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Full Length Research

Perceived Impacts of Noise, on Residents of Selected Communities in Obio/ Akpor Local Government Area of Rivers State, Nigeria

*Elenwo E.I., and Anyanwu C.O.

*Department of Geography and Environmental Management, Faculty of social Science University of Port Harcourt,P.M.B.5323, Choba , Rivers State, Nigeria.

*Corresponding Author's Emails ✉ : iyke2_elenwo@yahoo.com / ephraimelenwo@gmail.com / ephraim.elenwo@uniport.edu.ng

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The study examined noise pollution and its perceived impacts on residents of selected communities in Obio/Akpor local government Port Harcourt. The method adopted was cross sectional survey as well as direct field measurement. A total of 352 copies of questionnaires were administered on the residents of selected communities randomly to elicit information on their perception towards noise pollution. Descriptive and inferential statistics were used for data analysis. The WHO permissible standards were compared with the mean noise values in the communities. Findings revealed that there was a significant variation of noise in the study area in the morning (t=8.422; p<0.05), afternoon (t=2.965; p<0.05), evening (t=12.508; p<0.05) and night (t=17.200; p<0.05). Similarly, significant variation existed in the noise levels in the day (L_D) (t=8.572; p<0.05) and night (L_N) (t=16.048; p<0.05) between the observed and WHO permissible limits. The evening period recorded the least mean daily noise level of (70.5 dBA) while the night recorded (73.6dBA),. There was no significant variation of noise in the morning, afternoon, evening and night amongst the selected communities. Similarly, the noise levels of day (L_D) and night (L_N) did not show any significant variation. 46.0% of respondents agreed that electric power generator is the major source of noise pollution in the area. Findings also revealed that 77% agreed to annoyance effect, 86.6% headache, 90.4% speech and communication interference, 88.3% hearing impairment.

Keywords: Perceived, Noise, Impact, Residents, Obio/Akpor.

INTRODUCTION

Noise pollution is another serious threat to man's environmental quality and human health. Noise abatement remains one of the greatest challenges in achieving a pollution free environment. Noise control and regulation is a great challenge to environmentalists and regulators in Nigeria, since there are no specified laws and regulations on noise pollution control (Wokocha and Omenihu, 2015). Noise pollution is perceived to be on the increase, and the society seems to be ignorant about its hazards. According to Sogebi et al.,(2014) who pointed out that only a few persons are worried about the effect of noise and are concerned about noisy environment. Noise pollution is perceived not to have negative impact by many, as such receives little attention, unlike water, air and soil pollution. To evaluate perceived impacts of noise, a proper understanding is required concerning the different

sources of noise in an area. Noise is defined as the unwanted sound dumped into the atmosphere without regards to the adverse effects it may have on the inhabitants (Olayinka, 2012). In electronics and communication science, noise is referred to as perturbation that interferes with the communication system (Cunningham et al., 2005). Noise Pollution is defined as any undesirable sound that is especially loud, harsh and in quantities and duration that might be potentially injurious and have deleterious effect on human life or that tampers unreasonably with the comfortable enjoyment of life within and around the immediate environment (Elenwo and Ochege, 2018). However, unlike other pollutants, noise is neither persistent, nor cumulative and nor transported over great distances. Once the noise source is stopped, noise dies out quickly. Noise or sound is a form of energy, consisting of wave motion. It requires medium such as gas, liquid or solid for spreading. Sound waves travel at 330m/s = 1,070ft/sec = 1220kphor 760m/ph., through the medium from source where the sound is produced to the recipient or listener (Santra, 2013). The problem of noise can be seen from the loudness, frequency and duration of the noise. The motor parking, major road junctions and markets in Nigeria towns and cities are noisy, as a result of vehicular and other commercial activities, particularly from those that direct passengers and commuters to vehicles. In some motor parking, megaphones are used by different persons to announce and direct commuters to vehicles. The markets are particularly noisy, as a result of commercial activities, including the use of bells and megaphones by traders to attract customers (Ladan, 2012). Retail shop owners have added a new brand, but worrisome dimension to environmental noise by employing the services of musicians and dancers, who playing very loud music, especially in front of their shops and at strategic places and major road junctions, to attract customers or promote their goods and services (Babaloye and Palamuleni, 2015). Noise as nuisance continues to increase on daily basis as a result of poor public awareness. People are ill informed of the dangers and public health implications of noise pollution. The issue is becoming alarming in most cities in Nigeria e.g.,Port Harcourt and Obio/Akpor Local Government Area in Rivers State as well as other towns and cities in Nigeria. The Nigeria government established Federal Environmental Protection Agency (FEPA, decree 58 of 1988, repealed by National Environmental Regulatory Enforcement Agency (NESREA) Act 2007, FEPA Decree 58 of 1988 as amended in 1992 has powers to regulate environmental pollution, but the absence of Noise Act in Nigeria puts in a reverse position the effective regulation of noise pollution in Nigeria. The media, both electronic and print media which supposed to serve as one of the watch dog to society, seem not to be doing much in creating awareness and shaping the public thoughts and re-orientation them on the implication of noise hazards on human health. It is on the basis of the foregoing that this study is embarked upon, to investigate noise pollution and its perceived impacts on the residents of some selected communities in Obio/ Akpor Local Government area in Rivers state. Arising from the study are the following research questions;

(a)What is the level of noise in the selected communities in the study area?
(b)What are the sources of noise pollution in the study area?
(c)Which health impacts are residents of the study area likely to suffer as a result of noise pollution?
(d) How does the observed noise level in the study area relate with the WHO specified noise level limits?

Aim and objectives of the study

The aim of the study was to examine the perceived impacts of noise, on residents of selected communities in Obio/ Akpor Local Government Area of Rivers State, Nigeria.
The objectives are as follows to;
(i)Determine the level of noise in the selected communities.
(ii)Generate spatial noise level map of Obio/Akpor.
(iii)Examine the perceived health impact of nose pollution on residents of sampled communities.
(vi) Determine the spatial noise levels in selected communities are within or above national and WHO standards.

Hypotheses Statement;

(i) There is statistically significant variation in the noise levels in the morning, afternoon, evening, night, day time, and night time across the selected communities in Obio/Akpor L.G.A.
(ii) There is statistically significant variation in

the WHO (2017) specified noise level limits and observed noise levels in the study area.

METHODOLOGY

The study was carried out using a cross sectional survey design as well as direct measurement of noise levels in the selected communities.

