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Understanding the Health Effect of Human Exposure to Noise: A Strategy to Enforce Noise Standard and Control in Ibadan Metropolis OYO State Nigeria

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Abstract

Noise in an urban area has always been a global issue. This study focuses on industrial noise (sawmill) in Ibadan metropolis. The study examined the level of noise in purposively selected 4 sawmills and ambient environment. 87 respondents including the operators were interviewed on their level of knowledge of health effect of human exposure tonoise. Simple descriptive statistics (percentage, mean, and standard deviation) were used to analyse the data. The resultrevealed that the level of knowledge of the people on health effect of human exposure to noise is that weighted mean is 1.74 which indicated a low knowledge based on the decision rule. The operators of the sawmills also denied knowledge of National Environmental Standard and Regulation Enforcement Agency (NESREA) as the legal Authority which control noise level in Nigeria. Therefore, the NESREA and Ministry of Environment should intensity efforts to jointly organized periodic audit. Audit Checks on industrial projects in general and sawmills in particular to establish recognition and ensure compliance with the stipulated noise limit in the law.

Furthermore, public awareness should be organized for the benefit of the general public, industrialists and operators of sawmill in particular in order to increase their knowledge about the harmful effect of noise and recognition of NESREA as authority charged with the responsibility of controlling noise in Nigeria.

Keywords: Environmental Noise, Industrial Noise, Regulatory bodies, Health effect of noise.

Introduction and Statement of the Problem

Noise is an unwanted sound and one of the most disturbing features of modern civilization. There are numerous research Findings which support the fact that specific disorders such as cardiovascular disease, annoyance, speech interference and sleep disturbance can occur due to exposure to noise. Noise can also cause some psychological and non-specific disorders, temporary and even permanent impairment to hearing from prolonged exposure to excessive noise (Muralikrishna & Manickam, 2017).

Noise affects both workers and people who reside close to the factories (Orikpete et al., 2021). The consequences of industrial and environmental noise are diverse, serious and due to its prevalent exposure could be very widespread (Basner et al., 2017). According to Orikpete et al. (2021), noise causesdiseases such as high blood pressure, heart attack, circulatory problems, cardiac disturbances, neurosensory, motor impairment and even more social conflicts at home and at work.

WHO (2011), carried out research which examined the relationship between environmental noise and cardiovascular disease, sleep disturbance, tinnitus, cognitive impairment in children and annoyance. The source of data for this study wasfrom various large-scale epidemiological studies of environmental noise in Western Europe, span over a ten year period, and discovered that at least one million healthy years of life are lost each year in Europe alone due to environmental noise pollution (Orikpete et al., 2021).

Mustaghace et al. (2013) examined the effects of industrial noise on the hearing acuity of people working in the tiles and ceramic industries in Iran. The authors carried out annual audiometric testing on 555 workers who were divided into four groups depending on the level of noise that each group would be subjected to. The authors compared results of audiometric tests obtained in the first year with that obtained in the second year to find out if there were any discrepancies or changes in hearing ability over the two year period. The results of the study showed that the effect of noise was mostly noticeable at audiometric frequencies of 4000, 6000 and 3000HZ. Based on the results obtained, the authors concluded that there is a large occurrence of occupational noise induced hearing loss among workers in the tile and ceramic industries in Iran therefore, it is recommended that compulsory use of hearing protection such as ear muffs and ear plugs be used as a control measure.

The causes of increase noise pollution in the cities is the quest for economic growth and prosperity (Pam & Garba, 2019). Closely related to this is the shortage of electricity supply in developing countries. For instance, electricity supply has gradually dropped over the year with the current population of Nigeria. The volume of power generated is insufficient to cater for the need of her citizens in term of economic development (Wike, 2018). According to www.CEICDATA.com, Electricity supply by Nigeria in 2024 is 6,879GWH, Brazil 58,211, Canada 61,591, Ghana 23,163 in the year 2022, Australia 252,260 in 2012, Iran 367,433 in 2023, America 918,600 in the year 2025 among others.

Due to shortage of power supply from the national grid, most industries in developing countries and Nigeria in particular depend on Megawatt electricity generators on the industries and this very often necessitates long hours of power generation within the factories (Farai, 2012). Industrial noise is usually on high level intensity and varying frequencies. It comes from machines which convert energy from one form to another and generates sound energy as one of the by-products. The fraction of energy converted to sound is about 0.1 percent and can be up to 5 percent depending on the machine efficiency (Farai, 2012).

