EFFECT OF ENVIRONMENTAL NOISE POLLUTION AND SCHOOL FUNCTIONING OF SECONDARY SCHOOL STUDENTS IN CALABAR,CROSS RIVER STATE, NIGERIA.

BY EWA, JAMES ABUA

INSTITUTE OF SPECIAL EDUCATION STUDIES

FACULTY OF EDUCATION

PALACKY UNIVERSITY, OLOMOUC

Abstract:

The natural environment is being aggressively attacked by rapid and increasing growth in human economic and social activities in terms of population, urbanization, industrialization and technological advancement which has hitherto resulted in noise pollution. This paper sought to ascertain the effect of environmental noise pollution and school functioning of secondary school students in Calabar Metropolis. To achieve the objectives of the study, three research hypotheses were formulated to test the effects of traffic noise pollution, industrial noise and commercial/social noise pollution on the students. The study adopted a survey research design. The instrument used for data collection was a five point Likert-like questionnaire tool and was administered on 200 respondents randomly drawn from four secondary schools. The data were analysed using the Pearson Product Moment Correlation Coefficient. The result of the findings revealed that traffic noise, industrial noise and commercial/social noise pollution negatively affect the smooth cognitive, psychomotor and affective school functioning of the students in the secondary school. Based on the findings some suggestions are made to curb the effects of noise pollution in the Calabar Metropolis and its environs.

Acknowledgement: This article is one outcome of the research project which was funded by IGA Palacky University Olomouc \_2013\_013 Czech Republic.

Introduction:

The human environment is filled with sound. The produced sound may contained properties that are pleasant or harsh, orderly or discordant, palatable or discomforting depending on the psyche and configuration of the listener and the consistency and intensity of the sound produced or both. Whereas sound with the former properties may not necessarily pose a significant threat to human health and development, those with later characteristics do. When sound signals possess properties or characteristics harmful to the growth and development of the listener, it can simply be classified as noise (Kalu, Egaga, Olayi & Ewa, 2010).

Noise is an unpleasant sound. It is an erratic, in harmonious, meaningless or statistically random variations in sound pressure. Noise is a noxious agent with pervasive effect on human hearing or health.

The effects of environmental noise pollution are multifarious to human health, among which are irritability, insomnia, annoyance, nuisance, muscular rigidity, perspiration, cerebral disorientation, low productivity, psychological changes in heart beat and blood pressure as well as psychological stress (Kalu et al).

The natural environment is being aggressively attacked by rapid and increasing growth in human economic and social activities such as urbanization, population, civilization, industrialization, agricultural practices, construction of infrastructures and application of science and technology in recent times has resulted to high increase of noise pollution in Nigeria (Enu, 2012).

Ukpong (1995), observes that despite vast improvement in human health globally over the past decades, with millions of people living longer healthier lives, yet preventable illnesses and premature death are still occurring in shockingly large number due to unavoidable environmental factors which Kalu et al described as the deplorable environmental predicament, an irony of achievement as man is dying of success. Rapid increase in human activities has resulted in noise pollution, increase threat to hearing level of many urban cities dwellers in Nigeria. Unfortunately, many citizens in this area as well as other parts of Africa tend not to notice the havoc done to life by environmental noise pollution to their hearing and other functional levels of the individuals as every malfunctioning is superstitiously blamed on the ‘witchcraft’ or the ‘devil’.

It is against this background that this paper sought to ascertain the hazardous effect of environmental noise pollution on the school functioning of secondary school students in Calabar Metropolis.

Statement of the problem:

Calabar metropolis is the capital city of Cross River State in Nigeria. It is comprised of two local government areas-Calabar Municipality and Calabar South respectively. The high concentration of industrial layout and construction firms, there has been a rapid increase in the population and heightened level of commercial and industrial activities has resulted to high increase in noise pollution in Calabar.

In view of the above problem observed that the paper sought to ascertain the fate of the students whose schools are located in the noisy areas

HO1: there is no significant relationship between traffic noise pollution and school function of secondary school students in Calabar Metropolis.

