



Psychomatic Impact of Noise Pollution on Adult Residents in Calabar, Cross River State, Nigeria

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ABSTRACT

The study predicated on investigation of environmental impact of noise pollution on the overall well being of residents in the study area, Calabar, Cross River State, Nigeria. The problem identification derives from the recognition that there appeared to be regulatory regimes established to control or curb the noise menace. It is therefore envisaged that an investigation into the true essence of the incidence scenario will produce findings that will arouse awareness towards the direction of attention at the solution of the incidence impact in the area. Accordingly, objectives have been formulated in such directions as:

- i. Determination of the magnitude of noise produced by different activity types in the area.
- ii. Investigation of the true perspective of the noise impact in different locales in the area.
- iii. Identification of the residents perception of the noise impact in their respective domains of domestication.

The literature equally explores:

- i. The nature and sources of noise production in urban places.
- ii. Impact of noise pollution on human health and;
- iii. Noise pollution control and regulatory measures.

The methodology embodies description of research design, area of study, population and sampling, procedure for data collection and technique of data analysis. The anticipated results of outputs is also clearly elaborated.

Introduction:

Urban noise incidence is a well-known environmental problem in all cities of the world. There is prodigious mass of information in the literature concerning urban noise incidence and its attendant health problems. There are numerous sources of noise in the urban place all contributing to the production of a din or noise-urban transportation is foremost as an offender in the noise development scenario. Noise from exhaust mufflers, horn blaring, acceleration effect and so on lead to the production of noise incidence above the maximum allowable level of decibel accepted by World Health environmental regulatory bodies.

In the peculiar case of Calabar Urban, industries are comparatively less in their contribution to urban noise nuisance yet there are pockets of point sources such as fabricating machines used for welding, grinding, generators and other generating plants that contribute to the noise level production.

Entertainment and hospitality industries are also culpable in contribution to noise hazards. Musical sets are used in drinking pubs, business centres and such other allied occupations. Along similar lines, religious activities also contribute significantly to the noise level production by amplifying their public address system to an exceedingly high pitch beyond the health tolerable decibel level.

Domestic neighbourhood sources are equally rampant in their noise production capacity through use of exceedingly audible megaphones in the form melody for their own entertainment to the detriment of neighbours who may have less capacity to control or regulate them equally.

The underlying implication is the adverse health effects it produces on those exposed to it. Plausible evidences have been documented in the literature concerning the psychosomatic (mental/bodily) effect of noise on those exposed to

it. It has equally been substantiated that the magnitude effect increases with the level of or duration of exposure. In this regard, urban environmental agencies such as the United States Environmental protection Agency (USEPA), British Environmental Agency (BEPA), Canadian Environmental Agency (CEA) and other regulatory agencies such as World Health Organization (WHO) and United Nations Environmental Programme (UNEP) have set maximum limits for noise in certain activity locales in the city. With such recognition, most high noise activity occupations are located away from residential areas and strict compliance to layed down standards is ensured. In Calabar and other such cities in Nigeria, the Federal Ministry of Environment standard criteria is a mere factor layer lacking implementation.

Statement of the Problem

Urban noise impact is an environmental nuisance that cannot be taken for granted.

As stated the background to this study, they are derived from various anthropogenic activities. Currently in Calabar, one formidable channel is the proliferation of religious denominations who in their effort at winning converts will remain a veritable noise nuisance to those far and near as they Blair their megaphones across the nights thereby causing numerous residents to lose their sleep. Many other sources have been cited and they are all contributory to development of one effect or the other.

The proposed study is considered based on the recognition that scant attention is paid to the essence of this noise made by urban environmental managers such as

Calabar Urban Development Authority (CUDA) and the States Ministry of Environment (SME). Accordingly, there is the dire necessity of unraveling the implicit health impact it produces on the adult residents in their respective domains. The choice of adult residents is informed by the existing background that there is linear relationship between the length of exposure to noise incidence and the impact level produced. There is also the concern for an understanding, the spatial prevalence of noise relate morbidity in relation to activity type.

