

THE AWARENESS LEVEL, CHALLENGES AND PROBLEMS MILITATING AGAINST HEARING CONSERVATION PROGRAMME FOR SCHOOL AGE CHILDREN IN AKURE, ONDO STATE

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ABSTRACT

The focus of this study was to investigate whether there is the existence and awareness of hearing conservation programme in Akure schools, especially for the school-age children. The study highlighted the importance of hearing conservation programme in order to prevent the trouble shooting of the hearing mechanism, due to noise pollutant, which are everywhere in our society. The benefits of hearing conservation and processes were identified in this study.

The opinions of 180 Head teachers and principals, male and female respondents, young and old were sampled to know their awareness levels as well as the challenges and problems militating against the implementation of hearing conservation programme in Akure schools. Six Null hypotheses were tested and found not to be significant in this study.

The findings showed that hearing conservation programme does not exist in Akure schools, the awareness of the respondent

on hearing conservation programme and benefits were nil. Hence many problems were hindering the implementation, ranging from lack of adequate policy and funding system, as well as lack of professionals and screening procedure/ equipment.

Relevant solutions and recommendation were made for proper implementation of hearing conservation programme in Akure Schools. Among them are inauguration of adequate policy to back up hearing conservation programme, provision of professionals to implement it in schools and offices, provision of equipment, and frequent screening of the hearing mechanism of the school age children at the point of time into school and every year in the school setting.

INTRODUCTION

The main use of hearing in man is to enable him to comprehend and produce articulate speech as well as to enrich his experience and knowledge through information gathering via hearing mechanism that is intact.

Communication by hearing and speech is a very complicated skill that has to be mastered through an acoustic cycle of interactions between the brain cerebral cortex and the hearing organs of pinnae, auditory canal, tympanic membrane, auditory ossicles, eustachian tube, semi-circular canal, cochlea, oval window, and the auditory nerve (VIIIth nerve), (a complex chains of reaction and counter reactions). The experience gained from the services are internalized, structured and stored, in order to improve our personality, vocabulary, knowledge, communication, social interaction and permit our overall integration into society.

However, environmental noise nuisance, pollutants and other diseases may jeopardize the effectiveness and functioning

capacities of this chain of mechanism in our body. Noise is part of our every day affairs that may emanate from loud speech, disco music amplifiers, radio, traffic congestion, car horn blast. industrial machines and appliances, household chores, aircraft/ planes noise, bomb blasts, schools and markets, appliances to name but a few. But excessiveness of these noises leads to acoustic trauma and damage to our hearing mechanism. Noise-induced hearing loss is a common phenomenon in Nigeria (Bakare, 1989)..

Hearing conservation therefore is a programme designed to prevent, reduce or if possible totally eliminate the effect of noise pollutants on the hearing system of man. It aims to discover, identify the source of the problem, remove the cause medically or practically if necessary, as well as aid the individual to communicate efficiently. It provides related services and follow-up procedures for individual with hearing problems. Essentially, hearing conservation is designed to plan and cater for the individual awareness, prevent and protect against noise menace, as well as to improve vocational and social adjustment of both the normal and the hearing impaired children and adults alike. It involves the provision of medical, surgical, audiological, educational and related services that are required to prevent and overcome an impairment of hearing mechanism caused by excessive noise.

LITERATURE REVIEW

Hearing conservation consists of provisions of all Inter-disciplinary services such as medical, surgical, audiological, educational and related services required to prevent and overcome an impairment of the hearing system (Campbell, 1998). It involve the routine check up of the hearing mechanism with a machine and other speech sounds, as well as performing a host of other identification audiometry, in order to detect the

trouble shooting in the hearing system of adults and children.

The practice of hearing conservation in Nigeria should include constant hearing assessment at least every three months, diagnosis and other medical referral services and remediation. It should also include follow-up services, which must necessarily involve the service of speech consultants and other allied professionals. This is necessary in our school system, in order to offer early remediation to individual that required conservation needs and those with hearing problem, whether in industry, Offices Company and residential areas. Where a noise pollutants are common.

OSHA (1990) stipulated that industries with noise levels meeting or exceeding Protection Exposure Level (PEL) should implement a hearing conservation programme (HCP). According to Campbell (1998) the HCP'S include not only an audiometric testing programme and hearing protection, but also employee education and motivation programmes, noise exposure measurements and analysis, and extensive record keeping.

