



Determination of Noise Level in Some Selected Major Markets within OBIO/AKPOR Local Government Area Rivers State.

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Abstract

Noise is an environmental pollutant and can lead to some adverse health effects in humans. The noise levels in some selected major markets in Obio/Akpor Local Government Area has been analysed using the KKMOON sound level meter (GM135) to measure the noise levels. The global positioning system (GPS) was used to record the various geographical coordinates of the sample points. The noise levels were evaluated in a total of 10 selected markets. In each of the markets, a total of five sample points were measured giving an overall of 50 sample points for the 10 markets. The computed average noise levels for the 10 sample locations varied from 70.92 dB to 82.28 dB with an overall average of 76.154 dB. The measured noise levels and the computed average levels are all below the recommended safe limit of 90. 0 dB by the World Health Organization (WHO) and 85.0 dB by the Federal Environmental Protection Agency (FEPA). These noise levels obtained indicate that people who do business within these markets are not exposed to any health hazard associated with noise levels above the ambient level. However, routine monitoring of the noise levels is recommended within these markets.



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Introduction

Noise can be explained as an undesirable sound especially above ambient levels in an environment. Noise generation in the environment is growing at an unacceptable level as a result of the increase in human activities.¹ Generally, the world population is increasing geometrically and this accounts for the proportional increase in environmental pollution.

Pollution is the presences of unwanted substance in any part of the environment which most of the time are generated by humans due to its everyday activities. These generated pollutants are usually discharged into the environment as by – products. Some sources of noise pollutions are, natural sources, biological sources and artificial sources.

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The natural sources involve those sources of noise which ordinarily cannot be avoided and are inevitable.² These sources includes high speed wind, thunder storm, hurricanes, gales, earthquakes, high intensity rainfall, hail storms, waterfalls, etc.

Another sources of noise pollution is the biological and includes noise from wild and tamed animals, such noise involves roars of lions and barking of street dogs. It also involves sounds created and generated by humans such as shouting, laughing, singing, weeping and quarrelling.

The artificial sources of noise pollution in the environment are the sounds generated due to man's activities, and may arise from industries, automobiles, railway locomotive engines, construction works, aircraft, musical instruments, factories, loudspeakers and other domestic appliances. The health effects of these noise levels cannot be measured cumulatively.³

The health effect of noise pollution on humans cannot be overemphasized. They may include annoyance, sleep interference, auditory impairments, speech interference and psychological effects.⁴

Auditory impairments may involve the damages done to hearing mechanism due to exposure to higher noise levels. The speech interference is the non-audibility of a person's speech as a result of environmental noise pollution.

Environmental noise pollution can lead to some psychological effects such as changes in the behavior of some individuals and animals. Some of these behavioral changes include annoyance, irritation, weakness. These changes in behavior could result in poor output, reduced efficiency and lead to errors. It can also affect the speech by reducing its intelligibility.⁵

It is estimated that about 5% of the children in developing countries are affected by some levels of speech inadequacies due to exposure to noise above ambient levels.^{5,6} Annoyance and irritation are usually caused by high frequency noise levels. Also sounds of very greater intensity can cause mental imbalances. Some Neurotic individuals are more sensitive to noise level.⁶ Noise levels below 85.0 dBA decibels are usually said to be free from noise pollution while the levels above this value are regarded to be unsafe.⁷

Higher noise levels can reduce the quality of good sleep and affect the overall mental and physical health of an individual. The intensity of noise level at night is estimated to be at the range of about 40 dBA and can result to sleep disturbance.⁸ Noise intensities at the range of 50dBA to 60dBA can affect the center of the brain and lead to change of normal sleep patten and distort deep sleep.⁶



FIG. 1: (Kkmoon Sound Meter, GM135)

Materials and Methods

Materials

The KK Moon sound level meter (GM1352) was used for recording the noise level in the study sites. The KK Moon sound level meter (GM1352) has SPL, L_{eq} , L_{max} , L_{min} and S_{EL} measurement. It is very simple to operate and is an ideal and essential tool for noise measurement and data collection in the field. It has a wide measurement range and a host of features and linear weighting.