Justification of the Research:

Environmental noise pollution is a reaching human health nuisance as it affect both the physical and psychological well-being of individuals. Excessive noise impact can lead to emotional anxiety and cause insomnia or sleeplessness.

A clear appreciation of noise level will provide sufficient evidence of mainstreaming the health management control in urban locale. Urban residential planning will consider uppermost the land use pattern in order to avoid the impact caused by the noise menace,

The study will unravel the impact scale of the damage caused by exposure to the noise in respective areas of the urban population agglomeration.

The study will create insight on possible ways of ensuring compliance with the urban noise level regulation.

The study will clearly substantiate the true perspective of auditory impairments prevalent in the adult population in the study area.

The study will also provide information on the occupational management in respect of workers protection against the impact level of noise.

Objective of the Study:

The study aims at investigation of the following specific objectives.

1. Identification of existing impact level of noise on the population of residents in different areas of the city domain.
2. Identification of the residents' perception of the noise impact in their respective areas of residency.

Study Hypothesis

The hypothesis are stated in the null form as form as follows:

1. There is no significant impact of the noise level on the population of the residents in Calabar, Nigeria.
2. Hypothesis two: Residents perception of the noise impact level do not vary significantly in the area.

Literature Review

Noise Pollution — The Nature of the Problem

Urban noise pollution problem has been an object of neglect until recently especially in developing countries where scant attention is paid by most municipal governments. The full view of the problem has been substantiated in the literature by several studies carried out by authorities in the field.

Hardoy et al (1992) reported that the health impact is now being given more attention and that though precise health impact has not been recognized except the issue of auditory impairment.

Another report provided that noise impacts could lead to critical stress factor which may influence mental disorders and social pathologies (WHO, 1992). It is also further reported that most intense and continuous exposure to high noise levels are related to certain occupations such as in industries (Lee 1985). The report went on to state that there are four sources of high noise levels namely, aircraft, industrial operations, construction activities and highway traffic (WHO 1992) it was also reported that large areas of many Third World have high noise level from aircraft landing and taking off in nearby airports. That noise form a major problem since most Third World Governments have not instituted effective noise control programmes on road vehicles.

Report has been given about the city of Shanghai in China, where the average noise level from vehicles had reached 62 Decibel with an average noise reaching 75 Decibel at rush hour and 90 Decibel in certain locations (Zhonmina, 1988).

Also in Bangkok noise pollution is considered a serious problem, Noise from trucks, buses, motorcycles reached mean levels greater than 25 decibels in many locations. Findings from environmental legislations in Western Nations suggest that noise levels should be kept under 65 decibels to comply with desirable limits indoors (Phanter et al, 1982).

While noise pollution remains a major problem in Western Nations, there are yet regulatory institutions to enforce them and democratic procedure through which — protests can be organized. This trend is lacking in the cities of the developing regions and especially so in Nigeria with proliferation of worship houses which have significantly increase the outdoor noise level (Hardoy et al 1992).

Noise Pollution and Human Health

Hirai, J. J. et al (1991) presented elaborate information on the incidents of noise pollution and human health. They listed the incidents of noise maladies to include hearing impairments, interference with spoken communication. Sleep disturbance, annoyance and so on (Basner, 2019).

Following a WHO Review the effects were accordingly substantiated. With regards to impaired hearing they reported that it might come from work place environment, the community and so on. The report presented that one of the major causes of hearing loss is occupational exposure and that other sources of noise such as recreational noise may be equally implicated (Berghund et al, 1995). It is equally reported that exposure to noise of up to 8 hours at the level of 85 decibels is detrimental, It is equally reported that exposure to noise beyond 70 decibels will lead to acute hearing impairment.

Other negative disabilities resulting from hearing impairment following the reports included abnormal loudness perception, distortion (Paracusis) and Tinnitus-Tinitus which may be temporal. The fallouts of these disabilities were listed to include loneliness, depression, impaired speech, discrimination, impaired performance, limited job opportunities and a sense of isolation (Passchier and Passchier, 2000). Again, a wide range of attributes were ascribed to damages caused by noise

pollution such as anger, disappointments, dissatisfaction, withdrawal, helplessness, depression, anxiety, distraction, agitation or exhaustion (Goines, L.2007).