Daniel (1999) in his findings claimed that the federal government of the USA has taking a voluntary pro-active stance on noise. Most of the neighbourhood are being to assisted experience noise levels below the Federal law stipulation of 65decibels exposure level. He further claimed that, the number of people affected by noise has dropped from 1,119 to a 37, under the noise abatement strategies that were put in place. Tubbs (1991), in his research on occupational noise exposure and hearing loss, in 'Fire- Fighters' assigned to airport fire stations, showed that an average fighter exhausted a characteristic noise induced permanent threshold shift in their audiometric patterns compared to those not assigned to the airport. Chen, et al (1992) similarly discovered, the effects of

noise on hearing and auditory damage connected with job patterns, as damages of both periphery cochlea organs and the central auditory pathology, by high frequency noise exposure.

Similarly, Zink and Apiner (1971) discovered a major trend in hearing conservation programmes, through questionnaire he sent to twenty-eight states in the United States. A total of twenty-four states reported having hearing conservation programmes, while twenty states have hearing aid selection provisions. The children to be screened are expected to be in the 1st grade years. The identification tests include individual tests and group hearing tests while the research aspects of identification audiometry focuses on judgment between the past and the present for public school hearing conservation. Those responsible for the organization of hearing conservation programme strove to maintain the highest levels of competency in order to identify those children with hearing losses. Identification audiometry specifically refers to the detection of a hearing impairment and not the detection of ear pathology which may exist, even when the hearing system is within normal limits.

However, House and Ghorig (1974) discovered that the usual audiometric screening procedures are not completely suitable for use in schools or in industrial testing programmes. This made Lawrence and Rubin (1974) in an attempt to evaluate limited frequency screening, to study two groups of children. Group I consisted of 1000 school children in grades 1 to 12 in New Orleans; Group II was made up of 1000 children with the same grade distribution in school enrolment. Groups 1 and 2 consisted of 2000 children. Group I was given a hearing test at 25dB (decibel) on 2000 and 4000 HZ (Hertz). Sweep check was also given at 25 dB on 250Hz, 500Hz, 1000Hz, 2000Hz, 4000Hz and 8000Hz. Group II was given a sweep check at 25dB, on 250, 500, 1000, 2000, 4000, and 8000 Hertz (HZs). The result of the analysis conducted by Lawrence and Rubin (1974)

concluded that the validity of the single frequency principle in this study appeared to be established.

However, Melnick and Levine (1970) evaluation of some procedures which were advocated by the National Conference on Identification Audiometry, They then confirmed and made the following recommendations on hearing conservation testing:

- (I) testing should be conducted in acoustically treated test room;
- (II) the frequencies recommended for identification and audiometry at the school age level were 500, 1000, 2000, 4000 and 10000 Hertz (Hz).
- (III) the 500, 1000, 2000, and 6000 Hertz should be screened at 20 dB and at 30 dB for the frequency of 4000Hz.
- (IV) the criteria for failure should be failure to respond at 20dB at 1000, 2000, 6000 or at 8000Hz.

The present study aimed to find out whether there is a hearing conservation programmes in Akure Schools and the procedures that are used to implement such programme if there is any.

“The study further sought to find out the level of awareness of the principals and Head teachers on hearing conservation programme in Akure Metropolis.

Essentially the objective of hearing conservation in Akure schools should be to detect and remediate problem shooting of the pupils/ students’ hearing mechanism, in order to reduce academic failures and underachievement educationally among the school-age children which could result from hearing exposure to noise and other diseases in the school age years. Basically uncorrected hearing problems can jeopardize academic and classroom achievements. Similarly, identification screening audiometry in Akure will surely assist in providing necessary measures for those with hearing problems and enable them benefit from environmental everyday communication and

learning. All these are vital to personality development, vocational competency skills and overall integration of the individual into effective communication if adequate hearing conservation is put in place in Akure schools.

Healing problems can start at any point in the life of man but early remediation is vital for success in life, since typical hearing problem jeopardize personality and social development.

Therefore, individuals, public and government alike should make adequate provision and evolve policy to prevent noise pollution in our environment, as well as its deleterious effect on human health, through hearing conservation programmes. The fact remains that noise is everywhere around man in the school, market or by grinding machines or other noisy equipment in and around homes or musical recreational facilities that abound on the streets and homes. Joint efforts should be made to combat its menace in our society.

