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ASSESSMENT OF NOISE POLLUTION IN SELECTED LOCATIONS IN OTA, NIGERIA

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ABSTRACT

The subject of noise is not easily understood by many as a physical pollutant. This is because the human ear gradually gets automatically adjusted to the level of sound, such that increase in the sound level is not easily observed. It is therefore important to assess the environment where noise levels have risen up using suitable tools of measurement and analysis to determine whether or not a definite nuisance exists. This study aims to reveal the growing level of noise pollution in Ota, Ogun State, Nigeria. The noise level measurements was conducted using sound level meter in five different areas in Ota and three locations inside Covenant University to serve as control. The study showed that the noise pollution levels measured at some locations in Ota exceeded the standards and limits set by the World Health Organization (WHO), Federal Environment Protection Agency (FEPA). Results revealed that there was a considerable increase in noise pollution in Oju-ore and Toll-gate due to high numbers of vehicular movement and road congestion within Ota. The study therefore concluded that there should be an enforcement and adherence to the regulation regarding noise pollution limit.

Keywords: Noise level, pollution, vehicular movement, noise limit, Ota
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1. INTRODUCTION

Noise is inevitable. We come across it in our daily lives while driving, working and many routine activities. Many interact daily with machinery, either during working activities, or domestic chores, which produce noise levels large enough to be sources of environmental concern. The noise levels, which vary from place to place, are increasingly becoming a source of concern. The daily emergence of factories and huge mechanical industries coupled rapidly developing community brings to light the various hazards and danger of working in a noise-polluted environment. Modern life has given rise to a new form of pollution, noise. Crowded cities and towns, mechanized means of transport, new devices for recreation and entertainment are polluting the atmosphere with their continuous noise. Noise is no doubt a normal phenomenon of life and is derived to be one of the most effective alarm systems in

man's physical environment. However, it is continuously disturbing human peace and tranquillity [1]. Sound is a form of energy emitted by a vibrating body that causes the sensation of hearing on reaching the ears through nerves. Noise is defined as unwanted sound [2]. Not all forms of sound produced by vibrating bodies are audible. The frequency ranges of audibility are from 20 Hz to 20 kHz [3]. Noise is a natural consequence of whatever we do. Noise is one of the plagues of the modern world. It is an unwanted product of our technological civilization, and is becoming an increasingly dangerous and disturbing environmental pollutant. Only recently has it begun to gain attention. Since the industrial revolution, the daily lives of people, particularly in urban environments, have been invaded by unwanted and disruptive sounds. Traffic noise, which has been generally accepted without complaint has recently become noticeable and increasingly intolerable. Aside from the increase in number of operating motor vehicles, the universal adoption of the use of diesel engine which has further increased the level of noise produced by these automobiles.

According to the World Health Organization, noise in big cities is considered the third most hazardous environmental type of pollution, preceded only by air (gas emission) and water pollution [4]. Considered largely as a major problem of annoyance in cities, the subject of noise pollution has been an unavoidable issue since the seventies. Pollution in large cities and constantly urbanized communities and towns is due to the fact that the urban environment is becoming increasingly crowded, busy and noisy. According to various researches that have been carried out, road traffic is the leading source of noise in urban areas [5]. It has been generally accepted that noise pollution, particularly road traffic noise is severe in rapidly expanding cities such as those of South-eastern and South- western Nigeria where insufficient control is exercised and cities are poorly planned [6]. [7] reported the noise level measurements in residential, industrial and commercial areas of Delhi, India and concluded that commercial areas have the highest noise levels followed by industrial and recreational areas. [8] On the other hand reported that noise level measurements recorded in industrial areas were higher than those obtained from commercial and residential areas of Ilorin, Nigeria.

The adverse effects of noise pollution are numerous and stretch over a wide range. It has far-reaching effects on our mental and physical well-being. The length of exposure to the pollutant determines how badly an individual is affected by noise pollution. Noise pollution effects can be categorized into two: namely auditory and non-auditory. The adverse effects of noise pollution observed are as a result of continuous constant exposure to it. Auditory effects also known as physical effects hearing defects. Non-auditory effects are associated with effects on work performance, such as reduction of productivity and misunderstanding what is heard; psychological effects such as disorders, sleeplessness, irritability and stress; physiological effects, such as increased blood pressure, irregularity of heart rhythms and ulcers. Noise pollution can play havoc with the nervous system affecting the physical and psychological behaviour of individuals [9 – 14]. People differ in their sensitivity to noise, in that, what one perceives to be sound may be perceived as noise by another. Therefore, the aim of this research is to assess noise pollution levels and its sources in some locations in Ota, Ogun State and its possible adverse effects on the populace in that selected region.

