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## PERCEIVED EFFECTS OF ENVIRONMENTAL NOISE ON THE HEALTH OF RURAL AND URBAN COMMUNITIES IN LAGOS STATE, NIGERIA.

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### ABSTRACT

Lagos has been experiencing serious environmental challenges especially in the area of environmental noise as a result of urbanization with aftermath effect of health disease. This research sought to establish the perceived influence of environmental noise on the health of the residents in rural and urban communities in Lagos State, Nigeria. The study bridge the gap with former research works that only concentrated on urban areas without consideration for rural communities.

Quantitative survey served as the research design while purposive sampling techniques was employed to select respondents who participated in the study. 400 respondents from rural and urban areas of Lagos State filled in questionnaires regarding their perceived influence of environmental noise on their health. SPSS analysis was done using ANOVA and Independent sample t-test to determine the significant difference in the study areas.

The findings of this study indicate that there is no statistically significant difference in the perceived influence of environmental noise on the health between the residents of rural communities (*Mean* = 1.764, *SD* = 0.620) and urban communities (*Mean* = 1.802, *SD* = 0.545) in Lagos State.

**Key Words:** Environmental Noise, Perceived, Health, Residents.

## **Introduction**

The existence of environmental noise is acknowledged as a life-threatening environmental problem today especially in our major urban cities which main sources include industrial and commercial activities, transport activities, constructions activities and social activities, market places, sports events and entertainments which has several harmful effects on urban environment and might result in an immense deal of costs on the populace.

Pondering on the unwanted impact of growing levels of environmental noise on the society and public health, environmental noise is considered as potential environmental pollutant and it has become a normal phenomenon with no tangible action on the part of the government to protect the citizens from several health hazards which is ravaging the urban areas even though the impacts of environmental noise are well understood.

It has been established that exposure to noise disturbs sleep proportional to the amount of noise experienced in terms of an increased rate of changes in sleep stages and in number of awakenings (Gitanjali & Ananth, 2003).

Various studies carried out on environmental noise and high blood pressure indicated that there is significant association between environmental noise and high blood pressure (Jarup, Babisch, Houthuijs, 2008). Shrestha and Shigi (2017) study showed that the prevalence of hypertension is associated with the occupational noise exposure.

Munzel, Schmidt, Steven, Herzog, Daiber, Sorensen (2018) said that chronic noise can cause mental-health disease (including depression and anxiety, at the same time can impair the cognitive development of children).

Various evidence showed that risk factors in the physical environment may facilitate the development of cardiovascular disease (CVD) (Munzel, Frank, Schmidt, Sebastian, Johannes, Daiber, Sorensen, 2018; Münzel, 2020).

Hearing loss is the most serious health hazard associated with high level of noise exposure leading to the inability to understand speech and can have a severe social effect. A one-time exposure to an intense impulse sound (such as gunfire) can cause hearing loss (Munzel, Gori, Babisch, and Basner, 2014).

The present study intends to ascertain the extent to which people in both rural and urban areas perceived environmental noise effects on their health. The study also recommends the important measure that can be embarked upon to reduce the impacts of environmental noise.

## **Objectives**

The study examined the perceived influence of environmental noise on the health of the residents in rural and urban communities in Lagos State, Nigeria. To achieve this, the study was based on this research objective, to investigate the perceived influence of environmental noise on the health of the residents.

### **The study hypothesizes that:**

Ho. There is no statistically significant difference in the perceived influence of environmental noise on the health of the residents in rural and urban of communities in Lagos State.

## **The Study Area**

Lagos State, Nigeria was created on May 27, 1967 by virtue of State (Creation and Transitional Provisions) Decree No. 14 of 1967, which restructured Nigeria's Federation into

12 States. Before this, Lagos Municipality had been administered by the Federal Government through the Federal Ministry of Lagos Affairs as the regional authority, while the Lagos City Council (LCC) governed the City of Lagos.