METHODOLOGY

The research was based on a simple descriptive survey that tested six null hypotheses thus:

- (i) There is no significant difference between the awareness level of male and female teachers of hearing Conservation programme in Akure schools.
- (ii) There is no significant difference in the awareness of young and old teachers of the existence of hearing conservation programme in Akure schools.
- (iii) There is no significant difference in the opinions of young and old teachers on the age at which hearing conservation programme should begin in Akure schools.
- (iv) There is no significant difference in the opinions of principals and Head teachers on the benefits of hearing

conservation programmes in Akure.

- (v) There is no significant difference in the opinions of male and female teachers on the problems militating against hearing conservation programme in Akure schools.
- (vi) There is no significant difference in the opinions of principals and Head teachers on the solutions to the problems militating against implementation of Hearing Conservation programme in Akure schools.

SAMPLE

The sample for this study consisted of principals of schools and Head teachers of Primary schools who were purposively selected. A total of 180 subjects out of 200 subjects who completed the questionnaires were chosen through a proportionate systematic sampling technique. 90 males and 90 females who visited the State Primary Education Board and Ministry of Education Offices in Akure to discuss matters affecting their schools in these centers. The respondents were principals and head teachers who were voluntarily requested to complete the questionnaire forms via three (3) research assistants in the Akure Ministry of Education Offices. The sample were made up of 90 principals and 90 Head teachers who had taught for several years before becoming Head teachers or principals.

Among the purposively selected subjects 80 were old teachers, above 10 years in service and their age range is between 45 and 55 years, while 100 were young teachers below 10 years in service and their age are below 45 years as it was indicated on the background information in the questionnaire.

INSTRUMENTS

A 25 item questionnaire in a likert format was used to collect data for this study. The self validated questionnaire was named

'Hearing Conservation Programme in Akure Schools - (HCPAS)'. The instrument was trial tested among 40 headteachers in Ibadan Municipality and a 'test-re-test' reliability scale of 0.67 was established for the instrument. (with a cronbach alpha value of 0.57). The questionnaire contained sections 'A' and 'B'. Section 'A' is made up of 5 items on the biodata of the respondents such as name of school, age of respondent, years of experience, no of pupils in the school, number of arms in the school. Section 'B' contained 20 items, which are statements on general awareness of hearing conservation programme, age at which hearing conservation programme should begin in schools, existence of hearing conservation programme in Akure schools; Government policy on hearing conservation programmes, benefits of Hearing conservation programmes. problems militating against implementation of hearing conservation programmes in Akure, and solutions to the problems. The respondents are to say whether they agree, partially agree, disagree or are undecided on the statements.

PROCEDURE: The questionnaire was administered to the headteachers and principals during their visits to the Primary Education Board, State Ministry of Education or Teaching Service Commission via research assistants in the centers. The participation was voluntary in order to ensure reliable and valid information. There was no time limit for the completion of the questionnaire; however, the investigators and their assistants started requesting for the completed questionnaire after the second day and by the third months, all questionnaire forms had been received. 200 questionnaire were received among which 180 was found usable.

DATA ANALYSIS

The t-test statistical tool was employed to analyze the data

collected in the course of the research. All the null hypotheses were tested at the 0.05 level of significance.

RESULTS: All the usable questionnaire forms returned were assembled, collated and the data collected from their responses were analyzed to test the hypotheses for the study.

Hypothesis one

The first hypothesis states that “there is no significant difference between the awareness level of male and female teachers on the hearing conservation programme in Akure Schools”.

Table 1- Means, Standard Deviations and t-value of respondents’ level of awareness of hearing conservation programme

Items 6,7,8

Respondent	N	X	S.D	DF	T-calculated	Table t	P
Male	90	5.6	15.854	178	0.234	1.960	0.05
Female	90	5.0	18.514				

N.B = $P > 0.05$ at $df = 198$. *Not Significant

Table 1 reveals the t-test of differences between opinion of male and female teachers on the awareness of hearing conservation programme. The result of the t-test analysis shows no significant difference in their awareness since the table value of 1.96 is greater than calculated t-value of 0.234 at $df = 198$ $P > 0.05$.

Therefore, the null hypothesis is accepted, that there is no significant difference in the awareness level of male and female teachers of hearing conservation programme in Akure Schools.

Hypothesis Two

“There is no significant difference in the awareness of young and old teachers on the existence of hearing conversation programme in Akure”.

Table 2 - Mean, standard deviation and t-value of young and old respondents' awareness of existence of hearing conservation programme in Akure Schools.

