

## Adults' Motives for Visiting Urban Green Open Spaces in a Sub-Sahara African City

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### Abstract

This study investigated the factors that influence the use of urban green open spaces by the elderly population in Enugu urban, south-east Nigeria. The data were derived from a survey of 275 respondents ages 60 and older. The questionnaire method was used to elicit both qualitative and quantitative data. Principal component analysis and multiple linear regression were also used to analyse the findings. The study revealed accessibility/spatial attributes, psychological factors, health benefits, naturalness/environmental, social integration, park attributes, and user personal factors as the significant factors that drive the usage of green open spaces by the elderly in Enugu. This finding provides the platform for urban planners to create elder-friendly green open spaces that will encourage the ageing population to have a sense of social and community ties, as well as improve the reliability of the planning and development of green open spaces in African cities.

**Keywords:** Green spaces; elderly; inactive

### Introduction

The health consequences of an inactive lifestyle for urban dwellers, especially the elderly, have remained a fundamental health issue. It has become obvious that urban residents have sedentary lifestyles with decreased physical and body activities. This has resulted in health challenges. In some sub-Saharan African countries, statistics show that there is a rise in the number of overweight and obese people in urban areas (Ward et al., 2018), and this has been attributed to the sedentary lifestyle noticed in city residents, mainly across the elderly community. (Tam, 2007; Barreto et al., 2021; Yang et al., 2023). However, in this spirit of environmental development, various prevention strategies have been proposed in order to minimise and reduce the increasing public health issues among urban residents. One of these measures is dwelling in a viable urban green space, since this will encourage urban dwellers (mainly the elderly) to be more physically active (Kaczynski et al., 2015; Tinsley et al., 2018; Matiza & Slabbert, 2020). Visiting green open spaces has been proposed to be a veritable measure to reduce some sedentary lifestyle-associated health challenges seen among the elderly, thus encouraging physical activities, providing leisure resources, and reducing exposure to environmental hazards (Wang et al., 2022a). More so, most fields of study have focused on providing much study on the psychological and social needs of the elderly. (Sugiyama & Thompson, 2007; Chaudhury et al., 2012). Even the town planners tend to place emphasis on the elderly in the

built environment (Payne et al., 2002). Natural exposure has been associated with a possible mechanism behind the relationship between health and free space (Maas et al., 2009). It was observed that linear exposure to the outdoor environment has been associated with osteoporosis, obesity, and mental and heart disease (Eklom et al., 2009; Nawrath et al., 2019). Dipeolu et al. (2021a) have noted that green open spaces have been observed to be cited for curative contacts with nature. Green open spaces have been described as areas where residents can improve their physical and mental health through engaging in physical activities (Wang et al., 2022b). Urban residents have become healthier due to activities in most urban green spaces. Reductions in poor health, cardiovascular diseases, poor mental health, and overweight in New Zealand have been attributed to green spaces through physical activities (Levy-Storms et al., 2018).

Following the import of these open spaces to humans, the United Nations (2017) General Assembly posited that the development of open spaces is an integral part of the Habitat III agenda, and this was targeted at enhancing the wellbeing and health of urban residents in the 21st century as well as contributing to the achievement of sustainable development goals (SDG). (Ko & Lee, 2021). Nigeria, one of the most developing countries in the sub-Saharan region of Africa, is experiencing rapid urbanisation and industrialization. Her populations are ageing even though this trend has been taking place globally but seem more rapidly in urban areas of developing countries around the world (Lin et al., 2012). In Enugu, Nigeria, for example, the percentage of the elderly population has reached 32% (NPC, 2007), and the number is still increasing. Nigeria is expected to become a super-aged society by 2030 since it is projected that over 23% of her population will be older than 65 years old then. (NPC, 2007). The need to therefore extend and maintain older adults' life expectancy ratio is worthwhile, and urban green open spaces provide elderly residents with easy access to nature. The usage and availability of outdoor spaces within these elderly communities play a vital role in enhancing active ageing and social interaction among the elderly. Studies have shown that in the designing and planning of open spaces, attention is always focused on the mortality requirements and safety of this elderly population (Yang et al., 2023) but there seems to be few researchers that focus on the drivers of these elderly residents to use these green open spaces. These green open spaces provide the aged community in society with a place for social and interpersonal interactions as well as improve their active ageing longevity. Plouffe and Kalache (2010) submitted that they enhance active living, physical active lifestyles, and social integration, all of which promote successful aging. Various studies have, however, x-rayed the key characteristics that drive urban residents to use urban green open spaces. The influencing factors include safety concern (Zhao & Chung, 2017; Linda & Nzama; 2020, Hisau, 2022), quality of vegetation (Zhang et al., 2022), accessibility (Wang et al., 2021; Dallimer et al., 2014), street connectivity (Zhang et al., 2015; Ubani et. al., 2023) amongst others. Other identified factors from studies that have influence on visits to UGOS are related to visitors' socioeconomic characteristics (Dipeolu et. al., 2021b; Wang et al., 2019; Shan, 2014; Schipperijin et al., 2013). Most existing studies have focused on urban areas in western nations of the world.

