure	21	21
	Agree	28	28
	Strongly Agree	13	13
	No response	5	5
	Total	100	100

Figure 54

Participants responses about "There are safe and comfortable urban open green spaces in my neighborhood." (%)
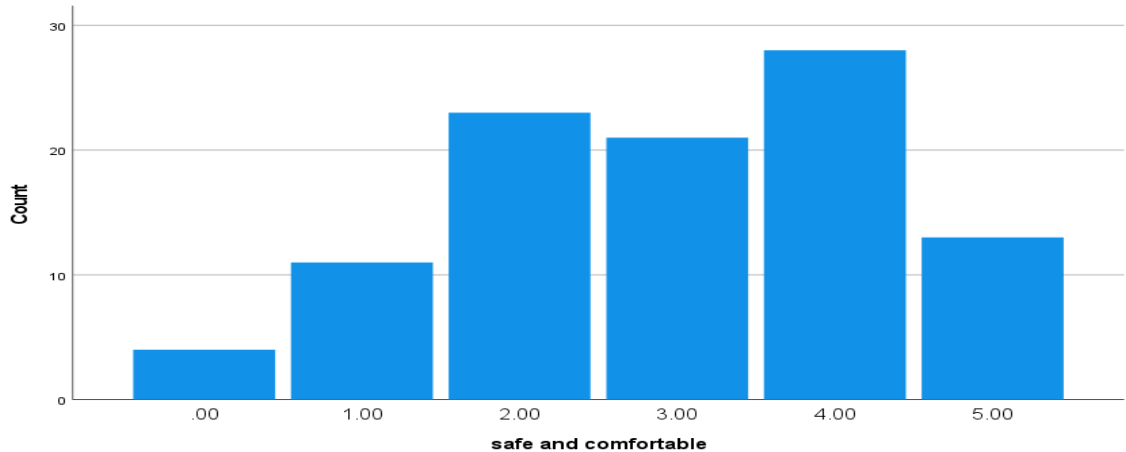
Section C.2: Urban parks are important for enhancing public health.

33% strongly agreed that urban parks are important to enhancing public health, 26% agreed, 15% were unsure, 12% strongly disagree and 9% disagree.

Table 18

Participants responses to "Urban parks are important for enhancing public health" (%)

	Urban parks are important for enhancing public health		
	Characteristics	Frequency	Percentage
Valid	Strongly Disagree	12	12
	Disagree	9	9
	Unsure	15	15
	Agree	26	26
	Strongly Agree	33	33
	No response	5	5
	Total	100	100

Figure 55

Participants responses to "Urban parks are important for enhancing public health" (%)
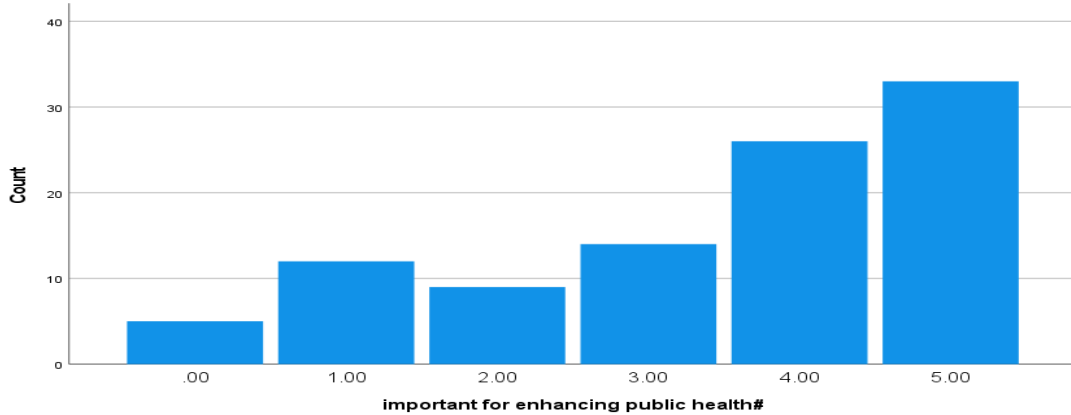
Section C.3: Green spaces have been more important to me after Covid-19

37% were unsure whether green spaces have been more important to them after covid-19, 19% agreed, 17% disagree while 11% strongly agreed and also disagreed that green spaces have been more important to them after covid-19.

