Urban Forestry and Its Impact on the Health of Residents of Covenant University, Ota, Ogun State

To cite this article: O. T. Omotoye *et al* 2022 *IOP Conf. Ser.: Earth Environ. Sci.* **1054** 012036

View the article online for updates and enhancements.

Urban Forestry and Its Impact on the Health of Residents of Covenant University, Ota, Ogun State

O. T. Omotoye, E. B. Aduwo[*], P. O. Okunlola and T. O. Anjorin

Department of Architecture, KM 10 Idiroko Road, Covenant University, Ota, Ogun State, Nigeria.

[*]Corresponding author's email: egidario.aduwo@covenantuniversity.edu.ng

Abstract. In every environment, the presence or lack of urban forests impacts the built environment. Urban forestry, a branch of Urban Green Infrastructure (UGI), refers to an urban framework in which individual trees and tree populations in urban settlements are cared for and also managed to promote the health and well-being of the occupants of the urban settlements. Urban forestry strongly posits that trees are an integral part of the urban setting. The urban forest is an urban green infrastructure system that largely contributes to multiple service sectors and functions in urban environments. Although the environmental advantages of urban forests have been realised, the essentiality of urban forests in learning environments and educational communities alike, few have been largely neglected in existing research. Therefore, this research paper aims to investigate the impact of urban forests on the mental health of residents of Covenant University, Ota, Nigeria. Data for this research was collected through the use of structured questionnaires and field observation. The data collected was analysed through the use of the IBM Statistical Package for the Social Sciences (SPSS). The results obtained from the analysis of collected data explicitly highlights the effects of urban forests in learning environments and their positive impact, on the mental health and overall wellbeing of the residents of the university community. This research endeavour recommended that more urban forests should be planned and put in place within built up environments to improve the stability of the eco-system and the overall wellbeing of the residents of that urban environment.

Keywords: Health, Residents, Urban forestry

1. Introduction

The provision of ecosystem services like clean air, natural pollination of crops and other services, by urban green infrastructure proponents is gaining traction as a source of numerous well-being advantages. Urban Green Infrastructure (UGI) is a linked network of natural areas and all other open areas that act as a conservatory measure for the natural ecosystem values. Urban Green Infrastructure also maintains clean air and water and helps to provide a broad range of benefits to people and animals [**Error! Reference source not found.**].

Trees are needed in the everyday lives of humans. It is believed that the presence of green and nature makes us feel well. Trees and vegetation are very important components of the built and unbuilt environment [**Error! Bookmark not defined.**]. Any community's public trees are important civic assets as they provide both real and subjective advantages for a variety of functions, including pollution control, energy conservation, storm-water mitigation and management, property value, animal habitat, education, and beauty [0]. Citizens, companies, and tourists alike benefit from the aesthetic and environmental advantages of trees on roadways as well as other publicly run assets maintained by public works organizations [0]. Aside from providing shade and beauty, trees provide practical advantages and have a monetary worth that cities are often unaware of [0].

Many people have instinctively understood this for many years, but science and policy are finally catching up. A new study supports the public health objective of urban forestry and natural resource management in general. As a result, the evidence for nature's numerous good effects on human health and well-being is now quite solid. However, research findings are only gradually making their way into policy and practice. Although the environmental advantages of urban forests have been realised, the essentiality of urban forests in learning environments and educational communities alike, have been largely ignored in

existing research. This article explains why this is so, as well as how urban forestry may affect people's mental health in the built environment. Therefore, this research paper aims to investigate the impact of urban forestry on the mental health of residents of Covenant University, Ota, Nigeria. The objectives of this research are to identify the socio-economic characteristics of the respondents, and also investigate the effects of urban forestry on their overall mental health.

The scope of this research, for time-bound purposes, involves the undergraduate student body of the above-stated university community.

