



EVALUATION OF NOISE POLLUTION AND PERCEIVED RISKS ON THE HEALTH STATUS OF STUDENTS LIVING IN OUT-OF-CAMPUS HOSTEL ACCOMMODATION IN EDO STATE INSTITUTIONS, NIGERIA

**Akinnubi Caroline Funmbi¹ⁱ,
Adekunle Phebian Funmilayo²,
Owombo Helen Osewumi¹**

¹Department of Kinesiology,
Health Education and Recreation,
Obafemi Awolowo University,
Ile Ife, Nigeria

²Department of Public Health,
University of Ilesa,
Ilesa, Osun State,
Nigeria

Abstract:

The study specifically investigates noise pollution situations, determines the causes of noise among students living out of campus hostel accommodation, and examines perceived risks to the health status of students in the study area. A descriptive survey research design was used to determine respondents' responses to the research study. Two hundred respondents were selected with the Snowball sampling technique. The research tool used was a validated self-designed instrument and the reliability of the instrument was determined using a split-half reliability procedure using the Cronbach Coefficient alpha method yielded a correlation coefficient of 0.87 and significant at 0.05 level. The questionnaire comprised two sections. Section A was for the information on personal data while Section B was used to address information from the students. The hostels were visited using the snowballing method. Data were analyzed using appropriate descriptive and chi-square analysis. The findings showed that the respondents' environment was always noisy. Numerous factors were the causes of the noise pollution and that noise pollution would have a significant negative influence on the health status of students living out of campus hostel accommodation. Various noises that could pollute the environment should be prevented by the three tiers of the government.

ⁱ Correspondence: email fakinnubi@oauife.edu.ng, aadekunles91@gmail.com, owombohelen@gmail.com

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1. Introduction

Pollution is the accumulation of contaminants in the environment that adversely affects humans and organisms (Walker and Xanthos, 2018). Noise is an environmental pollutant that has great adverse effects on human well-being and performance (Debasish & Debasish, 2012; Awosusi & Akinduntire, 2014). Singh & Davar (2004) referred to noise as an unpleasant, loud, and unwanted sound capable of creating distress in human beings. Sound measured in decibels (dB) is termed as noise if its intensity is more than 80 dB (Miglani, 2010). The modern world is now a noise-producing environment and noise-related technology-automobile, aircraft, helicopters motorcycles, snowmobiles, leaf blowers, amplified music, and bass-driven cars (Singh & Davar, 2004).

Noise pollution emanates from various sources. The major sources of noise pollution according to Awosusi & Akinduntire (2014) are:

- 1) power generating plant,
- 2) traffic,
- 3) religious homes, and
- 4) construction sites and industries.

In the same vein, Olokooba, Ibrahim & Abdulraheem-Mustapha, (2010), connoted that factories, industries, homes, and worship centres do make loud noise through generating plants without minding the attendant effects on the people and their health. The authors further added that aside from the smoke emission from power-generating plants that contribute to the depletion of the ozone layer, the noise produced by the plants is equally harmful to the people and their well-being. According to research conducted by Rhiannon, *et al.* (2022), there was great quality proof for an association between environmental noise and reasoning impairment among people of middle to older age. Traffic constitutes another source of noise pollution. This becomes serious environmental pollution as a result of improper urban planning (Debasish & Debasish, 2012; Awosusi & Akinduntire, 2014).

The enormously large number of automotive vehicles makes traffic pollution problems apparent and worrisome nowadays. The noise from traffic sources is hazardous to the health of more than one-third of the world's population (WHO, 2012). Awosusi & Akinduntire (2014) itemized the major sources of traffic noise to include sound from automobiles such as trucks, cars, and motorcycles. People's health is also being threatened by noise from emergency vehicles like ambulances, firefighters, sirens from security agents, and top government officials' vehicles as well as blaring horns at gridlock. This is common in the cities or urban centers. The authors further explained that noise from churches most especially the use of PAS during vigils and the early morning call for prayers by Muslims could be considered as noise pollution to constitute disturbances to people.