The rate of industrialization and urbanisation in Nigeria over the past 20 years has indeed necessitated the development of many organised public open spaces, mainly in densely populated areas like Enugu urban. Studies have been on the use of open spaces and the factors that drive their use, but concentration has been primarily in western cities, which have different city structures and morphologies from those of sub-Saharan African cities. The obvious cultural, security, and city morphological differences between western societies and Africans will not make the findings and recommendations for western cities valid for urban cities in Nigeria. Only very few studies have x-rayed the use of public opinions in Africa (Uzonnah et

al., 2023; Nwankwo, 2016). A knowledge gap exists in terms of the factors that drive visits to green open spaces by the elderly in the sub-Saharan region and specifically in emerging cities in Nigeria. The study filled the gap by analysing the determinants that influence elders' visits to green open spaces in Enugu urban, southeast Nigeria. The objective of the study was to determine the predominant factors that drive visits to green open spaces by the older adults in Enugu urban, in the southeast region of Nigeria. The study is valuable in revealing the best approach to considering urban open space design and planning criteria for adult usage in most African countries, as well as appreciating the contributions of organised open spaces to the sustainability of the built environment.

## **Theoretical framework**

### ***Green urbanism***

Green Urbanism is a guiding concept for policies and projects that aim to create a new urban vision based on preserving the urban environment naturally. The essence and principle of this concept are associated essentially with creating and maintaining urban green areas and spaces as essential parts of the environmental landscape. Green urbanism, according to Jim et al. (2003), can be described as the act of providing communities that benefit human well-being as well as the wider natural and physical environment. In this term, “green” means a healthy or sustainable environment, while “urbanism” refers to the practice and art of creating new urban settlements and areas. The concept of green urbanism started to develop slowly in developed countries as early as the 1980s, especially in some towns in Britain and the United States. Many more urban areas around the globe started adopting these principles in the early 1990s. Green urbanism encourages the use of green building processes, principles, and technologies at the neighbourhood scale, connecting buildings, natural systems, and infrastructure (Wolch et al., 2005). Key bedrocks that underpin green urbanism involve creating cities that promote more robust, healthy, and sustainable lifestyles, developing urban areas that mimic nature's functionality, and designing towns that operate within their ecological limits. Central to actualizing these aims is the conservation of urban green areas and vegetation. Therefore, the integration of urban natural vegetation such as forests, parks, green roofs, gardens, and urban trees into the urban landscape is recommended to reduce issues like the environmental heat island effect and other harsh and unfriendly environmental challenges (Maas et al., 2009). The Green Urbanism Theory strongly advocates for the inclusion of green urban spaces in an urban area's physical fabric as a way to preserve the urban environment. In conclusion, this theory emphasizes the importance of urban green spaces in the literature on environmental sustainability, highlighting that these green open spaces offer environmental, social, and economic benefits to meet the aged communities' needs while protecting the urban natural vegetation and environment for future generations. It is pertinent to stress that these benefits underscore the core concept of environmental sustainability, making it important to focus on green spaces and their role in environmental sustainability.

### **Literature review**

Elders' motivations and preferences for visiting green spaces are multifaceted. A study by Tinsley et al. (2022) using 59 elderly participants who regularly visited 12 urban parks in Bradford, United Kingdom, identified several common motivations, including relaxation, exercise, socialising, and connection with nature. These motivations were shared by participants across different genders and ethnic backgrounds. The study also identified some barriers and facilitators for park use, such as accessibility, safety, cleanliness, facilities, biodiversity, and personal preferences. These factors varied depending on the individual characteristics and circumstances of the participants. Studies done by Potwarka et al. (2008),



Yildiz et al., (2023), and Gaikward and Shinde (2019) posited that different types of benefits were valued by different groups of users. For example, women tended to value more the social, emotional, and aesthetic benefits of green spaces, such as meeting friends, reducing stress, and enjoying nature. On the other hand, men tended to value more the physical and functional benefits of green spaces, such as exercising, playing sports, and accessing facilities. In the same vein, the presence of amenities such as benches, shade, and cleanliness were important factors influencing users' preferences (Wells & Lekies, 2006). Table 1, however gave a concise revelation of the identified factors that cause urban dwellers to visit urban open spaces across their localities. The cities/countries where the studies were done is noted in Table 1.

