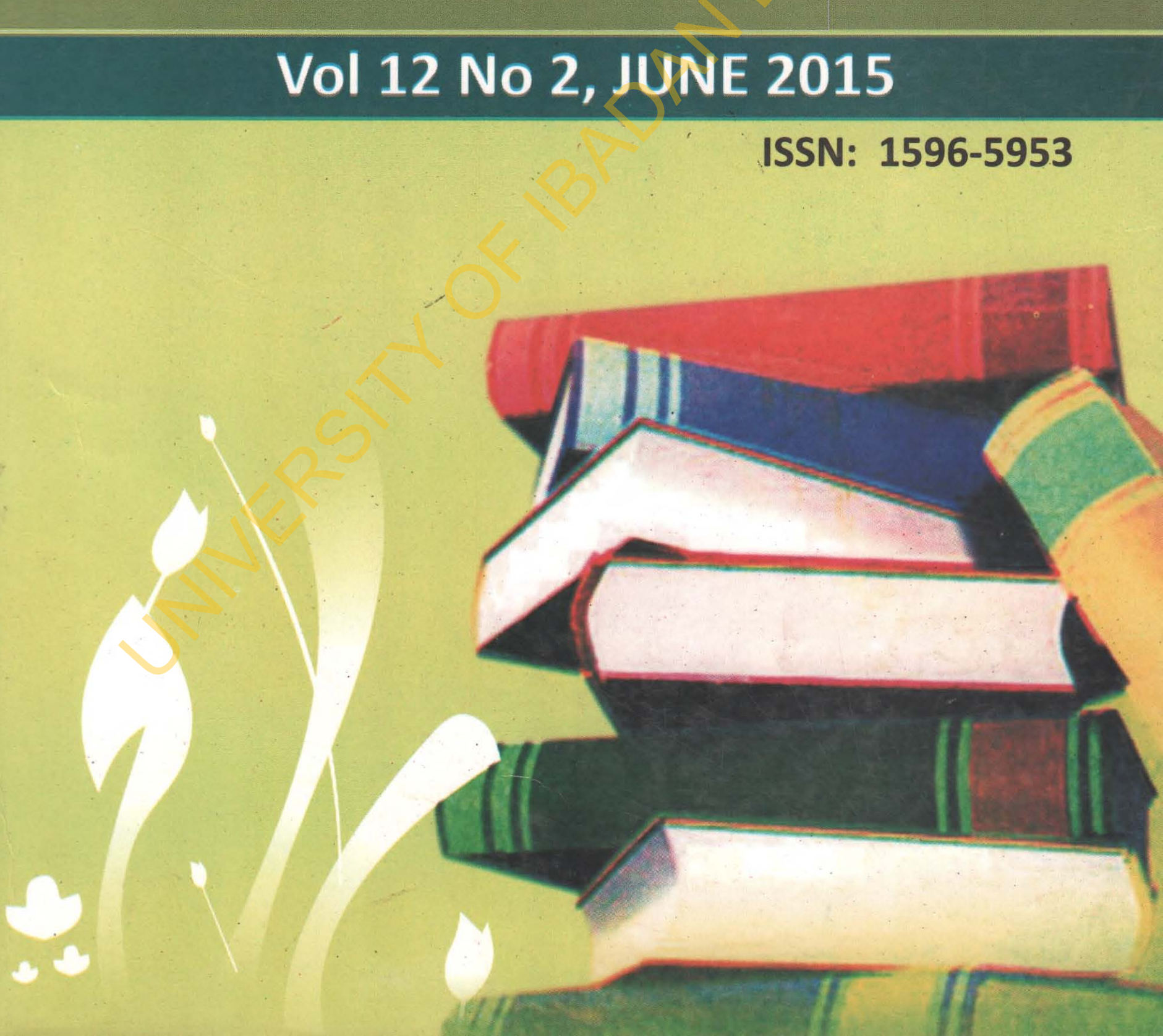
Ibadan Journal of Educational Studies

(IJES)

Vol 12 No 2, JUNE 2015

ISSN: 1596-5953



Volume 12, 2015

Ibadan Journal of Education Studies (IJES)