Sampling and Sample size

There are about 89 communities in Obio/Akpor local Government Area as delineated by National Population Commission (1991). There are also about seventeen (17) wards in Obio/Akpor local government, with a projected population of about 649,600. The wards were listed and simple random sampling was applied and about 9 communities were selected. Taro Yamane (1967) formula was used to get the number of person to administer questionnaire to residents in the study area.

$$n = \frac{N}{1 + N(e)^2}$$,where

n = Population size

N = Total population of Obio/Akpor

e = Level of significance = 0.05

$$\frac{649{,}600}{1 + 649{,}600\ (0.05)^2} =$$

$$\frac{649{,}600}{1+ 1.624} =$$

$$\frac{649600}{1.625} = 399.75 = 400$$

Field Measurement of Noise

Direct field measurement of noise level was done using digital sound level meter. Measurements were carried out at major road junctions and intersection, bus stops and locations prone to vehicular traffic, and residential areas, in the selected communities. About twenty seven (27) sampling points were measured from the sampled nine (9) communities as shown in Figure 1. Furthermore, a total of 352 questionnaires were administered to residents of sample areas and retrieved. The measurements were conducted for a period of four weeks during the hours, (6.30am -8.00am), afternoon (12.30pm - 2.00 pm), and evening hours (5.00pm-7.00pm), and Night, 8.00pm – 10,00pm).The measured noise levels were used as data for computing the Day time noise level (L_D), Night time noise level (LN), in the study area using equation (2) and (3) below respectively. While the Day-Night time noise level (L_{DN}) in the study area was obtained from the relationship between equation (2) and (3) as shown in equation (4).

$$LAeq = 10Log[1/N\sum (10^{LAeqi}/10)\ ni \quad \ldots\ldots(1)$$

$$LD = 10Log\ [1/2\{(10^{LAeqM}/10) + (10^{LAeqA}/10)\}] \quad \ldots\ldots(2)$$

$$LN = 10Log\ [1/2\{(10^{LAeqE}/10) + (10^{LAeqN}/10)\}] \quad (3)$$

$$LDN = 10Log\ [1/24\{(15X10^{LD}/10) + (9X10^{LN+10}/10)\}] \quad \ldots\ldots..(4)$$

where:

LAeq = The weighted equivalent sound pressure level

LAeq M = The equivalent sound for Morning measurement

LAeq A The equivalent sound for Afternoon measurement

LAeq E The equivalent sound for Evening measurement

LAeq N The equivalent sound for Night measurement

L_D Day time noise level

L_N Night time noise level

L_{DN} Day-Night time noise level

The results from equations 2, 3 and 4 were compared to national and WHO standards. The coordinates of the sampling points were captured using calibrated hand held Global Positioning System (GPS) instrument.

Data Analysis

Descriptive statistics of mean and standard deviation parametric statistics, as well as analysis of variance (ANOVA) were utilized. Paired T sample test, as well as one sample (T) test, was also used for various tests and analysis. Mean ±SD were used to determine variation in noise level across different periods in the sampled locations in study area. ANOVA for single factor experiment using F- factor distribution was employed to test the veracity of stated research hypotheses, it was further used to determine variation in noise level in terms of Day time noise (L_D), Night time (L_N) and Day-Night time (L_{DN}) noise levels across various locations studied, as well as different periods of morning, afternoon, evening and night.

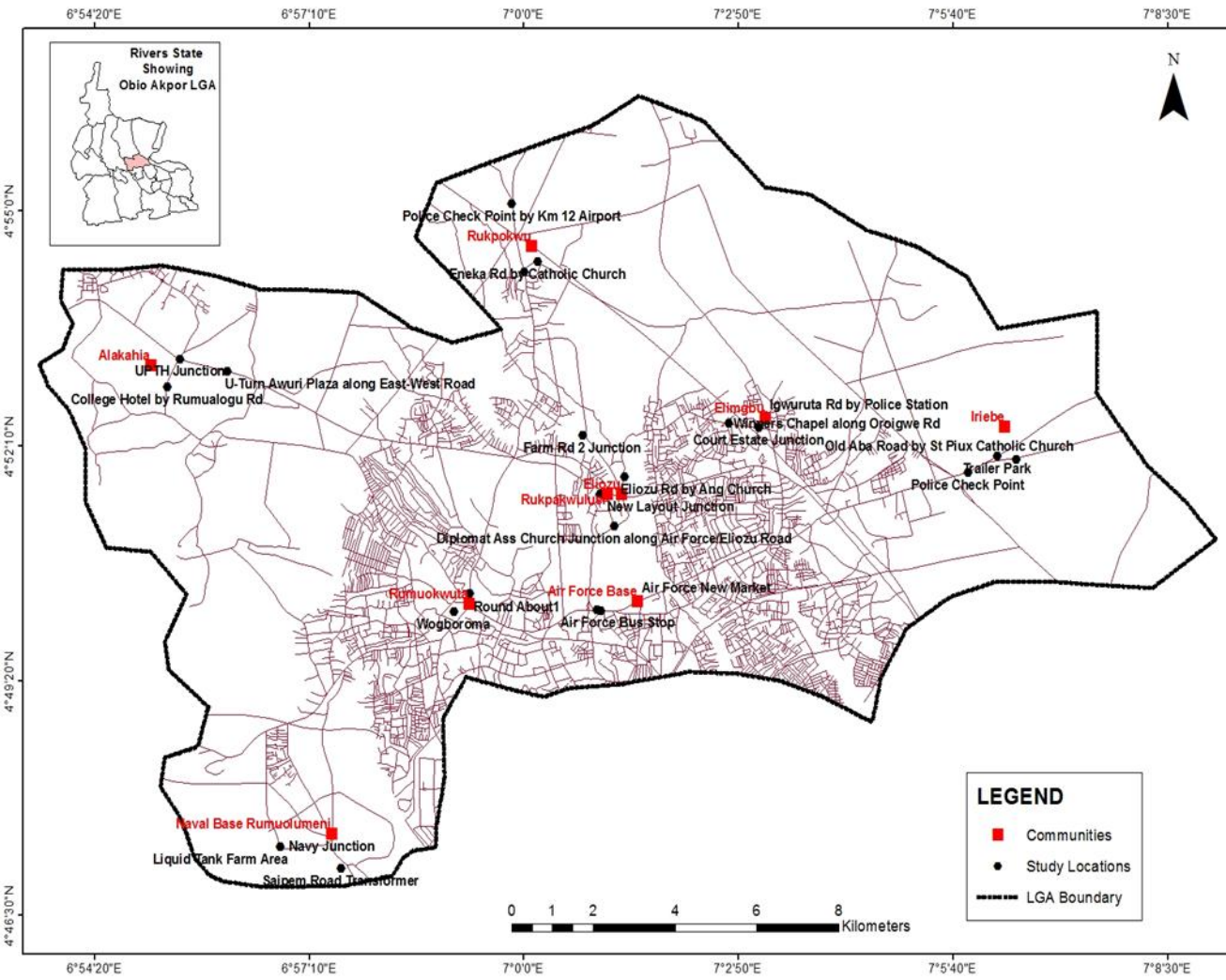

Figure 1. Sampled Communities in Obio/Akpor Local Government Area designated in Red Symbols.