Table 19

Participants responses about "Green spaces have been more important to me after Covid-19" (%)

	Green spaces have been more important to me after Covid-19		
	Characteristics	Frequency	Percentage
Valid	Strongly Disagree	11	11
	Disagree	17	17
	Unsure	37	37
	Agree	19	19
	Strongly Agree	11	11
	No response	5	5
	Total	100	100

Figure 56

Participants responses about "Green spaces have been more important to me after Covid-19" (%)
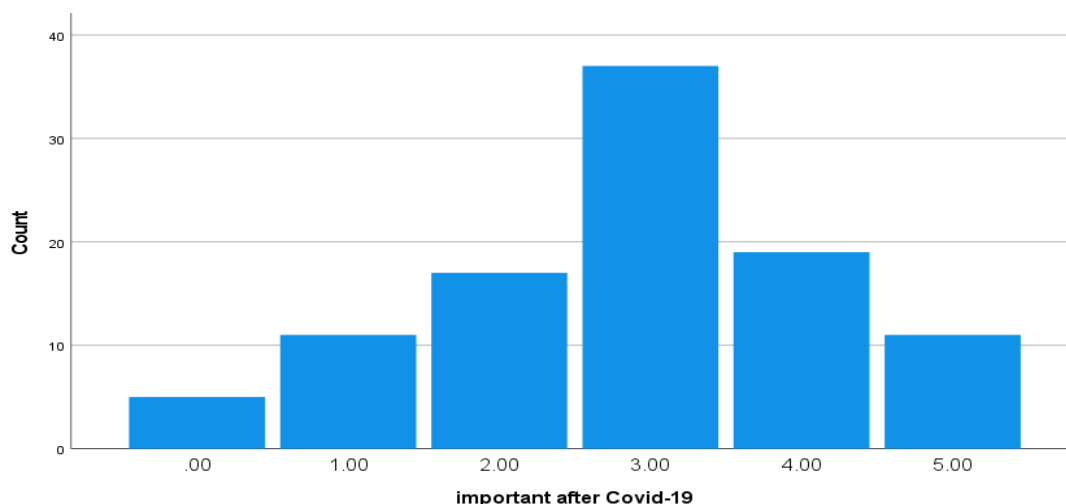
Section C.4: I believe the number of green spaces must be increased in Abuja

34% strongly agreed that the number of green spaces must be increased in Abuja, 18% agreed, 20% were unsure, 9% strongly disagree and 13% disagree.

Table 20

Participants responses about "I believe the number of green spaces must be increased in Abuja" (%)

	I believe the number of green spaces must be increased in Abuja		
	Characteristics	Frequency	Percentage
Valid	Strongly Disagree	9	9
	Disagree	13	13
	Unsure	20	20
	Agree	18	18
	Strongly Agree	34	34
	No response	6	6
	Total	100	100