ISSN: 1596-5953

Vol. 12 No. 2, 2015

Vol. 12, No. 2

Some Effect of Environmental Noise on The Academic Attainment of Students Attending Regular Secondary Schools in Ibadan Metropolis

A. Osisanya and Y. E. Obalola
Dept. of Special Education, University of Ibadan, Ibadan
ayo_osisanya@yahoo.com

Abstract
The study examined the effect of environmental noise on the academic attainment of some secondary school students in order to determine the relationship between the two variables. 500 randomly selected secondary school students from four purposively selected schools of 125 each formed the participants for the study who were assessed with the use of Sound Pure Tone Audiometres (PTA), and a self- developed Environmental Noise on Academic Attainment Scale (ENASS) with a reliability coefficient of .85 Alpha. The results of the study through the use of some level meter (SLM) showed that the external noise of the participating schools exceeded the standard of 35dB set by the WHO, with a significant difference in the sound level of schools located in a noisy environment and those of noise-free environment. The hearing level of participants from a noisy environment was found to differ significantly from the hearing level of participants from a noise- free environment ($5.445 > 1.96$; $= P < 0.05$), while the educational attainment of participants from schools in a noisy environment and participants from noise- free schools also differed significantly ($5.61 > 1.96$; $= P < 0.05$). It was therefore suggested that government should enforce the public laws on school- site, noise- control and hearing conservation. Also, there should be strict compliance to the global standard in that generated noise level in schools must not exceed the standard of 35db set by the WHO, as noise has been found to have a deleterious effect on the academic attainment of school children.

Introduction

Noise is any unwanted sound, referred to as a harmful communicational feature capable of damaging the receptors of the sound signals. Bakare (1991) stated that noise is any undesired sound or sound of any kind which interferes with the audibility of another sound, and consists of a scramble of many frequencies that may not stand in any simple numerical relation to one another. Noise has been reported to affect people and the environment, as it has so many deleterious effect on the auditory perception of the individual, is detrimental to health, triggers off one's state of mind, changes thought, mood and can result in mental illness (Seschagiri, 1998). Noise has equally been observed as the common event in the daily life of the present- age; and probably is the most ubiquitous of work- place hazards, which implies that high noise exposure is common in industrialised societies, as this phenomenon instills profound impact on the ability to communicate and participate in social relationship, causing depression and loss of self- esteem (Clark, 2008; Tanaka, Chen, Hu, Chi, & Li, 2009; Flame, Stephen, & Mcgregor, 2012).

Excessive noise can damage several cell types in the inner ear, but most affected are the outer hair cells (Osisanya, 1998). In humans, results of noise accrue progressively and often unnoticed until it reaches a certain degree. Very high levels of noise can lead to acute mechanical damage to inner and outer hair cells, but this form of damage is very rare, and commonly, there is a chronic damage that builds up slowly over time. According to Holmberg (1997), Noise can be distinctly categorized into four which are physical, psychological, physiological and semantic. Physical noise is external to the speaker and listener, and includes such as the sound of road construction outside the window which makes it difficult to hear what is being said. Physiological noise is any physiological issue that interferes with communication, for example having a migraine. Semantic noise occurs when there is no shared meaning in a communication. This often occurs when someone is dealing with medical professionals, lawyers and others who use terminologies that lay people may not understand. Lastly, psychological noise is mental interference that prevents one from listening (Holmberg, 1997).

Noise pollution can be from simple sources such as an air conditioner, traffic, a loud radio, human conversation, a dog barking, to more complex machinery such as large trucks and airplanes (Berglund& Lindvall, 1995), and has been found to propel a decrease in the performance at work and school. Noise has numerous health effects, making noise pollution a public health concern although it has not been well addressed (Rabinowitz, 2000). To name a few, the effect include elevated blood pressure, noise-induced hearing loss, sleep disorders, and irritability. Noise has both auditory and non-auditory effects, and in recent years, evidence has been found to suggest that noise inside the classroom covid affects letters, number and word recognition ability.

