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RESEARCH ARTICLE

NOISE INDUCED HEARING LOSS AMONG SOCIAL STUDIES EDUCATION STUDENTS IN TERTIARY INSTITUTION IN ENUGU STATE, NIGERIA: AWARENESS AND SAFETY ISSUES

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ABSTRACT

The purpose of this paper is of three –folds; (a), to analyse the awareness of the causes of NIDHL of students in tertiary institutions; (b), to explore whether students in tertiary institutions are aware of the consequences of NIDHL and (c), to ascertain whether the students are aware of the strategies for preventing NIDHL. The sample of this study is made up of 525 students from 5 tertiary institutions in Enugu. The design of the study is a descriptive survey. To collect data from the respondents, three research questions were formulated and validated by three experts, one in measurement and evaluation and two from special education. The validated instrument was trial tested at Nnamdi Azikiwe University Awka, Anambra State and a reliability coefficient of 0.76 was obtained. The findings of the study among others showed that the students in the 5 tertiary institutions in Enugu were not aware of the causes of NIDHL and their consequences.

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INTRODUCTION

The human ear is an extraordinary sound detecting device which is so sensitive that it can almost hear the random Brownian movements of the air particles as they strike (Christen, 2009). Nevertheless certain factors could diminish the sensitivity of the sounds heard normally by the ear. Research indicates that constant exposure of the ears to noise from Personal Entertainment Devices (PED) such as mp3 and iPods over a long period of time damages the sensitive structures in the inner ear which results in Noise Induced Hearing Loss (NIHL) (Levey, Fligor, Ginocchi & Kagimbi, 2012). Noise induced hearing loss (NIHL) is one of the most common forms of hearing loss (Rabinowitz, 2000). According to United States Environment Protection Agency (2009) NIHL is a permanent hearing impairment resulting from prolonged exposure to high levels of noise or by sudden high level impulse noise. Harrison (2008) sees noise induced hearing loss as a hearing loss that involves the damage to the delicate structure of the inner ear, particularly the hair cell as a result of constant exposure to loud noise. Advancements in technology have greatly increased the number of higher institution students who own personal entertainment devices in the recent years. Most of the students own mp3, iPods, CDs, gaming devices, portable music and other personal entertaining devices. These students are seen on the streets with their earphones or head phones plugged into their ears and listening to music as they walk along. Some of them plug the head phone into their cell phone or lap tops and listen to them while they read. These actions put them at risk of developing hearing loss as a result of constant exposure of the ear to the PED. Kean, (2010) observed that it is estimated that 16% of teenagers have sustained NIHL. A German review of clinical data estimates that one in every ten adolescents has some degree of hearing loss due to exposure to leisure time appliances (Zenner, 1991). A study conducted in China among 120 young users of personal entertainment devices indicates that 14% of the users were found to have impaired hearing of about

25dB. (Peng, Tao & Huang, 2007). These findings though in foreign countries should cause some worry to educators, parents and society especially with the increase in the students' use of PED in Nigeria. Unfortunately, the plugging of PED into the student's ears has become fashionable and a symbol of class distinction.

Noise-induced hearing loss can result from a one-time exposure to a very loud sound, blast, or impulse, or from listening to loud sounds over an extended period. The noise from PED could also result in temporary threshold shift or tinnitus (ringing in the ear). After exposing the ear to loud noise for a while there could be temporary mild hearing loss. Recent studies by National Institute on Deafness and other Communication Disorders, (2008) also show that exposure to loud sound or noise levels triggers off the formation of molecules, called free radicals inside the ear that could damage the delicate hair cells of the cochlea in the inner ear resulting in NIHL. Noise-induced hearing loss, however, may not be medically or surgically corrected. The students may not be aware of the impending danger since the loss may be gradual, painless and often goes unnoticed for a long period. Other factors that could put students at risk of noise induced hearing loss include attendance to night clubs, attendance at live concerts and playing a musical instrument such as band (Vinck, 2010). Not many people are aware of the level at which environmental sound becomes harmful or injurious to the ear. National Institute for Occupational Safety and Health NIOSH (1998), disclosed that noise above 85dB could damage the hair cells, interferes with sleep, increases blood pressure and reduces hearing ability. Any form of hearing loss is capable of affecting the student's social interaction, communication skills, behaviour, emotional development and academic performance. Some suggestions have been proffered on how to prevent NIHL. Literature indicates that there are some noise control devices such as ear plugs or earmuffs that can prevent the hair cell from damaging. Manufacturers of PED also package practical advice relating to the risk of NIHL noise that enters into the ear. They indicate that the sound of the PED entering the ear should not be above 85 decibels. Unfortunately the students do not have access to a dB sound level

