



ASSESSMENT OF NOISE LEVEL AROUND AIRPORT AND THE RESIDENTS' PERCEPTION TO NOISE POLLUTION IN LAGOS

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Abstract

Noise is a physical exposure agent and environment and occupational hazard presenting risks to people's overall health and well-being and being experienced by residents and workers around the airport. The study focuses on the health complaints of the residents and workers. Questionnaires were administered to willing participants in residents and shops close to the airport. The noise level assessment was done at various points very close to the airport using a noise level meter. The noise level at Ikeja, Oshodi and Ajao Estate ranged between 73.2 - 93.9dBA, 90.3 - 95dBA and 90.0 - 94.6dBA respectively. The noise level was quite high when a plane was in sight (either landing or taking off). The respondents stated that the quality of sound in their environment was noisy, 32% agreed it was moderately noisy while 20.9% agreed it was very noisy. Majority of the respondents were quite aware that the quality of their environment is not conducive to work or living. About 70% of the respondents were mostly annoyed, 26.7% felt irritated while a mere 3.3% were quite indifferent to the poor quality of sound in their environment. The most prominent health problem complained of by the respondents were Anxiety > Insomnia > Tinnitus > Temporary hearing loss in the descending order. This condition if continued over a long period of time could lead to a more severe health problem for the residents or workers. Therefore, the enforcement of noise control by the government is highly recommended and this includes relevant authorities regulating and monitoring air transport services to ensure compliance with specifications, standards and aircraft worthiness.

Keywords: (Noise, noise level, health complaints)

Introduction

The noise is an unwanted sound that may cause some psychological and physical stress to the living and non-living objects exposed to it (Singh and Davar, 2004). Noise is a physical exposure agent and environment and occupational hazard presenting risks to people's overall health and well-being (Ana, Shendell, Brown and Sridhar, 2009). Noise exposure is increasingly being seen as a major environmental stressor in urban areas and an important environmental public health issue (Oyedepo, 2013; Clark and Stanfeld, 2007). Noise is a prominent feature of the environment including noise from transport, industry and neighbours and it interferes in complex task performance, modifies social behaviour and causes annoyance (WHO, 2015). Noise level has increased rapidly over the years due to increase in human population and human activities such as transportation, urbanization and industrialization (Hunashal and Patil, 2012). Noise is a potential hazard to human health, communication and enjoyment of social life. Depending on its duration and volume, the effects of noise on human health and comfort are hearing defects, increased blood pressure, irregularity of heart rhythms, sleeplessness, disturbed sleep, annoyance, irritability and stress and also indirect effects on work performance, such as reduction of productivity and misunderstanding what is heard (Oyedepo, 2013; Olaosun, Ogundiran and Tobih, 2009). Noise exposure is increasingly seen as an important environmental public health issue (Clark and Stanfeld, 2007). Despite the numerous adverse effects of exposure to noise pollution, the rate of noise pollution is on the increase daily.

Research has shown that the effects of noise on human health and comfort can be divided into physiological effects such as irregular heart rhythms, increased blood pressure; psychological effects such as sleeplessness, irritability, anxiety; physical effects such as permanent or temporary hearing defects and finally effects on work performance such as reduction of productivity and misunderstanding what is heard (Marius, Tjunelis, Fitzsullivan, Sean and Henderson, 2005; Quis, 2001). The aim of the research is to assess the noise level in various points of the airport and

its environment and also, to assess the common health complaints of the residents and workers around the airport. The challenges posed by noise pollution on human health and the environment have not yet received full attention which it deserves thus the need to do more assessment of noise pollution in noise prone area and document the extent of the damage done.

Materials and Methods

Questionnaires were administered to willing participants in homes and shops close to the airport. The noise level assessment was done at various points very close to the airport. These points were Ikeja, Oshodi and Ajao Estate in Lagos. At each location, the noise meter was operated on continuously for a measuring period of 10 minutes. The sound level meter was hand-held and well positioned from the noise source. Sample size of 206 was also calculated using p = prevalence at perceived health effect 84% (0.84) according to Akinyemi and Ojo, (2016) and a degree of freedom of 0.05. 206 questionnaires were distributed to the residents/workers willing to participate in the study.

