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Health impacts of noise exposure in an academic environment

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ABSTRACT

In the face of increasing exposure to various environmental pollutants, the peculiarity of noise has made it to pervade even well-structured societies. This study assessed the health impacts of noise exposure within the University of Lagos main campus. An opinion pool of staff and students was taken with an online questionnaire survey that inquired about the likely health effects of noise. Common noise-related problems reported by the survey participants include increased distractions, loss of concentration, and issues of health and mental wellbeing. It is recommended that immediate measures be put in place to checkmate the negative impacts of prolonged noise exposures in university campuses nationwide.

1. Introduction

Noise as a pollution and nuisance, has dramatically increased in our environments, prompting many individuals to consider relocation to quieter areas (Obaidat, 2008). Urbanization and industrialization have compounded the problem of environmental noise all over the world (Gholami et al., 2012).

The difficulties faced by noise pollution cannot be overstated, as most people are unaware of not just the deleterious repercussions of long-term exposure to it, but also what it is (Luqman et al., 2013). In general, the public overlooks several factors that contribute to increasing sound levels in the surroundings (Obiefuna et al., 2013). Increased sound levels from sources considered acceptable could, however, be sources of noise pollution, as the long-term consequences are similar to those generated by repetitive exposure to those considered as unpleasant.

Noise comes from a variety of places in the environment, including the neighborhood (Laze, 2017), industrial operations (Bubli et al., 2010), and transportation (Sotiropoulou et al., 2020). Individuals are often unaware of these noise sources because they have been accustomed to it, in addition to passion for their investments of time and resources. Hence, their

concentrations in everyday activities for personal goals. As a result, the negative consequences of failing to recognize rising noise pollution as a contributing factor to their poor health and reduced quality of life are amplified (Nwobi-Okoye et al., 2015).

Increased urbanization nowadays results in higher sound levels as a result of traffic congestion, industrialization, and other factors. Several studies have found a strong link between people's hearing loss, mental health issues, and annoyance and the noise levels exposures (Alimohammadi et al., 2019; Babisch, 2011).

High noise levels also have a negative impact on different learners' auditory, reading, and cognitive abilities in their learning contexts (Shield et al., 2003). These and other harmful consequences of noise have resulted in the development of laws and a variety of engineering solutions to manage and/or reduce its negative impact on human health (WHO, 2018).

In a previous study, we mapped noise level variations within the University of Lagos main campus, with the use of spatial and statistical analysis, and a conformity assessment based on internationally recognised noise standards (Alademomi et al., 2020). In the study, it was shown that the noise levels within the university campus exceeded the tolerable limits for

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academic, commercial and residential areas set by World Health Organisation (WHO) and the National Environmental Standards and Regulations Enforcement Agency (NESREA). The present study goes further to assess the potential health impacts of noise exposure on members of the university community.

2. Methods

2.1. Study area

The University of Lagos is a higher institution of learning and a popular choice for tertiary education by many residents of Lagos and Nigeria generally. Its urban location makes it a beehive of activities beyond academia, including commercial and social activities, thereby exposing it to regular noise pollution. It is located in the low-lying Lagos metropolis between longitudes 3°23'00"E – 3°24'30"E and latitudes 6°30'00"N – 6°31'30"N. It is bounded eastwards by the Lagos lagoon and surrounded by dense residential and commercial buildings. The map of the study area is as shown in Fig. 1.

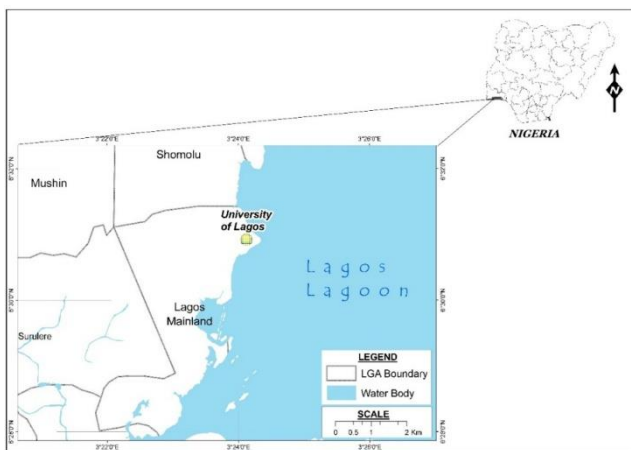


Figure 1. Geographic location of the study area, University of Lagos Main Campus, in Nigeria

2.2. Questionnaire survey and analysis

A questionnaire form was created with the Google forms tool. Most of the questions required respondents to select a single option on a 5-point scale. Whereas, others had predefined options for selection (especially the checkboxes) and a single yes/no question was included as well. The key questions asked in the questionnaire are summarized in Table 1. The link to the online questionnaire was distributed to members of the university community via Whatsapp messaging in the month of September, 2020.

The responses were transferred to a Microsoft Excel spreadsheet for statistical analysis and visualisation.

3. Results

There were a total of 324 responses. The health impacts of noise exposure were assessed and are presented in Fig. 2 and Tables 2- 3.

Table 1. Summary of questions provided for survey.

S/N	Questions
1	Which of the following challenges/issues do you experience due to excessive noise
2	How often do you experience earaches as a result of noise?
3	How often do you experience headaches from excessive noise exposure?
4	How often do you feel dizzy after excessive noise exposure?
5	How often do you experience ringing in the ears (tinnitus) due to excessive noise exposure?
6	Do you experience changes in your mood/attitude after prolonged exposure to the noise on campus?
7	How well do you concentrate beyond noise levels deemed moderate to you?