HO2: There is no significant effect of industrial noise pollution and school functioning of secondary school students in Calabar.

HO3: There is no significant relationship between commercial/social noise pollution and school functioning of secondary school students on Calabar Metropolis.

Literature review:

Traffic noise pollution and school functioning of secondary school students:

According to Shield and Dockrell (2003), in the past 30 years there have been many investigations examining the relationship between noise exposure of school age children and their school functioning (performance) in various cognitive tasks. The earlier studies were concerned mainly with external environmental noise exposure of schools, but more recently the effects of internal classroom noise have been investigated. It is generally accepted that noise has a detrimental effect upon learning and attainments of secondary school students.

Picard and Bradley (1990) carried out two major researches in this area. The result showed that chronic noise exposure of young school children has a particular detrimental effect upon their reading ability, attention, mathematics as well as other tasks that required high cognitive processing. In summary, the general effects of chronic noise exposure on children are deficits in sustained attention and visual attention, poorer auditory discrimination and speech perception, poorer memory for tasks that requires high processing demands of semantic material, poorer reading ability and general school performance on national standard tests.

The major sources of noise pollution in the community are transport such as air craft’s taking off and landing, road traffic and railways, fixed industrial and commercial installations, construction activities, commercial/social noise and leisure activities.

Road traffic is the most widespread source of noise pollution in both developed and developing countries. A study carried out for the European Commission by the French Institution INRETS in 1994 as cited by Enu, (2012),has estimated that about 200 million people in the European union, 60 percent of the population are exposed to road traffic noise level exceeding 55dB and some 132million (39 percent) to60dB. In a similar study, Shield and Dockrell (2000), carried a survey of noise sources outside school in London, found that the predominant sources were cars (86%), aircrafts (54%), lorries (35%), buses (24%) and railway (11%). This distribution of sources of noise agrees closely with the occurrence of sources recorded outside dwellings around the UK during the 2000/2001National Noise Incidence Survey. For instance NNIS found 87% of dwellings exposed to road traffic noise, and 12% of dwellings to rail noise. It can therefore be assumed that these figures are likely to reflect the typical noise exposure of school children in industrial societies.

According to the World Health Organization (WHO) (2001), traffic noise is one of the main sources of environmental noise pollution exposure in urban communities. Like the home and work place, the school is also a micro environment. Hence the school is important for the cognitive, psychomotor and affective development of the school children. Schools are therefore expected to ensure thebestpossible conditions for a child’s physical, emotional, psychological and intellectual development, including control of excess environmental noise.

Noise levels are measured in decibels (dB). One decibel is the threshold of hearing. Approximately, 60dB is the level of normal talking. According to WHO (2001), the permissible noise level in school environment should not exceed 35dB. Exposure of school children for more than six hours a day to sound in excess of 85dB is potentially hazardous to health. In less developed countries (LDC), like Nigeria, many children do not have access to serene or ideal learning environments. Therefore, noise control in the school environment is a really public health challenge.

Godson, Ana, Derek, Shendell & Brown (2009), opine that noise has both auditory and non auditory effects. Although the direct physical consequence of loud noise exposure especially over a long period of time is hearing loss and tinnitus (auditory effect), but noise at lower levels can have an indirect impact on our physiological and psychological systems that is non auditory effects. Scientific evidence has suggested that chronic noise exposure of schools near air, road and/ or rail traffic has a stress and distracting stimulus which can lead adults and children at schools and home to adverse effects of health problems such as elevated blood pressure(hypertension), noise induced hearing loss, annoyance, stress, mental health and behaviour problems, decrease school performance and cognitive delays like trouble with word discrimination, reading, problem solving, memorization and interference with speech communication.

Noise, therefore is a physical exposure agent and environmental and occupational hazard presenting risks to our overall health and wellbeing. Studies carried out industrialized countries cities such as in the European Union have suggested that children living and attending schools near airports, elevated trains and highways suffer distractions, lack of concentration and restlessness resulting in poor scores and low productivity in their academic performance as compared to their peers in less noisy environments. Godson et al further observed that in less developed countries where urban laws and proper land use conditions that either do not exist or are not always monitored and enforced, few locale specific data exist to help improve the situation.

