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Environmental Noise Pollution and Impact in Major Markets of Akwa Ibom State, Nigeria

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Abstract- Environmental noise pollution and impact in some markets of Akwa Ibom State, Nigeria have been carried out. The average maximum noise level of 90.4 dB(A), 85.2 dB(A) and 74.3dB(A), recorded in the mornings, afternoons and evenings constitute a health hazard for the vendors and buyers in these markets as they exceed the recommended standards. The average minimum values of 66.66, 63.7 and 60.0dB(A) were also recorded for mornings, afternoons and evenings. Reduced hearing acuity, speech intelligibility and clarity, communication disturbances and fatigue were some of the negative impacts on the market operators as acknowledged during the subjective assessment of the respondents. Lock-up shops which should serve as noise barriers should be provided in these market to replace the open market operations as this would reduce the emitted noise and the negative impacts.

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Environmental Noise Pollution and Impact in Major Markets of Akwa Ibom State, Nigeria

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Abstract- Environmental noise pollution and impact in some markets of Akwa Ibom State, Nigeria have been carried out. The average maximum noise level of 90.4 dB(A), 85.2 dB(A) and 74.3dB(A), recorded in the mornings, afternoons and evenings constitute a health hazard for the vendors and buyers in these markets as they exceed the recommended standards. The average minimum values of 66.66, 63.7 and 60.0dB(A) were also recorded for mornings, afternoons and evenings. Reduced hearing acuity, speech intelligibility and clarity, communication disturbances and fatigue were some of the negative impacts on the market operators as acknowledged during the subjective assessment of the respondents. Lock-up shops which should serve as noise barriers should be provided in these market to replace the open market operations as this would reduce the emitted noise and the negative impacts.

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I. Introduction

One of the environmental problems which have to be looked into is noise pollution in urban and rural communities in developing countries such as Nigeria when one considers the adverse effects on the citizenry.

Industrialization and urbanization have made people migrate to the developing areas of the communities thereby increasing human activities that have resulted in noise pollution. Periodic markets where buyers and vendors gather for their commercial, economic and social transactions are created in these communities and their activities as they gather result in noise pollution of the environment. Populations of vendors and buyers to the tune of 5000 to 10000 people as they gathered and coupled with the fact that these markets are operated in open spaces create a serious environmental problem as they transact their commercial businesses. Some of the vendors in an attempt to advertise their products thereby attracting customers shout and blare loudspeakers in full volume which result in unimaginable noise pollution. Herbal medicine vendors are not excluded from this act. Small power generating sets are used by some vendors to run their grinding machines, and these constitute serious noise hazard as the grinding machines themselves also produce noise.

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Tracks are created within the market space where trucks, lorries, cars, tricycles, and even motorcycles convey people, and goods into the market and these again are sources of noise. The whole market areas become so congested in market days such that human activities such as buying, and selling are being carried out on both sides of the road. In these days, everybody is so busy and this result in environmental noise pollution with impacts.

Exposure to noise for a long duration according to occupational safety and health act (Osha) may result to physical, physiological and even psychological roblems. These problems may include permanent or temporary hearing loss, interference with speech clarity and intelligibility, reduced productivity, increase blood pressure and even lack of concentration (Osha 2006).

II. Literature Review

To address this issue of noise pollution, several studies have been conducted at different locations, occasions and cities in the entire globe. In the study of noise pollution during pre-carnival, carnival and post-carnival festivals in Calabar which is an occasion that people gather in numbers at a particular period of time and place just like the market, Akpan *et al*. (2013) concluded that the organisers of the festival should not only look at the merriment and income generating aspect of the festival. They should also consider the damaging effect of the noise on the well being of the people which includes temporary or permanent hearing loss. Mangalekar *et al*. (2012) in his study of noise pollution in Kolhapur city, India during Deepawali festival showed that there was an enhanced measure of noise at all sites due to increase in the number of vehicles and facilities of transportation. All the sites under study showed higher sound level than the prescribed limits by the Central Pollution Control Boards (CPCB).