Lagos State lies to the southwestern part of the Federation. It shares boundaries with Ogun State both in the North and East and is bounded on the west by the Republic of Benin. In the South it stretches for 180 kilometers along the coast of the Atlantic Ocean. Though it is the smallest state in Nigeria with an area of 356,861 hectares of which 75,755 hectares are wetland, nevertheless it has the highest population (estimated at 17.5 million) which is over five percent of the national estimate (Oludele, Olumuyiwa & Nurudeen, 2015).

While the State is essentially a Yoruba-speaking environment, it is a socio-cultural melting pot attracting both Nigerians and foreigners alike.

The port of Lagos consists of Customs Quay, on Lagos Island, and the more important Apapa Quay, on the mainland, which serves as the principal outlet for Nigeria's exports. The city is the western terminus of the country's road and railway networks, and the airport at Ikeja provides local and international services. The high urbanization and industrial growth rate in Lagos have made it one of the most densely populated regions on the earth with a population of about 9.3 million according to 2006 Census (Adesuyi, Njoku & Akinola, 2015).

Lagos is the center of Nigerian Intellectual and cultural life; this includes the University of Lagos (founded in 1962), Yaba College of Technology (founded in 1948), Lagos State University (founded in 1977), National Museum (established in 1957), National Library of Nigeria (established in 1964), National Theatre (established in 1976) and many institutions.

Out of the twenty local government areas in the state the study addresses four of them. The selected four areas were based on the characteristics that differentiate urban and rural areas.

**Ikeja/Agege:** Ikeja is an urban area with a population of 313,196 (NPC, 2006) and Agege with a population of 459,939 (NPC, 2006) dominated with residential development, shopping mall, office, and industries. The two local governments are thickly populated. Their major occupations are industrial, administrative and professional. The extensive environmental noise in the area is due to urbanization, and it is being the largest employer in the area and the backbone of the state economy. They are characterized by an influx of people and a high volume of vehicular flows in and out.

**Badagry/Epe:-**The population of Badagry is put at 241,093 while that of Epe is 181,409 (NPC, 2006). They are a typical example of rural-based communities in a small size, with a low-density population with agriculture as the fundamental occupation of the rural people and form the basis of the rural economy. Most of the activities revolve around the natural environment, therefore offered an opportunity to survey the neighbouring residents' perception of environment noise.

### **Data Types and Sources**

Both primary and secondary sources of data were used for this study. The primary data were a set of questionnaire that was administered to residents. The structure of the questionnaire was such that seeks to generate information on variables such as socio-economic characteristics and perception on influences of environmental noise on health.

Secondary data include various documents on environmental noise.

### Methodology

400 copies of questionnaire were distributed in four purposively selected local government areas of Lagos state. The areas include Ikeja, Agege, Epe and Badagry. Sample population which was randomly selected consisted of students, civil servants, academics, artisans, business men and women, all who are above 18 years because they are considered to be conscious of environmental noise effects.

### Data analysis

Responses of residents to questionnaire from the different areas (Table 1) were coded into a statistical software package (Statistical Package for Social Sciences, SPSS version 17). Responses were analyzed using simple frequency percentage distribution for socio-economic and demographic characteristics. Statistical tests used in the research are One Way Analysis of Variance (ANOVA) and Independent Sample t-test for the hypothesis.

### Results and Discussion

#### Demographic Data of Question by Respondents

Results of social economic and demographic characteristics of the respondents are presented below.

**Table 1 - Sample demographic characteristics**

			Frequency	Percentage
1.	Gender	(a) Male (b) Female	N=400	44.75 55.25
2.	Years of Residence in Locality	(a) 1-4Yrs (b) 5-9Yrs (c) 10-14 Yrs (d) 15 Yrs+	N=400	27.50 44.25 18.25 10.0
3.	Age	(a) 18-24 (b) 25-44 (c) 45-64 (d) 65 and above	N= 400	16.0 53.0 27.5 3.5
4.	Marital Status	(a) Single (b) Married (c) Divorce	N=400	32.0 61.5 6.5
5.	Educational Qualification	(a) Primary (b) Secondary (c) Post-Secondary (d) Postgraduate	N=400	3.0 25.75 49.5 21.75
6.	Occupation	(a) Public servant (b) Civil servant (c) Self-employed (d) Private sector	N=400	11.0 28.0 40.0 21.0