Effect of industrial noise pollution and school functioning of secondary school students:

Exposure to continuous noise of 85dB-90dBA, particularly over a life time in industrial settings can lead to a progressive loss of hearing, with an increase in the threshold of hearing sensitivity. Exposure to industrial noise disturbed sleep in adults and children. Industrial noise interferes in complex tasks performance, modifies social behaviour and causes annoyance. Studies on occupational and environmental noise exposure suggest an association with hypertension. Studies on industrial noise exposure are related to raise catecholamine secretion in children. Moreover, chronic exposure of children to aircraft and industrial noise pollution impairs reading comprehension and long term memory and maybe associated with raised blood pressure in adults. There is strong evidence of the effect of noise on the cardiovascular system based on studies from studies on occupation/industrial settings. (Stenfield & Matheson, 2003). They further posited that many occupational studies have suggested that individuals who are chronically exposed to continuous industrial noise at levels at least 85dB have higher blood pressure than those not exposed to noise.

Kalu et al (2010), hold it that most manufacturing and industrial operations create noise. In most cases this may be limited to the plants interior. While in others, it will affect the communities (schools) in the neighbourhood. Although the community noise pollution was formerly restricted mainly to heavy manufacturing industries. This is not necessarily the case today as small manufacturing industries or business services which create noise may be located close to school properties. The introduction of improved ventilation has resulted in the installation of powerful fans located in walls and roofs of buildings which can if badly positioned leads to significant noise level in the classroom especially classes. In the same vein, Bakari (1989) as cited in Bakari (2013), carried out a study on the effect of industrial noise in Nigeria, the result revealed that the noise generated by machines was between 104 and 113dBA.66% of the workers operating in these machines exhibited hearing lsses compared to 13% of workersin industrial areas judged to be relatively noise.

British Medical Bulletin (2003), put it that construction activities are noisy and have the potentials to cause disturbance in the surrounding schools. Ventilations from industrial settings are perceived as a complement to low noise in most community surveys of noise and are found to be important factors in determining annoyance, particularly because they are commonly experienced through other senses as well as hearing.

Effect of commercial/social noise pollution and school functioning of secondary school students:

Neighbours make noise, in fact noise from the living and social habits of our neighbours generate more noise complaints than other sources of noise. These include: domestic equipment, stereos, television, animals, children’s game, lumbering machine, as well as lawn mowers. Many of these appliances may generate noise as a result of poor installation during the designing stage. The anti social habits of individuals could equally cause noise nuisance. Kalu et al (2010), further observed that the growing sophistication of leisure activities over the past few years has led to an increase in noise level in the recreational areas/centres. Population increase as a result of rural-urban drift is also a factor to be reckoned with for the increase in noise pollution in Calabar metropolis. Thus, the urban areas are now not only grappling with the menace of soil erosion, litters from industrial wastes, commercial/domestic wastes, air, water, and land pollution, but the most predominantly now is noise pollution which now counterbalance the sanity and peaceful nature of the environment. This has led to increase mental health problems, emotional imbalance and psychological trauma of the citizenry. In the same vein Enu (2012) posits that noise pollution is caused by man’s technical activities on the environment such as loud music, bulldozer operation, open market noise, barking of dogs, hooting/blasting of horns by motor vehicles/ships, motor parks, night clubs, jet/aircrafts, industrial machines as well as household appliances which produces sound more than 60dB could damage one’s hearing. The author further observes that people exposed to loud sound above 60-100dB for quite considerable length of time may suffer from physical, emotional discomfort and deafness.

Menkiti (1996) also observed that when a sound becomes undesirable, it pollutes the desirable one. For instance, noise from blast devices, industrial machines process, generators, road haulage and heavy duty vehicles could be dangerous. The writer summarised the causes of noise pollution in Calabar metropolis to include:

Loud Music: With the recent development in the Calabar Metropolis where record stores and worship centres are located at every nook and cranes of the city and sometimes very close the schools have a grievous effects due to the rate at which the operators tune the volume of their appliances/loud speakers. The major aim is to attract costumers/worshippers respectively. No one can quantify the negative effects on the neighbourhood. It causes discomfort and contamination to the entire environment, thereby making it undesirable for human existence.