Table 1: Identified factors that drove residents' visit to green open spaces

|    | Identified Factors                 | References  | Cities/Countries                 | Methodology  |
|----|------------------------------------|---|----------------------------------|--|
| 1  | Cooling shade                      | Wang et. al (2021)  | Australia                        | Quantitative/survey  |
| 2  | Breeze                             | Dallimer et al (2014)   | Schffield, England               | Questionnaire/survey   |
| 3  | Quality of vegetation and facility | Zhang et al (2013), La Rosa (2014)                                | Shanghai                         | Survey design  |
| 4  | Adequacy of facility               | Wolch et al (2014), Holman et al (1996), Sugiyema (2007)          | Los Angeles                      | Regression model   |
| 5  | Accessibility                      | La Rosa (2014), Giles-Corti et al (2015)                          | America                          | ANOVA, cross sectional   |
| 6  | Safety concerns                    | Uzonnah, et al. (2023)  | Nigeria                          | Logistic regression/survey                                       |
| 7  | Maintenance and management         | Schetke et al (2016) & Wang et al (2021)                          | China                            | Mixed cross-sectional analysis                                   |
| 8  | Rest                               | Chiesura. (2004), Comber et al (2008)                             | Amsterdam, Netherlands           | Survey Design  |
| 9  | Reduced stress                     | Zhang et al (2015). La Rosa (2014)                                | Shanghai                         | Quantitative/survey  |
| 10 | Proximity to home                  | La Rosa 2014, Giles-Corti 2005,                                   | America                          | Questionnaire/survey   |
| 11 | Greenery                           | Wang et al (2022b). Schule et al. (2016)                          | China                            | Survey design  |
| 12 | Calmness                           | Dipeolu et al (2020)  | Nigeria                          | Survey design/correlation analysis                               |
| 13 | Aesthetics                         | Madureira et al (2018)  | Portugal                         |  |
| 14 | Size of park                       | Giles Corti (2005) Wang et 2015, Schipperijn et al (2013)         | China. /England                  | Environmental scanning   |
| 15 | Attitude towards nature            | Schipperijn et al (2013)  | Denmark                          | Survey design/association  |
| 16 | Location                           | Kaczynski, et al (2009), La Rosa (2014), Giles-Corti et al (2015) | Catania, South Italy             | Survey design/Correlation  |
| 17 | Design of park                     | Koohsari, et al (2013)  | Melbourne, Australia             | Space Syntax, GIS  |
| 18 | Pollution control                  | Payne et al (2002)  | Ohio                             | Computer-assisted telephone interview                            |
| 19 | Promote wellbeing/longevity        | Sugiyama & Thompson (2007)  | England                          | Review of literature   |
| 20 | Enhance successful aging           | Sugiyama & Thompson (2007), Levy Storms (2018)                    | England                          | Review of literature   |
| 21 | Thermal comfort/sensation          | Sugiyama and Thompson (2007) Lin et al (2012)                     | Taiwan                           | Onsite investigation/microclimate parameters                     |
| 22 | Public facilities around           | Chen & Jim (2016), Wen et al (2018)                               | South China                      | Questionnaire/logic regression model                             |
| 23 | Connectivity of roads to           | koohsari et al (2015),  |                                  | On Site observation/quantitative analysis                        |
| 24 | Social integration                 | Schipperijn et al (2013), Wen et al (2022)                        | Denmark                          | Survey design/association  |
| 25 | Meditation/ spiritual              | Chaudhry et al 2012   | Vancouver, British, and Columbia | Survey design and photo voice                                    |
| 26 | Recreation                         | Schuppe, et al. (2016).   | China                            | Questionnaire  |
| 27 | Mental peace                       | Kaczynski, et al (2015)   | America                          | Observational data/Logistic regression                           |
| 28 | Good atmosphere                    | Cohen et al (2006)  | USA                              | Cross sectional study  |
| 29 | Protection of environment          | Cohen et al (2006). Mitchell and Popham, (2008)                   | USA                              | Cross sectional study  |
| 30 | Oxygen generation                  | Yang. et al (2023)  | Guangzhou, China                 | Quantitative analysis  |
| 31 | Reducing of global warning         | Yung et al (2016)   | Hong Kong                        | Quantitative analysis, On Site observation/quantitative analysis |
| 32 | Biodiversity                       | Mowen et al (2005)  | Ohio                             | Telephone survey   |

Source: Author's literature compilation

Further studies have discovered a significant positive relationship between specific green space features among the respondents, such as benches, shade, cleanliness, water features, wildlife, flowers, trees, playgrounds, sports facilities, paths, and their usage of open green space. Studies done by Cerin et al. (2017), Schetke et al. (2016) and Wang et al. (2021) found the most common motivations for visiting green spaces to be accessibility, maintenance, and amenities. Other features included diversity of vegetation, wildlife, water features, and safety. The study found that the most reported benefits of visiting green spaces by the elderly population were

improved mood, reduced stress, increased physical activity, and enhanced social interaction. Other benefits included improved mental health, well-being, and quality of life. Some other studies considered factors that discourage the elderly from visiting green spaces, such as weather, lack of time, distance, and personal factors. Other barriers included lack of facilities, safety issues, and environmental problems. Most of these identified factors that drove residents to use urban open spaces were actually found from studies done in western countries which had different cultural and morphological context from that most sub-Sahara African countries and cities. These studies were dominated by findings from America and Asia countries and there is large variation in the city structures of these countries with that of Africans, thus their recommendations for these findings are not automatically valid for sub-Sahara African country, Nigeria inclusive.

