



Assessment of Noise Levels in Abali Motor Park Port Harcourt, Rivers State.

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ABSTRACT

Motor Park is an important part of a growing and a developed city as people converge in parks to ensure transportation. The study examined Noise Level in Abali Motor Park Port Harcourt. Noise level measurements in the motor parks were conducted with a type II noise meter called Sound Level Meter GM1352, measured in Decibels (dB). Measurements were carried out at five points within the selected motor park (Abali Park) during morning, afternoon and evening time periods from Monday to Sunday. The minimum mean and maximum mean noise levels for morning time periods were between 74.3 dB(A) and 85.1 dB(A) respectively. The afternoon time periods showed a minimum mean noise level of 67.8 dB(A) and a maximum mean noise level of 82.7 dB(A). In the evening time periods, A mean noise levels were between the lowest of 68.7 dB(A) and highest of 83.8 dB(A). The day time noise levels for the commercial location therefore revealed that at Abali Motor park, all noise levels measured exceeded the acceptable noise pollution levels (> 65 dB(A)). The findings of the study showed that high noise levels are generated in the park and exceeded WHO limits therefore, strict policies in reducing noise pollution in motor parks should be ensured by the government.

Keywords: Abali Park, noise pollution, Port Harcourt, noise level

Introduction

An important factor for the life quality in urban centres is related to the noise levels to which the population is submitted. Several factors interfere with the amount of noise pollution throughout the city. Growth in terms of economic, social development and population increases the tendency towards increasing noise generation (Baloye and Palamuleni, 2010). Considering the connectivity of vicinity, transport routes could result to an increase in noise volume generated. Noise is considered a growing health threat, and if, left unchecked could result to hazardous conditions (Adejobi, 2012).

Motor parks perform quite a number of other functions in addition to the primary function of acting as a transport terminal. Indeed, very many of this type of public space, especially in urban centers act as the nerve centre of economic activities of where they are located. Parks are therefore where there are concentration of people and economic activities. With the agglomeration of economic activities and concentration of people in parks, existing environmental service are over-stressed (Pathak *et al.*, 2008). Crowded cities and towns, mechanized means of transport, new devices for recreation and entertainment are polluting the atmosphere with their continuous noise (Li, 2013). 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 with developing community brings to light the various hazards and danger of working in a noise-polluted environment (Mangelekar *et al.*, 2012)

In Port Harcourt city, Nigeria, noise pollution has increased as a result of increased commercial and industrial activities; population growth, expansion of highways and increase in the number of automobiles (Oyedepo, 2012). Khilman (2004) and WHO (2005) reported that environmental noise pollution was the third most hazardous form of pollution behind air and water pollution. Noise pollution is said to occur if the level is high beyond acceptable limits. Anyakoha (2007) reported that noise was due to vibration of irregular frequency such as the rattling of a wheel on a rough road. According to Anomohanran *et al.* (2008), noise is an environmental pollutant that is increasing very rapidly as a result of improvement in commercial, industrial and social activities.

The growing vehicular population gives rise to noise pollution and associated health effects and can cause both short-term and long-term psychological and physiological disorders. Environmental noise causes numerous psychological effects such as annoyance (Ouis, 2001; Ohrstrom *et al.*, 2004; Pathak *et al.*, 2008), anxiety, depression and serious health effects such as cardiovascular disease (Babisch *et al.*, 2005; Babisch, 2008; Selander *et al.*, 2009; WHO- JRC, 2011; Davies and Kamp, 2012; Jamir *et al.*, 2014). The objective of the study was to determine the environmental impact of noise pollution in a major Abali park, a major motor park in Port Harcourt.

Methodology

Study Area

Abali park is one of the major motor parks in the center of the city of Port Harcourt. Port Harcourt is the capital of Rivers State, and it lies on the banks of the Bonny River about 66 kilometres upstream from the Gulf of Guinea in south western Nigeria. Port Harcourt is located geographically on latitude $4^{\circ} 45' 00''$ N and $4^{\circ} 55' 00''$ N and longitude $6^{\circ} 52' 30''$ E and $7^{\circ} 10' 00''$ E (Figure 1). Port Harcourt is a major industrial centre, with several multi-national firms located there, and the most important oil refining city in Nigeria. In 2007, over 1.6 million people lived in Port Harcourt, and almost 3.7 million lived in the Greater Port Harcourt region.