Noise has been known to be a silent killer yet much has not been done to control it especially in developing countries like Nigeria. Even relatively low levels of noise have adverse effects on human health which may include hypertension, sleep disturbance or hinder cognitive development in children (Kiernan, 1997).

Esin *et al.* (2017) studied the spatial and temporal levels of noise pollution generated from urban traffic in Uyo metropolis, Nigeria and found that seven (7) out of eight (8) streets sampled for the study had

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noise levels exceeding the International Financial Agency and Environmental Protection Agency noise threshold of 55dB for residential and 70dB for industrial and commercial areas during weekdays and most weekends. They, therefore, recommended the promulgation and implementation of a noise bill and empowerment of regulatory agency as major ways of solving the menace of noise pollution from vehicular traffic.

All the twenty- seven (27) spots investigated during the study of the noise level in Nagaon District of Asam in India showed noise levels that were more than permissible standards (Debnath *et al*. 2013). The noise was as a result of uncontrolled movements of heavy vehicles like trucks and buses due to increasing rapid urbanization.

Pramendra *et al*. (2011) recommended an appropriate management strategy for limiting noise pollution on affected sites in Dehradun city, India due to vehicular transportation and frequent use of horn by vehicles. In this study, noise levels of 50.7 – 82.5 dB which were more than the recommended level of 30 – 75 dB were recorded in Server Shock, Prince Chock, Saharanpur Chock, Gandhi Park and Clock Tower.

Industrial noise pollution in 27 industries in South-eastern Nigeria showed a noise exposure rating greater than unity in over 20 of the investigated sites (Onuu and Akpan, 2006). Although almost all the workers contacted wanted the occupational noise pollution controlled because of its various effects, some of them liked it.

a) About the study Area, Akwa Ibom State

Akwa Ibom State is a state in Nigeria located in the coasted southern part of the Country and lying between latitude 4°32N and 5°33'N and longitude 7°25'E and 8°25'E. The state is located in the South-South geographical zone and is bordered by Cross River State on the East, Rivers State, and Abia State in the West and on the South by the Atlantic Ocean and the Southernmost top of Cross River State. The state is one of the thirty-six (36) states of Nigeria with people spread over three senatorial districts of Eket, Uyo, and Ikot Ekpene. In addition to English, the main spoken languages are Ibibio, Annang, Eket, and Oron (Wikipedia.org/wiki/Akwa Ibom State).