RESULTS

Table 1 shows the mean equivalent of continuous noise levels in the morning, afternoon, evening and night in all the sampled communities. The GPS records of the various sampling points, in each community sample were also taken at 3 different points, giving a total of 27 sample points. The table also highlighted the mean equivalent noise levels for day time (L_D), night time (L_N) and day- night time (L_{DN}) for each of the 3 sampled locations in the communities.

Furthermore, Table 1 shows the mean noise levels at different periods of the day. It was revealed that Air force Base area recorded the highest mean noise level in the morning, evening and night periods with 83.5 ± 6.6 dB(A), 79.4 ±7.7 dB(A), and 80.0±3.3 dB(A), respectively, while Naval Base area recorded the least mean noise level in the morning, (58.4±2.8.) Afternoon (61.4± 4.1), evening (58.3±6.2) and night (67.3±3), respectively.

Table 2 shows the mean day time noise level (L_D), night time noise level (L_N), and day – night time noise level (L_{DN}). The record shows that Naval base area recorded the lowest mean noise level for day of 60.2± 3.6, and 60.6± 3.1 respectively, while Air force base area recorded the highest mean Day time noise level of 82.6 ±6.5, night time noise level of 78.3± 7.3, and day night time noise level of 86.0 ± 7.0.

Table 3 shows the general mean noise level at various periods across the 27 locations. It indicates that evening period recorded the lowest mean noise level at 70.5 dB(A), while Day – Night time recorded

Table 1. Mean Noise Levels ($_{dB\ (A)}$) at different periods (Morinig, Afternoon and Night) in the communities.

Communities	Period			
	Morning $_{dB\ (A)}$	**Afternoon $_{dB\ (A)}$**	**Evening $_{dB\ (A)}$**	**Night$_{dB\ (A)}$**
	MEAN ±SD	MEAN ±SD	MEAN ±SD	MEAN ±SD
Eliozu	76.1 ± 6.2	75.1 ± 9.6	73.7 ± 12.5	75.0 ± 12.0
Rumuokwuta	73.4 ± 14.2	72.1±16.3	75.4 ± 13.3	77 ± 12.3
Iriebe	70.4 ± 11.0	65.9 ± 13.5	70.4 ± 11.5	73.7 ± 12.5
Rukpoku	73.7 ± 4.7	78.9 ± 4.8	70.5 ± 12.2	73.1 ± 12.3
Elimgbu	74.5 ± 3.0	70.0 ± 4.0	65.0 ± 5.0	69.8 ± 3.5
Alakahia	72.6 ± 15.9	71.2 ± 18.9	73.9 ± 11.0	74.0 ± 10.3
Naval-Base Rumuolumeni	58.4 ± 2.8	61.4 ± 4.1	58.3 ± 6.2	67.3 ± 3.5
Airforce Base	83.5 ± 6.6	78.7 ± 4.4	79.4 ± 7.7	80.0 ± 3.3
Rukpakwulusi	68.5 ± 16.0	70.3 ± 12.1	68.2 ± 11.8	71.6 ± 7.5

Table 2. Mean Day time, Night and Day- Night time noise levels.

Communities	Period		
	Daytime ($L_{D\ dB\ (A)}$)	**Night time ($L_{N\ dB\ (A)}$)**	**Day-Night time ($L_{DN\ dB\ (A)}$)**
	MEAN ±SD	MEAN ±SD	MEAN ±SD
Eliozu	75.9 ± 7.4	74.1 ± 12.0	71.1 ± 28.0
Rumuokwuta	73.6 ± 13.9	76.6 ± 12.7	82.6 ± 12.8
Iriebe	68.9 ± 11.6	72.3 ± 12.2	78.3 ± 12.2
Rukpoku	77.0 ± 4.5	72.1 ± 12.1	80.4 ± 9.6
Elimgbu	70.1 ± 5.0	68.2 ± 3.5	75.0 ± 3.6
Alakahia	72.1 ± 16.9	73.8 ± 10.7	80.3 ± 11.3
Naval-Base Rumuolumeni	60.2 ± 3.6	66.6 ± 3.1	72.6 ± 3.0
Airforce Base	82.6 ± 6.5	78.7 ± 7.3	86.0 ± 7.0
Rukpakwulusi	69.9 ± 13.4	70.8 ± 8.3	77.3 ± 8.7

Table 3. Mean Noise level at different periods (n = 27).

Period	Mean dB (A)	Standard Deviation dB (A)
Morning	72.3	10.7
Afternoon	71.1	10.9
Evening	70.5	10.6
Night	73.6	8.7
Day Time (L_D)	72.2	10.4
Night time (L_N)	72.6	9.0
Day- night time (L_{DN})	78.2	11.6

the highest mean noise level of 78.2 dB(A). Figure 2 shows noise level map of morning period. The analysis shows that high noise was spread around Airforce base area, Rumuokwuta, and Eliozu. These communities are located in the high traffic and economic zones of the local government, while the