The issue of interference with spoken communication was also featured in the WHO report based on studies carried out. The effects were outlined such as poor concentration, fatigue, lack of self-confidence, irritation, misunderstanding disturbed inter-personal relationship etc. (Goines, L. 2007). Sleep disturbance or loss of sleep is another critical defect presented in the report. In the report the value of good sleep as a prerequisite for good physiologic and mental functioning was readily recognized,

The report also stated "inter alia" that when sleep disruption becomes chronic, the results are mood changes, poor performance and other long term effects on health and wellbeing. The report stated categorically that continuous exposure to noise beyond 30 decibels (DB) can cause sleep disturbance and that for intermitted noise, the probability of being awakened increased with the number of events per night (Berghund, B. 1995).

Sleeplessness has been recognized to cause decreased alertness leading to accidents, injuries and disrupted circadian rhythms, (Firdaus et al 2010). It is further reported that noise annoyance during the night can increase total noise annoyance during the 24 hours following sensitive groups included the elderly, shift workers, persons vulnerable to physical and mental disorders, (Passchier, W. 2000).

Noise Pollution Control Measures

International regulatory measures for noise pollution, national guidelines and

guidelines by environmental regimes are available for compliance by engaged in noise producing activities.

Besides legislative measures, there are strategic measures devised to curtail excessive noise levels in different environments. Some of the ethical or strategic measures include (1) Acoustic Zoning: these are reserved silence areas near schools, hospitals, schools or zoning of noisy industrial areas, bus terminal or railway stations and aerodromes. (2) Sound resolution at construction strategies which include (a) use of sound absorbing materials (b) acoustic titles. (iii) Tree planting etc. (Subramani, 2012). Besides the above legislative measures have set up to control noise pollution. There is the World Health (WHO) Noise pollution (regulation and control rules (2000) which have been formulated under

"Environment Protection Act". Following this, there is the Ambient air quality standards in respect of noise (Vartika et al 2017).

This criteria specifies zones according to maximum and mini decibel (DB) sound as follows.

Table 1

Area Code	Category of Zone	Limits in Elb (A) Lq*	
		Day time	Night time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Leq: it is an energy mean of the noise in a specialized period

So far it can be said that elsewhere are being taken to regulate noise level for purposes of human health but in Calabar, other similar cities in Nigeria such efforts are lacking on non-existent.

Research Methodology:

The design of this study is field enquiry design aimed at investigating existing noise scenarios produced by human activity category and its impact on the population.

Area of Study

The study is Calabar Urban, which is the political and Administrative Head Quarter of Cross River State, Nigeria. Calabar in its settlement hierarchy categorization would have rightly be considered among the primate cities such as Lagos, Ibadan,

Port Harcourt, Kaduna, Kano and so on but for some political disadvantages, Calabar as early as 1905 was the colonial administrative headquarters of the protectorate of southern Nigeria.

Geographically, Calabar is situated at the curve formed by the Gulf Guinea I the Atlantic Ocean in the area around the Bight of Biafra.

It enjoys a marine equable climate along the shores of Atlantic Ocean and a subequatorial biome towards the hinterland around its boundary with Odukpani Local Government to the North. While the Southern boundary fronts the Atlantic Ocean, its northern delimitation is as already described and to the east is Akpabuyo/Bakassi Local Government Area while to the West are Creek Town Adiabo Ikonetu rural Fringes. Climatically, it registers adequate rainfall through nine months of the year due to its marine location.

Demographically, Calabar typifies an urban settlement as expressed by the heterogeneity of its resident's composition which are drawn from all over Nigeria and beyond. Other indices of its urbanization attributes are seen in the sprawlingly built up environment caused by aggressive demand for land due to its far reaching ecological foot prints (Mitlin et al 1992),

The noise problematic which is the focal direction of this envisaged study is also an index of its urbanization process.