Item 9, 10, 11

Respondent	N	X	S.D	DF	T-calculated	Table t	P
Young	100	3.22	19.312	178	0.248	1.960	0.05
Old	80	2.56	17.228				

*Not significant, - 0.242 < 1.960 at 0.05 df 178

Table 2 shows the t-test of difference between young and old teachers awareness of the existence of hearing conservation program in Akure Schools. The table shows that the calculated t - value of 0.242 is less than the table value of 1.960 at elf of 178. $P > 0.05$. This indicates that there is no significant difference in their awareness level of whether hearing conservation programme exists in Akure Schools or not. The hypothesis is accepted.

Hypothesis Three

“There is no significant difference in the opinions of young and old teachers on the age at which hearing conservation programme should begin in Akure”.

Table 3 - Mean, standard deviation and t-value of teacher respondents' opinions on the age at which hearing conservation should begin.

Items 12,13,14

Respondent	N	X	S.D	DF	T-calculated	Table t	P
Young	100	9.44	21.775	178	1.071	1.960	0.05
Old	80	6.56	13.311				

*1960 > 1.071 - at df 178 P > 0.05 Not Significant

Table 3 shows the t - test of difference between young and old teachers opinion on the age at which hearing conservation should begin in Akure Schools. No significant difference was found in the opinion of young and old teachers, based on the fact that the calculated t of 1.071 is less than table t of 1.960 at df. 178.

The hypothesis stands accepted since P is greater than 0.05 at degree of freedom 178.

Hypothesis four

“There is no significant difference in the opinion of principals and Head teachers on the benefit of hearing conservation programme”.

Table 4 - Mean, standard deviation and t-values of opinions of Principals and Head teachers on the benefits of Hearing conservation programme in Akure Schools.

Items 15,16,17, 18

Respondent	N	X	S.D	DF	T-calculated	Table t	P
Principals	90	8.333	26.531	178	0.394	1.960	0.05
Teachers	90	10.00	38.831				

* 0.394 < 1.960 - at 0.05 df 178

Table 4 shows that t - test of difference of respondents who are principals and those who were Head teachers is not significant on the benefits of hearing conservation programme in Akure Schools.

Table 4 indicated that the t-value of 0.394 is lesser than 1.960 table value at 0.05 degree of freedom. Both respondents have negative feelings about the benefits but the principals are more negative than the Head teachers of schools. Hence the hypothesis stands accepted that there is no significant difference in the opinions of the respondents.

Hypothesis Five

“There is no significant difference in the opinions of male and female teachers on the problems militating against hearing conservation programme in Akure Schools”.

Table 5 - Mean, standard deviation and t-value of male and female teachers respondents' opinions on problems militating against hearing conservation programmes in Akure Schools.

Items 19,20,21,22

Respondent	N	X	S.D	DF	T-calculated	Table t	P
Male	90	20.333	39.291	178	0.219	1.960	0.05
Teachers	90	19.11	35.727				

0.219 < 1.960 at 0.05 df = 178 N.B. Not significant

Table 5 reveals that calculated t of 0.219 is less than the table of 1.960 at 0.05 degree of at 178 degree. There is no significant difference in the opinion of male and female teachers on the problems militating against hearing conservation programme

in Akure School. The hypothesis is therefore accepted.

Hypothesis Six

“There is no significant difference in the opinions of principals and Head teachers on the solutions to the problems militating against implementation of Hearing Conservation Programme in Akure Schools”.

Table 6 - Mean, standard deviation and t value of respondents’ opinions on solutions to the problems militating against the implementation of the hearing conservation programme in Akure Schools.

Items 23,24,25a and b

Respondent	N	X	S.D	DF	T-calculated	Table t	P
Principals	90	11.56	30.511	178	0.224	1.960	0.05
Teachers	90	12.66	36.165				

- 0.224 < 1.960 at 0.05 - df = 178 Not significant

Table 6 reveals that the t calculated of 0.224 is less than 1.960 at 0.05 at 178 degree of freedom. This indicates that there is no significant difference in the opinions of principals and Headteachers on the solutions to the problems militating against implementation of Hearing conservation programme in Akure Schools.

In table six, the opinions of principals and head teachers on these solutions showed no significant difference although the principals are more biased on the solution now t. The t calculated is - 0.224 as against table t of 1.960 at 0.05 with degree of freedom of 178. Hence their opinions have no significant difference on the solutions attested in the questionnaire.