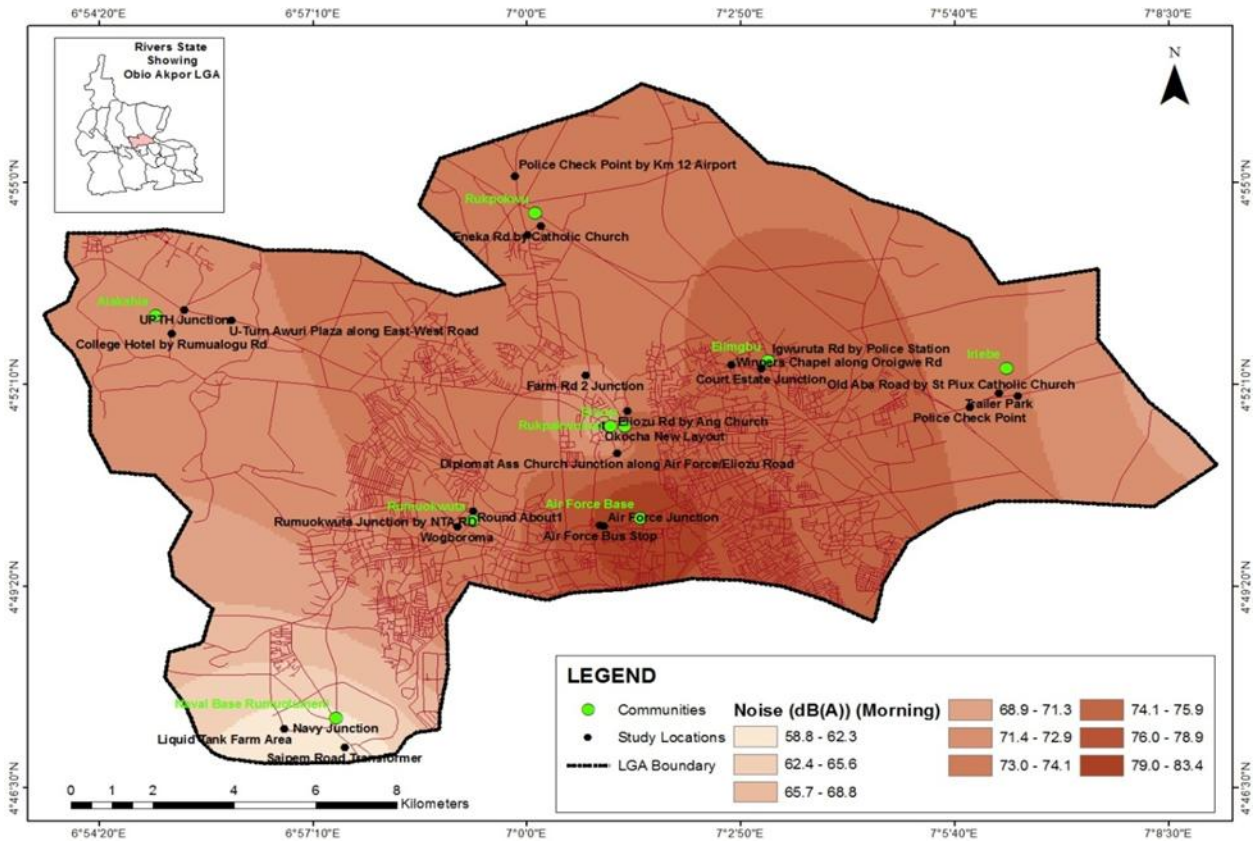

Figure. 2. Spatial Noise level at Morning period.

in land communities recorded low noise. This suggests that the communities at the center are prone to high noise levels because of the vehicular and other commercial activities in the area.

Figure 3 shows noise level in the afternoon period in the study area. The analysis indicates that the pattern of noise distribution in the afternoon remained the same like the morning period where high noise was spread around Airforce base area, Rumuokwuta, and Eliozu communities with that of Rukpoku area which recorded high noise levels also in the afternoon.

Figure 4 shows noise map of evening period, with high noise levels still concentrated around Airforce area, and Rumuokwuta communities. In these areas, this period is a peak of vehicular traffic, this contributed to the high noise level of these areas. Figure 4 also shows noise levels at night period. The map shows that the communities' recorded low noise levels at night period, except Airforce, Rumuokwuta junction - roundabout. This also suggests that these areas experience some form of night life in the study area. Figure 5 also shows noise level map at day time (L_D). The analysis reveals that high noise was concentrated around the central business area at the study area with Airforce , Rukpoku, Rumuokwuta , Eliozu, and Rukpakulusi, recording high day noise levels, while the in land communities such as Iriebe, Elimgbu, Naval Base Rumuolumeni were less noisy. The low noise level at these communities was due to low vehicular and light commercial activities during the period.

Figure 6 shows noise level map at night time (L_N). It revealed high night noise levels in the central Business areas such as Air force, Rumuokwuta and Eliozu. Alakahia area was partially noisy in while the border communities such as Iriebe and the Naval Base area recorded low night noise levels.

Figure 7 shows noise level map at day-night time (L_{DN}). The analysis shows that Airforce area, Rumuokwuta, Rukpoku and Alakahia recorded high day -night time noise, while the border communities such as Iriebe and Naval Base area (NNS Okemini)

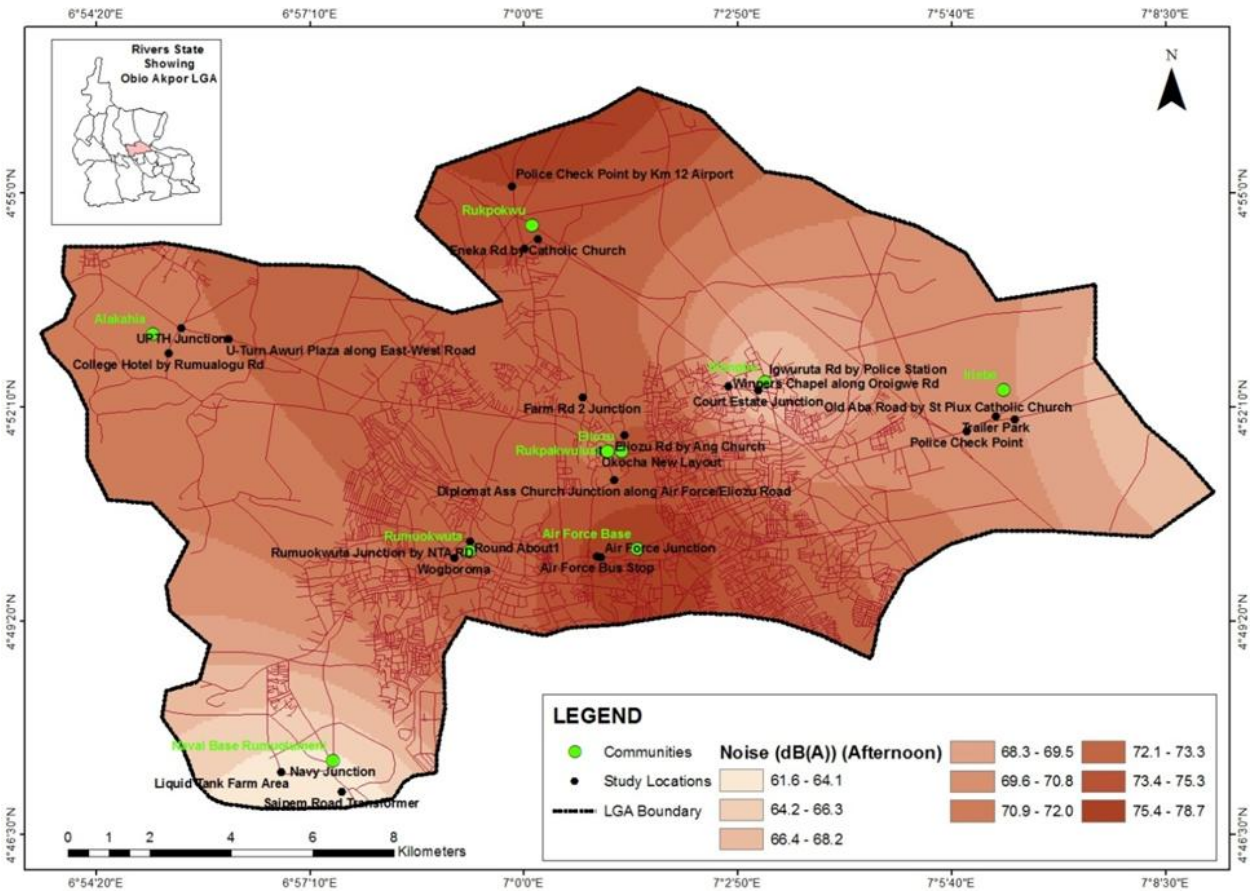

Figure 3. Spatial Noise level at Afternoon.

recorded low day-night time noise levels. The information from this study would guide prospective investors and tourists to know areas in the local government that are perceived noise zones, and make right decisions where to live and to carry out their businesses. This information also suggests that the low noise areas could serve as buffer zones against the high noise areas. Table 4 and Table 5 lend credence to the assertions as it shows (WHO, 2017) standard on noise levels at day and night and the permissible limits.