2. METHODOLOGY

2.1. Area of Study

The area of study in which the research was carried out is Ota, Ogun State. Ogun state is located in south western Nigeria. Rapidly becoming a Nigeria's new industrial hub, many factories and manufacturing industries are located in Ogun state. Some of these industries

located in Ota include Obasanjo Farms Nigeria Ltd, Honda Manufacturing Nigeria Ltd, Toky Chemical Manufacturers, Capital Trust Brokers Ltd. Tagged as Nigeria's new industrial hub, Ogun state is gradually becoming the choice set-up area of many companies and industries [15 – 17]. Ota is located within Ado-Odo Local Government of Ogun state. It has twenty local government headquarters with a population of 3,751,140 people [18]. Standing on the border of Lagos metropolis and Ogun state, Ota has become the home of many industries and factories. This rising emergence of factories is not without consequences. With urbanization comes population growth. Increased population leads to increase in noise population in various parts of that region. Due to the rising urbanization, population growth is inevitable and so is the increase in noise pollution [19]. The locations selected for this study are;

Oja-Ota: This is a major market located along Sango/Idiroko expressway. On specific market days (every 5 days), there is a great influx of people that come to the market to ply their trade.

Oju-Ore Roundabout: A busy commuter road which links major roads together along Idiroko expressway. This axis serves as a major point where buses are boarded and a mini-market also lies within this area.

Toll-Gate: This is the border between Lagos metropolis and Ogun state. This is where various buses, cars, motorbikes wait to pick up passengers. There is always a lot of hustle and bustle in this area so it provided a good location to take readings for noise levels.

Sango: This serves as a major entry point into Ota, Ogun state with overhead bridge. This route also acts as a major route for automobiles going to various places, both within Ogun State and to other locations outside Ogun State.

Road Side (Idiroko Expressway): Noise readings were taken from this source in other to be able to evaluate the noise levels from roadside traffic, which has been widely said to be the leading cause of noise pollution in urban areas; and three locations in Covenant University to serve as control

2.2. Noise Level Measurement

A digital sound level meter model no DSM8922 with an RS232 Output was used to measure the noise level in an environment. A sound level meter is a device used to measure how loud, in decibels, a given environment is. The sound level meter was held at arm's length during measurements, to reduce the effects of the body on the measurements, or to be fastened to a tripod stand for more stability. It has features such as a measurement quality microphone, a mic preamp, frequency weighting networks, an RMS detector circuit, averaging circuits, meter display, AC and DC outputs used to feed other measurement devices or for recording. The Sound level meter was comfortably in hand with the microphone pointed towards the noise source at a distance of not more than 0.5 m and 1.2 m above ground level. Noise measurements were carried out on specific days at the designated locations. Five (5) measurements were taken at each sampling point for several days.

Figure 1 Sound level meter

3. RESULTS AND DISCUSSION

Table 1 is the mean of the noise level measured at the five locations in the period of two weeks and Figure 1 is the pictorial representation of the measured value. Figure 1 revealed that Oju Ore had the highest mean noise level (87.69 dB) closely followed by Toll gate noise level (86.99 dB) there was high correlation in the recorded values because the two locations have nearly the same features. The noise level was due to the presence of loudspeakers, from the roadside noise from the expressway opposite it and due to high traffic and vehicular movement. The mean noise level measured at Sango was a little bit lower than that of the road side traffic this is because there are many road links (pathways) which reduced the concentration of the noise to a dual carriage road. Oja Ota had the least noise level due to the fact that there are not much vehicular movement inside the market. The order of the noise level is Oju ore > Toll gate > Road side > Sango > Oja-ota. Some of the measured noise level measured exceeded 90-100 dB which is far above the 85 dB that was reported to be the starting level of ear damage [20].

The measured noise level in the control location (Covenant University) is much lower than those measured in Ota town. Daniel Hall had the highest noise level due to the fact that the hall is located beside the the road, while Chapel is a place of worship and without service there will be minimal noise from the building while days with high reading were service days. Cafetaria had the least noise level it was below (70 dB). In all the location in the control area the mean noise level is below 80 dB. The results of this work is in consonance with the research work done by [20], where road traffic was judged to be the highest source of noise in urban environments, this study revealed that road traffic and high vehicular movement rank as the highest source of noise pollution.

The noise level measured are higher than the recommended limit set by the WHO standards set for Day time exposure for industrial and commercial areas (65 dB for Industrial areas and 55 dB for residential areas). However, some of the locations were within the Federal Environmental Protection Agency [21] guidelines which stated that noise limits in excess of 95 dB should not be heard for more than 4 hours at a stretch. All the locations visited in Ota that is, outside the control location had readings in excess of 95 dB at one time or the other which also violates the FEPA standards. At all the places visited most traders and occupants in the environment are staying close to the noise source consistently for long period of time.