A total of 400 respondents participated in the survey, of this figure, 44.75% were male, 55.25% female, majority of the respondents 44.3% spent around five to nine years in the area they reside, 27.5% of respondents have spent around one to four years in the area, 18.3% respondents stated that they have been residing at the area for ten to fourteen years, the remaining 10% respondents stated they have been residing at their house for over fifteen years. Age distribution of respondents; 16% falls within the age bracket of 18-24, 53% were within the age of 25-44, 27.5% respondents within the age of 45-64 while the least 3.5% of respondents fell within 65 years and above. In terms of marital status, 32% were single, 61.5% were married and 6.6% were divorced. This shows that most of the residents that participated in the study were married with family responsibilities and many were also single. Most of the respondents were very literate having one form of educational qualification or the other. The literally level of the respondents notwithstanding, the degree of environmental noise remains high. The distribution of occupational status shows that 11% were public servants, 28% were civil servants, 40% were self-employed and 21% were in the private sector. It means that bulks of the residents in the areas are an economically active population who are more mobile than the elderly.

### Test of Hypothesis

**Table 2:**ANOVA analysis on perceived influence of Environmental noise on health

		Sum of Squares	Df	Mean Square	F	Sig.
Environmental noise can cause stress.	Between Groups	9.693	1	9.693	9.267	0.002
	Within Groups	416.297	398	1.046		
	Total	425.990	399			
Environmental noise can cause anxiety.	Between Groups	0.479	1	0.479	0.531	0.467
	Within Groups	359.081	398	0.902		
	Total	359.560	399			
Environmental noise can lead to hearing impairment.	Between Groups	0.083	1	0.083	0.106	0.745
	Within Groups	312.354	398	0.785		
	Total	312.438	399			
Environmental noise can lead to heart-related disease.	Between Groups	11.043	1	11.043	7.908	0.005
	Within Groups	555.747	398	1.396		
	Total	566.790	399			
Environmental noise can cause sleep disturbance.	Between Groups	5.319	1	5.319	8.512	0.004
	Within Groups	248.681	398	0.625		
	Total	254.000	399			
Environmental noise can lead to hypertension.	Between Groups	0.113	1	0.113	0.123	0.726
	Within Groups	364.527	398	0.916		
	Total	364.640	399			
Environmental noise can result in low productivity.	Between Groups	2.216	1	2.216	1.787	0.182
	Within Groups	493.424	398	1.240		

	Total	495.640	399			
Environmental noise can lead to a lack of concentration.	Between Groups	0.775	1	0.775	0.960	0.328
	Within Groups	321.385	398	0.807		
	Total	322.160	399			
Environmental noise makes me nervous.	Between Groups	6.069	1	6.069	5.300	0.022
	Within Groups	455.681	398	1.145		
	Total	461.750	399			
Environmental noise awakes me from sleeping during nighttime.	Between Groups	1.663	1	1.663	1.924	0.166
	Within Groups	343.927	398	0.864		
	Total	345.590	399			
Environmental noise can lead to annoyance.	Between Groups	0.048	1	0.048	0.054	0.817
	Within Groups	359.462	398	0.903		
	Total	359.510	399			
Environmental noise can lead to mental health.	Between Groups	3.365	1	3.365	2.516	0.113
	Within Groups	532.385	398	1.338		
	Total	535.750	399			

From table 2 above on ANOVA analysis on the perceived influence of environmental noise on the health of the residents, this actually established the variability significant level. The analysis cannot be used to determine the final level of significant between the rural and urban areas; as a result, the data was further subjected to independent sample t-test to test the hypothesis.