Awosusi & Akinduntire (2014) opined that noise from construction sites has hazardous effects on the wellbeing of the people. Homes or offices located close to construction sites find it difficult to enjoy the environment during the period of construction (Awosusi & Akinduntire 2014).

Persistent noise exposure is injurious to health (Boateng & Amedofu, 2004; Oyedepo, 2012; WHO, 2012). Damage caused by noise pollution amounts to the intensity of the sound it has (Bashorun & Olamiju, 2013). Constant exposure to excessive noise may have serious detrimental effects on human health and behaviour. Sound sleep is one of the major prerequisites for good physiological and mental functioning in healthy individuals. Environmental noise can cause tinnitus, hearing loss, sleep disturbance, and other harmful effects on health (Mead, 2007; Olokooba, Ibrahim & Abdulraheem-Mustapha, 2010). Sleep disturbances such as difficulty falling asleep, alterations of sleep pattern or depth, and awakenings may necessitate the need for using sleeping pills or earplugs. The problem or the solution proffered can both have significant detrimental effects on health. Evidence for sleep disturbance by noise can either be objective or subjective because sound as noise to someone could be a source of pleasure to another (Olaosun, Ogundiran & Tobih, 2009).

In Nigeria predominantly, the persistent noise from numerous factors such as the generators, vehicles, churches, and mosques could result in irritation, anger, and clashes thereby hindering the healthy link of the people living in an environment and the environment. Studies on traffic and aircraft noise have shown that noise levels have been associated with annoyance in a close-response relationship. Jarup *et al.* (2008). Explosive sounds can rupture the eardrum or cause immediate damage to the structures of the middle and inner ear and are associated with the destruction of the hair cells of the inner ear (Olaosun Ogundiran & Tobih, 2009).

The observed increase in noise levels in metropolitan cities above specified standard limits is responsible for the rising incidence of deafness among the inhabitants (Bhargawa, 2001). According to Clark, Crumpler, and Notley, (2020), there is low worth of evidence for the damaging effect of noises from road traffic, aircraft, and railways on some cancer outcomes. Children exposed to noise have been discovered to have difficulties in concentrating in comparison to the students in schools and this unusual noise level was said to cause stress and high blood pressure which is the foremost cause of health problems (Mead, 2007).

Workers who are exposed to a high level of noise do have a difficulty occurrence of circulatory problems, cardiac diseases, and hypertension, neurosensory and motor impairment (Landrigan *et al.* 2002). Studies have shown that there is a significant association between daily traffic noise and night-time aircraft noise and an increase in blood pressure (Jarup *et al.*, 2008).

Olaosun *et al.* (2009) and Olokooba *et al.* (2010) revealed that noise pollution causes sleep disturbance, cardiovascular diseases, and lack of concentration. Donatelle (2002), Rabinowitz (2002), Bhongawa (2001) and Boateng and Amedofu (2004) revealed that noise pollution causes loss of hearing; Mead (2007), Goines and Hagler (2007), and Jarup

et al. (2007) revealed that noise pollution is associated with cardiovascular disease; Ouis (2001), Bronzaft (2000) revealed that noise pollution causes stress; while Picard *et al.* (2008), Martin *et al.* (2006) and Miglani (2010) revealed that noise pollution causes an accident in the workplace. Noise pollution can cause poor health conditions, distress, and unrest among the people particularly those that are long exposed to it.

2. Statement of Research Problem

An environment without noise condition is very imperative for good healthy living. Noise pollution in any community is always detrimental to the health of individuals. It has been observed that residents in numerous communities and streets are often exposed to environmental menaces mostly noise pollutants from religion home using public address system, factories and industries, heavy traffic and construction sites. This occurrence seems to be having injurious concerns on the residents' students in off-campus accommodation. Hence, this study.

2.1 Purpose of the Study

The purpose of this study was to examine noise pollution and perceived risks to the health status of students living out of campus hostel accommodation institutions in Edo State.

