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Knowledge and Perception on the Interrelationship between Biodiversity and Human Health in Lagos, Nigeria

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ABSTRACT

As modern society emerged, and the human population condensed into urban areas, industrialization disallowed many people from reliance on direct consumptive interactions with nature. Although, there is mounting empirical evidence that interacting with nature delivers measurable benefits to people. However, contributions from ecologists are few in number, perhaps hindering the identification of key ecological features of the natural environment that deliver human benefits. This study therefore assessed peoples' knowledge and perception on the interrelationship between biodiversity and human health. A mixed method of data collection was used and these include combining data from surveys, document reviews, information from participants and key informants through questionnaire (301) and oral interviews. Result revealed that larger percentage of the respondents were male (71.9%) while 28.1% were female. 51.7% of the respondents strongly agreed and understood the impacts of biodiversity on mental health. This is followed by those that agree (41.3%) to a lower degree. 4.7% of the respondents were not sure. Majority of the people (70.4%) strongly opined that mental health describes the balanced and emotional state of mind; and that it is irrespective of age and social status (71.3% and 22.3%). They further strongly agreed that nature and living things in the environment makes human feels good (70.1%)., a greater part of the respondents strongly agree that exposure to nature have restorative effects (66.4%) and 29.5% agreed with this. 45.1% and 49.2% strongly agreed and agreed respectively that participation in outdoor recreation can lead to mental health improvement. Biodiversity is important and should be conserved for its values and benefits to human health and well-being. Increased understanding of these health benefits may improve public support for conservation.

Keywords: Biodiversity, human health, Lagos, conservation

Throughout history, humans have had an intimate relationship with nature, depending on it for subsistence and production (Fuller *et al.*, 2010). As modern society emerged, and the human population condensed into urban areas, industrialization freed many people from reliance on direct consumptive interactions with nature. Indeed, in post-war society, people-nature interactions have fundamentally shifted from direct consumption and exploitation to more mutualistic relationships in which people actively seek out interactions with nature for recreation and enjoyment (Irvine *et al.*, 2010).

There is mounting empirical evidence that interacting with nature delivers measurable benefits to people (Maas *et al.*, 2006). However, contributions from ecologists are few in number, perhaps hindering

the identification of key ecological features of the natural environment that deliver human benefits. Although many types of benefits have been studied, benefits to physical health, cognitive performance and psychological well-being have received much more attention than the social or spiritual benefits of interacting with nature, despite the potential for important consequences arising from the latter (Keniger *et al.,* 2013). The evidence for most benefits is correlational, and although there are several experimental studies, little as yet is known about the mechanisms that are important for delivering these benefits (Keniger *et al.*, 2013).

Some studies of populations in developed countries have suggested that adults exposed to green space report few symptoms and a lower overall incidence of certain diseases than others, and that the relationship is strongest for mental illnesses such as depression, anxiety and stress. Researches has been carried out and shows that health benefits arise in all urban and rural ecosystems tested, ranging from deep wilderness, open countryside, forests, woodlands, national or country parks, nature or wildlife reserves, urban parks, grasslands, hills and valleys to domestic gardens and allotments (Pretty *et al.,* 2005). Today, due to some negative factors that come along with development and civilization, stress and mental ill-health are becoming more common, and the public health costs associated with these conditions are growing. In the face of widespread and growing threats to the natural environment, two major arguments about the need for conservation have come to dominate: the environment should be conserved for ethical reason (Eckersley, 1999) or economic reasons (Sandifer *et al.*, 2004).

Indeed, within the next decade, the number of people living in urban areas will exceed those living in rural environments for the first time in human history, with more than 3 billion people dwelling in urban settlements (Pretty *et al.*, 2005). It is opined that people living in urban centres are exposed more to stress and mental ill health due to development, overpopulation, day to day activities and competition for available natural resources and exposed more to stress and mental ill-health. As natural green environments have increasingly come under pressure from economic development, so it seems our own wellbeing has suffered as a consequence (Pretty *et al.*, 2005). The rate of biodiversity loss is on the high side and having great impact on the health of humans due to urbanisation, hence conservation of biodiversity to improve human health must be addressed and resolved.

Study Area

The research study was carried out in Epe which is a coastal area in Lagos state (Oyekale, 2013). It is endowed with diverse marine natural resources. Lagos state is located in the southwestern geopolitical zone of Nigeria. It is bounded on the North and East by Ogun State. In the West it shares boundaries with the Republic of Benin. Epe town lies 89km northeast of Lagos state and is divided into two local government areas (Oyekale, 2013). Based on 2006 National Population Census, Epe Local Government Area has a total population of 323,634 people of which 153,360 were males (National Bureau of Statistics, 2009).