Table 6 showed the perceived sources of noise pollution. From the various sources about 46.0% are said to come from Electric power generators, 17.3% from vehicular traffic, 16.2% from the combination of all the listed sources, while 7.4% are from religious centers, 6.0% from entertainment outfits, wand 7.1% from aircrafts.

The Table 7 shows the perceived effects of noise pollution by respondents. About 85.1% agreed it disturbs sleep, while 14.9 % disagreed. 88.3% agreed the impairment of hearing, while 11.7% disagreed. On speech and communication interference, 90.4% agreed while 9.6% disagreed, on headache and vibration, 86.6% agreed, while 13.4% disagreed, on irritation and annoyance, 77.0% agreed while 23.0% disagreed, on mental performance reduction, 23.8% agreed while 71.6% disagreed.

Hypothesis: i

H_0 There is no statistically significant variation in the noise levels in the morning, afternoon, evening, day time, night time and day-night time across the sampled communities in the study area.

H_1 There is statistically significant variation in the noise levels in the morning, afternoon, evening, amongst the sampled communities in Obio/Akpor L.G.A.

The analysis on variation on noise levels in the morning, afternoon, evening and night across the

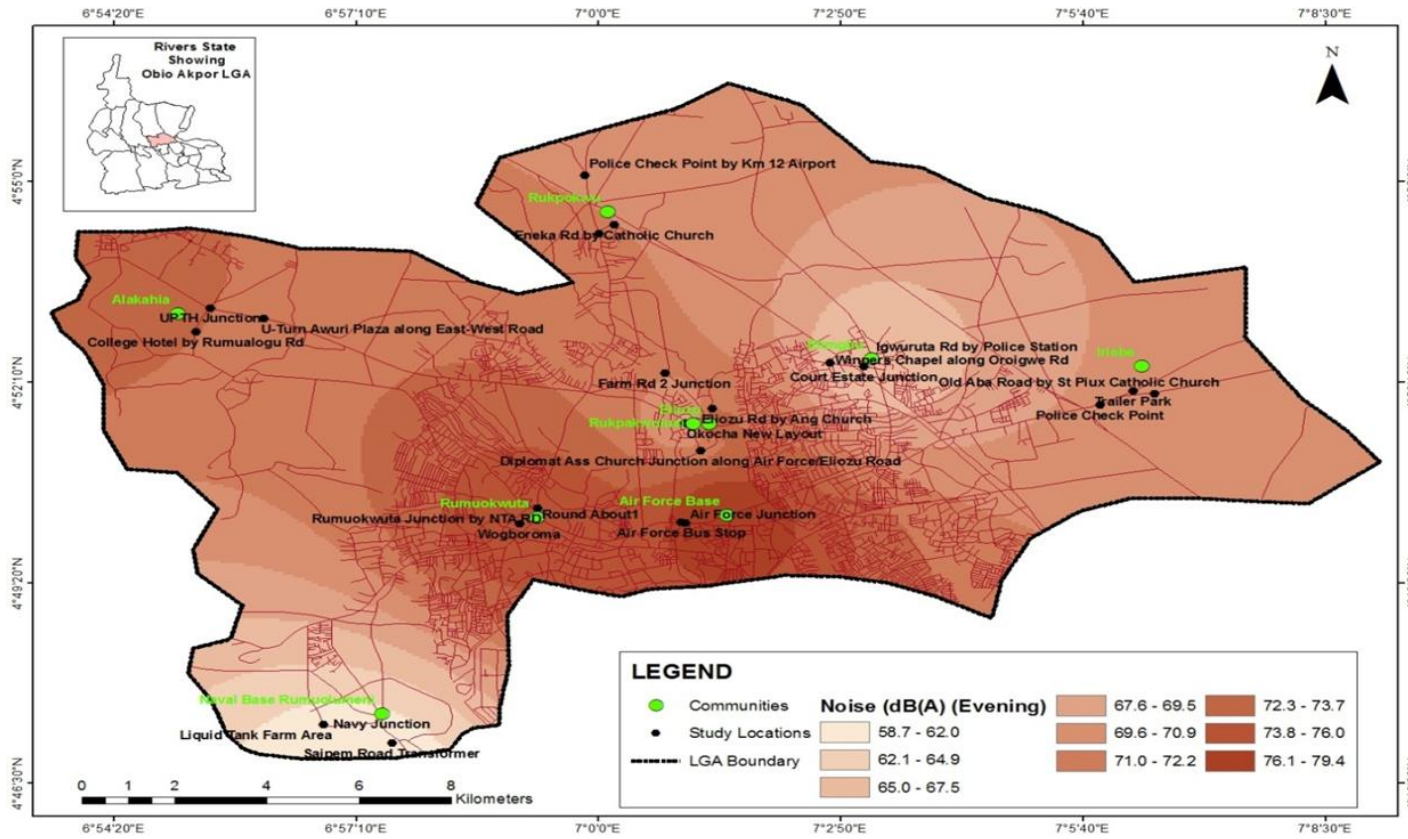

Figure 4: Spatial Noise level at Evening.

sampled communities are shown in Table 8, the p values of the F values were greater than 0.05 confidence levels. Thus, there is no significant variation in noise levels for morning, afternoon, evening and night across the sampled communities. The null hypothesis was accepted while the alternative hypothesis was rejected. Similarly, the noise levels of day time (L_D) night time (L_N) and day-night time (L_{DN}) did not show any significant variation because the p values of F values were greater than 0.05 confidence levels. The null hypothesis was accepted while alternative hypothesis was rejected.

Hypothesis: ii

H_0: There is a statistically significant variation in the WHO (2017) specified noise level limits and observed noise levels in the study area.

H_1: There is statistically significant variation in the observed noise levels in the study area and the WHO (2017) specified noise level limits.