Sample size determination

$$n = \frac{z^2 pq}{d^2}$$

n = sample size

z = standard normal deviate set at 1.96

p = prevalence at perceived health effect 84% (0.84) according to Akinyemi and Ojo, 2016

q = 1-P

d = degree of freedom 0.05

$$n = \frac{(1.96)^2 \times 0.84(1-0.84)}{0.05^2}$$

n = 206

Results and Discussion

Table 1: Noise level measurement in areas close to MMIA Airport Lagos

Surveyed locations	Noise Level (dBA)			
	Point A	Point B	Point C	Mean/SD
Ikeja	93.9	73.2	80.8	82.6±10.5
Oshodi	90.3	93.9	95.0	93.1± 2.5
Ajao Estate/Isolo	94.6	93.6	90.0	92.7± 2.4

Table 1 shows the measurement of noise levels in areas close to the Murtala Mohammed airport in Lagos. The noise level at Ikeja when a plane was in sight ranged between 73.2 and 93.9dBA. the noise level in Oshodi when a plane was in sight ranged between 90.3 and 95dBA while the noise level in Ajao Estate when a plane was in sight ranged between 90.0 and 94.6dBA. This shows that the noise level was quite high when a plane was in sight (either landing or taking off). The acceptable standard noise level by National Ambient Air Quality Standard (NAAQS) of 90dBA

was majorly exceeded in most points by this study. This indicates that the workers or those residing in these areas may likely suffer from health issues such as anxiety, temporary hearing loss, tinnitus, insomnia, annoyance and communication interferences and many other serious health problems.

Table 2: Socio-demographic characteristics of respondents

Characteristics	Frequency (N=206)	Percentage (%)
Gender		
Male	88	42.7
Female	118	57.3
Age		
15-24 years	26	12.6
25-34 years	69	33.5
35-44 years	75	36.4
45 years and above	36	17.5
Marital Status		
Single	97	47.1
Married	109	52.9
Level of education		
Primary	31	15.0
Secondary	55	26.7
Tertiary	106	51.5
No education	14	6.8

Table 2 shows the socio-demographic characteristics of respondents. The female has the highest frequency of 57.3% while male respondents had 42.7%. The 35-44 years age range had the highest frequency of 36.4% while the age range of 15-24 years range had lowest frequency of 12.6%. The marital status of the respondents indicated majority were married with a frequency of 52.9%. Level of education show majority had a tertiary education with a frequency of 51.5% while the minority of 6.8% had no education at all.