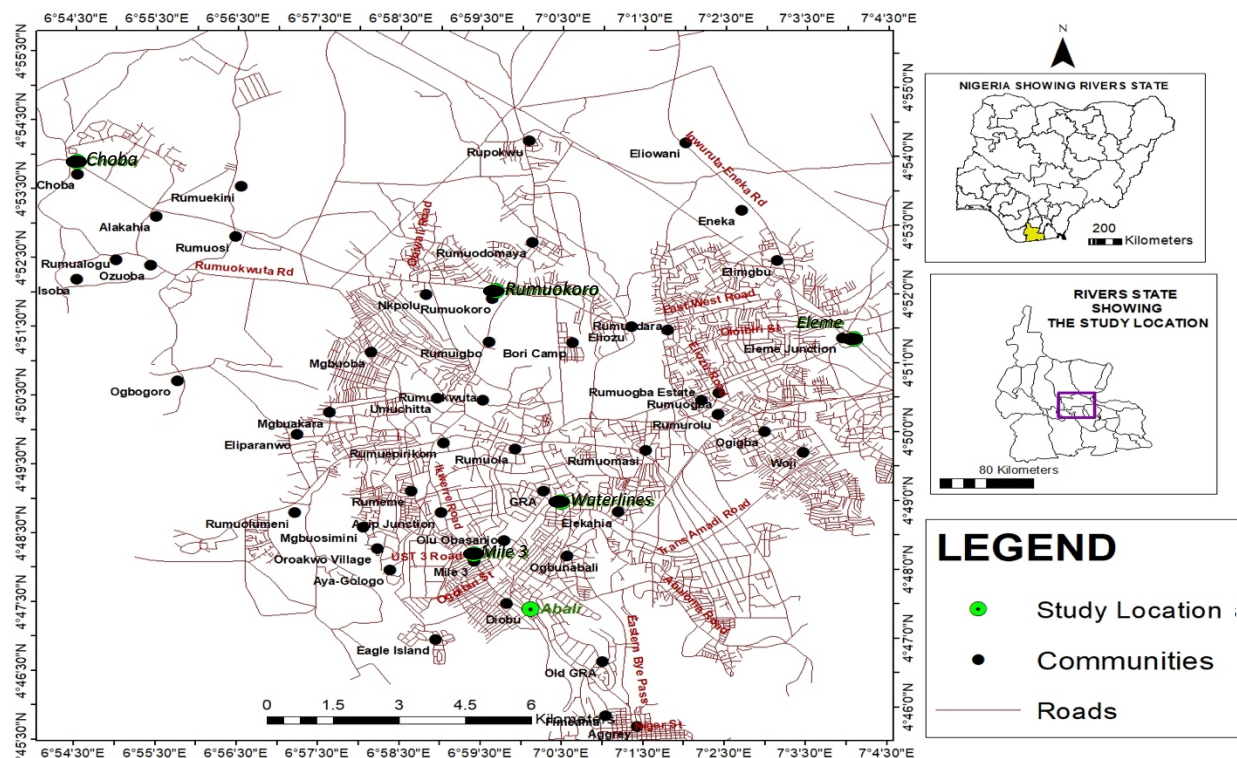


Figure 1: Map of Port Harcourt Metropolis showing the Study Location
Source: Adapted from Rivers State, Lands and Housing

Sample Collection

Noise level measurements in the motor parks were conducted with a type II noise meter called Sound Level Meter GM1352, measured in Decibels (dB), and held at about 1.2 metres above the ground. Measurements were carried out at five points within the selected motor park (Abali park) during morning, afternoon and evening time periods. Noise level measurements were conducted in the morning time between 7.00 am and 10.00am, afternoon time between 12.00pm and 3pm, as well as during the evening time between 4.00 pm and 7.00 pm for a period of 7 days (Monday

– Sunday) at each selected motor park. During each time frame, each day of sample, noise levels were measured from five (5) different points which were randomly selected around the selected motor park, based on noise pollution sources.

Method of Data Analysis

The descriptive and inferential statistics was employed for data presentation and analysis for the study. The data collected on noise levels among selected motor parks were presented in tables, charts and graphs for clarity purposes. The descriptive statistics was used to explain the information obtained from the data collected from direct noise measurements; while the inferential statistics was used to explain the results of the stated hypotheses for the study. The stated hypothesis 1 was tested using the One-Sample T-test. The One-Sample T-test was employed because the study is trying to check if there is a significant difference between the observed values (mean noise levels) and WHO environmental noise pollution standards. The stated hypothesis 2 was tested using the ANOVA statistics because the study attempted to establish variations between and within noise levels in the study area. All statistical analyses were performed using the Statistical Package for Social Scientist (SPSS) version 24.0