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meter and they may not know how to practically make such adjustments. Vinck (2010) suggests that there is need to avoid or limit the period one is exposed to noise. Though solutions have been proffered on how to prevent NIHL, much of the studies conducted have focussed on recreational noise amongst students in the western world. However, in Enugu State especially among the students in tertiary institutions, there is no empirical evidence on students' awareness of the causes of NIHL, the consequences of constant exposure of the ear to noise and measures they can take to prevent noise induced hearing loss. The study, therefore, seeks to find out whether tertiary institution students especially social studies education students in Enugu State are aware of the sounds that can lead to hearing loss, and whether they are aware of the consequences of the NIHL and the anti-noise devices that can protect them from eventual noise induced hearing loss as a result of their use of PED. Social studies education students are very important in this study because social studies is the man and its environment (Onuoha, 2010). It helps to correct social problems through classroom instruction. Thus, it has been adopted by various countries of the world as a more relevant and liberal education which furnishes a greater understanding of mankind (Ezegbe, 2008). Social Studies integrates other aspects of social sciences and humanities to promote civic competence and thereby "found concrete expression in its usefulness for national integration, socio-economic development, as well as the development of the right attitude and values" (Ezeudu & Ezegbe, 2005:176).

**Research Questions:**

Three research questions were formulated to guide this study

- 1.To what extent are students in tertiary institutions aware of the causes of noise induced hearing loss?
- 2.To what extent are students in tertiary institutions aware of the consequences of Noise induced hearing loss?
- 3.To what extent are students aware of the strategies for preventing noise induced hearing loss?

**METHOD**

**Design of the Study:** A descriptive survey design was used to collect data from the respondents. It was used to elicit information on students' awareness of the causes of NIHL as well as the strategies for preventing NIHL. The survey design was used because the researchers wanted to collect valid opinion, ideas and beliefs as presented by the respondents.

**Population for the Study:** The population for the study was eight hundred and seventy-nine students from five government owned higher institutions in Enugu state who use PED. A population of two hundred and twenty-five (225) students came from the University of Nigeria, Nsukka (UNN), two hundred and sixty –four (264) from Enugu State University of Science and Technology (ESUT), one hundred and thirty-five students from Federal College of Education Ehamufu (FCEE), one hundred and twenty –six (126) from Enugu State College of Education Technical (ECET) and one hundred and nineteen (119) from Enugu State College of Agriculture (ECA) Iwollo respectively.

**Sample and Sampling Technique:** The sample for the study was five hundred and twenty-five (525) students drawn through proportional simple random sampling technique. Proportional was used to get the actual number of respondents from each cluster based on their population. UNN 124 students, ESUT 128 students, FCEE 122 students, ECET 87 students and ECA 74 students. The simple random technique was used in order to ensure that every respondent has a fair chance of being included in the sample.