**Hypothesis**

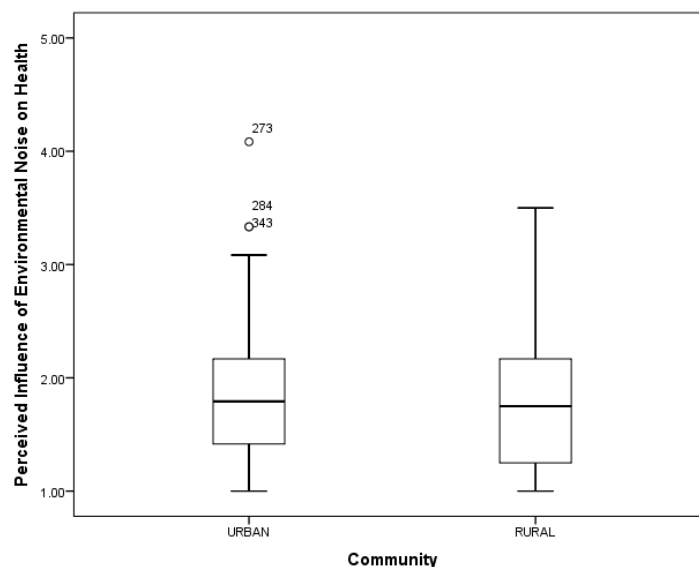
**H<sub>0</sub>:** There is no significant difference in the perceived influence of environmental noise on the health of the residents of rural and urban communities in Lagos State.

**Table 3: Result of the Independent Sample t-test for Hypothesis  
 Sample Size: 400 Respondents**

<b>Group Statistics:</b>	
Mean responses for Urban	1.802
Mean responses for Rural	1.764
Mean Difference	0.038
Standard Deviation – Urban	0.545
Standard Deviation – Rural	0.620
<b>Leven’s Test for Equality of Variances:</b>	
F	5.625
<i>p</i> -value	0.018
<b>Independent t-test – Equal Variances Assumed (student t-test):</b>	
t-statistic	0.633
<i>p</i> -value	0.527
95% confidence interval of the mean difference	<b>Lower:</b> -0.080 <b>Upper:</b> 0.156
<b>Independent t-test – Equal Variances Not Assumed (Welch’s t-test):</b>	
t-statistic	0.609
<i>p</i> -value	0.543
95% confidence interval of the mean difference	<b>Lower:</b> -0.085 <b>Upper:</b> 0.161
<b>EffectSize (Eta Squared):</b>	0.0009

*Source: Author’s computation, 2022.*

Table 3 presents the result of the independent-sample t-test for the hypothesis. The Leven’s test for the equality (homogeneity) of variance ( $F = 5.625$ ,  $p\text{-value} = 0.018 < 0.05$ ). The null hypothesis of equal variance cannot be accepted. More clearly, the boxplot (figure1) shows the degree of the variability in theperceived influence of environmental noise on the health in the rural and urban communities.



**Figure1:** Boxplot for level of perceived influence of environmental noise on the health

As shown in figure 1, Welch's *t*-test is considered appropriate for the test of this hypothesis. The Welch's *t*-test of unequal variance test ( $t(255.076) = 0.609$ ,  $p\text{-value} = 0.543 > 0.05$ ) reveals that there is no statistically significant difference in the perceived influence of environmental noise on the health between the residents of rural community ( $Mean = 1.764$ ,  $SD = 0.620$ ) and urban community ( $Mean = 1.802$ ,  $SD = 0.545$ ) in Lagos State. Therefore, the null hypothesis that "there is no significant difference in the perceived influence of environmental noise on the health of the residents of rural and urban communities in Lagos State" cannot be rejected. This means that there is no significant difference between the rural and urban residents of Lagos State on the perceived influence of environmental noise on their health.

### Discussion

The result on hypothesis of the research indicates that an equal variance in the perceived influence of environmental noise on the health in rural and urban communities cannot be assumed. It also shows the degree of the variability in the perceived influence of environmental noise on the health in the rural and urban communities.

It can be observed that larger variability features obviously among the residents in the rural communities as compared with those in the urban communities.

Meanwhile, the effect size (eta squared = 0.0009) suggests that about 0.09% of the total variance in the perceived influence of environmental noise on the health is explained by the residents' communities (urban and rural). This effect size appears to be very small. This implies that there are other dominant factors that determine the perceived influence of environmental noise on the health aside from the settlements of the residents. The Welch's *t*-test reveals that there is no statistically significant difference in the perceived influence of environmental noise on the health between the residents of rural community and urban community in Lagos State.