Table 9 shows the analysis of noise level variation between day time levels (L_D) and night time levels (L_N) in using Pairwise t test. The analysis shows that the p value (0.722) of the t value (0.360) was greater than 0.05 confidence levels. The null hypothesis was accepted, while alternative hypothesis was rejected. This shows that there was no significant variation between L_D and L_N of noise in the study area. The paired sample T test above indicates that variation between day time noise levels (L_D) and night time noise levels (L_N) in sampled communities in study area was not significant.

DISCUSSIONS

According to Okeke and George (2015) it was stated that the noise level of Port Harcourt Metropolis especially the commercial areas, busy junction, bus stops exceed (WHO, 2017) permissible limits. The study area (Obio/ Akpor LGA) is largely part of Port Harcourt Metropolis and with enormous and extraneous vehicular and

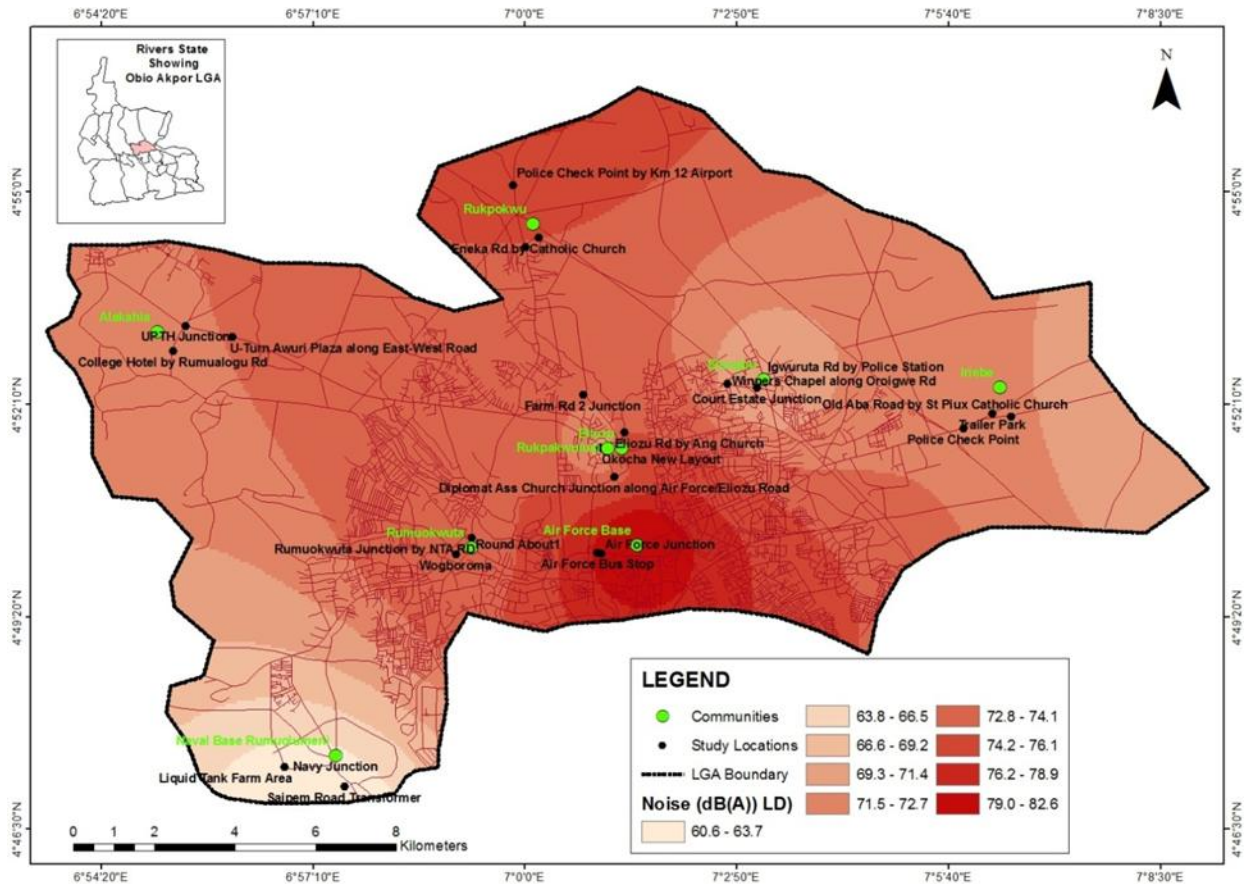

Figure 5. Spatial Noise Day time (L_D).

commercial activities in the area, the noise level here leaves much to be desired. There was no significant variation in mean noise levels between different periods of morning, afternoon, evening, and night in monitored locations in the communities. However, Airforce Base area recorded the highest mean and standard deviation noise level in the morning, evening and night periods with 83.5 ± 6.6 dB (A), 79.4 ±7.7 dB(A), and 80.0±3.3 dB(A), respectively, while Naval Base at Rumuolumeni area recorded the least mean and standard deviation noise level in the morning, 58.4±2.8, afternoon 61.4± 4.1, evening 58.3±6.2 and night 67.3±3, respectively. There was no significant variation in the mean noise level of monitored communities in terms of day time noise level (L_D), and night time noise level (L_N), and day – night time noise level (L_{DN}). However, Naval base area records the lowest mean noise level for day time of 60.2± 3.6, and 60.6± 3.1 respectively, while Airforce base area records the highest mean Day time noise level of 82.6 ±6.5, night time noise level of 78.3± 7.3, and day night time noise level of 86.0 ± 7.0. The mean noise level at various periods across the 27 locations indicates that evening period recorded the lowest mean noise level of 70.5 db (A) while day – night time recorded the highest mean noise level of 78.2 dB (A).

The study also showed that 61.7% of respondents claimed that electric power generator was the major source of noise pollution, the assertion was in agreement with the findings of (Omubo-Pepple et al., 2010) in their study on pollution in Port Harcourt Metropolis, as well as (Olayinka,2012) while investigating urban environmental noise pollution and perceived health effects in Ibadan, they both agreed that generator was one of the major sources of noise pollution. Futher more, Noise investigation in Delta State University Abraka campus 2, by (Otutu, 2011) concluded that power generator was the major source of noise pollution in the campus. The study also showed that 71.6% disagreed that noise pollution leads to reduced mental performance, while only 10.7% agreed to this