Method

The KK Moon sound level meter (GM1352) is a hand – held instrument. At each sampling point, the instrument was raised to a height of about 50cm above the ground level. The noise levels were measured at five different sampling points for each location at a considerable distance away from the preceding measurement. The analysis of results used in generating our results was the Statistical Package for the Social Sciences (SPSS). The expression for the mean value of the measured noise levels within the sample locations is given in equation (1). The computed mean noise values are expressed in unit of Decibel (dBA).

$$\bar{x} = \frac{\sum x_i}{n} \dots(1)$$

Results and Discussion

The mean of the measured Noise levels in the various sample locations indicate that in Rumuola market the noise level varied from 70.1-74.9 dB, with an average of 71.92 dB, Rumuokwuta market, the noise levels varied from 73.6-79.6 dB with an average of 76.8 dB, in Rumuigbo market the noise level ranged from 63.3-104.4 dB with a computed average of 81.9 dB, the noise levels in Rumuokoro market varied from 69.0-81.9 dB, with an average of 76.88 dB , Wimpey market ranged from 71.4-90.9 dB with an average of 76.86 dB, Junction market changed from 67.4-74.7 dB, with an average of 70.92 dB, the noise levels at Iwofe market ranged from 80.7-90.3 dB, with an average of 82.28 dB, the noise level at Ozuoba market ranged from 72.0-93.7 dB, at Choba market, the noise level varied from 72.0-93.7 dB, within average of 76.82 dB, while the noise levels from Rukpokwu market ranged from 70.9-75.8 with an average of 70.72 dB. All these values obtained indicate that Iwofe market has the highest average noise level of 82.28 dB and this can be attributed the high presence of milling machines within the market.

Table 1: Result From Market Analyses

S/N	Name of Market	Latt	Long	1st Reading	2nd Reading	3rd Reading	4th Reading	5th Reading	Average Reading
		(N)	(E)	dBA	dBA	dBA	dBA	dBA	dBA
1	Rumuola	4.83158	7.00437	70.2	70.1	70.1	74.9	74.3	71.92
2	Rumuokwuta	4.83998	6.98591	78.6	77.9	74.2	73.6	79.7	76.80
3	Rumuigbo	4.8396	6.98705	63.3	85.6	77.9	104.4	78.3	81.90
4	Rumuokoro	4.84745	6.99042	81.9	83.3	69.0	72.7	77.5	76.88
5	Wimpy	4.84958	6.79493	71.4	76.6	73.0	72.4	90.9	76.86
6	Market Junction	4.83391	6.79493	67.4	72.6	68.6	74.7	71.3	70.92
7	Ozuoba	4.87416	6.92984	86.9	79.5	74.2	73.9	67.7	76.44
8	Iwofe	4.82014	6.95487	74.6	81.0	84.8	80.7	90.3	82.28
9	Choba	4.89247	6.90057	72.0	72.2	93.7	69.1	77.1	76.82
10	Rukpokwu	4.90153	7.00103	70.9	75.8	63.1	72.1	71.7	70.72