2. Literature Review

In recent decades, an international forum in charge of research on urban forestry has formed, with a growing body of knowledge and new approaches and procedures. The structure and the responsibilities of urban forest resources, as well as the policies, planning, and also design policies that impact them are all considered in urban forestry. It became popularised as a field in North America in a bid to the need for improved ways to deal with the increasing vitality of tree-dominated urban greenspace [0]. The phrase "urban forest" refers to any tree-dominated green area in or around a city. This covers forests, other forested terrains, and trees that are not in forests, as long as they are in urban areas. In an urban forestry context, the terms "woodlands" and "woods" are commonly employed to differentiate between larger urban forest products and their constituents [0]. Urban forests can also be referred to as forests that are located in cities and urban areas. Urban forestry is an essential part of the systems of urban green infrastructure. Urban forests utilize relevant trees and vegetation types, rather than just any types of trees that could become invasive and noxious. This helps reduce the need for regular maintenance and also irrigation [0]. Furthermore, native species offer aesthetic appeal while lowering costs. To prevent monocultures, plant diversification should be incorporated in the development of urban forests. This enables the urban forests to remain relevant and robust to pests and other damages [0] .

Throughout the Middle Ages, a good number of European cities were interested in preserving woodland resources as they were used for food, fuelwood, construction wood, and fodder. Within the boundaries, green spaces were commonly used for similar practical reasons, such as agriculture. There was an upsurge in interest in the beautifying and equally, recreational benefits of urban green space throughout the historical periods [0] A new class of wealthy individuals began to take an interest in their local parks and other urban green areas in the 18th and 19th centuries. City governments grew more interested in their green areas throughout the Industrial Revolution, often with the assistance of industrialists. Previously closed-off royal and private parks and domains were restored to the public, and new green spaces were built with an emphasis on active recreation [0]. Over the twentieth century, as urbanization increased the demand for and the pressure on urban green areas, the desire for more structures and the comprehensive management of natural resources grew. Several components of urban green building have traditionally been the purview of several professions. Singular trees along highways and roadsides, for example, had received attention, through shade tree legislation in North America, and had later become the domain of arboriculture [0]. Previously, horticulturists, landscape architects, and park administrators concentrated on inner-city public green spaces like parks. Furthermore, foresters were hesitant to work in towns, preferring to stay on the outskirts, where there were more woods and other natural areas.

Urban trees and other plants help to minimize heat and the effects of the urban heat island effect. This, in turn, has been proven to affect mortality from many causes, but particularly cardiovascular mortality, as well as having a favorable effect on mental health and children's birth weight Second, urban trees and other forms of nature improve 'affect,' or the sensation of feeling emotions. When we interact with nature, we feel inspired, happier, calmer, and more connected to the environment and to other people. It has been discovered that the increased effect has a favorable influence on cardiovascular and other mortality as well as mental health and wellness [0]. Thirdly, Urban forestry can help with energy use as it was discovered that urban trees can provide up to 47% energy savings [0]. Furthermore, it was discovered that the maximum air temperature in tree groves was lower than in open regions without trees. This is due to a phenomenon known as evaporative cooling. Storm-water is diverted from waterways by urban trees, which aids in water management. Trees catch a lot of the rain that falls on them [0].

Trees in cities may assist in decreasing pollution while also increasing property value. Greenery in cities also aids in the promotion of mental health and well-being. The establishment of urban forests has a wide variety of public health consequences. More trees increase property value, indicating that people respect greenery [0]. Urban heat islands are formed as a result of heat condensation produced by materials

and infrastructure. Natural shade structures are provided by urban trees at a fraction of the cost of manufactured shading structures. According to the World Health Organization, they reduce the negative health impacts of rising global temperatures (WHO) [0]. Building new urban forests in existing metropolitan areas creates new labor vocations that do not require a high level of education, which helps to minimize working-class unemployment and benefits society. Green infrastructure in an urbanized area can aid in the restoration and resilience of an ecosystem to natural disturbances and disasters [0].

Nature can help us feel better while we're sick, but it can also improve our overall health and make us less vulnerable to sickness. Furthermore, health should be seen from a broad perspective, as it pertains to our whole well-being, including our meaningful connections with others, rather than just the absence of sickness [0].