In 1980, the World Health Organisation (WHO) defined environmental noise as noise emitted from all sources except for noise at the industrial work place. European Union (EU) Directive 2009/401/EC on the management of environmental noise, and Parliament of the Council in April (2009) also defined environmental noise as "unwanted or harmful outdoor sound created by human activities, including noise from road, rail, airports and from industrial sites". The terms community, residential or domestic noise have also been applied to environmental noise, although these terms are not necessarily used consistently (European Environmental Agency, 2009). Children who are very young, learning in a second language, or suffering from a hearing impairment may find the noise particularly interfering (Boman& Enmarker, 2004). High noise levels may reduce satisfaction with the learning environment, both on the part of the teachers and the students, inducing fatigue, reduced motivation and inattention. According to Maxwell and Evans (2000), high classroom noise levels may have long term effects on student's academic progress.

While there is a large body of work concerning the effect of external environmental noise upon students at schools, there are fewer investigations into the effects of typical classroom noise upon student's performance (Babisch, 2006). According to the WHO (1999), the permissible noise level in school environments should not exceed 35dB, as chronic noise exposure would impair concentration, general cognitive functioning, and particularly reading skill. Also, external noise has a significant negative impact upon performance, the effect being greater for the older students. The major effect of noise in the classroom is the reduction of speech intelligibility and the hearing and understanding of speech by students of different ages in various noise and acoustic condition (Shield & Dockrell, 2008). Noise has some effects in the areas of reading, motivation, language, speech, and memory, with a common theory for the causes of these problems being speech interference- if students who are learning to read cannot understand their teachers, they may develop reading problems. These problems appeared to be aggravated in vulnerable populations, such as students for whom English is a second language (den Boer & Schroten, 2007). Exposure to environmental noise can cause a negative reaction to students, most especially in the urban city where there are different technologies that generate noise continuously.

The location of schools in the urban area can have a great effect on students, whereby the school is located at market place, industry, factory, train by-pass or road, traffic area. Tasks that involve language, such as reading, and those that have high cognitive processing demands involving attention, while problem solving and memory appear to be most affected by exposure to noise in schools. On the contrary, schools that are not exposed to noise will record better and academic attainment. The students and teachers will hear themselves and effective learning will take place, as good concentration, understanding, and impactful skills will be recorded. Consequently, a study on the effects of environmental noise on academic attainment of students will be necessary to examine the deleterious impact of environmental noise.

The purpose of this study was to initially assess the effect of environmental noise on academic attainment of students in Ibadan, while other objectives were: to measure the level of noise both external and internal of the participating schools with Sound Level Meter (SLM), to know the difference in noise range between schools that are exposed to noise and schools that are not exposed to noise, to assess the level of hearing of the students- both those that are exposed to noise and those that are not exposed to noise using Pure Tone Audiometry (PTA), and to determine the extent to which external and internal noise can affect the students' academic attainment. In order to achieve these purposes, we predicted that the sound level of the selected schools would not exceed the standard of 35dB set by the WHO, and that there would not be a significant difference in the sound level of

schools located in a noisy environment and those in a noise- free environment, in the internal noise level of schools located in a noisy environment that were privately owned, and schools located in a noise- free environment that were government owned, in the hearing level of participants from schools located in a noisy environment and participants located in a noise- free environment, and in the educational attainment of participants from a private school in a noisy environment, and from participants from a government-owned school in a noise- free environment.

Research Questions

i. Does the sound level of the schools exceed the standard of 35dB set by the WHO?
ii. What is the range of the hearing levels of the participants?
iii. Does noise affect the participants' learning ability?
iv. What are the effects of environmental noise on the students' academic achievement?

Hypotheses Tested

The following null hypotheses were tested at 0.05 level of significance

i. There is no significant difference in the effect of noise on the educational attainment of participants from private schools and those from public schools
ii. There is no significant difference in the educational attainment of participants from schools in a noisy environment, and the participants from schools in a noise- free environment.

Methodology

Participants

The participants for the study were 500 randomly-selected secondary school students from four purposively-selected secondary schools. Due to the aim of the study which was to compare the effects of noise on the academic attainment of secondary school students, participating schools were purposively selected. The first condition required the schools to be located in either a noisy environment, or a noise- free environment. The second condition required the participating schools to be either private-owned or government-owned. Consequently, the schools that met the two criteria were selected thus (see Table 1). Thereafter, 125 students were then selected from each school to have a total of 500 students participate in the study. The participants were 294 males and 206 females, were aged between 12 through 20 years, were between Senior Secondary School 1 to 3, and have been at school for at least 1 to 3 years.