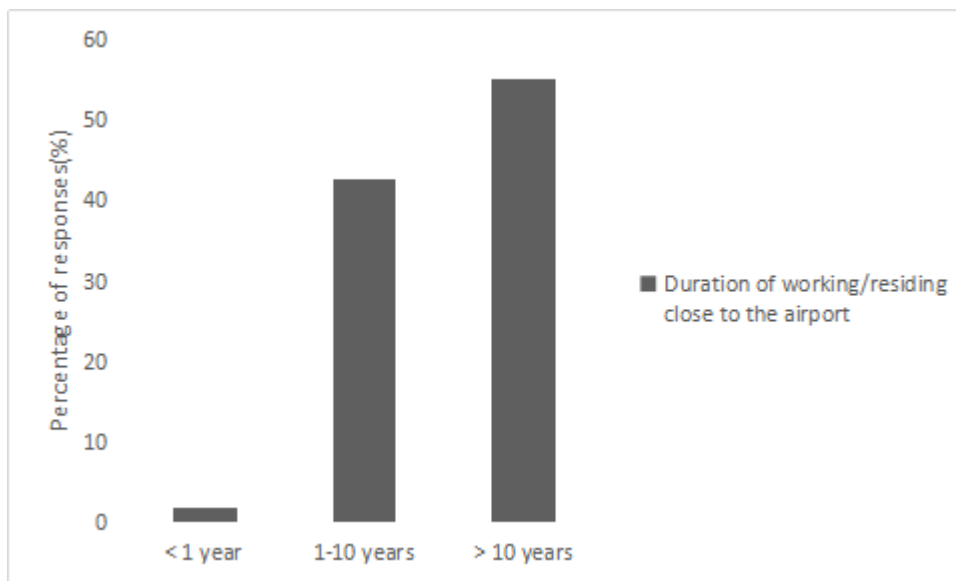


Figure 1: Duration of working/residing close to the airport

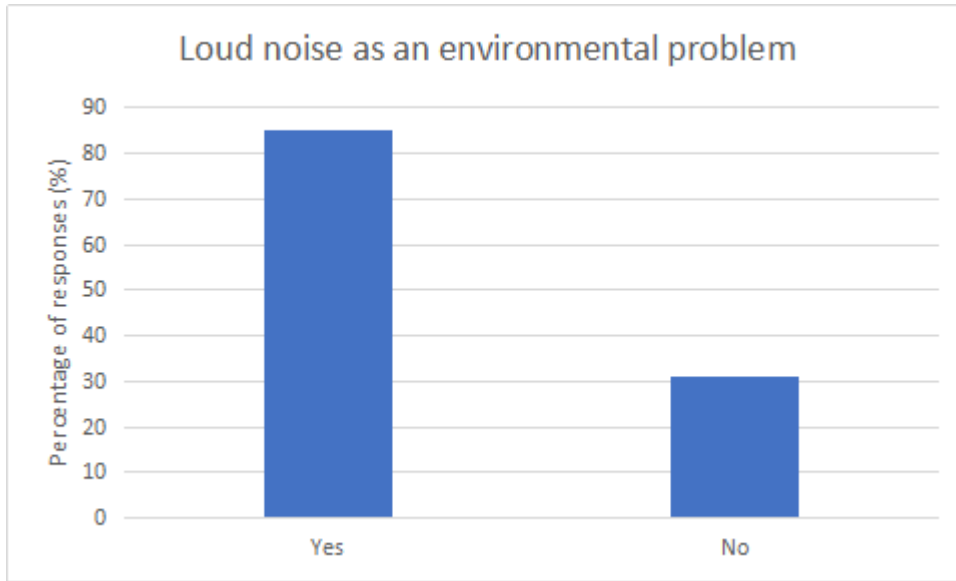


Figure 2: Respondents opinion on loud noise as an environmental problem

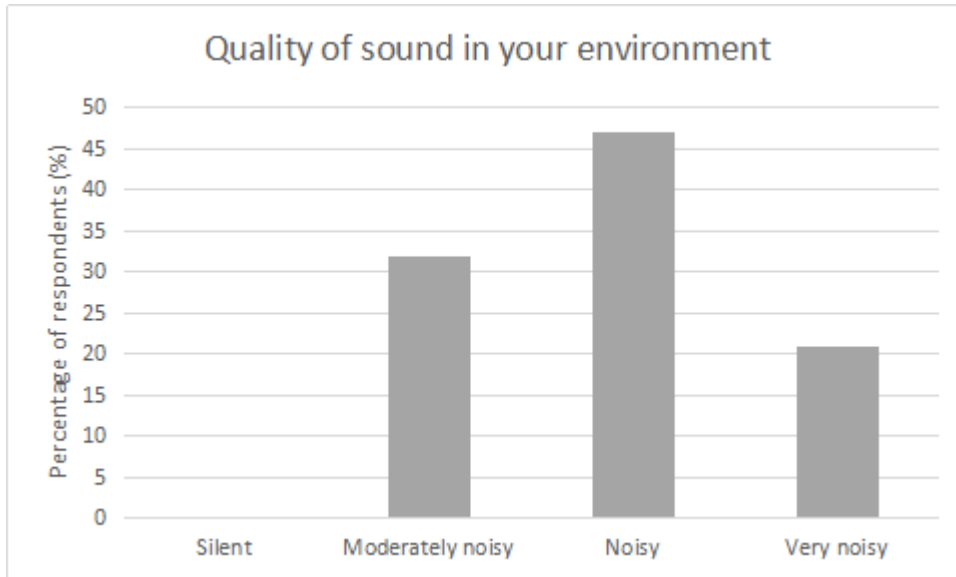


Figure 3: Quality of sound in the environment

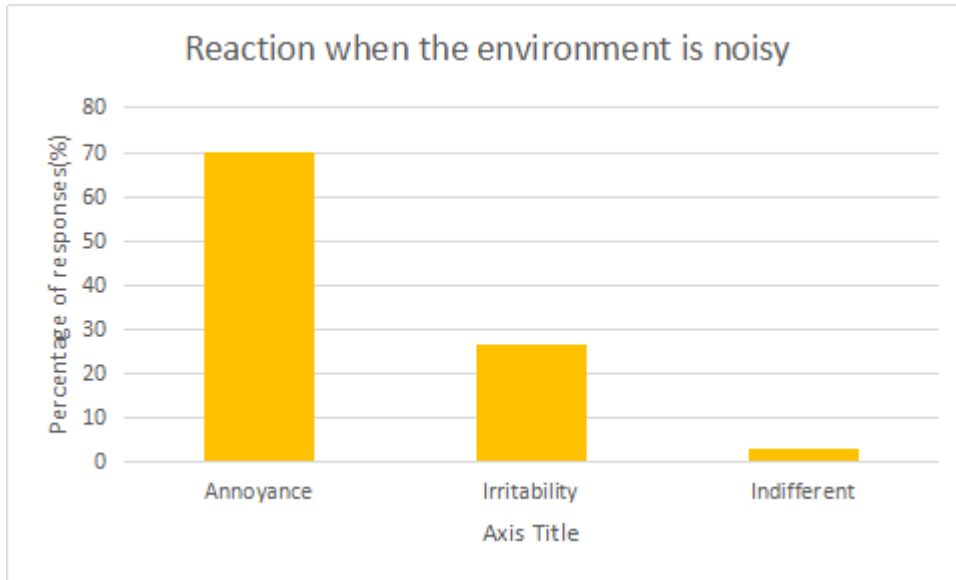


Figure 4: Reaction of respondents when the environment is noisy

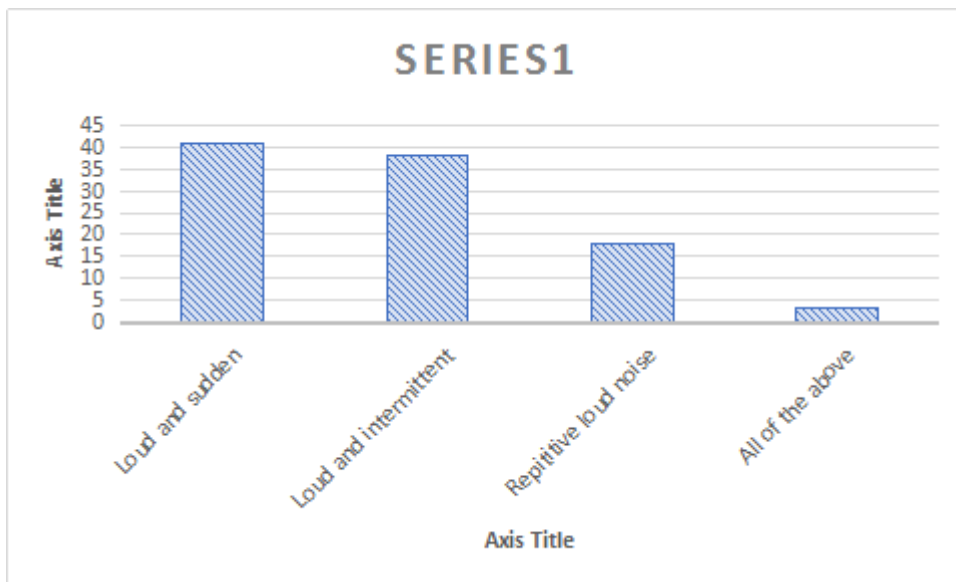


Figure 5: Opinion of respondents on the noise most annoying

Figure 1 also indicates that about 56% have resided or worked or have done businesses close to an airport for over 10 years. About 42% agreed to have resided or worked for 1-10 years while a mere 2% worked or resided close to the airport for less than a year. Since the majority have resided or done businesses close to the airport, the study shows that they might be exposed to noise pollution for over a decade and this can lead to serious health implications such as tinnitus, temporary hearing loss, anxiety, insomnia and other serious health issues especially the elderly or those with other underlying health issues. Results shown above in figure 2 shows 85% of the respondents are opined that loud noise is an environmental problem. As seen in figure 3, 47.1% of the respondents stated that the quality of sound in their environment was noisy, 32% agreed it was moderately noisy while 20.9%

agreed it was very noisy. This indicates that majority of the respondents were quite aware that the quality of their environment is not conducive to work or living. Their reaction in figure 4 also shows that 70% of the respondents were mostly annoyed, 26.7% felt irritated while a mere 3.3% were quite indifferent to the poor quality of sound in their environment. Only a minority have gotten used to the loud noise and were quite indifferent while the majority were always bothered.