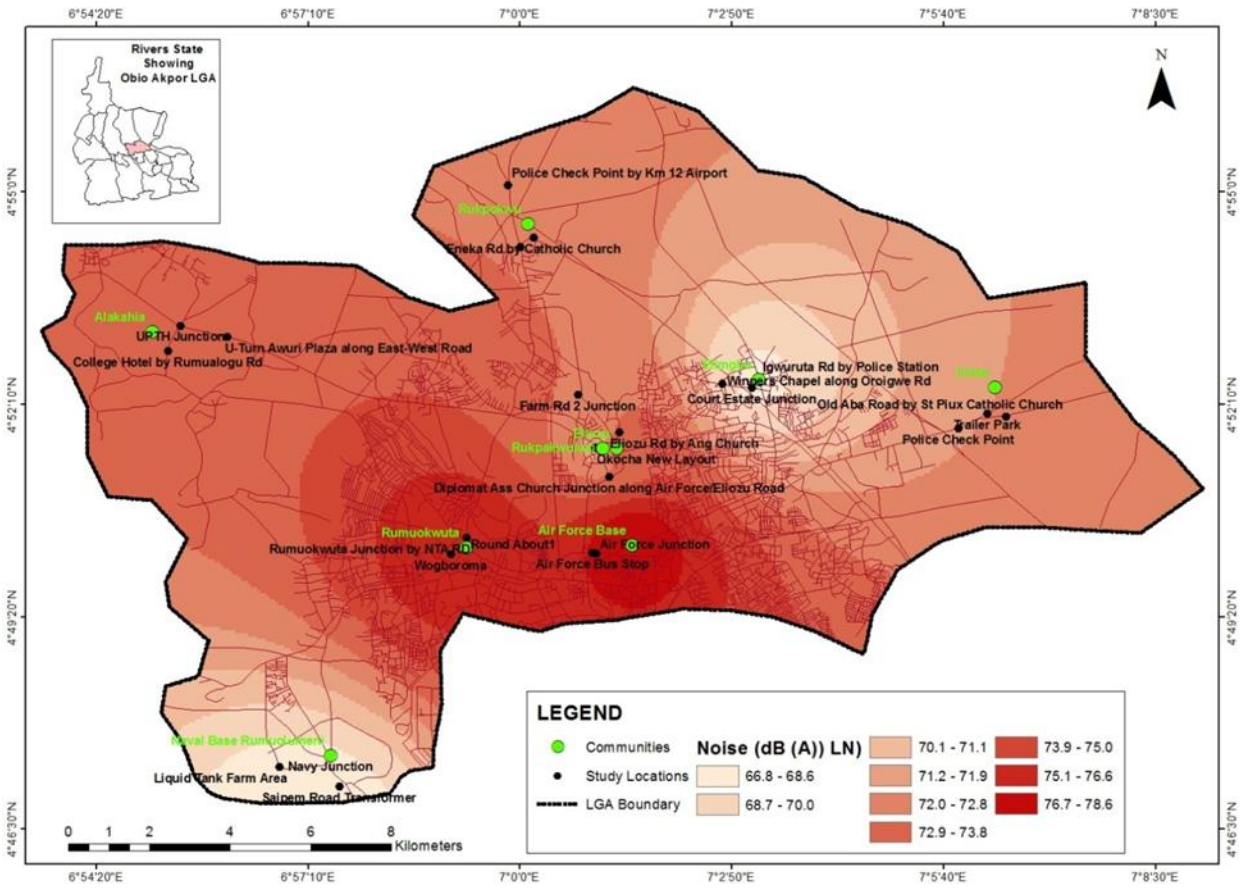

Figure 6. Spatial Noise at Night (L_N).

opinion. This was in line with the findings of (Omubo-Pepple et al., 2010) where only few agreed that noise pollution leads to mental stress. The analysis on variation of noise levels in the morning, afternoon, evening and night amongst the selected communities is shown in Table 8, the p values of the F values were greater than 0.05 confidence levels. Thus, there was no significant variation in noise in the morning, afternoon, evening and night among the sampled communities. The null hypothesis was accepted while the alternative hypothesis was rejected. It equally revealed that the noise levels of L_D, L_N, and L_{DN} did not show any significant variation because the p values of F values were greater than 0.05 confidence levels. The null hypothesis was accepted while alternative hypothesis was rejected. The analysis of noise level variation between day time (L_D) and (L_N) is shown in Table 9, using pairwise t test. The analysis showed that the p value (0.722) of the t value (0.360) was greater than 0.05 confidence levels. The null hypothesis was accepted while alternative hypothesis was rejected. This shows that there was no statistically significant variation in day time (L_D) and night time (L_N) noise in the sampled communities. The analysis of noise level variation across morning, afternoon, evening and night in the entire study area is shown in Table 10; the analysis showed that the p value (0.705) of the F value (0.468) was greater than 0.05 confidence levels. The null hypothesis was accepted while alternative hypothesis was rejected.

CONCLUSION

Noise pollution and its perceived impacts on residents of sampled communities in the study area has been concluded. In the course of the study, the noise level of sampled communities were determined at different periods of morning, afternoon, evening and night. The result indicates that residents of the study area are exposed to high