2.2 Research Objectives

The objectives of this study were to:

- 1) Investigate the noise pollution situations of outside campus hostel accommodation in institutions in Edo State;
- 2) Determine the causes of noise pollution among students living out of campus hostel accommodations in Edo State institutions; and
- 3) Examine perceived risks of noise pollution on the health status of students living out of campus accommodation in tertiary institutions in Edo State

The research hypothesis for the study:

H₀₁: The perceived risks of noise pollution will not have a negative significant influence on the health status of students living out of campus hostel accommodation in Edo State Institutions

3. Methodology

Descriptive survey research designed was to ascertain respondents' responses to the research study conducted in Edo State, Nigeria. The sample for the study comprised 200 students across the institutions living in outside hostel accommodation in Benin City of the State. A total of four Federal and State institutions were selected. Fifteen off-campus hostels were selected particularly near the institution selected. This was done using the

Snowball sampling technique. The research tool was a self-designed structured questionnaire used to collect the data for this study.

The questionnaire comprised two sections. Section A contained information on the personal data of the respondents while Section B was used to elicit information from the students. The questionnaire was subjected to face and content validity procedures. The face validity of the instrument was ensured by experts in the field. They validated the instrument by ensuring that all questions in the questionnaire addressed the research objectives, research questions, and hypothesis were correct. Content validity was used to ascertain the suitability or essentiality of the items in a questionnaire. This method helped to ensure that the assessment of both the content and composition were appropriate and the instrument measured what it was meant for. The reliability of the instrument was determined using a split-half reliability procedure on separate respondents. After the questionnaire was carried out on the two halves separately (15 respondents each making a total of 30 respondents) to determine the reliability of the instrument, The data collected from the first halve and second halve was tested for reliability using the Cronbach coefficient alpha method. The result yielded a correlation coefficient of 0.87 which was deemed high, reliable, and significant at 0.05 level (no = 20, $r = 0.84$, $p < 0.05$). The researcher employed 3 trained research assistants for the administration of the instrument. The hostels were visited using the snowballing method. The respondents were encouraged to be sincere in supplying information for a reliable result. The questionnaire was distributed and collected on the spot after completion. All the copies of the questionnaire administered to the respondents were correctly filled and returned. Data was analyzed using the appropriate descriptive and statistical package of (SPSS) Statistical Package for Social Sciences.

4. Results and Discussion

Table 1: Demographic Characteristics of Respondents

Variables	Frequency	Percentage
Gender		
Male	124	62%
Female	76	38%
Age		
Below 21 years	96	45%
21-30 years	66	46%
31-40 years	38	9%
41 years and above	-	-
Religion		
Christian	118	59%
Muslim	68	34%
Traditional	10	5%
Others	04	2%
Total	200	100

Table 1 shows the demographic characteristics of the respondents in off-campus hostels in public institutions across Edo State. The table showed that 124 (62%) respondents and 76 (38%) respondents were male and female respectively. It was also observed that 96 (45%) respondents were below 21 years of age while 66 (46%) and 38 (9%) respondents were between 21-30 years and 31-40 years, respectively. None of the respondents were between the ages of 41 years and above. It was also revealed that 118 (59%) respondents were Christian, 68(34%) respondents were Muslim, 10 (5%), respondents were Traditional, and 04 (2%) respondents were others.

Research question 1: What are the noise pollution situations outside campus hostel accommodations in institutions in Edo State?

Table 2: Descriptive analysis of noise pollution situations of off-campus hostel accommodation institutions in Edo State

S/N	Noise pollution situations	A	D
1.	There are generating plants around my environment	170 (85%)	30 (15%)
2.	There is heavy traffic around my environment.	114 (57%)	86 (43%)
3.	There are heavy sounds from religious homes e.g. churches and mosque using PAs in my environment	132 (66%)	68 (34%)
4.	There are construction sites around my environment	42 (21%)	158 (78%)
5.	Factories and industries	32 (16%)	168 (84%)
6.	Shop selling CDs	121 (60.5%)	79 (39.5%)

Table 2 shows the noise pollution situations of outside campus hostel accommodation institutions in Edo State. A total of 170 (85%) respondents stated that there were generating plants around their environment. One hundred and fourteen (57%) respondents agreed that there was heavy traffic around their environment. One hundred and thirty-two (66%) respondents identified that there were heavy sounds from religious homes e.g. churches and mosques using PAs in my environment. In the same, a total of 121 (60.5%) respondents strongly agreed that the shop selling CDs was one of the noise pollution situations around the study areas. The finding of the above implied that the respondents' environment was always noisy.