### **Case study area**

Enugu is the capital of Enugu State. It is located in the south-eastern geopolitical region of Nigeria. Enugu City is located between  $06^{\circ}21'0''N$  and  $06^{\circ}30'$  latitude and between longitude  $07^{\circ}26' E$  and  $07^{\circ}37' E$ . The land area of the city is estimated at about 72.8 square kilometers. The study area has many organised and unorganised green open spaces that are primarily used for recreation. The unorganised ones mostly function during festive periods and are incidental. The organised public parks that provide recreational opportunities, aesthetic value, and environmental benefits include Michael Okpara Square, Polo Park, Nnamdi Azikiwe Stadium Park, Unity Park, Nnaji Park, Brifinna Garden, Nike Lake Resort Park, Overcomer Garden, Ngwo Pine Garden, and New Berry Park. These parks offer facilities such as playgrounds, fountains, sculptures, lawns, trees, flowers, benches, etc. They also host events such as cultural festivals, concerts, and sports.

### **Methodology**

The research design adapted in the study is a cross-sectional survey. The choice of this research design was due to the objective of the study and the nature of the subject matter being investigated. The human population included the elderly population aged 60 years and older. The retirement age for civil servants in Nigeria is 60 years (NCC, 2007), and this age was adopted in the study as a benchmark for considering the elderly. This is similar to the studies done by Yang et al., (2023), Plouffe and Kalache, (2010). The other non-human population in the study was comprised of the UGOS within the core area of Enugu Urban. The selected UGOS for the study area were: Utility Park, Ngwo Park, Nnaji Park, Nike Lake Resort Centre, and Overcomer Tourist Garden. Entry into all these parks is free for visitors, except for the utility park, which collects 100 naira per visitor. The management of these parks does not keep records of those who visit them. Due to the fact that records of visitors are not kept, it was not realistic to use probability sampling techniques in the study; instead, purposive sampling techniques were used to determine the elderly participants, who were the target respondents in the study. This method was similarly used by Yang et al. (2023) and Loh (2014). A pilot survey was conducted for on-site observations of visitors to these open spaces. Furthermore, since the study is elderly-specific, the pilot survey equally helped the researchers to know the parks that served the elderly population since youths and children were the predominant visitors to green open spaces (Ubani et al., 2023). The pilot survey helped the researchers ensure that the users of the parks have comparable standards of assessment. An approximate 300 elders were interviewed, and questionnaires were administered to them.

The questionnaire method, according to Cooper and Schindler (2006), is considered the best measure to understand the preferences of a large population. Beside this, the questionnaire method affords respondents the time to articulate their answers adequately (Mitra & Lankford,



1999). The study was carried out between May 2021 and August 2022. Even though the sample size of 300 was not statistically determined, we observed that the number of visitors in the parks did not vary appreciably after this point, thus indicating that the responses we used were quite representative of the majority of elders that visit the park. The survey was conducted by the researchers and the employed research assistants, and 300 copies of questionnaires were administered. Unity Park (n = 30), Nnaji Park (n =30), Nike Resort (n = 32), Ngwo Park (n = 30), and Overcomers Tourist Garden (n =28) However, similar studies by researchers used a lower number of respondents to study visitors' perceptions, and they used it for their conclusions and inferences. For example, Li (2023) used 250 visitors for the study in Delhi, D'Sonza and Nagenda (2011) conducted interviews for 23 visitors while Krenichyn (2006) and Turker et al. (2007) interviewed 41 and 82 park visitors respectively. Research assistants were engaged in the counting and administration of the questionnaires in each of the open spaces on weekday evenings, weekends, and other times when there were large number of elderly visitors. This survey was conducted on weekdays and every 20 minutes between 10 a.m. and 1 p.m. on weekdays and 6 a.m. and 1 p.m. on weekends. This was in line with the methods adopted by Wang et al. (2022) and Lak et al. (2020a). The questionnaire was administered face-to-face to ensure that sampling across the elderly visitors represented different professional backgrounds, educations, and genders. The questions in the questionnaire have responses that were either closed choices or open in ranking scale. A 4-point Likert scale was used to ascertain the factors that drive visitors to use the park. Responses seeking degrees of agreement were posed to respondents', namely: extremely important (4), important (3), unimportant (2) and extremely unimportant (1). The choice of this 4-point Likert scale instead of the normal 3 or 5-point scale was to ensure that participants gave definite answers and avoided fake answers. (Clinton and Thwala, 2012). The questionnaires were first of all pre-administered to a few elderly visitors before being administered in all 5 parks. This questionnaire was administered in English, and the research assistants helped interpret for the illiterate, which were very few. Out of the 300 copies of questionnaires distributed, 294 were properly filled out and used for the study, representing 96.4% success rate. Principal component analysis (PCA) was used to collapse the identified factors that may drive the respondents to use these parks into manageable and fewer factors. The PCA highlights the magnitude of each of the components (factor). This was observed from the percentages, factor loadings, and eigenvalues of each component. The researchers adopted factor loadings of 0.500 and above.