DISCUSSION

The main finding of this study is that the awareness of the principals and Head teachers is nil as regards the hearing conservation programme since most of the teachers sampled have no significant difference in their opinion as regards their awareness on whether hearing conservation exist in their schools and Akure city. They being principals and head teachers should know if there is any such programme t calculated of 0.234. Majority of the school do not carry out hearing conservation programme for their pupils or student and the t calculated in table 2 is 0.242 which is less than 1.960 of table value, hence it does not exist in the schools. While table 3 specifically revealed that the young and old teachers were not even sure of the age at which hearing conservation programme should begin hence; they have no significant difference about the age to start it judging from table t of 1.960 which is greater than calculated t of 1.071 indicated no significant difference in their opinions, on when to start hearing conservation programme in Akure Schools: Many of the respondents do not know whether government policy exist on it or not, while they portrayed that there was no funding by government to take care of it as revealed in item 22.

Table 4 further revealed that the principals and head teachers do not know the benefits derivable in hearing conservation programmes, since they refuse to embark on it even when government refuse to fund it, they can use other means to promote the programme in their schools. Although they are the same in their opinions about the benefits that it ensure early identification, better academic performances of students/pupils in the schools as well as prevents trouble shooting of the hearing mechanisms of the pupils. Table 4 revealed that the calculated t is negative - 0.394 and is lesser than table value of 1.960 at 0.05 with degree of freedom 178. This indicates that their

opinions are not significantly different on the benefits of hearing conservation. The mean of the principals' respondents of 8.333 is even lesser than the Head teachers' mean of 10.00 while the standard deviation (S.D) 26.531 of the principal is further lesser than the standard deviation of the Head teachers which is 38.831. This further indicates that there are lots of variance in the believes of the principals on the need for hearing conservation programme and benefits when compared with that of the head teacher but essentially their opinions remain insignificant.

Table 5 further indicated that many problems are militating against the success of hearing conservation programme in Akure Schools which include lack of proper funding, lack of policy statements, lack of equipment and referral procedures which are not adequately used. In fact, there is no screening procedure in place as well as inadequate execution of the programme. To all these problems the respondents have the same view about it, hence the respondents male and female opinions indicated a t calculated of 0.219 as against table t of 1.960 at 0.05, with degree of freedom 178 and it is not significant. Hence this attested to the fact that these problem exist, while they then suggested that Government should enforce environmental pollution protection laws. That educational agency should educate and raise the awareness of public, schools, on the benefits of hearing conservation programme. More so the respondents have the view that provisions should be made in schools to embark on hearing conservation programme as well as there should be provision of educational professionals in schools and ministries as to implement adequately the programme of hearing conservation.

Similarly, the recommendations of the National Conference on identification Audiometric should be followed in our schools. They include the provisions that testing should be conducted in acoustic treated room among our school children. Noise

induced hearing loss is a common phenomenon in Nigeria society (Bakare, 1979), hence schools in Nigeria need to do screening for children entering the school at the stipulated frequencies as well as every year in the course of their educational pursuit as to ward off the trouble shooting of the hearing mechanism which can occur as a result of noise menace in our environment. Many individuals without proper identification and screening will perform poorly in schools work and other learning areas as well as communication. There is a great need to embark on identification and screening of hearing problems in schools. Though most human beings necessarily have problems in terms of severity of their hearing acuity. The normal hearing pupils would usually be able to cope with their educational task. Then the hearing impaired especially when they are not identified for special necessary audiological services such as provision of extensive, diagnostic hearing tests, or hearing evaluation identification, hearing aid provision and social rehabilitation for their proper emotional adjustments would seriously have educational and social problems.

The greatest predicament that is evident in the responses of the headteachers is that a greater percentage of the subjects are having unsuspected hearing impairment without knowing that children in their classrooms are not gaining from classroom information, with the lack of routine hearing check-up in Akure schools hence many failures and drop out are common because they will be backward in their studies. The role of the government in the provision of hearing conservation programmes is highly evident as a major catalyst in alleviating hearing impairment problems for school children as soon as they are of school age.

The findings show that there are hearing impaired children in the regular schools without any identification. The learning and educational performance of these unsuspected, and unidentified

hearing impaired children with their hearing counterparts can never be similar in methodology and teaching approach. For instance, where the hearing impaired would need to strain his/her ears at times to acquire needed information, the hearing do not, they do not even need any form of aids to facilitate interpersonal communication, while the hearing impaired will benefit immensely from hearing aids and other assistive technology, if only the individual can properly be identified for conservation programme.