Results and Discussion

The information for the mean noise levels measured at the Abali Motor park at different time periods is presented on Table 1. The distribution showed that mean noise levels varied among sampled points from Monday to Sunday. However, noise levels were generally higher in the

Table 1: Mean Noise Levels at Abali Motor Park at different time periods

Time Periods	Points	Monday Mean±SD	Tuesday Mean±SD	Wednesday Mean±SD	Thursday Mean±SD	Friday Mean±SD	Saturday Mean±SD	Sunday Mean±SD
Morning (7-10am)	1	78.2±4.4	79.11±2	81.0±3.8	77.3±1.9	82.7±5.2	81.5±4.1	74.7±7.5
	2	76.2±4.8	80.3±1.3	82.4±3.2	83.3±1.6	80.1±5.5	82.6±3.1	79.6±0.9
	3	82.5±1.9	76.5±1.4	75.9±4.8	80.1±4.4	83.7±3	77±6.5	79.6±1.2
	4	76.1±2.9	81.3±0.6	82.5±2.1	85.1±4.6	78±1.5	83.3±1.6	76.4±4.9
	5	74.3±3.8	76±3.1	75.3±3.9	80.1±2.2	82.1±2.2	76±4.8	81.3±1.3
Afternoon	1	73.4±4.9	80.2±2.8	77.9±1.5	78.5±1.9	75.8±3.6	78.3±1.6	72.3±5.3

(12-3pm)								
	2	72.3±6.9	75.1±8.2	72.9±4.6	78.7±2.2	79.9±1.7	76.2±5.1	67.8±1.2
	3	72.5±2.3	80.1±4.8	72.6±2.1	80.4±6.7	80±9.1	75.7±3.9	77.9±2.5
	4	72.9±3.8	82.3±3.8	76.5±5.9	76.5±2.1	74.3±7.2	82.7±5.1	78.9±8.2
	5	72.5±4.2	79.1±4.24	74.1±3.0	76.2±3.8	76.3±3.3	72.6±5.4	77.4±9.7
<hr/>								
Evening								
(4-7pm)								
	1	81.3±1.2	74.3±9.9	76.9±2.2	79.1±8.8	79.4±7.3	77.8±2.7	75.6±1.6
	2	76.4±2.5	80±9.2	83.8±2.8	80.2±1.6	80±8.3	83.8±2.8	81.2±4.4
	3	77.6±3.2	78.9±1.5	73.7±4.9	73.7±6.5	74.1±5.1	75.8±4.7	80.2±5.5
	4	76.7±3.6	76.7±8.6	77.0±5.8	78.7±2.0	82.3±1.9	77.6±6.3	73.2±11.2
	5	68.7±1.8	77.6±4.3	79.3±3.5	79.3±2.8	76.8±7.3	82±4.6	76.2±3.0

morning and evening time periods than at the afternoon time periods in the study area. This is an indication of peak and off-peak time periods of the day. Usually, noise levels tend to increase during the peak periods as these periods are periods that experience higher traffic flow of vehicles on Port Harcourt roads. Also, coupled with several business and socio-economic activities, the sampled points around each selected Motor Parks were clear indications of high commercial activities all round. The findings agree with the findings of Riyad *et al.*, (2020) who studied noise pollution by traffic during peak and off-peak periods in Dhaka city. The study discovered that high noise levels were recorded at commercial roads especially during the peak periods of the day. The highest mean noise level values recorded in the study area were 83.8 dB(A) on Wednesday and Saturday (morning and evening time periods respectively); while the lowest mean noise levels recorded value of 67.8 dB(A) on Sunday during the afternoon. The least noise level on Sunday can be a function of the less travelling activity on the very day as people converge in churches and in their house and less need to use the road and motor parks.