Figure 57

Participants responses about "I believe the number of green spaces must be increased in Abuja" (%)
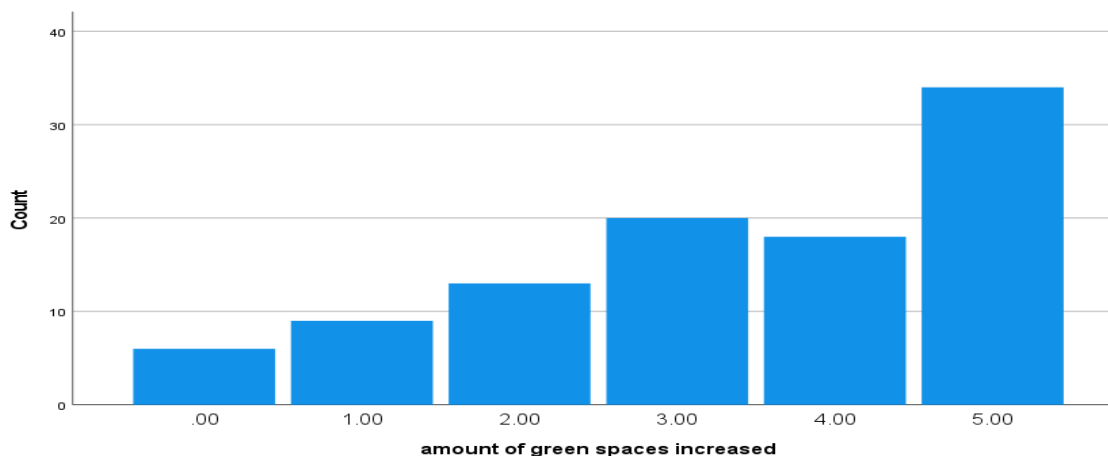
Section C.5: What activities do you prefer doing in urban parks

41% visit parks for socialization, 34% visit for enjoying nature, 11% for sport activities, 7% walking and 7% for taking children out.

Table 21

Participants responses about "What activities do you prefer doing in urban parks" (%)

	Preferred Activities in Parks		
	Characteristics	Frequency	Percentage
Valid	Socializing with relatives and friends	41	41
	Enjoying nature	34	34
	Walking	7	7
	Sporting Activities	11	11
	Taking a child out	7	7
	Total	100	100

Figure 58

Participants responses about "What activities do you prefer doing in urban parks"
(%)
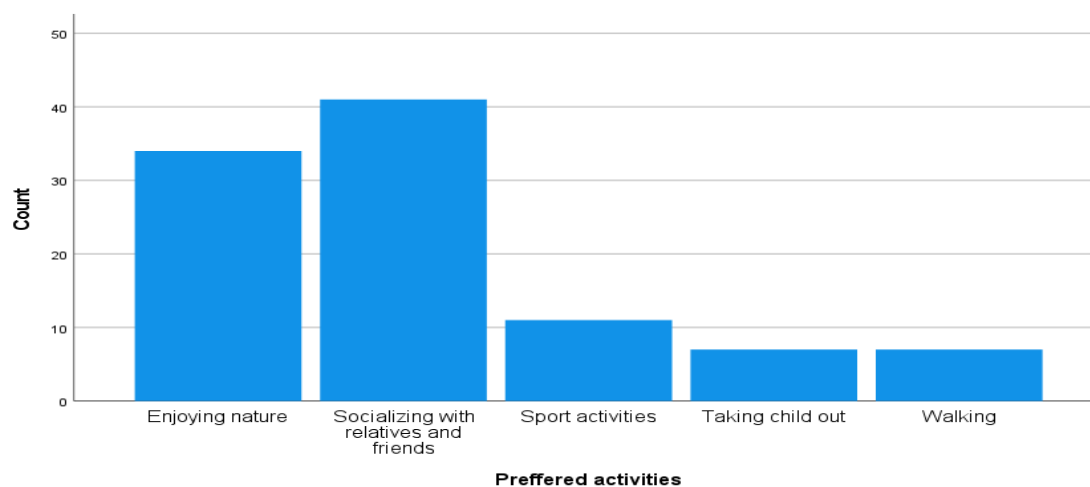
Section C.6: What is your opinion about the green spaces in Abuja

31% suggested that maintenance in those parks is insufficient, 23% suggested that children play area, resting area, sports field etc. are insufficient, 13% suggested 'all', 10% suggested that vegetation is insufficient and 9% suggested that urban furniture is insufficient.

