Original Article

Awareness of Ear Health Care among Urban City Residents, in South-South, Nigeria

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Abstract

Background: Exposure to Sound Pressure Levels (SPL) above 85 dB over 8 hours is potentially damaging to the ears. Unfortunately, many people may be unaware of the adverse effects of such SPL on the ear and quality of life. The level of awareness of hearing test has not been adequately determined in our region, a developing world. Some even seek ear care from unauthorized facilities and persons who often recommended inappropriate medications and treatment. The objectives of this study were to assess specifically the respondents' level of awareness of sound levels that could cause hearing loss, determine the number of respondents who have had a hearing test, and the sources of ear healthcare among residents in an urban city in South-South, Nigeria. **Participants and Methods:** An interviewee-administered questionnaire under three sections: socio-demographics; awareness of damaging sound levels and their sources; hearing testing and ear health care was used to collect data from 274 consenting respondents. Data were analyzed using IBM Statistical Product and Service Solution version 26.0. Results were presented on frequencies, percentages, tables, and figures. A $P \leq 0.05\%$ was considered statistically significant at a 5% level of significance. **Results:** The respondents were aged between 10 and 74 years, and a median age of 24 years. Most 202 (73.7%) were males, while 72 (26.3%) were females, with male: female = 2.8:1. The greater proportion 223 (81.4%) were single; 177 (64.6%) were students; 16 (5.8%) were unemployed and 21 (7.7%) civil servants. Of the 274 consenting participants, only 79 (28.8%) were aware that the numerical value of noise level above 85 dB could cause damage to hearing. Only a small proportion with tertiary education 28 (10.2%) reported having had a hearing test. All the respondents in occupations prone to high levels of noise never had a hearing test. There was a statistically significant association between the types of ear drop/substance used by respondents and the attendant health personnel ($P = 0.0001$). **Conclusion/Recommendation:** There is poor awareness of ear health care among urban city dwellers in Calabar, South-South, Nigeria. Most young adults aged 20–29 years were aware that loud noise is hazardous to hearing. Generally, there was ignorance on objective numerical noise levels for hazard; the importance of hearing testing; and utilization of appropriate ear care facilities for treatment of ear diseases. Public health education on appropriate ear healthcare is highly recommended.

Keywords: Ear Health care Practices, Hearing Test, Sound levels

Introduction

Hearing plays an important role in communication, health, function, and quality of life. At young ages, hearing is essential for speech development, social interaction, and learning skills. Hearing ability is inversely associated with distress, somatization, depression, and loneliness among all age groups.[1,2] Hearing loss in a child causes delayed language development and slows progress in school, while in adults it causes difficulty at work, increases dementia, social isolation and stigmatization.[3]

Worldwide, more than one billion people are affected by hearing loss. Eighty percent of people with hearing loss live in low and middle-income countries and disadvantaged communities in high-income countries.[4] In the United States, it is estimated that noise-induced hearing loss (NIHL) accounted for one-third of hearing loss and it is preventable.[5,6]

Noise is measured in units of sound pressure levels called decibels (dB). A small change in the number of decibels results in a huge change in the amount of noise. Adults and children

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are frequently exposed to potentially damaging sound levels above 85 dB at home, in the car while listening to the car radio, at various recreational centres where people play instruments and attend concerts, and at movie theaters, dance clubs, bars, sporting events, and exercise centers. In addition to recreational noise exposure, adults can also be exposed to occupational noise while children population can be exposed to unsafe noise levels at home, at daycare facilities or in schools through a variety of popular toys including musical toy instruments, squeeze toys, and battery-operated games that emit loud sounds.[7] Sound intensities differ from one source to another; 120–140 dB have been reported in rock concerts[8] and >100 dB in nightclubs and pop concerts.[9] In recent times, with the advent of personal listening devices (PLD) such as iPods and MP3 players, exposure to unsafe listening levels is increasing.[10] American Speech-Language-Hearing Association in 2013 reported a four times increase of children and adolescents owning iPods and MP3 devices.[11] Current PLDs have potential maximum output levels up to 126 dB depending on the listening mode choice, with higher output levels for ear inserts as opposed to headphones.[12] Alnuman *et al*.[13] and Morioka *et al*.[14] reported a significant increase in NIHL in participation in noisy leisure activities of sound level >90 dB.