Bulldozer operation/other construction activities: The application of science and technology in carrying out certain heavy duties in the modern world as in Nigeria and Calabar in particular, in road construction, clearing and tilling of farmlands, lumbering, demolition of buildings etc, produce high sounds undesirable to man and can destroy the nervous system.

Market noise: The open nature of the Nigerian markets is characterized with all kinds of activities that generate a lot of noise in the environment. The noise from the generator sets used in operating the radio set, loud speakers for selling/advertising goods/wares, grinding engines, blade filing engines and a host of others produce undesirable noise that pollute the environment. Moreover, the market women/men individual conversation and bargaining power help to increase the volume of noise in the environment which hitherto affects the school children negatively. A survey carried out by the author revealed that market location negatively affect school children in terms of low productivity characterized by truancy, absenteeism, distractions during lessons, school dropout and general poor performance in examinations.

Hooting/blasting of horns: The Calabar metropolis is experiencing influx of different types of vehicles/motor bikes. The rate of noise produced by indiscriminate hooting/blasting of horns pollutes the environment by causing distraction and discomfort to the inhabitants of the area. At times, the sudden hooting of their horns in still fear or shock in the pedestrians when moving/walking along the streets/roads and may at times lead to accidents. The study by Kalu et al (2010) revealed that there is a close relationship between pedestrian road accidents and sudden horn hooting in Nigeria.

Night club noise: Noise at the vigil night, cinemas and parties organized to entertain people have grievous effects on the environment. The noise from the generators, loud speakers, organs, guitars drums etc causes discomfort and unpleasant situation to the inhabitants in the area. Excessive music from the night club can trigger sleep disorders among children and adults and as well affect other physiological and psychological well being of the citizenry (students). Other sources of noise pollution include: barking from dogs, noise from jets/aircrafts, industrial/construction machines and household appliances. The author sums up by observing that social/commercial noise pollution affects one’s well being in many ways. It affects one’s sense organs, cardiovascular system and glandular nervous system. It also reduces one’s (students) rate of concentration, disturbs the thinking faculty and prevents people from enjoying their rest periods. In corroboration, WHO (1995), affirmed that noise pollution of different types affect human health and wellbeing in various ways: sleep disturbance, triggering annoyance, interfering in communication, reduces high performance in cognitive, affective and psychomotor activities, induces hearing loss, confusion and other psychiatric disorders.

Noise pollution is one of the greatest problems threatening man’s environment. With the devastating effects created by noise pollution on the environment, it becomes pertinent that everything possible should be done to minimize if not totally, eradicate the upsurge of this great disaster. Thus Ukpong (1995), suggested several steps to be put in place to provide control measures for noise pollution in the environment. These measures include:

* Installation of acoustic equipment in homes, schools and industries to reduce stress due to noise.
* Installation of sound proof generators to minimize sound production in the environment.
* Sitting of railways, airports, markets, motor parks and other noisy sources away from schools.
* Utilization of noise protective devices by school children whose schools are located close to the airports, factories, railways, markets etc.
* Restriction of industries and commercial houses being situated very close to schools.
* Installation of air conditioners in schools with heavy duty plants or close to noisy source so that doors/windows can be shut to reduce the interference/infiltration of noise during class activities.
* High pitched musical sound instrument record stores should be prohibited around the school environment.
* Adequate legislation should be made and enforced against the use of loud speakers in the areas close to schools and the environs.

Thus Ukpong observes that no single government has the responsibility and capability to be able to minimize all forms of noise pollution but all hands must be on deck. To this effect, the Federal Environmental Protection Agency has been charged with the responsibility of monitoring by helping to enforced environmental protective measures; establishing water quality standard; controlling of air quality; noise and atmospheric pollution and as well enforcing the noise controlling Act of 1996, which deals with the prevention, minimization and abetment of noise pollution in Nigeria. He equally calls for individual’s re-orientation of values that will reduce noise pollution in its totality or to the barest minimum.