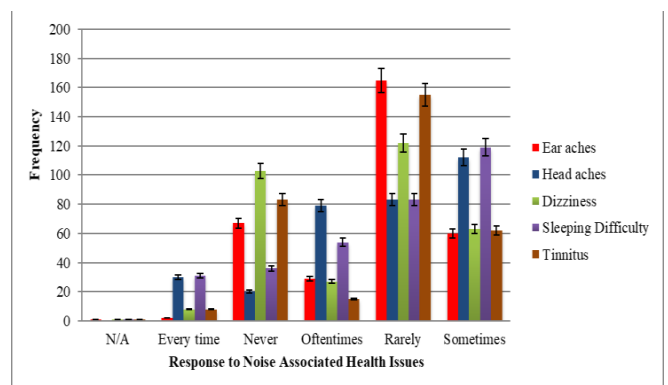


Figure 2. Frequency of health issues related to noise exposure

Table 2. Impacts of noise exposure on mood change

Mood changes	Frequency	Percent
N/A	7	2.2
No	94	29.0
Yes	223	68.8
Total	324	100.0

Table 3. Impacts of noise exposure on concentration

Ability to concentrate	Frequency	Percent
N/A	3	.9
Absolute loss of concentration	31	9.6
Excellently	18	5.6
Fairly well	147	45.4
Slightly	81	25.0
Very well	44	13.6
Total	324	100.0

4. Discussion

Fig. 2 above shows that 61 people experience difficulties with sleeping and headache every time. This number is above 9% of all the respondents. Other health issues reported include dizziness and tinnitus. Oftentimes and sometimes, respondents also experienced headache and sleep difficulties. Hence, the major illnesses associated with noise exposure at the

University of Lagos Campus are headaches and sleep difficulties.

Noise exposure also causes mood swings which can affect the healthy use of the brain in terms of memory retention and oftentimes leads to stress and outburst of anger (Yulia, 2014). From Table 2, 68.8% of the respondents in this study experience mood changes. These mood changes caused by noise exposure could affect the assimilation rate of the students and others which can lead to mental stress and discouragement.

5. Conclusion

Exposure to prolonged noise pollution has deleterious impacts on the health of any anyone who stays within the vicinity of such an environment. Some of the health issues that have been identified to be the result of noise exposure include tinnitus (itching/ringing ear), headaches, dizziness, loss of sleep, stress and poor concentration.

The effect of noise exposure on concentration levels could manifest in the absence of a good grasp of the knowledge being shared and the critical logical reasoning involved in research and learning process. This is a major cause of concern that shows the need for the University management to publish necessary regulations that can help to curb continuous noise levels.

The university management thus needs to administer necessary rules and give orientation to sensitize every member of the University of Lagos community about how to minimize noise level rise especially from social activities and other human activities.

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References

Alademomi, A., Okolie, C., Ojebile, B., Daramola, O., Onyegbula, J., Adepo, R., & Ademeno, W. (2020). Spatial and Statistical Analysis of Environmental Noise Levels in the Main Campus of the University of Lagos. *The Journal of Engineering Research [TJER]*, 17(2), 75-88.

- Alimohammadi, I., Kanrash, F. A., Abolghasemi, J., Vosoughi, S., & Chalak, M. H. (2019). Relationship between noise annoyance and cognitive performance in automotive workers exposed to chronic noise. *Journal of UOEH*, 41(4), 375-385.
- Babisch, W. (2011). Cardiovascular effects of noise. *Noise and health*, 13(52), 201.
- Gholami, A., Nasiri, P., Monazzam, M., Gharagozlou, A., Monavvari, S. M., & Afrous, A. (2012). Evaluation of traffic noise pollution in a central area of Tehran through noise mapping in GIS. *Advances in Environmental Biology*, 6(8), 2365-2371.
- Laze, K. (2017). Findings from measurements of noise levels in indoor and outdoor environments in an expanding urban area: a case of Tirana. *Noise Mapping*, 4(1), 45-56.
- Luqman, Y. A., Rowland, A. G., Zhang, Y., & Umar, O. Z. (2013). Work environment noise levels and risk locations in two selected commercial areas in Ibadan, Nigeria. *Global J. Med. Res*, 13(6).
- Nwobi-Okoye, C. C., Uyaelumuo, A. E., Okoronkwo, G. O., & Duru, C. A. (2015). Analysis and Modelling of Road Traffic Noise in Onitsha Metropolis, Nigeria. *International Journal of Advanced Multidisciplinary Research Reports*, 1(1).
- Obaidat, M. T. (2008). Spatial Mapping of Traffic Noise Levels in Urban Areas. In *Journal of the Transportation Research Forum* (Vol. 47, No. 1424-2016-117907, pp. 88-102).
- Obiefuna, J. N., Bisong, F. E., & Ettah, E. B. (2013). A GIS analysis of noise islands in Calabar metropolis, Nigeria. *J. Environ. Sci*, 3, 12.
- Shield, B., & Dockrell, J. (2008). The Effects of classroom and environmental noise on children's academic performance. In *9th International Congress on Noise as a Public Health Problem (ICBEN)*, Foxwoods, CT.
- Sotiropoulou, A., Karagiannis, I., Vougioukas, E., Ballis, A., & Bouki, A. (2020). Measurements and prediction of road traffic noise along high-rise building façades in Athens. *Noise Mapping*, 7(1), 1-13.
- World Health Organization. (2018). Environmental noise guidelines for the European region.
- Yulia Gershfeld (2014). Mood Swings: An application to track, understand and share emotions for people who need to control mood swings. Master's Thesis, Department of Communication and Information Science, Tilburg University, Tilburg. June 20014.