Multiple linear regression (MLR) statistical technique was used to analyse the relationship between the participants' average monthly visit to the parks and the factors that drive visitors to use the parks. The participants' average monthly visit to the parks was the independent variable, while the dependent variable was derived from the PCA aggregated factor scores of the identified factors that drive visitors to use the parks. The use of the PCA aggregated factor score as a dependent variable is similar to the study done by Yechen (2015) and Shafiu et al., (2021). Data processing and analysis for this study were performed using the Statistical Package for Social Sciences (SPSS) 22 for windows for statistical analysis of the quantitative data.

## Results

### *Factors that drive visitors to use the park*

Seven components were extracted using the PCA extraction method. To classify the identified components, the factor loadings were placed on rotations that converged in four iterations, and a properly classified rotated component matrix shown in Table 2 was observed.



Table 2: Exploratory factor analysis of factors that drive visitors to use the park

| Component Names  | Factor Loading | Percentage Variance | Eigenvalue |
|--|----------------|---------------------|------------|
| <b>FACTOR 1: accessibility and spatial attributes of the green open spaces</b> |                | 25.354              | 17.508     |
| ➤ proximity of these spaces to homes   | .841           |                     |            |
| ➤ location of these spaces   | .723           |                     |            |
| ➤ connectivity of roads to these space   | .697           |                     |            |
| ➤ accessibility  | .629           |                     |            |
| <b>FACTOR 2: Psychological/spiritual benefits</b>                              |                | 15.028              | 6.161      |
| ➤ Rest   | .783           |                     |            |
| ➤ Calmness   | .703           |                     |            |
| ➤ mental peace   | .665           |                     |            |
| ➤ Spiritual meditation/retreat   | .507           |                     |            |
| <b>FACTOR 3: health concerns and benefit</b>                                   |                | 10.903              | 4.470      |
| ➤ Reduce stress  | .861           |                     |            |
| ➤ Enhance successful ageing  | .839           |                     |            |
| ➤ Promote well-being longevity   | .675           |                     |            |
| <b>FACTOR 4: Environmental factors</b>   |                | 10.252              | 4.203      |
| ➤ Protection of environment  | .858           |                     |            |
| ➤ Oxygen generation  | .852           |                     |            |
| ➤ Cooling/shade effects  | .813           |                     |            |
| ➤ Breeze   | .714           |                     |            |
| ➤ Coolness   | .694           |                     |            |
| ➤ Aesthetics   | .686           |                     |            |
| ➤ Pollution control  | .609           |                     |            |
| ➤ Reduction in global warning  | .558           |                     |            |
| <b>FACTOR 5: social bonding and social integration</b>                         |                | 7.488               | 3.070      |
| ➤ social integration   | .914           |                     |            |
| ➤ social bonding   | .669           |                     |            |
| ➤ recreation   | .616           |                     |            |
| <b>FACTOR 6: parks attributes factors</b>                                      |                | 6.132               | 2.514      |
| ➤ quality of facilities in the parks   | .900           |                     |            |
| ➤ adequacy of facilities in the parks  | .812           |                     |            |
| ➤ park management and maintenance  | .808           |                     |            |
| ➤ public facilities that surround the open spaces                              | .791           |                     |            |
| ➤ fruits   | .769           |                     |            |
| ➤ design of park   | .751           |                     |            |
| ➤ greenery   | .725           |                     |            |
| ➤ biodiversity   | .687           |                     |            |
| <b>FACTOR 7: personal attributes factors</b>                                   |                | 5.290               | 2.169      |
| ➤ safety concerns  | .923           |                     |            |
| ➤ Comfort  | .891           |                     |            |
| ➤ environmental education  | .690           |                     |            |
| ➤ thermal comfort  | .582           |                     |            |
| <b>TOTAL</b>   |                | 97.796              |            |

Note: Extraction method. PCA

Rotation Method: Varimax with Kaiser Normalization

Source: PCA Analysis Result

The factors that drive adults to use the park were thoroughly examined and categorised into seven distinct components, which collectively accounted for 97.796 percent of the observed variability. However, before subjecting the data to PCA, the dataset was subjected to the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy test and Bartlett's Test of Sphericity. The results revealed that the KMO Measure of Sampling Adequacy was 0.738, which is greater than the recommended minimum value of 0.6, and the Bartlett's Test of Sphericity is significant at 0.001. This result implies that the sampling for the study is adequate and the result of the PCA was robust and reliable.