Research Design

This study adopted a descriptive research design of the survey type. The researchers adopted an ex-post facto design which is a non-experimental research technique in which pre-existing groups were compared on some dependent variables.

Measures

Three instruments were used for the study namely the Sound Level Metre (SLM), the Pure Tone Audiometry (PTA), and the Environmental Noise on Academic Attainment Scale (ENAAS). The SLM was a calibrated instrument used to measure the sound generated within the environment, with the result shown in decibel (dB). The SLM used was a Tenma- Test equipment of Rs-232 Sound Level Meter, weighting modes 72-860A which have the setting of low and high impulse response modes in- order to measure the noise at low rate or high rate. The PTA was a calibrated instrument that was used to assess the hearing threshold of the participants. Maico 53 was the diagnostic portable PTA instrument which was used to obtain result for the study. A pure tone stimulus was generated within the machine and projected out through a set of headphones that were biologically and technically calibrated to establish reliable hearing threshold. The Environmental Noise on Academic Attainment Scale (ENASS) was a Self-Developed Questionnaire. It was used to investigate the academic attainment of the participants, their reactions and how environmental noise affects their academic attainment. The questionnaire was divided into four sections. Section A entailed participants' personal details which is their demographic characteristics such as Name of school, sex and age, class. Section B entailed personal information of the participants, describing how long they have been exposed to noise in their school environment; the section consists of four items. Section C, entailed environmental noise- related issues which included the sources of noise in the schools, and the reading comprehension of the participants. Section D consisted of 34 items on academic attainment/well-being, constructed to measure the four areas outlined. The areas were- Reading Comprehension and Understanding; Learning Ability and Memory; Speech Recognition; Discrimination and Intelligibility; Concentration and Cognitive Functioning. Each participant was expected to rate each item accurately, with the rating set as how well a participant can positively affirm a statement (Strongly Agree) to Strongly opposing it (Strongly Disagree). The ratings were classified thus: Strongly Agree (SA) corresponded to 1 mark, Agree (A) 2, Disagree (D) 3, Strongly Disagree (SD) 4. The instrument was used to investigate the reaction of students towards noise. The reliability coefficient of the instrument was found to be .85, using the Cronbach's Alpha method.

Procedure

Approval for the study to be conducted was sought from the authorities of the selected schools. Based on the approval given by the school authorities, a specific day and time was given to the researchers for the conduct of the study so that it would not affect the normal school activities. At the conduct of the study, the SLM was the first instrument used to measure the noise level outside the school, inside the school and inside the classroom. The SLM results for each classification were then carefully recorded. Afterwards, 125 students were randomly selected from each school in order to have their hearing tested using the pure- tone audiometric process. Each of the 125 participants was then presented with the ENAAS questionnaire in order to assess the effects of noise on their academic achievement. The SLM, PTA and ENAAS results for each school was then carefully separated in order to avoid mix up. The data gathered was then analysed with the use of descriptive statistics of frequency count, percentages and inferential statistics of t-test.

Results

The sound level measures observed from the sampled schools exceeded the standard norm (35dB) set by the WHO. The noise measures observed even from the noise- free schools greatly exceeded the norm. Also, it was observed that the noise generated within the classroom (School 1= 56dB; School 2= 62 dB; School 3= 58 dB; School 4= 72dB) where teaching- learning was taking place greatly exceeded the standard norm. The measures observed indicated that none of the sampled schools conformed with the standard of 35dB set by the WHO. In fact, the lowest sound measures observed in the noise- free schools was 54dB (within the school premises), while the lowest from the noisy environment was 62dB obtained from a classroom environment (Table 2). For both right ears and left ears, 320 and 298 participants had normal hearing activity in both ears and left ears respectively, 16 and 14 had moderate hearing loss in both ears, 65 participants had right ear mild hearing loss as against 59 with left ear mild hearing loss. Further, participants from the noise-free schools had better hearing sensitivity than participants from noisy environment. Based on these results, it is evidently clear that noise exposure has damaging effects on the hearing of students schooling in such environment (Tables 3^{A} and 3^{B}).