MATERIALS AND METHODS

Mixed methods of data collection as recommended by Malgosia *et al.* (2013) was used in data collection and these includes combining data from surveys, document reviews, information from participants and key informants through questionnaire and oral interviews. Interviews involved farmers, fishermen, residents and foreigners in the town. Purposive sampling was used to select five communities based on existing structure in the area. The target respondents was randomly selected within the five communities selected in order to avoid bias and the respondents coming from a particular group age wise or in respect to occupation. Hence, 301 respondents were randomly selected based on household from the five communities in the study area (Table 1). Data was collected between April 2016 and June 2016 with semi-structured questionnaires, oral interviews and direct observation. Secondary data was collected from past research works, through the internet and

document reviews. Oral interviews was conducted by engaging in some of the activities they were doing presently while asking them pertinent questions in relation to the project to put them at ease and obtain vital information needed from them. The data was analyzed by means of descriptive statistic and inferential statistics using Statistical Package for Social Science (SPSS) version 20.

Community	Frequency	Percentage (%)
Imokun	33	11.0
Oluwo	41	13.6
Igbo Nla	36	12.0
Odorangushi	86	28.6
Poka	105	34.9
Total	301	100.0

RESULTS AND DISCUSSION

The results revealed that a larger percentage of the respondents were male (71.9%) while 28.1% were female. Respondents within the age group (years) 21-30 had the highest representation of 30.7%; followed keenly by the 31-40, 41-50 and above 50 groups with 27%, 20.9% and 16.6% respectively. The below 20 group had the lowest representation of 4.7%. Approximately thirty-four percent (34.3%) of the respondents had primary education; followed by 24.2% and 21.1% with secondary and tertiary education respectively. 19.7% of the respondents have no formal education. Majority of the respondents were married (68.5%) while 27.3% were single. The divorced and the widowed had the lowest representation of 2% and 2.3% respectively. 49.8% of respondents were Christians; 47.4% Muslims while 2.4% practiced traditional religion.

Respondents were mostly farmers (28%) and traders (27%). 17% were students. 11% were fishermen and women while 8% had other manual jobs such as technician and plumbers. Respondents that are civil servants and retired/none had the lowest percentages of 3% and 1% respectively. Respondents in Poka community had the highest representation of 34.9%, followed by Odorangushi residents with 28.6%. Oluwo, Igbo Nla and Imokun communities' respondents had 13.6%, 12% and 11% respectively.

The perception of residents on the impacts of biodiversity on mental health is represented in Table 2. 70.4% and 27.6% of the respondents strongly agrees and agrees respectively that mental health describes the balanced and emotional state of mind; and that it is irrespective of age and social status (71.3% and 22.3%). Majority of the respondents also strongly agreed that nature and living things in the environment makes human feels good (70.1%); people living in natural areas have a sense of kinship (66.4); having a sense of kinship is an indicator of good mental health (65.2%) and that serene environment helps in body relaxation and mental health (68.9%). This is followed by the group of respondents that agreed to all these statements with representation of 26.5%, 30.2%, 30.1% and 28.4% respectively.

More so, a greater part of the respondents strongly agree that exposure to nature have restorative effects (66.4%) and 29.5% agreed with this. 45.1% and 49.2% strongly agreed and agreed respectively that participation in outdoor recreation can lead to mental health improvement. Respondents that strongly agree and agree that leisure trips and tours should be recommended for patients with mental disorder; people suffering from mental illness should be exposed to nature regularly; tranquility enhances recovery from mental illness; nature views cumulatively provide relief from mental fatigue; and that cognitive functions have positive correlation with nature exposure had the highest percentage representation of 33.4% and 58.1%; 39.4% and 52.6%; 34.1% and 56%; 37.8% and 51.7%; 42.3% and 47.1% respectively.

Majority of respondents also strongly opined (21.6%) and agreed (58.9%) that hospitals should be encouraged to plant trees and flowering plants to enhance patient's recovery rate. In the same vein, 41.2% and 52.7% also strongly agreed and agreed that exercise in green areas should be encouraged and carried out more often.

51.7% of the respondents strongly agreed and understood the impacts of biodiversity on mental health. This is followed by those that agree (41.3%) to a lower degree. 4.7% of the respondents were not sure. the respondents who disagreed and strongly disagreed had the lowest representation of 1.8% and 0.5% respectively. Concisely, the bulk of respondents to the tune of 93% understood what mental health is as well as the interrelationship between biodiversity and mental health.

When asked the rhetorical question "biodiversity have no effect on human mental state", the respondents that strongly disagreed had the highest representation of 29.4%, followed closely by those that disagreed to a lower level (23.3%). 19.9% and 16.2% strongly agree and agree respectively while 11.1% was not sure (Fig. 1).