Often the hearing loss from noise exposure is insidious, and the initially affected frequencies are outside of the speech band, therefore, hearing loss may not be noticed by the individual until it is severe enough to cause communication difficulty. Children and young adults rarely mention if they are having challenges with their hearing, therefore, may never border to seek for treatment, while many adults delay investigating treatment options after they begin to suspect having a hearing problem, either because some did not think that the hearing loss is bad, or they are not aware of the availability of hearing health-care services or are concerned about the cost and social stigma.[15]

Studies have reported an increase in hearing loss in children and adolescents, particularly in high-frequency regions.[16] Another study done in the US revealed 23.5% of persons who self-reported excellent or good hearing but had 5.5% bilateral and 18% unilateral audiometry notches.[17]

Recreational NIHL can be prevented by turning the volume down, walking away, or using earplugs.[11] Hearing conservation programs among elementary school children are potentially effective to increase the knowledge about the hazards of noise exposure early in life, and this may result in behavioral change toward noise reduction and ear protection.[6]

Worldwide, NIHL is often said to be an occupational disease, though it can result from non-occupational exposure to noise.[18] However, little is known about the current level of knowledge and attitude toward hazards of loud sounds among the general population.[4] Most of the studies conducted in our region have dealt with awareness of occupational noise exposure.[19-21] Therefore, this study will add to the body of literature about the general public awareness of hazardous sound levels, hearing tests, and ear health care.

Participants and Methods

A total of 400 copies of interviewer-administered questionnaire were distributed among participants at an awareness campaign program on "Action for hearing loss, make a sound investment" during the 2017 World Hearing Day held in the University of Calabar Teaching Hospital Conference Centre; those who attended the World Family Day that held in Calabar South Local Government Area, and those who participated in a Religion Crusade held in a Tertiary Institution in Calabar, Nigeria. The respondents included secondary school children, undergraduates, tricycle riders, and staff of a tertiary institution. Respondents were fully informed about the study and consent obtained from them. Out of the 400 copies of the questionnaire that were distributed, 316 copies were retrieved, with 274 that were fully completed, while the remaining 42 incomplete copies were discarded. Respondents' socio-demographic characteristics, lifestyle, awareness of sound levels, previous history of ear infection, treatment received, attendant health professional, and health facilities attended were obtained. Data were analyzed using IBM Statistical Product and Service Solution version 26.0. Chi-square at 5% significance level was used to test for association between respondents' variables and level of awareness, with a $P \leq 0.05$ considered statistically significant.

Results

The respondents were aged between 10 and 74 years, with a median age of 24 years. The majority of 190 (69.3%) in the age bracket 20–29 years, followed by 35 (12.8%) aged 30–39 years. Two hundred and two (73.7%) were males, while 72 (26.3%) were females, with a male: female = 2.8:1. The greater proportions 223 (81.4%) were single; 177 (64.6%) were students; 16 (5.8%) were unemployed, and 21 (7.6%) were civil servants [Table 1].

Awareness of sound levels above 85 DB as the cause of noise-induced hearing loss

Of the 274 consenting respondents, 236 (86.1%) knew that loud noise could cause hearing loss; however only 79 (28.8%) out of them were aware that the numerical value of noise level above 85 dB could cause damage to hearing. While the remaining 196 (71.5%) did not know the objective level, dB of how loud is too loud. There was a statistically significant association between age ($\chi^2 = 52.176$, df = 20, $P \leq 0.0001$), education ($\chi^2 = 58.795$, df = 8, $P \leq 0.0001$) and awareness that sound level above 85 dB could result in NIHL [Table 2 and Figures 1-4].

Awareness and hearing test among respondents

A small proportion of respondents with tertiary education 28 (10.2%) reported having a hearing test, out of which 16 (5.8%) were special education undergraduate students who were using hearing aids at the time of this study. The entire respondents with primary and secondary education were unaware and have never had a hearing test.

There was a statistically significant association between education (χ^2 = 6.624, P = 0.036), occupation (χ^2 = 29.136, P = 0.007), and awareness of hearing test [Tables 3 and 4].

Awareness of ear health care

The respondents were asked about their previous history of ear discharge, ear pain, hearing loss, use of hearing aids, treatment received, and the attendant health-care providers.

Results in Tables 5 and 6 show response to ear discharge and ear pain, respectively, among respondents. There was a statistically significant association between ear pain and the age of the respondents (P < 0.0001).

Table 1: Sociodemographic characteristics of respondents

Demographic characteristics	Frequency (n=274), n (%)
Age	
10-19	13 (4.7)
20-29	190 (69.3)
30-39	35 (12.8)
40-49	16 (5.8)
50-59	6 (2.2)
≥60	10 (3.6)
Undisclosed	4 (1.5)
Sex	
Male	202 (73.7)
Female	72 (26.3)
Education	
Primary	13 (4.7)
Secondary	35 (12.70)
1st degree	224 (81.80)
Postgraduate	2 (0.70)
Occupation	
Business	13 (4.74)
Civil servant	21 (7.66)
Music producer	2 (0.73)
Tricycle driver	45 (16.42)
Student	177 (64.60)
Unemployed	16 (5.84)
Marital status	
Married	50 (18.2)
Single	223 (81.4)
Widow	1 (0.4)