3. Research Methodology

The objectives of this research were to identify the socio-economic characteristics of the respondents, and also investigate the effects of urban forestry on their overall health. To accomplish these objectives, a quantitative method of approach was used via survey. This survey was done by administering a structured questionnaire. The research surveys were conducted between August 2021 and September 2021. The study population for the survey extends to all the full-time enrolled undergraduate students of the university community and the sample frame is made up of the full-time enrolled undergraduate students of the university community which is Covenant University, Ota, Nigeria. The sample population for this study involves the undergraduate student body of the above-stated university community. This is ideal for this study because they are an integral part of the university system, they are mostly on university grounds and they have the most structured learning experience. According to the Covenant University Student Database (2021), there are six thousand, five hundred (6500) full-time enrolled undergraduate students in Covenant University, Ota, Nigeria. The students were chosen at random for the study. To calculate the number of questionnaires to be administered, the study adopted the Yamane Equation as the population of the full-time enrolled undergraduate students of the university community. The Yamane formular is given as follows:

$n = N/1 + (e)2$

Where n is the sample size, N represents the population size,

and e refers to the level of precision [0].

For N as 6500, and e as 0.05, the sample size is:

$n = 6500/1 + (0.05)2$ which is $6500/1 + (0.0025)$ which calculated equals approximately 377 questionnaires.

A total of 377 questionnaires were administered and 371 were filled. The questionnaire was divided into three (3) sections; Section A, Section B and Section C. Section A is based on the bio-data of the respondents, Section B covers the effectiveness of urban forests in various aspects and Section C focuses on the overall experience and relation to the academic performance of urban forests. A descriptive method of analysis was used in this research paper to achieve the results.

4. Discussion and Findings

The result gotten from the survey was analyzed using the SPSS method of analysis. The analysis is descriptivein nature. To achieve the objectives of this paper and evaluate the impact of urban forests on the health of undergraduate students in the university community, a statistical analysis was conducted on the data gotten. Out of the 377 questionnaires distributed, 371were returned and considered valid for further analyses. This represents a return rate of 98.4%. Quantitative data was processed and analyzed using descriptive statistical analysis methods using statistical package for the social sciences (SPSS) software. The analyzed data was assessed, arranged and presented using tables, pictures and numbers. Data were analyzed based on the objectives of the research.

4.1. Measurement of the impact of urban forests in the University Environment.

From the reviewed literature, the importance and overall benefits of urban forests have been identified. Therefore, a survey was carried to measure the impact of urban forests in the university environment, in this case, Covenant University, Ota, Ogun state, Nigeria. The results obtained from this survey are presented below.

4.1.1 Section A: Socio-Economic Characteristics Frequency Table.
Section A of the questionnaire assessed and examined the socio-economic characteristics of the users. It, therefore assessed gender, age group, level of study, college of study, number of years spent on the university grounds and Awareness of any of the benefits linked to the presence of the trees and vegetation in the university landscape. Table 4.1 below presents the users' bio-data and the interpretation following the table.

Table 4.1. Socioeconomic Characteristic Frequency Table.

Bio-data	Categories	Frequency	Percent
Gender	Male	188	50.7
	Female	179	48.2
Age group	Under 16 years	19	5.1
	16 years-20 years	78	21.0
	21 years-25 years	118	31.8
	26 years-31 years	132	35.6
	31 years and above	7	1.9
Level of Study	100 Level	77	20.8
	200 level	23	6.2
	300 level	41	11.1
	400 level	93	25.1
	500 level	107	28.8
College of Study	CST	143	38.5
	CBSS	73	19.7
	CLDS	65	17.5
	COE	70	18.9
Number of years spent in the University	Less than a year	15	4.0
	1 year-2 years	101	27.2
	3 years-4 years	122	32.9
	5 years-6 years	81	21.8
	above 6 years	44	11.9
Awareness of any of the benefits linked to the presence of the trees and vegetation in the university landscape	No	75	20.2
	Uncertain	123	33.2
	Yes	145	39.1
The total amount of questionnaire copies shared: 371			

The result in table 4.1 shows the demographic characteristics of the respondents. The result shows that 188 (50.7%) users were male while 179 (48.2%) were female. Based on age group, 19 (5.1%) respondents were below the age of 16. 78 (21%) were between 16-20years, 118 (31.8%) were between 21–25 years, 132 (35.6%) were between 26-31 years, while only 7 respondents were over 31 years of age.