42.8% and 23.2% of the participants strongly disagreed and disagreed respectively with the statement that learning is enjoyable with background noise, while only 15.8% of the participants agreed with the statement, 27.8% and 40.8% of the participants agreed and strongly agreed respectively that exposure to environmental noise has affected their learning ability significantly. This was supported with chi-square results (Table 4). Further, 35.2% and 40.6% of the

participants strongly agreed and agreed respectively that environmental noise leads to poorer reading ability, while 10.20% and 14.0% of the participants disagreed and strongly disagreed with the statement. A greater percentage of the participants- 41.6% strongly agreed that environmental noise leads to poorer memory for tasks and class activities while only 15.6% of the participants strongly disagreed with the statement. Further, 30.6% and 42.8% of the participants strongly agreed and agreed respectively to the claim that environmental noise leads to poor understanding of the instruction and communicated messages during class activities, while 10.4% and 16.2% of the participants respectively strongly agreed and agreed with the statement (Table 5). A significant difference was found in the effect of noise on the educational attainment of students from private and public schools ($5.445 > 1.96; = P<0.05$) (Table 6), in the educational attainment of students from noisy and noise-free environment as a result of environmental noise exposure ($5.61 > 1.96 = P<0.05$) (Table 7).

Discussion of Findings

Based on the findings of the research question one which focuses on the sound level measures from the noise- free and noisy environments, it was observed that the level of sound observed exceeded the standard of norm set by the WHO (even measures observed from both the private and public noise- free schools). Therefore, the outcome (observed measures) was contrary to the permissible noise level in school environment which should not exceed 35dB, because chronic noise exposure has capacity to impair concentration, general cognitive functioning and reading skill, and that noise reduces speech intelligibility within the classroom, as well as understanding of speech by students of different ages in various noise and acoustic condition (WHO, 1999; Babisch, 2006; Shield & Dockrell, 2008).

The results on the hearing levels of the participants show that participants from the noise-free schools had better hearing sensitivity than participants from noisy environment. Based on these results, it is evidently clear that noise exposure has damaging effects on the hearing of students schooling in an environment that is noisy. This study has thus helped to determine the hearing level of the participants schooling in either the noisy or noise-free environment, and reiterates the study of Sackett, Rosenberg, Gray, Haynes and Richardson (1996) which stated that one main purpose of evaluating hearing status of participants in a study is to serve as aid to researchers in the process of making adequate and comprehensive decisions regarding the type and extent of each of the participants so as to offer them healthy advice to safe-guard hearing loss or further degeneration of hearing sensitivity. Thus, the present researchers had given appropriate advice to the concerned participants.

Based on the responses of the participants on whether exposure to environmental noise has implication and effect on the students learning ability, it is evident that exposure to environmental noise has great effects on the learning abilities of the students. This finding was in line with the findings of Shield and Dockrell (2005), that environmental noise always impair performance on a range of literacy, numeracy and speed tests.

The findings of this study on the effect of environmental noise on the students' academic achievement show that environmental noise has negative impacts on the educational attainment of students in a noisy environment. This is in agreement with the findings of Goines and Hagler (2007) that the strongest effect of noise observed is in the area of poor reading, attention, problem solving and memory difficulties. These findings also corroborate the claims of Hygge, Evans and Bullinger (2002) that environmental noise leads to poorer reading abilities, cognitive development, physiological and motivational spirit towards class activities. As well, exposure to environmental noise in school could lead to annoyance and other negative behaviour in school (Holmberg, 1997).

The results on the effect of noise on the educational attainment of students in private and public schools implies that the effect of noise on the educational attainment of students from the two types of school was significantly different. Therefore, the null hypothesis was rejected. This further indicates that students from public schools are significantly affected by the environmental noise compared to those from private schools. This finding was thus in line with the report of Shield and Dockrell (2001), and Hygge, Evans and Bollinger (2002) that effects of noise on people might differ depending on the noise generated mechanisms. The learning process is more affected by verbal noise than broad-band noise (Martins, 1988), and that there is high interference with the encoding memory as a result of noise emanated from traffic and trains.