Each of these components is described in detail in the following paragraphs. The first is accessibility and spatial attributes of the green open spaces, which showed strong positive loadings with various factors, including proximity of these spaces to homes (0.841), location of these spaces (0.723), connectivity of roads to these spaces (0.697), and accessibility (0.629). Collectively, these factors account for 25.354% of the observed factors that drive elderly visitors to use the park, and thus, they stand out as a prominent factor among the participants sampled in the study areas. The second component, which explains about 15.028% of the

variance among the 33 variables listed in Table 2 and investigated in this research, is psychological and spiritual benefits. It is loaded with factors such as spiritual meditation/retreat (0.507), mental peace (.665), and rest (0.783). The third component identified is health concerns and benefits, accounting for about 10.903% of the variance in the 33 variables investigated. The three factors loaded on this are reduced stress (0.816), enhanced successful ageing, and promotion of well-being and longevity (0.675). This third factor has an eigenvalue of 4.470. Environmental attributes, which include protection of the environment, oxygen generation, cooling/shade effects, breath, coolness, aesthetics, pollution control, and reduction in global warming, contributed 10.252% to the factor that drives elderly visitors to use the green open spaces in Enugu. The study noted equally that social integration was the fifth predominant factor that moved the elderly population to use the green spaces in the study area. This accounts for 7.488% of the motivating factors that cause the elderly to visit parks in Enugu. A lot of the participants were seen to come in groups. The second least common factor that moves the elderly in Enugu to visit the green open space is the park attribute factor. It contributes about 6.132% of the aggregate motivating factor. The quality of facilities in the parks (.900), adequacy of facilities in the parks (.812), park management and maintenance (.808), and public facilities that surround the open spaces (.791) were among the leading variables in this factor. The personal attribute factor was the least common (5.2%) factor that motivates the elderly to visit open spaces in the study area. This suggests that this attribute, which includes safety, comfort, and thermal comfort, is the least on the participants' scale of preference for visiting open spaces in Enugu urban.

In summary, these seven components, namely accessibility and spatial attributes of the green open spaces (25.35%), psychological and spiritual benefits (15.02%), health concerns and benefits (10.903%), environmental factors (10.252%), social bonding and social integration (7.488%), park attributes (6.132%), and personal attributes (5.290%), collectively explain a substantial portion of the factors that motivate the elderly to visit open spaces in the study area. With their high factor loadings, these components comprehensively account for 97.796% of the observed variance in the 32 variables investigated.

Multiple linear regression (MLR) was further used to analyse the relationship between the number of monthly visits to the open spaces by the participants and the seven factors derived from the PCA results. The summation of the factor scores of these seven factors was done, and these represented the dependent variable. This was similar to the study done by Yechen (2015) and Shafiu et al. (2021). The study revealed that a significant relationship exists between the seven factors and the number of visits to these open spaces by participants. The MLR results shows that the model analysis has  $R^2$  value of 0.909, P-sig 0.000 at 0.001 significant level.

Table 3: Shows the significant effect of each of the exploratory factors

|                                      | B      | Sig  | Remarks            |
|--------------------------------------|--------|------|--------------------|
| (Constant)                           | -1.080 | .286 |                    |
| psychological/spiritual              | 3.682  | .030 | <b>Significant</b> |
| Park attributes                      | 4.943  | .001 | <b>Significant</b> |
| Health                               | 4.097  | .002 | <b>Significant</b> |
| Personal attribute                   | 3.974  | .012 | <b>Significant</b> |
| accessibility and spatial attributes | 7.034  | .000 | <b>Significant</b> |
| Environmental factors                | 2.079  | .042 | <b>Significant</b> |
| Social integration                   | 2.430  | .025 | <b>Significant</b> |

Source: Coefficient table of MLR

## Discussion

The studies determine the drivers that make the effort to visit open spaces in the sub-urban city. The results help to better plan and design UGS that will attract the elderly community and



encourage them to regularly visit GOS in cities in the global south. The study aimed to identify the factors that motivate the elderly community in Enugu to visit green open spaces. Some of the major findings in this study have been indicated and are further discussed. Firstly, it was observed that accessibility and spatial attributes of the green open spaces were the most important factors that drove the elderly to these parks in the study area. This accessibility factor, which involves the proximity of these spaces to homes, the location of these spaces, and the connectivity of roads to these spaces, had a significant influence on the visit of these open green spaces by the elders, as seen from the PCA result. These results lend credence to the findings of Lak et al. (2020b). They posited in their study that elderly people tend to prefer having pleasure within their locality instead of moving to a distant city with green open spaces. This is well expected since most elders would not want to travel very far from their homes. Moreso, the African traditional and cultural belief that elders do not leave their homes to distant areas was one of the likely reasons that would make this aged community not prefer further green open spaces.