The opinion of the respondents on the type of noise most annoying as illustrated in figure 5 showed that 40.8% of the respondents were of the opinion that loud and sudden noise was the most annoying followed closely by loud and intermittent noise as agreed by 37.9% of the respondents. 18% favoured repetitive loud noise was most annoying while 3.3% agreed all of the above were most annoying. This clearly indicates that over 95% of the respondents described the airport's area as highly uncomfortable due to the sudden, intermittent or repetitive loud noise emitted by the aircrafts. This is in line with a study carried out by Obisung, Akpan and Asuquo, (2013).

Table 3: Health Related Issues to Noise Pollution

Characteristics	Frequency (N=206)	Percentage (%)
People indicate that you talk too loudly		
Yes	66	32.0
No	123	59.7
Sometimes	17	8.3
Experiencing difficulties hearing what people say		
Yes	32	15.5
No	127	61.7
Sometimes	47	22.8
Hearing over the phone		
Without difficulty	181	87.9
Do miss some conversations	25	12.1
Noticed any changes in your hearing after a serious illness		
Yes	8	3.9
No	185	89.8
Sometimes	13	6.3
Experienced temporary hearing loss		
Yes	51	24.8
No	155	75.2
Experience tinnitus		
Yes	93	45.1
No	113	54.9
Experience anxiety		
Yes	129	62.6
No	77	37.4
Experience insomnia		
Yes	108	52.4
No	98	47.6

Table 3 shows health related issues to noise pollution by the respondents. Only 32% of the respondents agreed that people indicated that they talked too loudly, 59.7% agreed they do not talk too loudly while only 8.3% agreed that people sometimes indicated that they talk too loudly. About 15.5% of the respondents also agreed that they experience difficulties hearing what people say while 22.8% also agreed they sometimes experience difficulties hearing what people say. Also, 12.1% of the respondents agreed they did miss some conversations when talking over the phone. This clearly indicates that some of the respondents might be suffering from some type of hearing problem due to incessant loud noise they had been exposed to over a long period of time. It can be deduced that noise can interfere with communication in conversation and furthermore will interfere with the productivity and safety. According to Sondakh, Maryunani, Soemarno and Sietawan, 2014, physiological effects of noise can lead to decreased hearing ability and pain at a very high level if exposed to noise more than 85dBA repeatedly.

About 24.8% of the respondents agreed that they experience temporary hearing loss while 75.2% of the respondents disagreed experiencing hearing loss. Also, 45.1% agreed they experience tinnitus while the other 54.9% disagreed experiencing tinnitus. About 62.6% complained of being anxious most times while 37.4% disagreed experiencing anxiety. Also, 52.4% of the respondents complained of experiencing insomnia while 47.6% disagreed. This shows that the most prominent health problem complained of by the respondents were Anxiety > Insomnia > Tinnitus > Temporary hearing loss in the descending order. This conditions if continued over a long period of time could lead to a more severe health problem for the residents or workers.

Conclusion and Recommendation

The results of the study showed that locations close to the airport are constantly been exposed to very high noise levels on a daily basis. This investigation revealed that all the points measured exceeded the recommended limit set by WHO. Based on the perception of the public who live and work around the airport, they view loud noise as an environmental pollution with the majority opting for loud and sudden noise as the most annoying. Some complained of having difficulty hearing over the phone, temporary hearing loss, anxiety, insomnia and tinnitus. It can be deduced from this study that the quality of life of the majority of the residents and workers near the airport is poor. There is clear evidence of consequences of this problem on people's health. It is highly recommended that the enforcement of noise control by the government and this include relevant authorities regulating and monitoring air transport services to ensure compliance with specifications, standards and air craft worthiness.

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