Table 22

What is your opinion about the green spaces in Abuja (%)

	Opinion about the green spaces in Abuja		
	Characteristics	Frequency	Percentage
Valid	Maintenance is not sufficient	31	31
	Urban furniture is insufficient	9	9
	Children play area, resting area, sports field etc. are insufficient	23	23
	Vegetation is insufficient	10	10
	All	13	13
	I find it well-kept and useful	14	14
	Total	100	100

Figure 59

Participants responses about "What is your opinion about the green spaces in Abuja" (%)
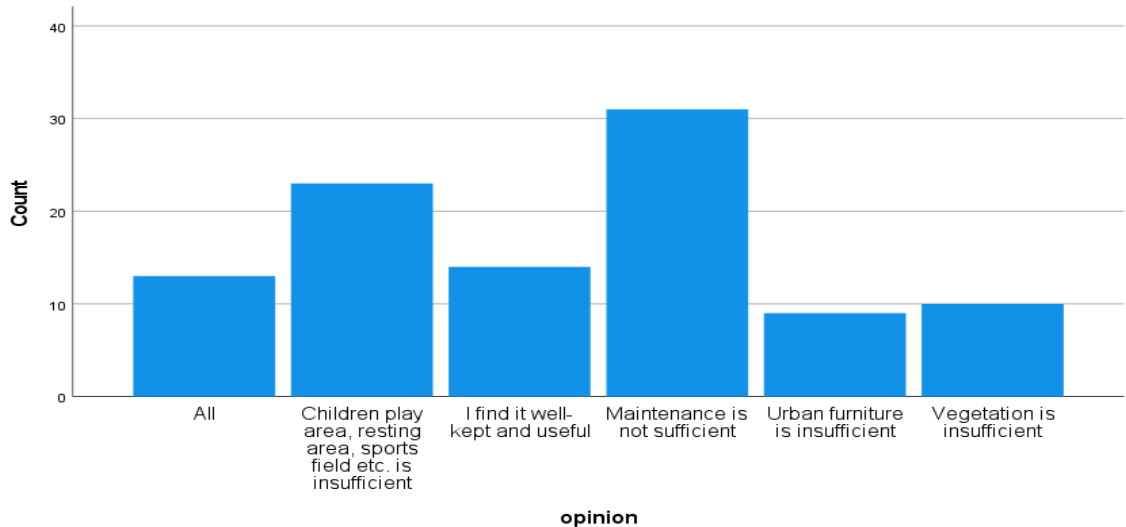
Discussion and Interpretation

During the survey a total number of 10 parks were visited within the Metropolis. From the result it was deducted that some of these parks are not well maintained. Millennium Parks possess all the features required of a park and it is the most visited park. The parks with sporting facilities are also patronized by mostly people who have high interest in sport while others are visited for the purpose of socialization.

According to the results from the questionnaire, 33% strongly agreed and 30.9% agreed that their use of green spaces will increase if they have more nearby green spaces, therefore there is a need for more nearby greens paces. In addition, merely 9% strongly agreed and 26% agreed that their visit to green spaces has increased after the pandemic; this shows that there is lack of awareness on the importance and benefits of the use of green spaces.

Merely 6% strongly agreed and 18.6% agreed that they had easy access to greenspaces during covid-19; this shows that most parks were not accessible during the pandemic either they were closed or due to distance. 35.5% out of the 100 participant use green spaces once or several times a month and 20% use them infrequently; this result still shows that there is lack of awareness on the benefits of the usage of green spaces in Abuja.

Further, merely 29.5% agreed that there are safe and comfortable urban green spaces in their neighborhood. 36,1% of the participants strongly agreed that the number of green spaces should be increased in Abuja. 41% visit parks for socializing with friends and relatives; 34% out of the participant visit parks to enjoy nature. Additionally, 31% believe that maintenance is not sufficient in parks.

Finally, it could be deducted that with proper maintenance the number of people vising parks will increase. The majority of those that visit parks in Abuja is to socialize with friends and relatives, hence, with awareness and sensitization on the importance of green spaces people will tend to understand that open green spaces also serve other purposes like enjoying nature and improving their physical and mental health. The government also need to provide more urban parks near to residential buildings for easy access.