Furthermore, studies have shown that accessibility is an essential aspect that affects attendance at public facilities. Mowen et al. (2005) further observed that spatial accessibility to parks affects the ease with which facilities can be reached. Their study noted that street integration factors were significant in driving elders to visit these open spaces. The challenge of crossing the streets and roads, which tend to be risky, can be a matter, especially for those with low mobility (Kaczynski et al., 2014). Further studies by Cohen et al. (2006), and Wang et al. (2019) have collaborated on the finding that older people are quite reluctant to travel longer distances. A similar study by Lo and Jim (2010), found that less mobile retired people were not willing to travel longer to visit parks. The study showed that most visitors to these parks live very close to the parks, as we noticed that there was a decrease in the number of daily elderly visitors to these parks with an increase in distance to the parks. These findings collaborate with the research done by Schipperijn et al. (2013) in Denmark and that of Roovers et al. (2002) in Belgium. It was further noted that proximity to home was noted in the study to be a significant factor associated with visits to green open spaces by elders in the study area. Aside from the views of Payne et al. (2002), who submitted that shorter distances to open spaces were quite critical for establishing a stronger user base, the study area had been experiencing insecurity and cases of kidnapping. This could be the reason why the elderly does not want to be far from their homes. The study by Zhang et al. (2015) has also posited that security and safety are critical considerations in the use of open spaces by urban residents. Although the findings of this study are in sync with the findings of Giles-Certi and Donovan (2002), Kooshari et al. (2015), and La Rosa (2014), where in their studies they observed that a positive relationship existed between frequency of visits to open spaces and nearness to home, the study by Rigolon et al. (2018) was on the contrary, where they found that distance to home was not associated with visits to green open spaces.

Psychological benefits were also noted as the second most important factor that drives elders to visit open spaces in Enugu urban. It was noted that the need for rest, calmness, and spiritual meditation was one of the psychological benefits of visiting these spaces. The quiet mood and the notices from elders reading some books were worth noting. A comment made by one of the elders sampled was "I am here to meditate and commune with my maker since I am going soon to meet him". Culturally, the elderly population in most African settings will always think of the world beyond. Budruk et al. (2009), in their study in Delhi, India, submitted that visitors to valued parks visit them for psychological benefits. Other studies that collaborated on this were done by Kooshari et al. (2015), Mosia et. al. (2022) and Chaudhry et al. (2011). It was noted by Officha (2017) that every Nigerian elder is thinking home – world beyond

Another factor that drives the elderly to visit green open spaces is health concerns and benefit. Respondents generally stated that their visit to these green spaces reduces stress, enhances successful ageing, and prolongs well-being and longevity. These elders seem to have some basic knowledge concerning the significant role that visits to space have in their health configuration. This study agrees with the findings that asserted that well maintained public open spaces can enhance older adults' mental health and physical well-being (Yung et al., 2016; Alves, 2008; Tuckett et al., 2018 and Levy Storms et al., 2020;). Mental fatigue, obesity, depression, and osteoporosis have been associated with lower exposure to the open space environment. This was posited by studies done by Ujang et al., (2015) and Mitchell and Popham (2008). Most of the elders found in the open spaces were involved in the trekking and walking around in the park. They confess that it reduces their stress. Hence, the creation of elder-friendly open spaces in Enugu can help the elderly live a healthy and active life and thus experience an acceptable quality of life. This study evidently gives ground for supporting policies that determine elderly-friendly open spaces. However, it was observed that the elderly in the study area do not engage in some physical activities that may make them fall down. Consistent with our findings, Boccardi (2019) and Fuller (2005) stated that the elderly does not likely engage in activities that may be used to control body posture due to risk prediction and the dangers of falling.

The need to conserve, protect, and preserve nature and the environment was noted to be an important factor for these elderlies to visit these open spaces. These variables were positively significant as a motivating factor that drives the elder to visit open spaces in Enugu, as noticed in the PCA result. The study noted that the need to control pollution and the import of biodiversity preservation of nature and green areas were among the environmental essences of these visits by this age group. Furthermore, environmental effects like breeze, shades, coolness, and aesthetics were other major reasons why the elderly visited the open space. This finding was contrary to a study in Cleveland where Payne et al. (2002) posited that older people are more interested in recreation than conservation. It was further noted that many of these visitors had an innate flare for the environment since they reported that they all had gardens and green areas in their homes. The pro-environmental attributes of the respondents were further reported by similar studies done by Dipeolu et al. (2020) and Lak et al. (2020b), where they found that there was a strong association between environmental conservation and the use of open spaces by the elderly population.