Noise is an unavoidable by-product of these generators which are indeed becoming a cause of increasing concern. Different nation adopt different safety sound levels in different environments such as the industrial workplace, open streets, and residential areas. Consequently, the Federal Environmental protection Agency (FEPA) came into being in Nigeria in 1988, following the koko toxic waste dump episode. In 1991, FEPA issued guidelines on industrial and workplace noise (Okorodudu –Fubara, 1998). The Federal Ministry of Environment which took over FEPA is expected to conduct periodic audit checks to ensure compliance with the stipulated noise limits. The FEPA recommended that daily noise exposure for workers in industries should not exceed 90dB(A) for an 8-hour working period. The rule among other things enjoined the creation of designated industrial layout separate from residential areas and to create buffer zones separating industrial areas from residential areas.

The law creating the National Environmental standard and Regulation Enforcement Agency (NESREA) Act was enacted by the National Assembly on 30th July, 2007 which repealed the FEPA Act of 1988 and consequently NESREA became the primary law on environmental protection in Nigeria (Orie, 2016).

Despite the use of instruments of law to effectively control environmental pollution in Nigeria these laws have major defects and poorly implemented. Therefore, this study aimed at assessing the level of compliance to noise standard of industries (sawmills) in Ibadan metropolis. In order to achieve this aim, the following objectives were pursued:

- Examine NESREA's provisions for noise control in Nigeria
- Investigate the noise level emitted by the sawmills and compare it with the permissible noise level
- Investigate the level of knowledge of the people on health effect of human exposure to noise pollution
- Investigate the role of NESREA in controlling or abating excess noise above permissible level
- Profer recommendation to both the public and NESREA on how to control noise through increase compliance to regulations.

Justification of the Study

As a result of the mounting studies and evidence that noise produces harmful health effects on people, for instance studies by (Ohaeri and Obafem (2024); Kee et al. (2019); Chen et al. (2020), Emenike and Sampson (2017); Bolaji et al. (2018), Booth, 2018; Pyko et al. (2018); Daniel et al. (2020)) among others. Consequently, many countries have enacted legislations to control the dose of noise to which people can expose without problem hence it is important to know the level of complianceto this regulations by the industrialist and the people who suffer from noise pollution.

While an increasing body of literature is emerging on the health effect of exposure to noise pollution, there has been little documentation on assessing the level of knowledge and understanding of these effect by the industrialists and the public at large.

Understanding the health effect of exposure to noise pollution will curb the industrialists from emitting noise in excess of the maximum permissible noise level and will also propel anypersons who suffer from such emitted noise to complain to the appropriate authority as stipulated in the regulation.

Materials and Method

The Study Area

This study was conducted on sawmill factories in Ibadan metropolis, Oyo State, Nigeria. It consist of five local government areas, Ibadan North, Ibadan North West, East, South and South West. Ibadan is Oyo state capital and serves as a centre for various industrial commercial and residential activities. Therefore, the choice of this area is justified for offering a good opportunity for the provision of information for this study.

Research Design

The study adopted a survey research design method. Interview methods was used to elicit the relevant information from the operators of the selected sawmills and the people around the factories. Also officer in the NESREA's office at Ibadan was interviewed. Information collected from the operators of sawmills and people around the factories include: Awareness of the impact of the noise on the health of the people; Awareness of Environmental Law (NESREA) by the respondents, What action taken by the operators and the people around the factory to limit noise within the permissible noise level. Information sought from NERSEA include: provision provided to control and mitigate noise; what they (authority) do if operators of

sawmills emit noise in excess of the maximum permissible level or if the affected persons fail to report due to ignorance or other reasons; does the NESREA conduct periodic audit checks to ensure compliance with the stipulated limit among others.

Purposive sampling procedure was used to selected 87 respondents (Operators and people around the factories) of the selected 4 sawmills in Ibadan metropolis: Bodija sawmills, Sango (Igbajo) sawmill, Old Ife Road Gbagi sawmill and Oje-Aremo sawmill. The measurement points known as the point of interest in the sawmills were selected to measure the level of noise emitted from the sawmill. The instrument used for collecting this information are TL-200 digital sound levels metre and a Global Positioning System (GPS) to collect noise level in decibels and coordinate of the measurement points respectively. Interview guides were also used to collect other primary data.