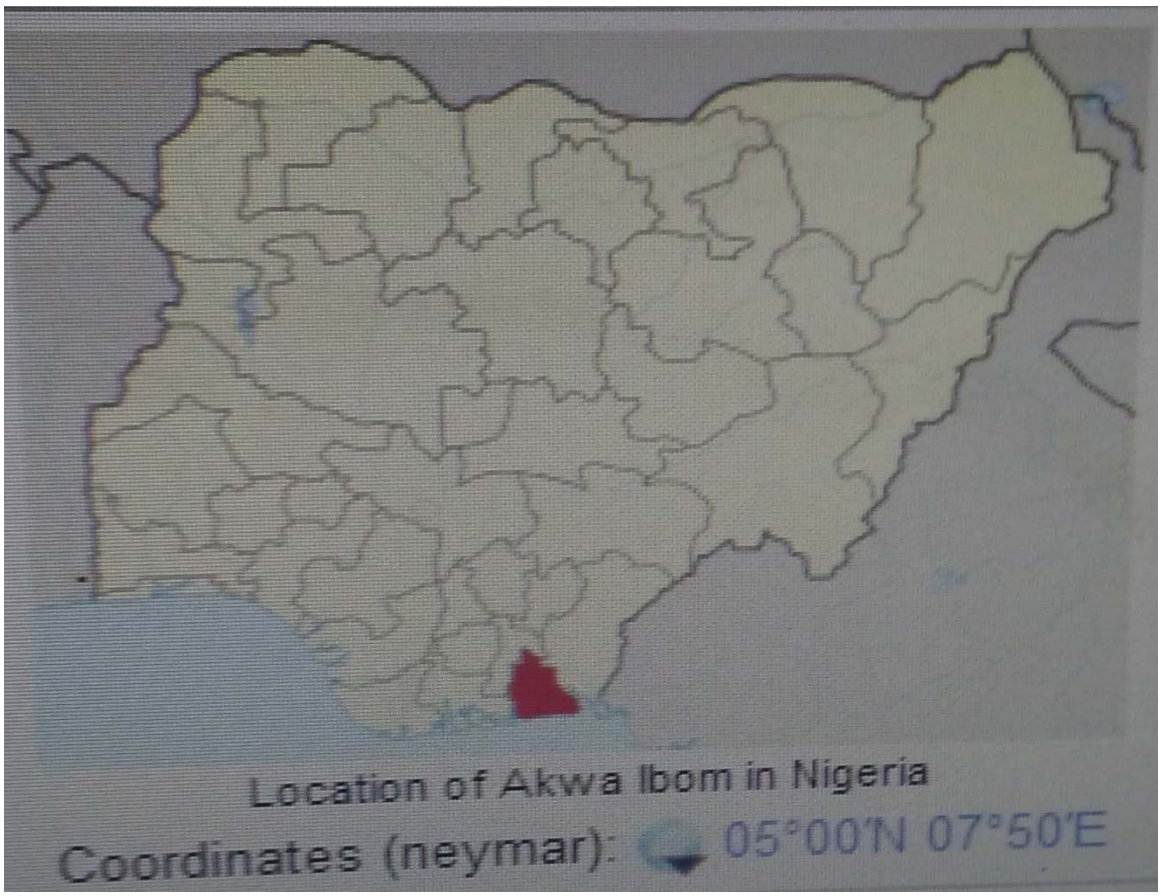

Figure 1.0: Map of Nigeria showing the Study Area

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III. Materials and Methods

This investigation was carried out in some Markets in Akwa Ibom State, Nigeria that more than 8000 people, both young and old, male and female gather periodically for their commercial, economic, social and financial transactions as shown in label 1.0. The markets were carefully selected so as to cut across the three senatorial districts of the state namely Eket, Uyo, and Ikot Ekpene senatorial districts. These markets were given codes for analysis:

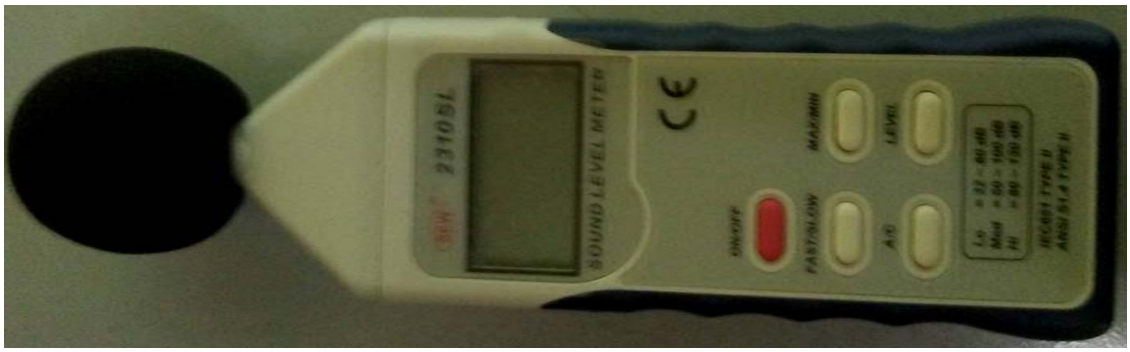

Figure 2.0: Sound level meter 2310SL

Table 1.0: Selected markets, locations, and codes

Market names	Locations (Senatorial Districts)	Codes
Ukam	Eket	M1
Ette	Eket	M2
Nka	Eket	M3
Akpan Andem	Uyo	M4
Itam	Uyo	M5
Kpokpo	Uyo	M6
Awak	Ikot Ekpene	M7
Tor	Ikot Ekpene	M8
Obo	Ikot Ekpene	M9

The objective assessment of noise levels was carried out using 2310SL digital sound level tester with measuring range of 32 – 80 dB for low range, 50 – 100dB for medium range and 80 – 130dB for high range. This 4-digit LCD meter has a maximum and minimum function with A and C frequency weighting selection and has a 0.1dB resolution. Over and under range indicator, AC signal output and low battery detection are other features of this meter.