The findings on the difference in the educational attainment of participants from schools in a noisy environment and those from a noise- free environment indicated a significant difference in the effects of noise on the educational attainment of participants from noisy and noise-free environment. Thus, this finding was in agreement with the positions of Goines and Hagler (2007) and Shield and Dockrell (2001) that effect of noise is stronger in urban primary schools than elsewhere. These findings also enjoy the support of Mackenzie and Hodgson (1994) that when students remain silent in a classroom, their reading attention increases, than those in a noisy environment.

Conclusion

Exposure to environmental noise in school have been observed as having capacity to reduce reading comprehension skill, speech intelligibility for hearing

and understanding as well as ability towards memory recognition. It has also been found that continuous exposure to environmental noise irrespective of the status and types of school makes the students develop poorer hearing ability for speech sounds, based on the deleterious effect of noise on the hearing process; annoyance and irritation towards schooling or classroom activities as well as poor academic attainment.

Also, it has been found that there is no school (be it private or public) practicing hearing conservation principles, adhere to noise control standard norm recommended by the WHO, and there is none having audiologist in their employment list, let alone observing noise-pollution control measures. Consequent upon this, adequate control measures must be put in place to safe guard students from developing hearing and learning difficulties. Further, a conducive environment must be created to improve the academic attainment of the students, irrespectively of the type of school they attend.

Recommendations

Based on the results of this study which indicates that exposure to environmental noise in schools leads to poorer reading ability, poorer memory for class activities/tasks and reduction of speech intelligibility in hearing and understanding during teaching and learning session. Therefore, it becomes imperative to make the following recommendations:

i. Schools should be established or cited in a noise – free environment, where the ambient noise level would not exceed 35 dB standard norm recommended by the WHO.

ii. The school environment should be made conducive, so as to help improve academic attainment of students positively.

iii. Government should enforce the regulatory standard norm of noise control in schools recommended by the WHO which must not exceed 35dB in all schools environment.

iv. Government should ensure that schools are located in noise free environments, while at the same time empowering the Federal Environmental Protection Agency (FEPA) in order to judiciously carry out her functions.

v. Already located schools within the noisy environment should be compelled to embrace noise control strategy/measures so as to curtail the implications and insidious effects of noise on the hearing, academic attainment of students as well as their psycho-physiological states.

vi. The students should be encouraged to reduce noise generation within school/classroom environment. As well hearing status of all students in the

country should be determined, in the bed to source out those at damage-risk criteria for help.

vii. Each school in the urban centre should employ the service of an Audiologist. This would serve as a measure to curtail hearing and learning difficulties due to noise pollution in the school.

viii. Hearing conservation principles must be adhered to strictly within and outside the school premises as a noise pollution control measure.

ix. School supervisory ministries and agencies saddled with responsibilities towards compliance must discharge their duties with all sense of commitment thoroughness and without prejudice, bias or compromise.

x. Approval for school establishment and accreditation parameters must be based on the compliance or conformity to the noise pollution control and hearing conservation strategies.

References

Babisch, W. (2006). "Transportation noise and cardiovascular risk, review and synthesis of epidemiological studies, dose-effect curve and risk estimation", WaBoLu-Hefte 01/06, Umweltbundesamt.

Bakare, C.A. (1991). *Clinical audiology*. Ibadan: University Press.

Berglund, B, and Lindvall, T. (2005). Community noise. *Archives of Centre of Sensory Research* (1): 1- 195

Boman, E. and Enmarker, I. (2004). Factors affecting pupils' noise annoyance in schools: The building and testing of models. *Environment and behaviour*, 36(2), 207-228.

Clark, W.W. (2008). Noise- induced hearing loss. In W.W. Clark and K.K. Ohlemiller. *Anatomy and physiology of hearing for Audiologists*. Clifton Park, USA. Thomas Delmer Learning.