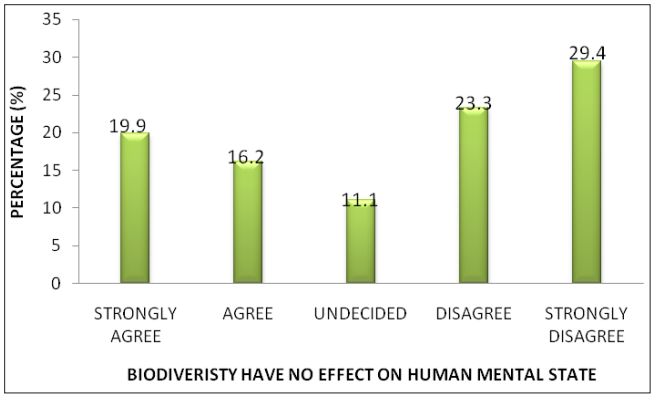

Fig. 1: Response to the effect of biodiversity on human mental state

As shown on the crosstab Table 3, majority of the respondents across all the age groups knew that forest and water bodies provide food. However, from the chi square result (Table 3), residents' knowledge of the ecological services provided by biodiversity is not significantly influenced by age ($P > 0.05$).

As shown on the cross-tabulation matrix (Table 2), a higher number of respondents with no formal education perceived that biodiversity have no effect on mental health. Respondents starting from those with primary through secondary to tertiary levels of education were able to affirm that biodiversity have effect on human mental health. The Chi square analysis result (Table 2) however suggests that there is no significant relationship between the educational status of residents and their knowledge of the inter-relationship between biodiversity and mental health ($P > 0.05$).

The environment is vital in the day-to-day activities of humans. Various anthropogenic activities are being carried out by humans to ensure survival and to ease their existence in the environment. However, these activities can have both negative and positive effects. The positive can be tourism, recreation, nature visits, basic facilities or social amenities that make survival easy. But in the bid for survival comes a long lasting negative effect that can truncate plans for healthy living. If the negative activities are not checked or a balance is ensured, the effects can be adverse ranging from degradation of habitat and extinction of diversity. When diversity has been affected, it will affect people. As posited by Hanski *et al.*, (2012) people around biodiverse areas are less prone to allergies and other chronic inflammatory diseases than people living in landscapes of lawns and concrete

Mental health describes a balanced state of mind and emotion, it is a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully and is able to make a contribution to his or her community (World Health Organization, 2014). Individuals need to have a sense of kinship with the environment and also be able to function effectively in the community. Little wonder why people in rural areas rarely fall sick due to their quick access to biodiversity. However, increase in population as led to the destruction of habitats and this as increased stress causing factors making people especially in urban areas to experience high stress level. Migraine, headaches, rheumatoid arthritis, chronic fatigue, receptiveness to allergies, and other maladies are caused as a result of chronic stress (Pretty *et al.*, 2005). This is so because the environment and it endowment with biodiversity has been depleted and as a result, there is reduction in its service to mankind. There is

Table 1: Residents perception of the impacts of biodiversity on mental health

Statement	Frequency (Percentage {%})				
	SA	**A**	**U**	**D**	**SD**
Mental health describes the balanced and emotional state of mind	209 (70.4)	82 (27.6)	3 (1.0)	3 (1.0)	0 (0.0)
Mental health is irrespective of age and social status	211 (71.3)	66 (22.3)	13 (4.4)	5 (1.7)	1 (0.3)
Nature and living things in the environment makes humans feel good	209 (70.1)	79 (26.5)	9 (3.0)	1 (0.3)	0 (0.0)
People living in natural areas have a sense of kinship with the environment	198 (66.4)	90 (30.2)	4 (1.3)	6 (2.0)	0 (0.0)
Having a sense of belonging is an indicator of good mental health	193 (65.2)	89 (30.1)	7 (2.4)	4 (1.3)	3 (1.0)
Serene environment helps in body relaxation and mental health	204 (68.9)	84 (28.4)	7 (2.4)	1 (0.3)	0 (0.0)
Exposure to nature can have restorative effects	196 (66.4)	87 (29.5)	7 (2.4)	5 (1.7)	0 (0.0)
Participation in outdoor recreation can lead to mental health improvement	134 (45.1)	146 (49.2)	8 (2.7)	6 (2.0)	3 (1.0)
Leisure trips and tours should be recommended for patients with mental disorder	99 (33.4)	172 (58.1)	15 (5.1)	8 (2.7)	2 (0.7)
People suffering from mental illness should be exposed to nature regularly	114 (39.4)	152 (52.6)	12 (4.2)	10 (3.5)	1 (0.3)
Tranquillity enhances recovery from mental illness	100 (34.1)	164 (56.0)	23 (7.8)	4 (1.4)	2 (0.7)
Nature views cumulatively provide relief from mental fatigue	111 (37.8)	152 (51.7)	21 (7.1)	7 (2.4)	3 (1.0)
Cognitive functions have positive correlation with nature exposure	123 (42.3)	137 (47.1)	25 (8.6)	5 (1.7)	1 (0.3)
Hospitals should be encouraged to plant trees and flowering plants to enhance patients recovery rate	63 (21.6)	172 (58.9)	43 (14.7)	10 (3.4)	4 (1.4)
Exercise in green areas should be encouraged and carried out more often	122 (41.2)	156 (52.7)	13 (4.4)	4 (1.4)	1 (0.3)
Total	**2286 (51.7)**	**1828 (41.3)**	**210 (4.7)**	**79 (1.8)**	21 (0.5)
	93.0%		4.7%	2.3%	