Table 1 Mean noise levels in Ota

Oju Ore (dB)	Sango (dB)	Oja Ota (dB)	Toll Gate (dB)	Road Side Traffic (dB)
102.9	90.8	88.9	83.7	87.5
95.2	86.3	83.7	81.2	82.6
80.3	91.3	84.9	84.5	80.3
82.6	90.6	95.6	99.2	83.3
92.7	84.5	91.4	88.9	86.5
95.1	82.3	81.5	84.0	82.0
93.5	81.9	88.6	81.5	79.6
78.0	85.5	73.4	85.5	76.8
89.6	78.5	82.9	80.7	79.8
81.3	83.6	84.9	82.3	97.7
83.9	88.7	68.5	92.3	94.1
84.2	79.3	84.5	96.5	80.4
90.2	89.3	83.9	91.2	80.8

Table 2 Noise pollution level in Covenant University

Cafeteria (dB)	Daniel Hall (dB)	Chapel (dB)
70.3	81.9	70.7
69.3	79.8	76.7
55.5	75.5	71.3
65.8	83.0	73.4
71.8	77.7	81.4
68.2	80.7	71.9
70.6	73.2	69.5
71.9	84.4	71.9
74.9	70.8	70.1
70.2	83.1	76.9
67.7	80.0	65.8
67.4	78.2	72.2
72.5	78.9	76.1

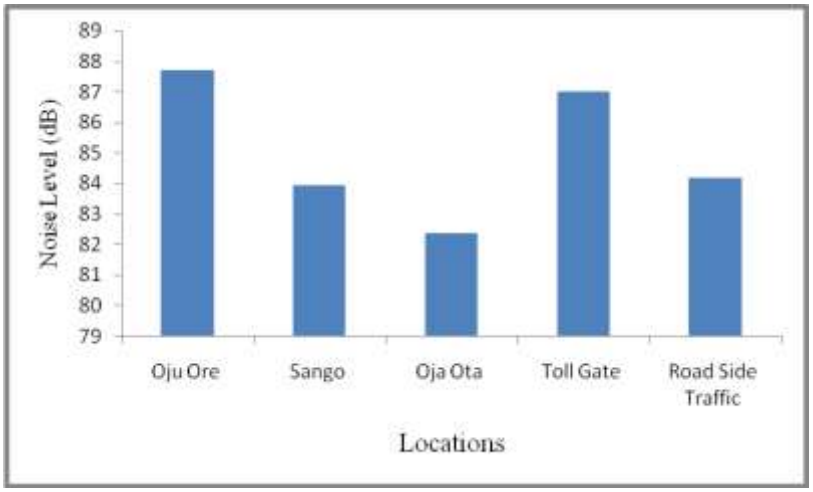

Figure 2 Mean noise level in the different places in Ota

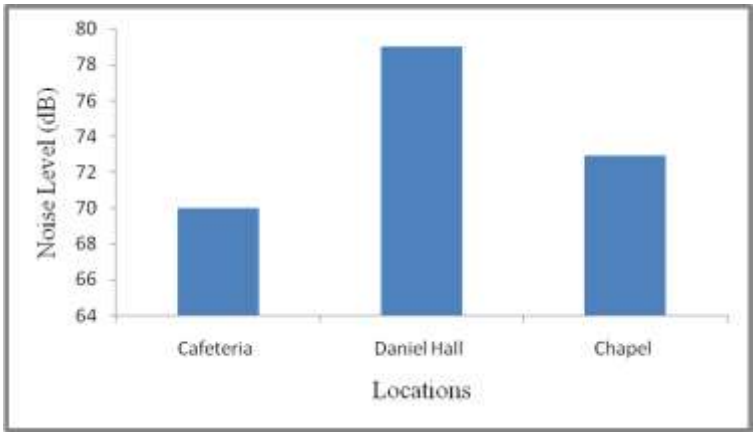

Figure 3 Mean noise level in Covenant University (control location)

4. CONCLUSION

This research studied the noise level in Ota town and within Covenant University using sound level meter. It showed that Ota is growing in a rapid rate and the noise pollution measured in some locations has reached levels high enough to be considered as a major environmental concern. This study revealed that the increase in the noise level can be attributed to the increased number/volume of vehicular movement. One of the major concerns for rising increase in the number of noise-related health issue can be traced to ignorance. Many people do not consider noise as a form of pollution, for this reason, it is widely ignored because it does not pose immediate health risk. However, the aftermath of being in a noisy environment have cumulative effects and the adverse effects are higher when living or staying in the noisy area for long periods. The research therefore recommended that, there should be public awareness of the dangers posed by noise pollution. Personnels working in highly noisy area should wear ear protectors. There should be strict enforcement of environmental policies regarding noise pollution limit for industries and places of work where the noise levels are very high.

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