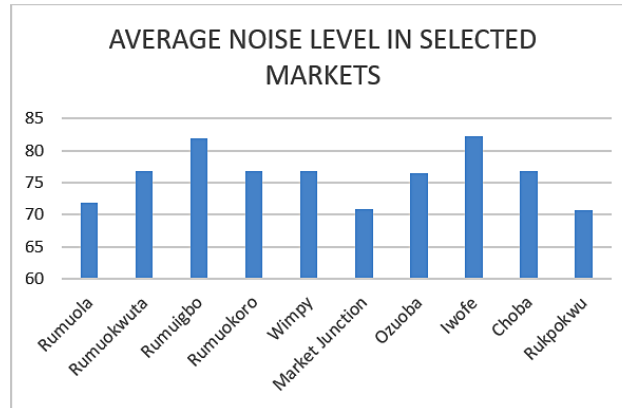


Fig. 2: Chart Showing Average Noise Level of Selected markets

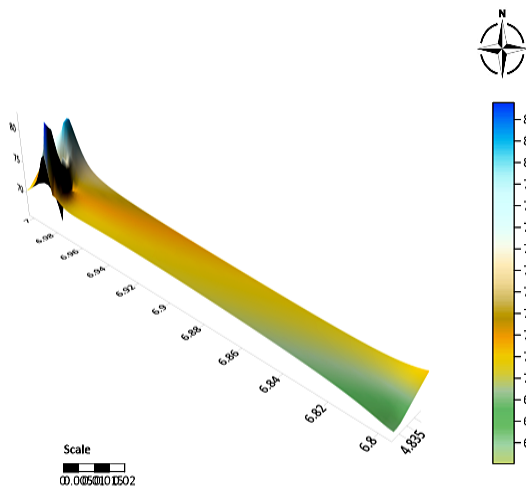


Fig. 3: Surface map of the Noise level in Ten Market in Obio/Akpor LGA

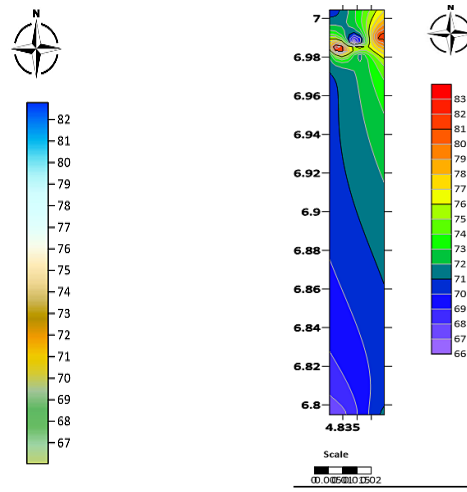


Fig. 4: Contour map of Noise level in Ten Market in Obio/Akpor LGA

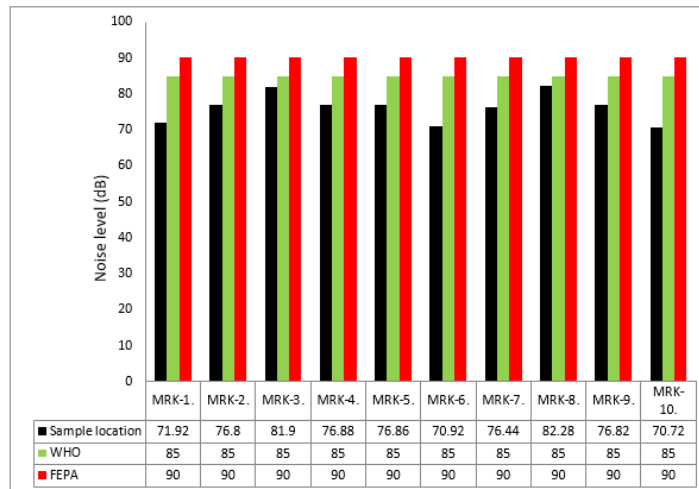


Fig. 5: Comparison of Noise level in Ten Market in Obio/Akpor LGA

A similar work⁹ on the assessment of Noise Pollution in wurukum and North Bank Areas of Markurdi, Benue State measured Noise level which varied from 50.7 -84.4 dB. Also, another work¹⁰ on level of Sound Exposure in Residential and Peace Zones of Kathmandu measured .

Noise levels which varied from 62.4-71.88 dB. These measured Noise Levels agree with the Noise Levels measured in this work.

All these measured Noise levels are within the recommended safe limit by WHO of 90.0 dB and 85.0 dB respectively. Therefore, those who do business in these markets may not be in danger of any health hazard from due to exposure to higher Noise level above ambient level.

Conclusion

The KK Moon sound level meter (GM1352) meter was used to obtain the noise levels in the 10 selected markets within Obio/Akpor Local Government Area. It provides a database on the noise level within these markets.

While some readings from some parts of the market has shown significantly low level of noise (63.1dBA – 63.3dBA), some other parts of the markets has shown significantly higher noise levels. However, the mean noise levels obtained for each market are all below the set standards of 85dBA Federal Environmental Protection Agency of Nigeria (FEPA) and 90dBA by the World Health Organization (WHO).¹¹⁻¹²

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Conflict of Interest

There are no conflicts of interest in this research work.

Data Availability Statement

All the database produced in this research work are contained in the manuscript.

Ethics Statement

This research work did not involve the experiment on any humans or animals.

Author Contributions

- **Dr. Orlunta Aloysius Ndubisi:** provided the theoretical background and carried out the field work
- **Dr. Mamah, Ifeyinwa Miriam:** assisted in the data analysis and the interpretation of the results.

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