The table also revealed the level of study of the respondents that 77 (20.8%) were in 100 level, 23 (6.2%) were in 200 level, 41 (11.1%) were in 300 level, 93 (25.1%) were in 400 level and 107 (28.8%) were in 500 level. 143 (38.5%) of the respondents were from the college of science and technology, 73(19.7%) were from the college of business and socials sciences, 65 (17.5%) were from the college of leadership and development studies and 70 (18.9%) respondents were from the college of engineering. Majority if the respondents (32.9%) have spent three (3) to four (4) years in the university. 39.1% of the respondents are aware of the benefits of the presence of trees and vegetation in the university environment, 33.2% are uncertain of the benefits and 20.2% of the respondents are not aware of any benefits of urban forests in the university environment.

4.1.2 Section B: Descriptive Analysis of the Effectiveness of Urban Forests on The Health of the Students.

Descriptive statistics were conducted to show the extent to which users felt the impact of trees and vegetation-in the urban environment. Table 4.2 shows the mean scores.

Table 4.2. Descriptive analysis of the impact of urban forests on health.

	Mean	Std. Deviation
Exposure to trees and vegetation-in the university helps me feel better	3.9806	.89701
I prefer spending time in a calm, green, garden than in an enclosed space	4.0431	.88120
The interior plants in the various buildings in the university have a positive impact on the health of users	3.4741	1.02363
Seeing trees and vegetation through windows or openings in the building helps me to relate ~~with~~ to the environment.	3.8447	.92646
Trees and vegetation-in the university help promote social interaction.	3.6442	.97681
The urban forests around me help~~s~~ to make me feel less stressed.	3.8819	.92400
The presence of trees and vegetation-make me feel relaxed and happier	3.4314	.91426

4.1.3 Section C: descriptive analysis of the overall user experience, and relation to the academic performance of urban forests

Table 4.3. Frequency Tables for Overall User Experience in relation to urban forests

Data	Categories	Frequency	Percent
How enjoyable do you find the trees and vegetation in the university?	Not enjoyable at all	20	5.4
	somewhat enjoyable	40	10.8
	Uncertain	72	19.4
	Enjoyable	185	49.9
	Very enjoyable	48	12.9
How serene do you find the overall environment of the university?	Not serene	59	15.9
	Somewhat serene	129	34.8
	Uncertain	170	45.8
	Serene	6	1.6
	Very Serene	0	0
How important do you consider the presence of trees and vegetation in the university community?	Not important	26	7.0
	Somewhat important	82	22.1
	Uncertain	63	17.0
	Important	144	38.8
	Highly important	44	11.9
Do you feel that the presence of trees and vegetation in the university community has impacted your academic performance?	No	75	20.2
	Uncertain	123	33.2
	Yes	145	39.1
	Not effective at all	70	18.9

How effective do you think the trees and vegetation are on your health?	somewhat effective	73	19.7
	Uncertain	65	17.5
	Effective	143	38.5
	Very effective	0	0

Out of all the respondents in the university environment, a total of 49.9% stated that they found the trees and vegetation-in the university quite enjoyable. 45.8% of the students were uncertain about the serenity of the university environment while 34.8% of the respondents found the environment somewhat serene. Only 1.6% of the respondents found the environment serene and No respondents found the environment very serene. 38.8% of the respondents thought that the presence of trees and vegetation-in the university community is very important. 11.9% considered urban forests very important and 7% considered urban forests not important in the university community. 39.1% of the respondents stated that the presence of trees and vegetation in the space has impacted their academic performance. 33.2 % are uncertain of this fact and 20.2% do not think that urban forests are in relation to their academic performance. Finally, 38.5% find the presence of urban forests effective on their health and 18.9% of respondents found the presence of trees and vegetation not effective at all on their health.

4.1.4 Summary. There is a mixed overall experience of the benefits of the presence of trees and vegetation (urban forests) in the university environment.

5. Conclusion and Recommendations

The findings concluded that the presence of trees and vegetation in an environment has an impact on the health and wellbeing of the residents of that environment. Urban environments with planned urban forests tend to give a better user experience. Thus, there is a need for architects and allied professions to consciously consider the introduction of urban forests into urban environments. Proper education about the impacts of urban forests on the ecosystem should be given to design professionals and all other allied professionals in the Built Environment as this will ensure that informed designs and considerations are beingput in place when designing. Also, Architectural professional bodies such as Architects Council of Nigeria (ARCON) and Nigerian Institute of Architects (NIA) should encourage and organize seminars, workshops and courses for the professionals.