Sound level measurements were carried out at five (5) different locations in each of the markets with the sound level meter frequency evaluation filter (weighting|) set at A and at slow time evaluation because the noise generated was steady and had no sudden and rapid changes. The A filter was selected since it represents the characteristics curve of the human ear. At a distance of 1.3 to 1.5 m above the ground level and in middle locations in the market where activities were high, minimum and maximum level of noise generated were measured. Since the majority of the vendors in these markets have a low level of education, they were assessed subjectively by direct face-to-face interview to ascertain the impact of the noise on them; the buyers were also interviewed.

A preliminary survey was carried out which informed the setting of the level range of the meter at 50 – 100dB while carrying out the measurements. Measurements were carried out three times a day in a particular market i.e, during morning hours of 9 -11 am, afternoon hours of 12 – 2 pm and evening hours of 4 – 6 pm.

IV. Results

Table 2.0: Measurement locations, period of measurements, and noise levels

S/N	MARKET CODE	MEASUREMENT PERIODS AND NOISE LEVELS					
		Morning (9-11 am)		Afternoon (12-1 pm)		Evening (4 – 6 pm)	
		Minimum dB(A)	Maximum dB(A)	Minimum dB(A)	Maximum dB(A)	Minimum dB(A)	Maximum dB(A)
1	M1	69.8	92.4	65.7	89.1	61.8	77.2
2	M2	65.1	90.3	63.8	87.5	60.2	75.4
3	M3	70.1	94.1	67.3	88.4	64.3	79.7
4	M4	60.4	81.7	59.2	79.1	55.4	66.2
5	M5	67.9	91.8	61.5	83.7	60.1	80.4
6	M6	72.3	96.1	69.6	91.3	64.2	77.4
7	M7	65.2	89.1	62.0	81.2	59.9	70.8
8	M8	67.1	90.2	64.2	89.0	55.1	66.1
9	M9	61.4	82.5	59.8	75.3	55.8	70.1

M = market

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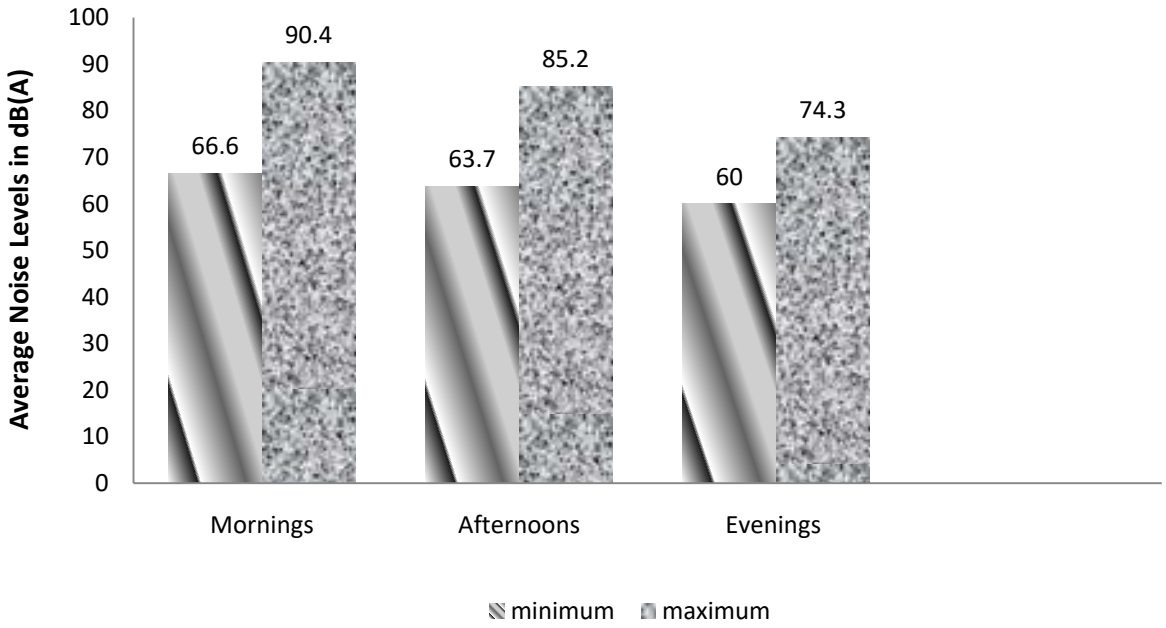