**Instrument for Data Collection:** A questionnaire titled Noise Induced Hearing Loss Awareness Questionnaire (NIHLAQ) was used

to generate data from the respondents. The questionnaire which was developed by the researchers consists of twenty items arranged in three clusters. Cluster A focused on students aware of the causes of noise induced hearing loss. Part B focussed on the extent students are aware of the consequences of NIHL while section C dealt with the strategies for preventing Noise induced hearing loss. The questionnaire was built on a four-point scale namely; Very High Extent (VHE), High Extent (HE), Low Extent (LE) and Very Low Extent (VLE), the levels of responses are weighted as 4,3,2,1 respectively. It was face validated by two lecturers in Special Education and one lecturer in Measurement and Evaluation from the University of Nigeria, Nsukka. Their corrections were used to produce the final copy of the instrument. The instrument was trial tested among thirty university students in Anambra state. The result was used to ascertain the internal consistency reliability estimate using Cronbach Alpha. The reliability co-efficient for cluster A and B were 0.68 and 0.76 respectively.

**Method of Data Collection:** The copies of the questionnaire were administered and collected by the researchers and two research assistants. The research assistants were briefed on the methods of administration and collection to ensure high return of the instrument.

**Method of Data Analysis:** Data generated from the study was analysed using mean and standard deviation. An item with a mean ranging from 0.50-1.49 is regarded as Very Low Extent (VLE), 1.50-2.49 is regarded as Low Extent (LE) and, 2.50- 3.49 is regarded as High Extent (HE) and 3.50- 4.00 is regarded as Very High Extent (VHE),

**RESULTS**

**Research Question 1:** To what extent are students in tertiary institutions aware of the causes of noise induced hearing loss?

**Table 1. Mean and standard deviation of the respondents on their awareness of the causes of noise induced hearing loss**

S/N	Knowledge of the Causes of Noise Induced Hearing Loss.	X	SD	Dec
1.	To what extent are you aware that : Constant exposure to music from mp3 daily at a high level for too long can lead to hearing loss?	1.64	.81	VLE
2.	Listening to loud music from an iPod daily can lead to hearing loss?	1.91	.71	VLE
3.	Listening to head phone at high volumes for a long period results in NIHL?	2.23	.86	VLE
4.	Listening to PED at volumes greater than 85db can have detrimental effect on hearing?	1.24	.96	VLE
5.	Inserting earphones into the ear to listen to music for a long time can lead to hearing loss?	2.34	.94	VLE
6.	Putting earphone into the ear damages the hair cells of the cochlea	1.41	.63	VLE
7.	Playing a band that generates heavy sounds for a long time can lead to hearing loss?	1.22	.71	VLE
8.	Inserting earphone into the ear causes ringing (Tinnitus) in the ear	1.25	.60	VLE

Table 1 above reveals the mean rating of the respondents on the awareness of the causes of noise induced hearing loss. All the five hundred and twenty-five students reported that they were not aware of the causes of the noise induced hearing loss since all the items have mean ratings below the accepted mean.

**Research Question 2:** To what extent are students in tertiary institutions aware of the consequences of noise induced hearing loss?

**Table 2. Mean and standard deviation of the consequences of noise induced hearing loss**

S/N	Consequences of Noise Induced hearing Loss	X	SD	Dec
1	To what extent are you aware that :NIHL occurs painlessly which in a long run may lead to hearing loss	1.64	.49	VLE
2	NIHL occurs gradually which may eventually lead to hearing loss	1.56	.81	VLE
3.	NIHL cannot be corrected medically	2.44	.86	VLE
4.	PED can lead to permanent hearing loss	1.58	.94	VLE
5	PED can cause irritation in the ear which may lead to hearing loss.	2.33	.96	VLE

The result in Table 2 above indicates the mean responses of the students on the consequences of noise induced hearing loss. The results shown above reveal that all the students reported unawareness of the consequences of the noise induced hearing loss. This shows that none of the responses of the students are above the accepted mean.

**Research Question 3:** To what extent are students in tertiary institutions aware of the strategies for preventing noise induced hearing loss?