5.1. Areas for Further Research

This study covered the concept of urban forestry and its impact on the health of residents in the community. However, it did not cover the impact of urban forests and the benefits of urban forestry on other components of the human experience. Further research can be done on other benefits of urban forestry. This is a starting point for the study of the impact of urban forests in other various community types that have not been covered inthe scope.

6. Acknowledgements

References

[1] Barker, R., Gonzalez, G., Hillman, A., Hyde, G., Veselka, W., Woodcock, P., Vogel, C., Lahaie, J., Cline, K., & Gulick, J. (2011). Urban Forestry Best Management Practices for Public Works Managers: Urban Forest Management Plan. *American Public Works Association*.

[2] Davey Resource Group. (2012). *Urban Forestry Management Plan Ypsilanti , MI*. 1–62.

[3] Faehnle, M., Bäcklund, P., Tyrväinen, L., Niemelä, J., & Yli-Pelkonen, V. (2014). How can residents' experiences inform planning of urban green infrastructure? Case Finland. *Landscape and Urban Planning*, *130*(1), 171–183. https://doi.org/10.1016/j.landurbplan.2014.07.012

[4] Federal Data Strategy. (2020). *2020 Action Plan*. https://strategy.data.gov/action-plan/

[5] Hansen, R., Rall, E., Chapman, E., Rolf, W., Pauleit, S. (2017). *Urban green infrastructure planning guide*. *June*, 1. https://technet.microsoft.com/en-us/library/dd857252.aspx?f=255&MSPPError=-2147217396

[6] Igwenagu, C. (2016). Fundamentals of Research Methodology and Data Collection. *LAP Lambert Academic Publishing*, *June*, 4. https://www.researchgate.net/publication/303381524_Fundamentals_of_research_methodology_and_data_collection

[7] Johnston, M., & Rushton, B. S. (1998). A survey of urban forestry in britain, part i: Aims and method of research. *Arboricultural Journal*, *22*(2), 129–146. https://doi.org/10.1080/03071375.1998.9747200

[8] Konijnendijk, C. C., Ricard, R. M., Kenney, A., & Randrup, T. B. (2006). Defining urban forestry - A comparative perspective of North America and Europe. *Urban Forestry and Urban Greening*, *4*(3–4). https://doi.org/10.1016/j.ufug.2005.11.003

[9] Mell, I. C. (2014). Aligning fragmented planning structures through a green infrastructure approach to urban development in the UK and USA. *Urban Forestry and Urban Greening*, *13*(4), 612–620. https://doi.org/10.1016/j.ufug.2014.07.007

[10] Mossabir, R., Milligan, C., & Froggatt, K. (2021). Therapeutic landscape experiences of everyday geographies within the wider community: A scoping review. *Social Science and Medicine*, *279*, 113980. https://doi.org/10.1016/j.socscimed.2021.113980

[11] Pauleit, S., Ambrose-Oji, B., Andersson, E., Anton, B., Buijs, A., Haase, D., Elands, B., Hansen, R., Kowarik, I., Kronenberg, J., Mattijssen, T., Stahl Olafsson, A., Rall, E., van der Jagt, A. P. N., & Konijnendijk van den Bosch, C. (2019). Advancing urban green infrastructure in Europe: Outcomes and reflections from the GREEN SURGE project. *Urban Forestry and Urban Greening*, *40*(May 2018), 4–16. https://doi.org/10.1016/j.ufug.2018.10.006

[12] Van den Bosch, M., & Bird, W. (2018). *Oxford Textbook of Nature and Public HealthThe role of nature in improving the health of a population: The role of nature in improving the health of a population*. Oxford University Press. https://doi.org/10.1093/med/9780198725916.001.0001

[13] Vargas-Hernández, J. G., & Zdunek-Wielgołaska, J. (2021). Urban green infrastructure as a tool for controlling the resilience of urban sprawl. *Environment, Development and Sustainability*, *23*(2), 1335–1354. https://doi.org/10.1007/s10668-020-00623-2

[14] Wolf, K. L., Lam, S. T., McKeen, J. K., Richardson, G. R. A., Bosch, M. van den, & Bardekjian, A. C. (2020). Urban trees and human health: A scoping review. In *International Journal of Environmental Research and Public Health* (Vol. 17, Issue 12, pp. 1–30). https://doi.org/10.3390/ijerph17124371