CHAPTER VI
Conclusion and Recommendations

Conclusion

Urban open green spaces have various ecological, social and psychological benefits. Interact with nature can also help in coping with the causes of the pandemics. Abuja is among the states that is greatly affected by the pandemic. The aim of this research is to examine the effect of Covid-19 Pandemic on the use of urban open green spaces in Abuja, Nigeria. The research focused on how Covid19 affected the usage and preferences of green spaces in Abuja, Nigeria.

The thesis is structured into six chapters; Chapter 1 includes a background to the research, setting out the aims; the problem statement, and the limitation for the study. Chapter 2 includes a review of scientific articles on urban open green spaces its classification and standards, urban green space is classified according to function type and usage type. In addition, the examples of parks in different countries was also reviewed. Chapter 3 includes theoretical reviews on the urban open green space and Covid-19 pandemic. Furthermore, Chapter 4 includes parks selected for the research, the criteria's for designing a park in Abuja was included, the methodology and research design was included. Chapter 5 includes analyses and discusses the results of the findings and its interpretations.

Based on the findings, there is insufficient awareness among the residents regarding the health benefits and importance of green spaces, most parks were not accessible during the pandemic either they were closed or due to distance. The findings also deducted that the parks are not well maintained and are not easily accessible.

Recommendations

Policies: By maximizing government policies through strategic management that is on target, easier to implement, and optimizing people's involvement through cooperation networks, the use of green open space can be pursued in a sustainable manner. This research has to do with the relationship between parks and Covid-19 pandemic therefore, policy makers should provide a large land cover for this parks, increasing the number of

parks and making it accessible to people could help in combating future occurrence of Covid-19 pandemic. This space provision will serve as an escape plans for parks who already make this provision in the future

Development control: Planning the financial budgeting of green open space wisely will prevent shortages and hurdles, especially in the budget for purchasing land that is thought to be extremely appropriate which is classified as a green open space area in the Abuja master plan and

Maintenance: from the result of the research 31% of the respondent said the parks are not well maintained therefore, the parks should be properly maintained in order for it to serve all the function needed of a park. In the case of parks that lacks children play area. It should be provided and well maintained. As parks that also lack some other facilities they should also be provided and well-maintained and made eco-friendly.

Proximity and accessibility: In the case of those who prefer to go for leisure and relaxation before home after their daily routine parks should be closely accessible and should also be in close proximity or nearby to residential areas in order for the users to have easy access, as shown in Figure 10 the parks do not spread around the municipal. Also including the elderly who are living in the out sketch of the metropolis should have nearby parks.

Sensitization and awareness: from the results of respondents on urban green spaces are important for enhancing health it was deducted that they don't know the importance of green space, since most people visit this parks for socializing and physical activities there is a need to create awareness platforms in order to sensitize Abuja residences on the importance and benefits of parks to mental and physical health

Aesthetics: Parks are among major source of ecosystem services, therefore its aesthetic value need to be preserved since beauty is one of the important of human need in the environment. This would also attract more users to the parks.

Social cohesion: in the providing nearby parks, the opportunities for different residents of different ethnicity and class, to meet and interact with each other will be built.

As human population increases worldwide, it is expected that demand for parks and other open green spaces would also increase. Due to the benefits and importance of open green spaces, policymakers and legislators should keep funding and also call for investors

to fund public parks, in order to increase accessibility and proximity to everyone and conceive of original, creative solutions to complex challenges such as the covid-19 pandemic. Land use conversion and urban sprawl are a common situation in urban areas of developing countries such as Nigeria, however, if regulations are enacted, monitored and adhere to it will help in cubing subsequent pandemic crisis