Population of the Study

The study population comprises adult residents from the age of thirty years and above. This choice is informed by the consideration that impact assessment in relation to noise and other environmental risks/hazard studies are based formally in length exposure and vulnerability criteria. The aged are in this category going by their chronological age and their susceptibility indices to all forms of ailments.

Sampling Technique

The technique will be carried as follows:

1. Purposive Sampling

This approach considered paramount areas with high noise activity profiles such as proximity to church sites, market centres, hospitality industries etc.

2. Prescribed Quota Strategy

This will involve allotting specific numeric value to each are identified. In this case a value of twenty persons per an area was be contemplated.

Instrument for Data Collection

i. The questionnaire was employed in eliciting information from the respondents.

ii. Noise measurement device was employed, measurement of noise levels in decibels determine the level of noise generate in specific point sources.

Method of Data Collection

Data was collected as follows:

- i. Structured questionnaires will be administered to respondents and withdrawn, "do facto" (on the spot).
- ii. Noise level detection was achieved by employment OSHA noise detect or meter.

Method(s) of Data Analysis

Data was analysed using one way analysis of variance (ANOVA).

Data presentation and Analysis

The field data collected are presented in tables 2 and 4 below.

Following the sampling technique, data was collected in designated high impact

noise activity areas. Twenty respondents each were selected from each area and interviewed and the results accordingly presented in the tables.

Table 1: Noise impact affirmation of residents in designated activity area:

Four points affirmation responses were employed as follows, H = High, VH = Very High, EH = Extremely High, M = Moderate.

These scales are represented in table 1 and the corresponding field reports depicted.

Table 2 (Noise impact affirmation).

s/N0.	NOISE INCIDENCE ACTIVITY AREAS	AFFIRMATION RATING				
		H	VH	EH	M	TOTAL
1.	Market area	12	17	09	12	50
2.	Church worship areas	15	18	12	05	50
3.	High way traffic	14	16	13	07	50
4.	Forge/fabrication points	11	15	18	06	50
5.	Hospitality industries	12	11	20	07	50
6.	Air traffic areas	16	15	18	01	50

From the table above a total of fifty (5) respondents were interviewed based on

individual noise level affirmation. The information was analysed using the Analysis of variance (table 3 under analysis).

Table 3: Anova: Single

SUMMARY

Groups	Count	Sum	Average	Variance
12	3	38	12.66667	16.33333
15	3	35	11.66667	42.33333
14	3	36	12	21
11	3	39	13	39
12	3	38	12.66667	44.33333
16	3	34	11.33333	82.33333

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	6.444444	5	1.288889	0.031522	0.999357	3.105875
Within Groups	490.6667	12	40.88889			
Total	497.1111	17				

Table 2: residents noise perception rating.

The rating considers individual level responses/sensitivity noise impact on psychic

perception based on the 4 points sensitivity index such as:

D = Deciphering, N = Nusea, O = Insomnia, and R = Restiveness. These were accordingly represented in the Table provided.

Table 4: Resident Noise perception=n Rating:

S/NO.	NOISE ACTIVITY AREAS	RATING SCALES				
		D	N	I	R	TOTAL
1.	Market area	10	14	15	10	50
2.	Church worship areas	14	15	18	03	50
3.	Highway traffic noise	15	12	16	07	50
4.	Forgery/fabricating points	17	16	11	06	50
5.	Hospitality industries	11	13	15	11	50
6.	Air traffic zones	12	15	17	06	50

From table 2 above, 50 respondents were interviewed based on their individual noise level perception, the results of which were accordingly depicted. The information was transposed for data analysis using the one way analysis of variance on table 5.