The study further found that visits to open green spaces are associated with and significant with social integration among elders in Enugu. It was observed that social binding and social integration were factors that motivated visits to the study area. This integration increases the tendency for informal face-to-face interaction with friends and age mates (Lak et al., 2020a). These findings sync with the studies by (Zhang et al., 2022), where they posited that elderly visit green open spaces for more neighbourly activities as well as close relationships with neighbours and friends. This strengthens the sense of community among the elderly population. Consistent with these findings, Boccardi (2019) and Cohen et al. (2006) stated that open green spaces are used primarily for socialising and recreation. The sampled parks were frequently visited by the elderly during the period of this study. This validates the position of Chaudhary et al. (2012) that the elderly is an important group of users of open spaces. He alluded to the fact that their gatherings were for social interaction, which aids in their physical health and mental well-being. The social gatherings and interactions among these elderly helps them remain active in their social lives. This understanding by landscape architects and planners will aid in planning and designing green open spaces that will be elderly friendly, thus encouraging increased use of these green spaces.

The quality and adequacy of facilities in the parks, the nature of park management and maintenance, and the kind of public facilities that surround the open spaces were noted from the study to be associated with the use of these spaces by the elderly that visited the area, even though these park attributes factored among the less positive significant motivators to open space visits. This finding supports the previous work done by Wolch et al. (2005), Kaczynski et al. (2014) and Wen et al. (2022), where they posited that the availability of public facilities in and around open spaces is significantly associated with visits to green open spaces. Furthermore, Chen et al. (2016b) and Cerin et al. (2017) submitted that the presence of facilities around open spaces has the tendency to propel open space visitors to the area after visiting public facilities like markets, banks, schools, or shopping centres, as previous studies have reported (Wen et al., 2018). However, while the use of fitness facilities like gymnasiums propels youths to use open spaces (Ubani et al., 2023), this is not the case in this study since the elderly population was not observed using any fitness facilities in the study area.

Finally, the study noted equally that some personal attributes like safety concerns, environmental education, and thermal comfort were among the factors that stirred up visits to these open spaces by the elderly in the study area. This finding is in line with a previous study by Chippendale and Boltz (2015), where they submitted that thermal comfort and safety are crucial in determining visits to open spaces. It was noticed that the sampled open spaces had park rules and organised security personnel; this made the visitors feel safe. This is in sync with the findings of Rahman and Tucker et al. (2007), who found that park visitors' security is significantly related to their frequency of visit to the park.

### **Policy implication**

The results of the study can contribute to informing designers and managers of green open spaces on the predominant factors and drivers in the design and planning of open spaces that would encourage the elderly to visit such areas. The design of such open spaces would improve their mental, psychological, social, and physical well-being. The outcome of this study provides a non-physical intervention in the provision of a balanced and quality urban environment that encourages and provides well-being and longevity for the elderly and gives them a sense of belonging and preferences. The implication of the study is that planning authorities and open space managers should consider locating open spaces in areas that are not only accessible to homes but also close to public facilities; this would be ideal and more attractive to the elderly. Even in this era of social networking in a virtual environment, elderly-friendly open spaces that will make elders leave their homes are sought. One limitation of this study is the small number of respondents used. An increased sample size may yield more robust findings. Again, the views of these elders could be precautionous and prone to change with time, season, and circumstance. A stretched research over years would suffice for more reliable and dependable findings.

### **Conclusion**

We found major motivating factors that drive the elderly to visit urban open green spaces in Enugu urban, south-east Nigeria; they include accessibility/spatial attributes, psychological factors, health benefits, naturalness/environmental, social integration, park attributes, as well as users' personal factors. This study contributed significantly to addressing the yawning needs of the elderly and providing the platform for urban planners and architects to create elderly-friendly green open spaces that will encourage the ageing population with a sense of safety and foster social and community ties. The inclusion of these factors in the design of open green spaces would offer health-promoting activities that will promote the physical health and mental well-being of the elderly in Nigeria. The conclusion of this research forms the basis for filling

the knowledge gap in green space design, urban design, and landscape architecture. The findings will aid policymakers in comprehending the vital motives of potential elderly visitors to green open spaces and other factors that influence their visits to these spaces. The knowledge of these factors improves the reliability of the planning and development of urban open spaces in Nigeria and other sub-Saharan African cities. It is obvious that an elder-friendly urban green open space can result in reduced medical and social costs as well as a reduced economic burden on the government.

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