**Table 3. Mean and standard deviation of strategies for preventing noise induced hearing loss**

S/N	Strategies for preventing noise induced hearing loss	X	SD	Dec
1	Wearing of ear plugs when involved in a loud activity	3.64	.81	VHE
2	Increasing the distance from loud noise when attending events as night clubs	3.65	.71	VHE
3	Reducing the number of times earphone is inserted into the ear	3.68	.74	VHE
4	Turning down volume of personal entertainment devices	3.91	.61	VHE
5	Limiting exposure to very loud sound,	3.55	.59	VHE
6	Using smart phone applications to download software to measure the decibel level of sounds,	2.87	.78	HE
7	Wearing ear muffs which fit completely over both ears	3.36	.84	VHE

The results in Table 3 the mean responses of the respondents on the strategies for preventing noise induced hearing loss. All respondents had mean scores of 2.87 and above. This signifies that the respondents are aware of the preventive measures for preventing noise induced hearing loss.

## DISCUSSIONS

Data on Table 1 reveal that all the students were not aware of the causes of the noise induced hearing loss. The findings of the study agrees with the National Institute for Occupational Safety and Health (1998) when it reported that noise above 85 dB could damage the hair cells interferes with sleep, increases blood pressures and reduces hearing. The students may not be aware of the impending damage since the loss may be gradual, painless, and often goes unnoticed for a long period of time. Further findings of this study show that students in tertiary institutions in Enugu state who use PED were not aware of the consequences of such to their ears. The findings are in line with the study of the National Institute on Deafness and other Communication Disorders (2008) who observed that constant exposure of the ears to loud sound or noise triggers off the formation of molecules called free radicals inside ear could damage the delicate hair cells in the inner ear resulting to NIDHL. This finding tend to be in consonance with the study of Levy, Aligor, Ginochi and Kegimbi (2012) that constant exposure of the ears to personal entrainment devices over a long

period of time damages the sensitive structures in the inner ear resulting to noise induced hearing loss. The findings of the study also reveal that though, the students were aware of the suggested strategies for the prevention of NIDHL, the students are seen with mp3, ipods, CDs and others in their midst.

## Recommendations

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

1. Educate students on the consequences of exposing their ear to constant noise. This can be done through seminars, classroom interactions, jingles on both radio and television and also through religious organisation that involves youths of their age.
2. Topics or subject matter relating to recreational hearing loss and the use of personal audio technology could be included in the school curriculum. Curriculum planners can infuse relevant topics into social studies education for proper emphasis.
3. Audiologist and other qualified professionals could be invited in the school or be employed in the university medical centre so that from time to time they can examine the students hearing threshold so that there could be early detection and intervention.
4. Children and adults should avoid staying close to loud sounds. Schools and institutions can make it as a policy that machines of high noise making capacities should not be used in such schools. They can also prohibit students from the use of ear phone.
5. Public and private offices should be built with noise absorbent materials, floors and walls of the offices to reduce noise induced hearing loss.
6. Workers who are working in places where there are heavy sounds, especially those working in airports should be provided with earplugs or earmuffs to reduce the effect of noise induced hearing loss.
7. The public should be enlightened on dangers associated of exposing ears to loud noise up to 90dB for too long.
8. Those who insert earphones into their ears to listen to music or those who listen to loud music for too long should be alerted on the possible effect of such loud music to the ear.
9. The music level acceptable for normally hearing people should be between 28 to 45dB.
10. Researchers should fast trade in testing vitamins and minerals in reducing noise induced hearing loss in human beings.

## Conclusion

Hearing is an important organ in the life of every living thing. Realising this, students in tertiary institutions in Enugu State and indeed all the tertiary institutions in Nigeria should be adequately educated to protect their ears against loud sound up to 60dB and above. This could be achieved by adhering to anti-noise measures recommended in this study such as avoiding staying very close to loud sound, limiting the use these hearing devices as well as attending night clubs where loud sounds are abound. Nothing is devastating as losing ones hearing, so avoid staying very close to loud sound for too long.

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