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APPENDICES

Similarity Report

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Questionnaire

A. Socio-Demographic Data

1. Gender
- ❑ Female
- ❑ Male

2. Age
- ❑ 18-25
- ❑ 26-40
- ❑ 41-55
- ❑ 56-65
- ❑ 66 Above

3. Participant status
- ❑ Resident
- ❑ Nonresident
- ❑ Tourist

4. How long have you been living in Abuja?
- ❑ Less than 1 year
- ❑ 1-5 years
- ❑ 6-10 years
- ❑ 11-20 years
- ❑ 20 +

5. Occupational Status
- ❑ Employed
- ❑ Unemployed
- ❑ Student
- ❑ Other: _____

6. What is your household financial situation?
- ❑ 30,000 – 50,000
- ❑ 51,000 – 100,000
- ❑ 101,000 – 150,000
- ❑ 151,000 – 250,000
- ❑ Above 250,000

B. Urban Open Green Space Usage Frequency

Listed below are statements about the relationship between humans and the environment. Please indicate the degree to which you agree with each item. Choose the number of your response for each statement using the following scale. The scale is from 1 to 5.

5= STRONGLY AGREE, 4= AGREE, 3= UNSURE, 2= DISAGREE, OR 1= STRONGLY DISAGREE
PLEASE TICK **ONE** BOX ONLY

1. My usage of open green spaces would increase if I had more green spaces nearby.

   ○ 1 ○ 2 ○ 3 ○ 4 ○ 5

2. My visit to open green spaces has increased after Covid-19.

   ○ 1 ○ 2 ○ 3 ○ 4 ○ 5

3. I have had easy access to the open green spaces nearby during Covid-19.

   ○ 1 ○ 2 ○ 3 ○ 4 ○ 5

4. I believe the other residents' visit rate to green spaces has increased immensely after Covid-19

   ○ 1 ○ 2 ○ 3 ○ 4 ○ 5

5. How often do you use the green spaces nearby?
   ☐ I don't use
   ☐ Infrequently
   ☐ Once or several times a month
   ☐ Once or several times a week
   ☐ Everyday

C. Urban Open Green Space Preference

Please indicate the degree to which you agree with each item. Choose the number of your response for each statement using the following scale. The scale is from 1 to 5.

5= STRONGLY AGREE, 4= AGREE, 3= UNSURE, 2= DISAGREE, OR 1= STRONGLY DISAGREE
PLEASE TICK **ONE** BOX ONLY

1. There are safe and comfortable urban open green spaces in my neighborhood.

   ○ 1 ○ 2 ○ 3 ○ 4 ○ 5

2. Urban parks are important for enhancing public health.

   ○ 1 ○ 2 ○ 3 ○ 4 ○ 5

3. Green spaces have been more important to me after Covid-19

   ○ 1 ○ 2 ○ 3 ○ 4 ○ 5

4. I believe the amount of green spaces must be increased in Abuja.

   ○ 1 ○ 2 ○ 3 ○ 4 ○ 5

5. What activities do you prefer doing in urban parks? (Please mark at most 3 options in order of importance).
   ☐ Socializing with relatives and friends
   ☐ Enjoying nature
   ☐ Walking
   ☐ Sport activities
   ☐ Taking child out
   ☐ Other _____

6. What is your opinion about the green spaces in Abuja? (Please mark at most 3 options in order of importance).
   ☐ Maintenance is not sufficient
   ☐ Urban furniture is insufficient
   ☐ Children play area, resting area, sports field etc. is insufficient
   ☐ Vegetation is insufficient
   ☐ All
   ☐ I find it well-kept and useful

Ethical Committee Approval

YAKIN DOĞU ÜNİVERSİTESİ

BİLİMSEL ARAŞTIRMALAR ETİK KURULU

01.02.2023

Dear Faith Danjuma

Your application titled **"Examining the effect of covid-19 pandemic regarding the use of urban green spaces in Abuja, Nigeria"** with the application number NEU/AS/2023/180 has been evaluated by the Scientific Research Ethics Committee and granted approval. You can start your research on the condition that you will abide by the information provided in your application form.

Prof. Dr. Aşkın KİRAZ

Coordinator of the Scientific Research Ethics Committee