Data Analysis

Table 1 presents the noise levels among the four selected sawmills in Ibadan metropolis at different times of the day. Generally, all these noise levels were far above the maximum permissible noise level of 85 dB(A) decibels and 60dB(A) in the day and night for 8hrs duration respectively by NESREA for industrial area as shown in Table 2 below

Table 1: Analysis of the measurement of noise level (dB) in the selected sawmills in Ibadan metropolis

S.No	Location	Morning (dB)	Afternoon (dB)	Evening (dB)
1	Bodija Sawmill Ibadan North Local Govt Area	82.5	78.2	79.6
2	Sango (Igbajo) Sawmill Ibadan North	87.5	88.7	89.1
3	Gbagi Old Ife Road Sawmill Ibadan North East	89.3	79.3	85.8
4	Oje-Aremo Sawmill Ibadan South	87.1	85.5	85.4

Source: Field Survey 2025

Table 2: Maximum permissible noise levels for factory and general environment

S.No	Facility	Maximum Permissible Noise (dB)	
		Day	Night
1	Factory	85	60
2	Factory (workshop outside the fence)	70	60

Source: NESREA 2009

Table 3: Summary of knowledge of health effect of noise pollution among the operators of sawmills & ambient environment in the selected area in Ibadan metropolis

S/N	Statement of Question	Yes	No	Mean	SD
1	Does noise causes mental stress	9(10.3)	78 (89.7)	1.9	0.31
2	Does noise cause permanent hearing impairment	15(17.2)	72 (82.8)	1.83	0.38
3	Does noise cause communication interference	35(40.2)	52 (59.8)	1.60	0.49
4	Does noise cause sleep interference and high blood pressure	54(62.1)	33 (37.8)	1.62	0.49
5	Does noise cause psychological disorders	32(36.8)	55 (63.2)	1.63	0.49
6	Does noise cause cardiovascular disease	1(1.1)	86 (98.9)	1.99	0.11
7	Does noise cause psychical tension	30(34.5)	57 (65.5)	1.16	0.48
8	Does noise cause biochemical effect	24(27.6)	63 (72.4)	1.72	0.45
	Total Weighted			**Mean = 1.74**	

Decision rule 1.50 – 1.99 = Low, 2.00 & above = High

Table 3 above reveals that 78 (89.7%) of the respondents affirmed that they do not know that noise causes mental stress while only 9 (10.3%) respondents do. Furthermore, 72 respondents (82.8%) said they do not know that noise causes permanent hearing impairment while 15 (17.2%) respondents do. Likewise 52 (59.8%) of the respondents do not know that noise causes communication interference while 35 (40.2%) respondents do. 33 respondents (37.8%) do not know that noise interferes with sleep and cause high blood pressure while 54 (62.1%) claimed that they know. Additionally, 55 (63.2%) affirms that they do not know that noise causes psychological disorder while 32 (36.8%) respondents do. 1 respondent (1.1%) established that noise causes cardiovascular disease while 86 (98.9%) did not. Besides 57 respondents (65.5%) disagree that noise causes psychical tension while only 30 respondents (34.5%) agreed. Only 24 (27.6%) agreed that noise causes biochemical effect while 63 respondents (72.4%) said they did not know.

Table 3 further revealed that the weighted mean was 1.74 which indicated that the score was low based on the decision rule. This means that the level of knowledge of health effect of human exposure to noise is low among the operators of sawmills in Ibadan metropolis Oyo State.

Discussion of the Findings

The finding of this study revealed that the level of knowledge of health effect of human exposure to noise is low among the operators of sawmills in Ibadan metropolis. This was established through the responses of most of the respondents (operators of sawmills and people around the area) shown by the low weighted mean of 1.74 in table 3 above.

This is in tandem with Ibekwe et al. (2016) who blamed ignorance of health effect of noises and lack of political will of government as causes of noise pollution in Nigeria. Also majority of the respondents denied knowledge of NESREA as the legal authority that control and regulate noise level in Nigeria.

It was therefore concluded in this study that the knowledge of the health effect of human exposure to noise is low among the operators of sawmills in Ibadan metropolis and there is also low awareness of NESREA as the legal authority that enforce noise regulation in Nigeria.

Recommendation

Based on the findings of this study, the following recommendations were made:

1. The study recommended that public awareness should be intensified by NESREA and Ministry of environment about the harmful effect of noise pollution.
2. It is also recommended that as stipulated in the Act, NESREA should carry out periodic audit check to ensurecompliance with the permissible noise level by the industrialists in general and operators of sawmill in particular.
3. Health and safety professionals bodies such as the Institute of Safety Professionals of Nigeria (ISPON) can educate the citizenry by creating awareness on the harmful effect of human exposure to industrial noise.
4. Finally, the member of the public who suffer excess noise above the permissible level should report to the appropriate authority as stipulated in the act.

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