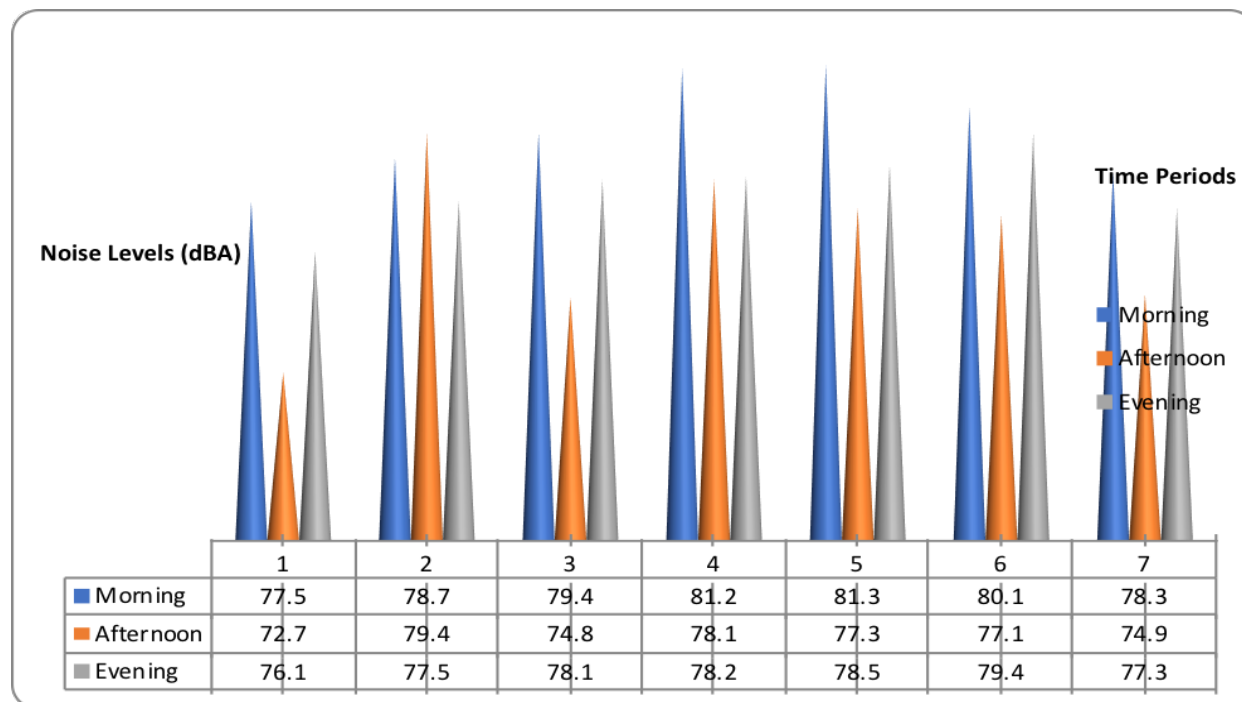


Figure 3: Column Mean Analysis of Noise Levels among Time Periods in Abali Motor Park

The information on Figures 3, revealed that generally the afternoon time periods recorded lowest mean values for the study. The morning time and evening time periods recorded slightly higher column mean values. Therefore, in the study area, using the information provided on Table 2, the time periods for high noise levels was determined. Since the study areas is a more of commercial centres than industrial, and not residential. The noise levels during the day time period (periods between 7.00am to 7.00 pm conducted for the study as morning, afternoon and evening time periods) as no evening time noise levels exceeding 7.00 pm was conducted for the study. The day time noise levels for the commercial location therefore revealed that at Abali Motor park, all noise levels measured exceeded the acceptable noise pollution levels (> 65 dB(A)). The findings of the study showed that high noise levels different from WHO limits can be observed in urban centres especially at

Table 2: Descriptive Statistics for Abali Motor Park

Time periods	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Morning	35	79.489	3.0039	.5078	78.457	80.520	74.3	85.1
Afternoon	35	76.309	3.3809	.5715	75.147	77.470	67.8	82.7
Evening	35	77.883	3.1961	.5402	76.785	78.981	68.7	83.8
Total	105	77.893	3.4246	.3342	77.231	78.556	67.8	85.1

points of commercial centres as revealed by the sampled Motor Park in the study area therefore stands with past researches. For instance, the findings of Baboye and Palamuleni (2015). The evening time periods showed more homogenous groups at sampled points (1 to 5), followed by the afternoon time periods before the morning time periods. High noise levels, higher than permissible limits are indications of an unhealthy environment and these have several health implications on the people overtime. As stated by OSHA (2020) high noise levels have serious health implications for both short term and long term exposures; amongst ailments mentioned are permanent hearing loss, physical and psychological problems.

Conclusion

Findings of this study revealed that measured noise levels were higher than international standards (WHO and USEPA) and national standards (NESREA and FMENV) in the study area indicating an unsatisfactory levels which are injurious to human health especially among those with high exposure levels. Thus, as a matter of urgency, measures to reduce the high noise levels at Motor Parks will go a long way to salvage the situation in the study area. Stricter laws should be established to put noise pollution issues in check at Motor Parks. This will ensure the management of noise levels even at the parks in the face of socio-economic activities

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