Figure 3.0: Comparing minimum and maximum average noise levels in the mornings, afternoons and evenings

V. Discussion of Results

This study was aimed at knowing the average noise levels generated at selected periodic markets in Akwa Ibom State, Nigeria so as to know whether the noise levels are within the recommended standards and proffer advice if necessary. It was also aimed at looking into the impact of the noise on market vendors, and buyers as they converge for their commercial transactions periodically. From Figure 3.0 it is observed that noise levels were higher during morning periods as compared to the afternoon and evening periods. This is not unconnected to the fact that commercial activities are always at its peak in the mornings as the vendors and buyers come with full energy and would want to sell out or buy their good at these early hours. The increase in commercial activities at this early hour of the morning leads to high level of noise. Noise levels at the afternoon period were less as compared to the morning period as the vendors and buyers must have gone far with their commercial transactions and are somehow tired and satisfied. Noise in the evening period is further reduced as many of the vendors and buyers must have left the market and gone back home after the day transaction.

The average maximum noise levels of 90.4dB(A), 85.2 dB(A) and 74.3 d(B(A) recorded for the mornings, afternoons and evenings as shown in figure 3.0 are not too healthy for the vendors and buyer. The act of buying and selling have become a profession to the vendors and some of them have been in the business for a very long period which makes the prolonged exposure to such a high level of noise not healthy (Osha, 2006).

Noise levels at Akpan Andem market seem to be the least as compared to others. This is because most of the commercial activities are carried out inside lock-up shops between the vendors and buyers, the emitted sound is thereby confined and reduced.

The vendors admitted that their hearing acuity had been reduced as compared to when they started the business. Vendors in Akpan Andem, Nka and Tor markets which operate daily have ended up spending part of their life in the market absorbing these high - level noise dose. Many of them also admitted to the fact that their speech intelligibility and clarity have seriously been affected and they always have to shout on top of their voices as they communicate with their customers. Another effect of the polluted noise environment on the vendors is fatigue as acknowledged by the respondents during the interview.

Emotional, physical, mental, psychological and social well being which are the dimensional concept of quality of life as perceived by individuals gives reasons to look at health related outcome of noise (Akpan *et al*. 2012).

VI. Conclusion

Noise levels emitted in some of the major markets in Akwa Ibom State, Nigeria and the impact on the vendors and buyers as they go about their commercial activities have been investigated. The noise levels were higher than its recommended standards and had been found to have unhealthy effect as acknowledged by the respondents during the interview. Though it is inevitable that these vendors and buyers converge in these markets for their commercial activities as a source of their livelihood, their health status should

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not be jeopardized. Health includes social, physical emotional and psychological well-being of the individual (WHO, 2011).

VII. Recommendation

It is recommended that open market operations where communications are being masked by intruding noise resulting in the communicators shouting on top of their voices should be stopped. Lock-up shops which will otherwise serve as noise barriers should be provided in these markets and commercial activities should be carried out inside the shops, and not in the open.

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