TABLE 5: Anova: Single Factor**SUMMARY**

Groups	Count	Sum	Average	Variance
10	3	39	13	7
14	3	36	12	63
15	3	35	11.66667	20.33333
17	3	33	11	25
11	3	39	13	4
12	3	38	12.66667	34.33333

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	9.777778	5	1.955556	0.076356	0.994742	3.105875
Within Groups	307.3333	12	25.61111			
Total	317.1111	17				

Discussion

One can say that the average ambient noise level in the study area is relatively below 50Db, although there were high noise levels in some areas within the zone. Both environmental and occupational noise exposure are associated with detrimental audiological (hearing loss, tinnitus) and non-audiological (neuropsychiatric, psychological, cardiovascular metabolic) health effects. Vulnerable groups of individuals, especially patients that suffer from autism, might be more affected. Autism itself causes these patients to be more socially isolated than the general population, and on the other hand, noise pollution causes autistic patients to become more and more socially isolated, what closes the vicious circle of noise pollution, social isolation and autism. With increasing population, traffic and noise-producing technology (speakers, amplifiers, television, home theater) there is an increasing need for public health measures and legal interventions in order to better regulate both environmental and occupational noise exposure.

Conclusion

Noise pollution is not believed to be a cause of mental illness, but it is assumed to accelerate and intensify the development of latent mental disorders. Noise pollution may cause or contribute to the following adverse effects: anxiety, stress, nervousness, nausea, headache, emotional instability, argumentativeness, sexual impotence, changes in mood, increase in social conflicts, neurosis, hysteria, and psychosis. Population studies have suggested associations between noise and mental-health indicators, such as rating of well-being, symptom profiles, the use of psychoactive drugs and sleeping pills, and mental hospital admission rates. The elderly, and those with underlying depression may be particularly vulnerable to these effects because they may lack adequate coping mechanisms. Noise levels above 80 dB are associated with both an increase in aggressive behaviour and a decrease in behaviour helpful to others. The aforementioned effects of noise may help explain some of the dehumanization seen in the modern, congested, and noisy urban environment. The ultimate goal should be to identify ways to improve the acoustic environment, but generally only rudimentary measures (dBA) have been reported.

REFERENCES

Basner, M, Babiseh, W. Davis A; Brank, M. and Clark C (2007). The LANCET, (383) 9925, 1325-1332.

- Bergwind, B; Lindval, T. (2007). Community Noise Archives of the centre for sensory 1995:2:2-195 WHO update 1995.
- Firdous, IV, Ahamd, A. (2010). Noise pollution and Human Health. A Case Study municipal; Cooperation of indoor and Build Environment. Sege Publications.
- Goines, L. Haglar. L. (2007). Noise Pollution, a Modern Plague, Southern medical Journal 100 (3) 287 - 294.
- Hardoy, J. E. Daina, M and Sellar Thaite, D. S. (11992). Environmental Problems in Third World Cities. London Earth Seam Publication.
- Hiral, J. Huma, S. S., Ninar, J. P. and Yogesh, M. G. (2001). Noise Pollution and Human Health: A Review T.P. + 91- 777901 939.
- Lee, J. (1985). The Environment, Public Health and Human Ecology, World Bank, Johns Hopkins University Press, Baltimore and London.
- Pantawane, R. N. , Kanchan, V. M Namrate, S. K. (2017). Effects of Noise Pollution on Human Health International Research Journal in Science, Engineering, Yavatmal, 4, Special Issue 3 Jan. 2017.
- Passchier, W. and Passchier, W. (2007). Noise Pollution and Public Health Environmental Health Perspective, 108 Supplemental.
- PhantumvaniVD. and Liegeharencity, W. (1989). Coming to terms with Bangkoks Environmental Problems, Environment and Urbanization 1 (1) 31-39.
- Singh, N. Daver, Sn (2004). Noise Pollution, Sources, Effects and Control. Journal of Human Ecology, 16 (3) 181-187.
- Subramani, T. Kavita, M. J. and Survey, K. P. (2012). Modeling of Traffic Noise Pollution. International J. Eng. Les 2 (3) 3125 — 3182.
- Vanika, S. and Pramenders; D. (2010). Environmental Impact of Noise Pollution. A case of Sate Anglipur, Western Uttah predesh, India INT. J. Earth Engm 0316, 869-874.
- World Health Organization (WHO, 1992), Our Planet, Our Health, Report of the WHO Commission on Environment and Health, Geneva.
- Zhongmin, Y. (1988). Shangai, the growth and Shifting Emphasis of China's Largest City, Oxford University Press.