Den Boer, L.C., and Schroten, A. (2007). Traffic noise reduction in Europe. Health effects, Social costs and Technical and policy options to reduce road and rail traffic noise. *Delft CE August Report. Solutions for environment, economy and technology*

European Environmental Agency (2009). Regulation (EC) No 401/2009 of the European Parliament and of the Council 0f 23 April, 2009

Flame, G.A., Stephen, M.K., and Mcgregor, K. (2012). Typical noise exposure in daily life. *International Journal of Audiology*, 51 (51).

Goines, L., and Hagler, L. (2007). Noise Pollution: A Modern Plague. *Southern Medical Journal*. Noise Pollution by Isabelle Lane MPHP 439, 100(3): 287- 293

Holmberg, K. (1997). Critical noise factors and their relation to annoyance in working environments. *Doctoral Thesis*. Division of Environment Technology. Lulea, Lulea University of Technology.

Hygge, S., Evans, G.W., & Bullinger, M. (2002). A Prospective Study of Some Effects of Aircraft Noise on Cognitive Performance in School Children. *American Psychological Society*. 13(5):469-474.

Mackenzie, D., and Hodgson, M. (1994). Speech intelligibility in classrooms. Proceedings

Martin, R.C., Wogalter, M.S., & Forlano, J.G. (1988). Reading comprehension in the presence of unattended speech and music. Articles on annoyance and effects on work from environmental noise at school. *Journal of Memory and Language* 27, 382- 398

Maxwell, L.E., and Evans, G.W. (2000). The effects of noise on preschool children's pre- reading skills. *Journal of Environmental Psychology*. 20(1), 91- 97. DOI: http://dx.doi.org110.1406/jevp.199.0144

Osisanya, A. (1998). The implications of oto- destructive properties of noise in Nigeria society. *Nigerian journal of speech and hearing*, 1(1), 44- 47

Rabinowitz, P. (2000).Noise-Induced Hearing Loss. *American Family Physician*. 61:2749-6, 2759-60.

Sackett, D.L., Rosenberg, W.M.C., Gray, J.A.M., Haynes, R.B., and Richardson, W.S. (1996). *Evidence- based medicine: How to practice and teach EBM*. Edinburgh: Churchill Livingstone

Seschagiri, B.C. (1998). Occupational noise exposure of operators of heavy trucks. *Journal of American industrial hygiene association 59(3): 205-213.*

Shield, B and Dockrell, J. (2002). Children's and teachers' perceptions of environmental noise in classrooms. *Proceedings of the Institute of Acoustics* 24 (2).

Shield, B., and Dockrell, J. (2005). The effects of environmental and classroom noise on the academic attainments of primary school children performance. 9th International Congress on Noise as a Public Health Problem (ICBEN) Foxwoods, CT. *Journal of the Acoustical Society of America*. 123, 133-144

Shield, B., and Dockrell, J. (2008). The effects of classroom and environmental noise on children's academic performance. 9th International Congress of Noise as a Public Health Problem (ICBEN) 2008, Foxwoods, CT

Tanaka, C., Chen, G.D., Hu, B.H., Chi, L.H., and Li, M. (2009). The effects of acoustic environment after traumatic noise exposure on hearing and outer hair cells. *Hear Research*. 250: 10-18

World Health Organisation. (1980). Noise. Environmental Health Criteria Document No. 12. World Health Organization, Geneva, Switzerland,

Guideline for community Edited by Birgitta Berglund, Thomas, Lindvall, and Dietrich H Schwela, 99-108.
World Health Organisation. (1999). Guidelines for Community Noise.

Appendix

List of Tables

Table 1: Factorial Matrix of Participating Schools

Table 2: Observed Sound Level from the Sampled Schools

School	Sound Level Measures in Decibels		
	Private Schools		
	SLM outside the School Premises	SLM inside the School Premises	SLM in the Classroom
School 1	60	54	56
School 2	77	65	62
	Public Schools		
School 3	64	60	58
School 4	85	70	72

Table 3[A]: Range of Hearing Level of all the Participants (Right Ear)