### Perceived Influence of Environmental Noise on Health.

Finding of this study on health impact indicates that environmental noise resulting in anxiety, hearing impairment, hypertension, low productivity, lack of concentration, wakes one from sleeping, annoyance, and mental health issues are similar among both rural and urban communities in Lagos State. The finding is in line with Ayodeji and Olumuyiwa (2016) in



their study that the majority (58.4%) are aware that noise has adverse effects on men. The majority are aware that noise can lead to hearing impairment, headaches. Furthermore, the finding agreed with `Babisch (2007) Global Burden of Disease (2010), Olokooba (2010), Ubuoh et al. (2012), Clark and Sorquist (2012), Hiral et al. (2017), Munsel et al. (2018), Madhu and Deepak (2020) finding that noise extensively results in annoyance, harmful effect on hearing, reduce working efficiency and interference with communication. Also similar to the finding of Essandoh et al. (2011) among Ghanian tertiary institution students, it was detected that environmental noise disturbs their concentration, and the result obtained by Tassi et al. (2013) indicate that noise exposure reduces attention in subjects which are also consistent with the present study.

It was assumed that rural residents should not have much problem with concentration but this is an indication that our rural areas are gradually losing their serene environment. In term of annoyance, it is in line with Von Lindern, Hartig, and Lercher (2010) study which postulate that traffic noise may also have a negative effect through noise annoyance as a constraint on restorative experiences in the residential environment.

The result of this study was also in line with that of Hiral et al. (2017) and Munzel et al. (2018) that there is growing evidence that chronic noise can cause mental health including depression and anxiety and can impair the cognitive development in children so also Jing et al. (2018) perceived higher noise exposure is associated with worse mental health. Also, in line with the finding of Dzhambov, Tilov, Makakova-Tilova, Dimitrova (2020) that there is a complex conditional relationship between traffic noise, annoyance, and mental ill-health. Ubuoh, Akhionbare, Onifade, and Ogbuji, (2012) study also shows that sampled population ascertained that noise is responsible for hearing impairment which is also confirmed by this hypothesis.

In line with this study, Ayodeji (2016) finding indicates that noise effect on the incidence of cardiovascular diseases, which is the leading cause of death, is significantly low. Only (5.5%) of the respondents were aware of its health effect on the cardiovascular system. The study also supports the finding of Awosusi (2014), where the respondent's awareness of its cardiovascular effects was below the mean score of 1.5.

The study also established that health effects as identified by urban residents include heart-related disease, sleep disturbance, nervousness, and stress which are in contrast with the hypothesis testing, though Saba et al. (2015) in their study agreed that environmental noise is related to heart disease.

The implication of this signified that residents in rural areas are not aware that most of the heart diseases resulted from the influence of environmental noise exposure on their health. The conclusion is that environmental noise in rural areas when compare to urban areas is not high to disturb their sleep which might lead to a heart problem. In a nutshell, environmental noise has emerged as the biggest cause of disability in the workplace and is becoming a big threat and challenge to residents in rural and urban areas.

### **Findings**

The data revealed shocking results on the health impact of environmental noise, it was established that environmental noise led to low productivity, affect deep sleeping, causes mental health, annoyance, and lack of concentration which reduce the efficiency of human beings. It was discovered that residents in the rural area are not aware that most of the heart diseases resulted from the influence of environmental noise exposure on their health. The

challenges posed by environmental noise on human health and the environment have not yet received the full attention which it deserves.

### **Conclusion**

This study has comprehensively examined the perceived influence of environmental noise on the health of the residents in rural and urban communities in Lagos State. The study identified annoyance, sleeping disturbance, hearing impairment, lack of concentration, speech interference, and interference with a conversation to disturbances in mental health. These indicate challenges posed by environmental noise on human health.

### **Recommendations**

In collaboration with other agencies, the Lagos State government should organize regular seminars and workshops to enlighten the residents on the hazards of environmental noise. More efforts should be concentrated in rural communities as to nip in the bud the rate of growing environmental noise as well as prevention of the spread and reduce the effects on human health.

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