Methodology:

The survey research design was adopted for the study. This is because it allows the researcher to make inferences and generalization of the population by selecting and studying the samples for the study. The population consisted of secondary school students in Calabar Metropolis. A total of 200 respondents were randomly selected for the study. The simple random sampling technique was adopted using the hat and draw method to select 50 respondents each from the four secondary schools under study: Federal Government Girls College (FGGC) and Margaret Ekpo Secondary School in Calabar municipality, Pinn Margaret Secondary School and Government Technical College, Mayne Avenue in Calabar South respectively. A five point Likert-like questionnaire was the main instrument of data collection. The instrument was validated by experts in measurement and evaluation/statistics of the faculty of Education, University of Calabar. The test re test reliability method was employed to ascertain the reliability estimate of the instrument. The reliability index was found to be high. At the end of the exercise, 200 copies of the questionnaire were retrieved with the aid of some research assistants.

Hypothesis by Hypothesis presentation of Results:

Ho 1: There is no significant relationship between traffic noise pollution and school functioning of secondary school students in Calabar Metropolis.

The result of the analysis is presented in table 1.

Table 1: Pearson Product Moment Correlation analysis of There is no significant relationship between traffic noise pollution and school functioning of secondary school students (N200).

Variable EX EX2 EXY r

EY EY2

Traffic noise pollution 3218 6297 74713 0.57

School functioning 3092 5463

Significance 0.05, DF=198, critical r=0.138

The result in table 1 reveals that the calculated r-value of 0.57 was found to be greater than the critical r-value of0.138 at .05 level of significance with 198 degrees of freedom. Therefore the null hypothesis was rejected. The result therefore means that traffic noise pollution has a significant relationship with the school functioning of secondary school students.

Ho2: There is no significant relationship between industrial noise pollution and school functioning of secondary school students in Calabar Metropolis.

The result of the analysis is presented in table11.

Table II: Pearson Product Moment Correlation Analysis of there is no significant relationship between industrial noise pollution and school functioning of secondary school students in Calabar Metropolis (N200).

Variable EX EX2 EXY r

EY EY2

Industrial noise pollution 3376 6375

73928 0.47

School functioning 3092 5463

\*significant at .05 level, critical r=138, df=198

From the table II above, the calculated r-value of 0.47 was found to be greater than the critical r-value of 0.138 at .05 level of significance with 198 degrees of freedom. The null hypothesis was rejected. From the result thereof it can be deduced that there is a significant relationship between industrial noise pollution and school functioning of the secondary school students.

Ho3: There is no significant relationship between commercial/social noise pollution and school functioning of secondary school students in Calabar Metropolis.

The result of the analysis presented in Table 3.

Table III: Pearson Product Moment Correlation Analysis of there is no significant relationship of the effect of commercial/social noise pollution and school functioning of secondary school students in Calabar Metropolis (N200):

Variable EX EX2 EXY r

EY EY2

Effect of commercial/social noise 3176 6154 74647 0.59

School functioning of students 3092 5463

Significant at 0.05 level; DF=198, critical r=0.138

From the III above, the calculated r-value of 0.59 was found to be greater than the critical r-value of 0.138 at .05 level of significance with 198 degrees of freedom. The null hypothesis was rejected. From the result it can therefore be deduced that there is a significant effect of commercial/social noise pollution on school functioning of secondary school students in Calabar Metropolis.

Discussion:

The findings in hypothesis one on the effect of traffic noise pollution on school functioning of secondary school students is in consonance with the work of Shield & Dockrell (2003), who uphold that traffic noise pollution has detrimental effect upon the learning attainment of school children. This idea is also shared by Picard & Bradley(1990) who posits that chronic exposure of school children to traffic noise pollution affect their reading ability, attention, mathematics skills as well as other tasks that require high cognitive processing. This is further corroborated by WHO (2001) and Godson et al (2009).