Research question 2: What are the causes of noise pollution among students living out of campus hostel accommodation in institutions in Edo State?

Table 3 showed that 170 (85%) respondents agreed that the power generating plant was one of the factors that produced noise pollution around their environment.

Table 3: Descriptive analysis of the causes of noise pollution among students living out of campus hostels accommodation in institutions in Edo State

S/N	Causes of noise pollution	A	D
1.	Power generating plant	170 (85%)	30 (15%)
2.	Heavy traffic	114 (57%)	86 (43%)
3.	Religion home e.g. churches' and mosques' public address systems (PAs)	132 (66%)	68 (34%)
4.	Construction sites	42 (21%)	158 (78%)
5.	Factories and industries	32 (16%)	168 (84%)
6.	Shop selling CDs	121 (60.5%)	79 (39.5%)

A total of one hundred and fourteen (57%) respondents agreed that there was heavy traffic around their environment. One hundred and thirty-two (66%) respondents identified that there were heavy sounds from religious homes e.g. churches and mosques using PAs in my environment that caused noise pollution. Likewise, a total of 121 (60.5%) respondents agreed that the shop selling CDs was one of the noise pollutions around the study areas. The above showed that numerous factors could cause noise pollution.

Research question 3: What are the perceived risks of noise pollution on the health status of students living out of campus accommodation in institutions in Edo State?

Table 4: Descriptive and chi-square analysis of perceived risks of noise pollution on health status of students living out of campus accommodation in institutions in Edo State

S/n	Variables	A	D	df	χ^2 Cal.	χ^2 tab.	Rem.
1.	Noise causes sleeplessness and psychiatric ailment.	132 (66%)	68 (34%)	3	11.020	5.32	Sig.
2.	Noise causes loss of hearing, nervousness, and lack of concentration.	146 (73%)	54 (27%)	3	16.540	5.62	Sig.
3.	Noise pollution can cause headaches.	135 (67.5%)	65 (32.5%)	3	26.020	5.62	Sig.
4.	Noise pollution can cause hypertension.	120 (60%)	80 (40%)	3	43.760	5.62	Sig.
5.	Noise pollution can cause circulatory problems.	109 (54.5%)	91 (45.5%)	3	23.740	5.62	Sig.
6.	Noise pollution can cause cardiac diseases.	112 (56%)	88 (44%)	3	21.580	5.62	Sig.
7.	Noise pollution can cause neurosensory and motor impairment.	111 (55.5%)	89 (44.5)	3	25.860	5.62	Sig.

p<0.05

From above Table 4, the following findings were perceived results. It was discovered that 132 (66%) respondents agreed noise causes sleeplessness and psychiatric ailment, while 68 (34%) respondents disagreed with this statement. A total of 146 (73%) respondents agreed with the statement that noise causes loss of hearing, nervousness, and lack of concentration. In the same vein, 135 (67.5%) respondents agreed that noise pollution can cause headaches. Furthermore, a total of 120 (60%) agreed that noise pollution can cause hypertension. Looking at the above results in the table generally, it was observed that numerous perceived health risks were associated with noise pollution. All these variables or factors above were tested with the chi-square of the table of analysis and they were all significant.

Research hypothesis 1: Noise pollution will not have a negative significant influence on the health status of students living out of campus hostel accommodation in Edo State institutions.

Table 5: Chi-square (χ^2) analysis of the negative significant influence of noise pollution on the health status of students living out of campus hostel accommodation in Edo State institutions

Responses	Frequency	%	df	χ^2 Cal	χ^2 Cal	Remark.
A	118	55	3	116.54	7.82	Significant
D	82	44				

χ^2 Cal = 116.54, critical t-value = 7.82; df 3; $p < 0.05$.