SA = Srongly Agree; A = Agree; U = Undecided; D = Disagree; SD = Strongly Disagree

mounting empirical evidence that interacting with nature delivers measurable benefits to people (Maas *et.al,* 2006).This assertion corroborates with the findings of this study, majority of people perceived that biodiversity can positively affect mental health. This describes the balanced and emotional state of mind; they also strongly agree that it is irrespective of age and social status (71.3%). It is worthy of note to point to the fact that people are aware of the mental benefit they have when biodiversity is involved and to a large extent it is a good instrument for biodiversity conservation education.

Although many types of benefits have been studied, benefits to physical health, cognitive performance and psychological well-being have received much more attention than the social or spiritual benefits of interacting with nature, despite the potential for important consequences arising from the latter (Keniger *et al.,* 2013 Gladwell *et al.,* 2013). Results also showed that leisure trips and tours should be

Table 2: Effect of Biodiversity on Mental Health (Education)

		Biodiversity does not have any effect on the mental state of humans					Total
		Strongly Agree	Agree	Undecided	Disagree	Strongly disagree	
Level of Education	None	16	11	7	9	13	56
	Primary	15	11	7	29	34	96
	Secondary	14	12	8	10	25	69
	Tertiary	11	12	7	20	11	61
	Others	1	0	0	0	1	2
Total		**57**	**46**	**29**	**68**	**84**	**284**

Table 3: Effect of Biodiversity on Mental Health (Age)

		Biodiversity does not have any effect on the mental state of humans					Total
		Strongly agree	Agree	Undecided	Disagree	Strongly disagree	
Age	≤ 20 Years	6	1	5	0	2	14
	21 - 30 Years	12	21	11	25	22	91
	31 - 40 Years	18	12	8	15	26	79
	41 - 50 Years	11	7	4	18	18	58
	≥ 50 Years	12	5	3	10	19	49
Total		**59**	**46**	**31**	**68**	**87**	**291**

recommended for patients with mental disorder; people suffering from mental illness should be exposed to nature regularly; tranquility enhances recovery from mental illness; nature views cumulatively provide relief from mental fatigue; and that cognitive functions have positive correlation with nature exposure.

This further confirms the research works and studies which claim that people find speedier recovery time from injury through exposure to plants or nature, fewer illnesses in prison inmates whose cell windows face nature, and calming effects of viewing natural landscape images after people are stressed (Frumkin 2001; Parsons *et al*., 1998). Biodiversity can have both direct and indirect benefits for physical and mental health (Pretty *et al*., 2011). Exposure to nature can also have restorative effects, potentially reducing the effects of stress in a person's life (Ratcliffe *et al*., 2013)

CONCLUSION

The study was conducted in Epe Local Government Area, one of the last indigenous areas of Lagos state resplendent with various flora and fauna resources. It is the largest coastal area in the state providing various marine resources and sea foods for families, restaurants within and outside the state. Results revealed that people are aware of the services provided by biodiversity in their environment especially the provisioning services rendered by biodiversity; and each of these services is essential to human health as this improves the psychological, physical and spiritual wellbeing of the people in the area. Biodiversity is a key environmental determinant of human health; the conservation and the sustainable use of biodiversity can benefit human health by maintaining ecosystem services and also options for the future. The environment has been known

to provide various health benefits to the human populace such as medicine, herbs and also therapeutic effects it has in soothing and calming down people experiencing various mental and psychological illnesses such as depression. Hence, Biodiversity is important and should be conserved for its values and benefits to human health and well-being. Increased understanding of these health benefits may improve public support for conservation.

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