The hearing impaired maintain an imbalance in their academic performance, hence there is a need for hearing conservation programme in schools with policy and regulation which should be made by education ministries as to provide necessary medical and Audiological service for children before admission, and in the schools years.

CONCLUSION AND RECOMMENDATIONS

Hearing conservation programmes in Akure and generally in Nigeria must be revisited by Government, Administrators/teachers, professionals, educational agencies and the public alike and it should be given appropriate attention. Lack of school hearing conservation programmes denotes a seemingly insensitiveness to the growing menace of health problems against hearing sensitivity in the life of the individual child in developing countries such as Nigeria.

This unfortunate development is in contrast to what obtained in some developed countries, about three to four decades ago. Necessary strategies were evolved to curtail the incidence of hearing impairment and its devastating effects on school age children's hearing capability.

In view of the above, the following procedures for school hearing conservation are recommended:

- (i) All pupils who are in school must be screened
- (ii) Pupils discovered by previous tests to have a hearing impairment must be referred to ENT on surgeon and Audiologists.
- (iii) Pupils returning to school after serious sickness should be referred for an audiological examination.
- (iv) All pupils who appear to be having emotional or mental retardation and behaviour problems should be auditorily examined.
- (v) Government must evolve a policy on hearing conservation programmes in schools.

REFERENCES

- American Speech-Language-Hearing Association (ASHA) Joint Commission on Infant Hearing 1994 Position statement. *Asha*. 1994; 36:38-41.
- Bakare, C.A (1989) Effect of Hazardous Noise on Workers in Nigeria. *Journal of Special Education* Vol. 1 & 2 (2) 60-64
- Campbell, K.A. (1998) *Essentials of Audiology for the physicians*. London: Singular Publishing Group. Inc.
- Conner, N.A. (1961) School Age Children with hearing loss. *American Speech and Hearing Association (ASHA)* Vol. 14 (6) p. 133-134.
- Chasing, M. (1996). *Musicians and the prevention of Hearing Loss*. San Diego: Singular Publishing Group INC.
- Chen, T.J., Chiang, A.C, and Chen, S.S. (1992). Effects of Aircraft Noise on Hearing and Auditing Functions of Airport Employees. *Journal of Occupational Medicine* 34 (6); pp 613-619.
- Daniel, E (1999) Noise abatement strategies. *Journal of Noise Abatement* 6 (5) 50-54 California.
- House, N. and Glorig, D. (1974): Audiometric screening procedures.

In *America Speech & Hearing Journal*, pp. 152 - 153 Vol. 6 (8).

Lawrence, A.C & Rubin K.T. (1974) public school Hearing Conservation programme. *British Journal of Audiology*, 75 (5), 265-272.

Jerome J.S. & Musiek, F.E. (2000). Conference of American Academy of Audiology. University of Texas, Dallas; capture from the site http://www.audiology.org/professional/jaa/ll-99_ph_pem 18/09/01

Melnick, E. & Levine, E.A. (1970) Evaluation of procedures on identification Audiometric. *British Journal of Audiology*, (19), 219-228.

Newby, H.A. (1976) *Audiology*. Washington, Mifflin Co Inc.

Osiki J.O. (1998): The casual comparative study of the psychological Adjustment of the Hearing impaired and the hearing among selected secondary schools: *Nigeria Journal of Speech and Hearing*. (NISHA) vol nol. JUNE 1998. (pp. 34-37).

Osha (1993). *Permissible Exposure levels*. Singular Publishing Group INC. p. 23, PP 4, Vol. 5.

Stub, M. (1986). *Educational Linguistic*. Oxford: Basil Blackwell.

Tubbs, R.L. (1991). Occupation Noise Exposure and Hearing Loss in Fire Fighters Assigned to Airport Fire Stations. *American Industrial Hygiene Association Journal* 52 (9) p 372-278

Ventru, I.M, (1997) (Ed). *Audiology and Education of the Deaf*. Washington, DC. Joint Committee on Audiology and Education of the Deaf.

Winston, S. (2000) *OSHA Hearing Rules for construction Industry*. Auckland. New Zealand: Engineering News Record publication: News Site. Vol. 244 (14), p 1.

Zink, G.D & Apner, O.M (1972). Hearing Aids children wear: A. Longitudinal study of performance. *The Volta Review* 74 (1) 45-51.