	Participants from Noisy Environment				
	Normal Hearing Activity (0-15dB)	Minimal Hearing Loss (16-25dB)	Mild Hearing Loss (26-40 dB)	Moderate Hearing loss (41-55dB)	Total
School 1 (Private)	59	32	28	6	125
School 3 (Public)	68	17	30	10	125
Participants from Noise- Free Environment					
School 2 (Private)	98	23	4	-	125
School 4 (Public)	95	27	3	-	125
Total	320	99	65	16	500

Table 3[B]: Range of Hearing Level of the Participants (Left Ear)

	Participants from Noisy Environment				
	Normal Hearing Activity (0-15dB)	Minimal Hearing Loss (16-25dB)	Mild hearing Loss (26-40 dB)	Moderate Hearing loss (41-55dB)	Total
School 1 (Private)	65	31	16	6	125
School 3 (Public)	57	48	18	3	125
Participants from Noise- Free Environment					
School 2 (Private	87	26	11	2	125
School 4 (Public)	89	24	14	3	125
Total	298	129	59	14	500

Table 4: Effect of Noise on the Students' Learning Ability

Variables		Freq.(%)	X^2 Cal	X^2 Crit.	df	P	Remark
I always enjoy learning in a noisy environment	SA	79 (15.8%)	400.69	7.81	3	0.000	Sig
	A	91 (18.2%)					
	D	116 (23.2%)					
	SD	214 (42.8%)					
Total		500 (100.0)					
Noise does not affect my focus and understanding in the classroom	SA	85 (17.0%)	356.90	7.81	3	0.000	Sig
	A	111 (22.2%)					
	D	160 (32.0%)					
	SD	144 (28.8%)					
Total		500 (100.0)					
Noise within my school has affected my learning ability and academic progress	SA	139 (29.8)	297.58	7.81	3	0.000	Sig
	A	204 (27.8)					
	D	108 (21.6)					
	SD	49 (9.8)					
	Total	500 (100.0)					
My reading comprehension and recognition memory ability has become poorer due to environmental noise within school	SA	145 (29.0)	315.82	7.81	3	0.000	Sig
	A	187 (37.4)					
	D	87 (17.4)					
	SD	81 (16.2)					
	Total	500 (100.0)					

Table 5: Effects of Environmental Noise on Students' Academic Attainment

Variables		Freq.(%)	X^2 Cal	X^2 Crit	Df	P	Remark
Environmental Noise within the school leads to poorer reading ability	SA	176 (35.2%)	311.90	7.81	3	0.000	Sig.
	A	203 (40.6%)					
	D	51 (10.2%)					
	SD	70 (14.0%)					
Total		500 (100.0)					
Environmental Noise reduces speech intelligibility in hearing during teaching and learning session	SA	198 (39.6%)	344.76	7.81	3	0.000	Sig
	A	205 (41.0%)					
	D	73 (14.6%)					
	SD	24 (4.8%)					
Total		500 (100.0)					
Environmental Noise leads to poorer memory for tasks and class activities	SA	208 (41.6)	373.02	7.81	3	0.000	Sig.
	A	172 (34.4)					
	D	42 (8.4)					
	SD	78 (15.6)					
	Total	500 (100.0)					
Environmental Noise brings about lack of concentration and poor comprehension in school	SA	194 (38.8)	349.78	7.81	3	0.000	Sig.
	A	170 (34.0)					
	D	63 (12.6)					
	SD	73 (14.6)					
	Total	500 (100.0)					
Environmental Noise Leads to poor understanding of the spoken presentation or missing or missing out some vital information	SA	153 (30.6)	287.86	7.81	3	0.000	Sig.
	A	214 (42.8)					
	D	81 (16.2)					
	SD	52 (10.4)					
	Total	500 (100.0)					

Table 6: T-test analysis of the Effect of Noise on the Educational Attainment Based on types of Schools

School type	N	Mean	Std Dev	t-cal	t.crit	Df	Sig
Private	250	18.472	7.008				
Public	250	20.660	12.525	5.445	1.96	498	0.000

Table 7: T-test analysis of the effect of environmental noise on the educational attainment based on location

Location	N	Mean	Std. Dev	t-cal	t-crit	Df	Sig
Noisy Environment	250	75.30	5.725				
Noise- free Environment	250	77.81	10.81	5.61	1.96	498	0.000

*Significant P<0.05