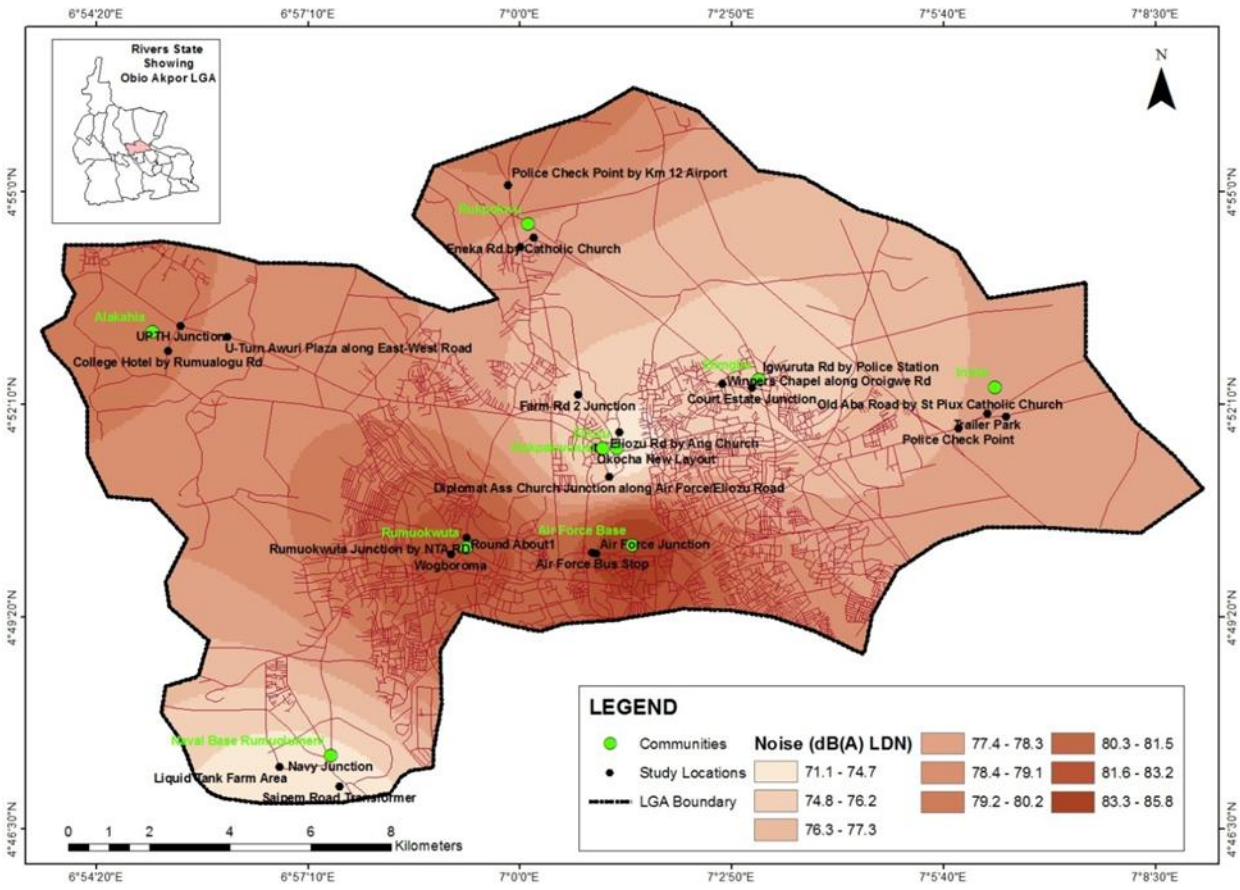

Figure 7. Spatial Noise Day-Night time (L_{DN}).

Table 4. Noise level classification at Day and Night time periods.

DAY- time		NIGHT-time	
LAeq (dBA)	**Noise quality Description**	**LAeq (dBA)**	**Noise quality Description**
0-30	Excellent quality	0-30	Excellent quality
31- 40	Very good quality	31-40	Very good quality
41- 60	Good quality	41-50	Good quality
61- 75	Satisfactory quality	51-65	Satisfactory quality
76-90	Unsatisfactory	66-75	unsatisfactory
91- 110	Hazardous quality	76-90	Hazardous quality
>111	Not Allowed	>90	Not Allowed

Source: World Health Organization (WHO, 2017).

noise levels. Noise mapping of Obio/Akpor L.G.A was generated. This clearly showed the areas that are prone to high noise levels and at different periods of the day and night. This information may guide prospective developers as well as those that wish to relocate their residence to the area to make an informed choice of where to live or do business. The study further identified the major source of noise pollution in the sampled communities, which was the electric power generating plant which implies that if there was improvement in public power supply, noise pollution would be drastically

Table 5. World Health Organization (WHO)'s Permissible Noise level at different times (dB A).

Specific Condition	Permissible Limit (dBA)
Day Time	55
Night Time	45
Residential (Day)	55
Commercial (Day)	65
Residential (Night)	45
Commercial (Night)	55
Indoor (For sleep) (Not to exceed)	30
For clear speech (Not to exceed)	35
Class room (Not to exceed)	35

Source: WHO (2017) Guidelines for community noise for specific environments N.B. Sound level in evening and night to be 5- 10 decibel lower than the day.

Table 6. Perceived sources of noise by respondents.

Sources of Noise Pollution	Frequency	Percentage (%)
Vehicular traffic	61	17.3
Aircraft	25	7.1
Electric generating Set	162	46.0
Religious Centre	26	7.4
Entertainment	21	6.0
All	57	16.2
Total	352	100.0

Table 7. Perceived effects of noise by respondents.

Effects	Agree (%)	Disagree (%)	Total
Mental performance reduction	28.3	71.6	100
Annoyance	77.0	23	100
Headache	86.6	13.4	100
Speech and communication interference	90.4	9.6	100
Hearing impairment	88.3	11.7	100
Sleep disturbance	85.1	14.9	100

reduced. The perceived health impact of noise pollution was determined, these include, mental performance reduction, annoyance, headache, speech and communication interference, hearing impairment and sleep disturbance. The residents' knowledge of relevant Government agencies regulating noise pollution in sampled communities was assessed. Environmental laws on noise pollution were never enforced or implemented by enforcement agencies.

Suggested Measures to Abate Noise Pollution

In order to reduce the current level of noise pollution, as revealed by the study, there is need to have a noise Act in Nigeria. There are WHO and

Table 8. Analysis of Variance on levels noise among the sampled communities.

		Sum of Squares	df	Mean Square	F	Sig.
Morning	Between Groups	1076.079	8	134.510	1.274	0.316
	Within Groups	1900.147	18	105.564		
	Total	2976.225	26			
Afternoon	Between Groups	820.119	8	102.515	.823	0.593
	Within Groups	2241.760	18	124.542		
	Total	3061.879	26			
Evening	Between Groups	923.292	8	115.411	1.037	0.445
	Within Groups	2003.533	18	111.307		
	Total	2926.825	26			
Night	Between Groups	339.079	8	42.385	0.476	0.857
	Within Groups	1602.940	18	89.052		
	Total	1942.019	26			
LD	Between Groups	936.276	8	117.035	1.107	0.403
	Within Groups	1902.307	18	105.684		
	Total	2838.583	26			
LN	Between Groups	348.687	8	43.586	0.453	0.873
	Within Groups	1730.047	18	96.114		
	Total	2078.734	26			
LDN	Between Groups	543.705	8	67.963	0.416	0.896
	Within Groups	2939.353	18	163.297		
	Total	3483.059	26			

Table 9. Variations between L_D and L_N using paired sampled T test.

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	LD- LN	-.37778	5.45819	1.05043	-2.53696	1.78141	-.360	26	.722

ISO specification and standards on environmental noise level for different activities and areas, though the laws are domesticated in this country, but there was no specific noise Act in Nigeria, a call to review the existing law to make it stricter for defaulters. Proper public enlightenment on the negative impacts of nose pollution is advocated especially at major road junctions, motor parks and at community levels by relevant Government agencies. Proper land use planning to be enforced the study observed that residential, commercial and business areas are not properly delineated. Town planners should endeavor to correct this anomaly especially in the emerging cities and satellite towns by creating and ensuring zoning regulations are adhered to and buffer zone created in the residential and acoustic architectural design incorporated into buildings designs. Existing national and international legislations on environmental noise pollution should be reviewed and made more effective. Government should include noise pollution as a public health issue and support research on noise pollution. Power supply to be regularized by the relevant agency (PHED), indeed noise pollution will be highly

Table 10. ANOVA test on noise level at morning, afternoon, evening and night in the study area.

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	147.308	3	49.103	.468	.705
Within Groups	10906.947	104	104.874		
Total	11054.255	107			

reduced if electricity power generators are banned which was implicated as the major source of noise pollution in the study area.

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