Table 5 above shows the analysis of the negative significant influence of noise pollution on the health status of students living out of campus hostel accommodation in Osun State. To find out if the research hypothesis stated was significant, chi-square analysis was used to determine, the finding showed that the chi-square calculated = 116.54, χ^2 Tab = 7.82, df = 3 at 0.05 level of significance was above. Since the χ^2 Cal value was higher than the χ^2 Cal value, the hypothesis was rejected. Therefore, there was a negative significant influence of noise pollution on the health status of students living out of campus hostel accommodation in Edo State institutions.

5. Discussion

The finding of this research study was that the respondents' environment was always noisy. This is similar to the finding of Awosusi & Akinduntire (2014), that the major sources of traffic noise include sound from automobiles such as trucks, cars, and motorcycles. People's health is also being threatened by noise from emergency vehicles like ambulances, firefighters, sirens from security agents, and top government officials' vehicles as well as blaring horns at gridlock. And the study by Olokooba, Ibrahim & Abdulraheem-Mustapha (2010), said factories, industries, homes, and worship centres make a loud noise by generating plants without minding the attendant effects on the people and their health.

Another finding showed that numerous factors could cause noise. pollution. This is similar to Awosusi & Akindutire (2014), that the major sources of noise pollution according were

- 1) power generating plant,
- 2) traffic,
- 3) religious homes, and
- 4) construction sites and industries.

And that major sources of traffic noise included sound from automobiles such as trucks, cars, and motorcycles.

Additional findings showed that numerous perceived health risks were associated with noise pollution. This is similar to the study of Picard *et al.* (2008), Martin *et al.* (2006), and Miglani (2010) which revealed that noise pollution can cause poor health conditions, distress, and unrest among people particularly those who are long exposed to it. And, the statement of Awosusi & Akinduntire (2014) stated that noise from construction sites has hazardous effects on the wellbeing of the people. And, the research conducted by Rhiannon, *et al.* (2022), that there was great quality proof for an association between environmental noise and reasoning impairment among people of middle to older age. Similar to the statement of Boateng & Amedofu, 2004; Oyedepo, 2012; WHO, 2012), which stated persistent noise exposure is injurious to health.

Further findings showed that there was a negative significant influence of noise pollution on the health status of students living out of campus hostel accommodation in Edo State Institutions. This is similar to Olaosun, Ogundiran & Tobih (2009) research findings, which affirm that the problem of noise pollution can have a significant detrimental effect on health.

5.1 Conclusion

Based on the findings from this study, it was concluded that noise pollution had serious negative implications on the health and well-being of students living in out-of-campus hostels in institution of Edo State.

5.2 Recommendation

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

- Record stores and religious homes should be sited away from residential areas to prevent health hazards.
- The government and its agencies should put in place policies or measures that will stop the siting of factories and industries in students' residential areas to prevent noise hazards.
- Health talk on noise pollution should be given to the students to understand the impact of noise pollution on the health of individuals.
- The government and its agencies should put in place laws that would prevent noise pollution of various types in the environment to prevent the inhabitants from dangers accompanying it.

5.3 Ethical Consideration

Ethical consideration is of importance to this study and was well-maintained. The study was cleared by the Institute of Public Health at Obafemi Awolowo University, Ile-Ife, Nigeria, with the protocol number IPH/OAU/12/2319. Confidentiality of information was also ensured during statistical examination and discussion of outcomes as contained in the consent form, provided the ethical clearance for the study.

Conflict of Interest Statement

The authors declare no conflicts of interest.

About the Author(s)

Two authors out of the three authors are PhD holders and working as lecturers at the university, while the third author is a PhD student. Our areas of interest are Environmental Sanitation Education, Personal Hygiene Education, Reproductive Health Education, Nutrition Education, Safety Education, and Drug Education. We also have links to the following academic networks such as Orcid, Google Scholar, Research Gate, Web of Science, institutional webpages, etc.

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