The findings in hypothesis two on the effect of industrial noise pollution and school functioning of secondary school students is in consonance with Stenfield & Matheson,(2003), who posit that individuals who are chronically exposed to industrial noise pollution at a level of 85dB for a longer time are prone to high blood pressure, raise catecholamine, disturbed sleep in adults and children as well as triggering annoyance. This view is further shared by Kalu et al (2010), and Enu (2012), that industrial noise pollution affect the well being of the students whose schools are situated very close to where these industries are located.

The result/finding on the effects of commercial/social noise and school functioning of secondary school students agrees with what WHO(1995), affirmed that commercial/social noise pollution negatively affects human health and wellbeing in various ways: sleep disturbance, triggering annoyance, interfering with communication, reducing cognitive performance, confusion and at times psychiatric disorders. In the same vein, Kalu et al observed that commercial/social noise affects school children in terms of low productivity characterized by truancy, absenteeism, distraction during lessons, school dropout and general poor performance in examinations. They further pointed out that the sophistication of leisure activities over the past few years has led to an increase in the noise level in Calabar Metropolis. Menkiti (1996), on the other hand identified the various sources of noise pollution to include: loud music, bulldozer operation, dog barking, hooting/blasting of horns, household appliances as well as market noise.

Conclusion:

Based on the review of literature and findings of the study, it can be concluded that noise pollution in the environment is characterized by man’s technical activities. Hence, schools should not be located very close to the sources of such noise pollutants. Moreover, proper legislation should be made and enforced by the Nigerian government and other stakeholders concern with noise control. Adequate screening processes should be put in place to check mate the negative effects of noise on the auditory system of the students. And those already suffering from the negative effects of noise should be rehabilitated to ensure wholesome inclusion in the society.

References:

Bakari, C.A. (2013), the hazardous effects of noise. In T. Ajobiewe & K. Adebiyi (Eds), Access and quality of special educational needs service delivery in Nigeria. Ibadan: Glory-land publishing company.

British Medical Bulletin (2003), vol 68(c).The British Council. Retrieve from the internet 7th April, 2014.

Enu, Q. O. (2012), Effect of environmental noise pollution on hearing level of pupils in Calabar Municipality L.G.A. of Cross River State. University of Calabar. Unpublished B. Ed project.

Godson, R., Ana, E.E., Derek, G., Shendel, L, Brown, G.E. & Sridhar, M.K.C (2009),Assessment of noise and associated health impacted of selected secondary schools in Ibadan. Journal of environmental and public health. Article ID 739502. Retrieve from the internet 7th April, 2014.

Kalu, M.I., Egaga, P.I., Olayi, J.E. & Ewa, J.A. (2010), Community participation in noise control and human health in Calabar, Cross River State. In T.B. Ajobiewe (ed) Special education for sustainable development. Ibadan: Glory land publishing company.

Menkiti, A. I.(1996), Environmental noise pollution. In P.A. Alozie (ed) Technology, science and environment: Current overview. Calabar: Emillis publications.

Picard, M. & Bradley, J.S.(2001),Revisiting speech interference in classroom, Audiology. 40, 221-224. Retrieve from the internet 9th April, 2014.

Shield, B.M. & Dockrell, J.E. (2003), the effects of noise on children at school: A review. J. Building Acoustics 10(2) 97-106. Retrieve from the internet on 7th April, 2014.

Stensfield, S.A. & Matheson, M.P. (2003), Noise pollution: non auditory effect. British Medical Bulletin vol 68(c). The British Council. Retrieve from the internet on the 7th April, 2014.

Ukpong, E.M. (1995), Influence of environmental hazards on community development in Community environmental education. Lagos: NCF publication.

World Health Organization (WHO) (1995), Primary health care: Health for all series. No 7. Geneva Switzerland.

World Health Organization (WHO) (2000), Occupational and community noise: Fact sheets no 258’ WHO: Geneva, Switzerland.

World Health Organization (WHO) (2001), Guidelines for community noise. Bergland, T. Lindvall & D. H. Schwela (Eds). WHO. Geneva: Switzerland.