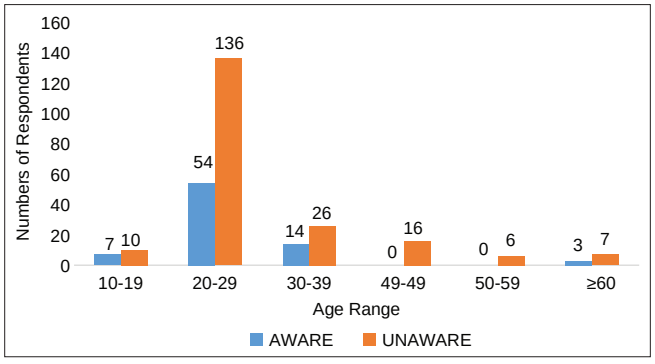

Figure 1: Association between age and awareness of sound levels > 85 dB as a cause of noise induced hearing loss. A statistically significant association was observed between age distribution and awareness of noise that can cause hearing loss. χ^2 = 13.24, df = 20, P = 0.026

Eardrop or substances instilled in the ear, the attendant health-care providers, and health facility attended

Most of the respondents 179 (65.3%) had never instilled ear drops or other substances into their ears before this study; only 95 (34.6%) had instilled some form of ear drops/other substances into their ears. Of those that have instilled ear drops or other substances into their ears, most 77 (28.0%) were males. The ear drops or substances were obtained mainly from the pharmacy shop 32 (33.6%), doctors 27 (28.4%), patent medicine shop 16 (5.8%), nurses 16 (5.8%), and traditional healers 4 (1.45%).

Hydrogen peroxide was a major substance instilled into the ears by 31 (32.6%) of respondents, out of which 13 (13.6%) obtained it from pharmacy stores and 11 (11.5%) from patent medicine stores.

The other common ear drops/substances instilled into the ears by respondents included gentamicin 28 (29.4%); chloramphenicol 18 (18.9%); ciprofloxacin 14 (14.7%), and leave extract gotten from traditional healer 4 (1.5%). Respondents' sex was statistically significantly associated with the types of eardrop or substances instilled into the ears (P = 0.042) [Table 7].

Figure 5 shows a statistically significant association between the types of eardrop or substances used by respondents and the attendant health personnel (P = 0.0001).

Discussion

The majority of the respondents 177 (64.60%) were students and 223 (81.4%) were single. this can be accounted for by the location of the study.

Two-third of the participants were aware of the impacts of loud and prolonged noise exposure on hearing. The age group of 20–29 years (19.70%) accounted for the highest number of respondents that knew the dangerous sound levels (dB), while the age group of 40–59 years was ignorant. This difference

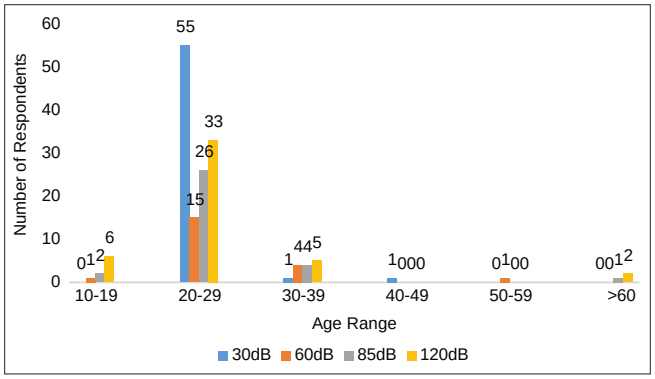

Figure 2: Specific sound level identified by respondents as possible cause of noise induced hearing loss in relation to age distribution. A statistically significant association was observed between age distribution and awareness of dB that can cause hearing loss. χ^2 = 52.176, df = 20, $P \leq$ 0.0001

Table 2: Awareness of sound level >85dB as a cause of noise induced hearing loss

	Sound level >85dB awareness		Total (n=274)	χ^2	P
	Aware (n=79)	Unaware (n=196)			
Age range					
10-19	7	10	17	13.24	0.026*
20-29	54	136	190		
30-39	14	26	35		
40-49	0	16	16		
50-59	0	6	6		
≥60	3	7	10		
Gender					
Male	60	142	202	0.284	0.355
Female	18	53	72		
Education					
Primary	0	13	13	24.56	<0.0001
Secondary	1	34	35		
Tertiary	78	147	226		

A statistically significant association was observed between age distribution, education and awareness of sound level above 85dB that can result to NIHL.
NIHL: Noise induced hearing loss

Table 3: Association between awareness of ear test and education

	Aware	Unaware	Total	χ^2	P
Primary	0	13	13	6.624	0.036
Secondary	0	35	35		
Tertiary	28	198	226		
Total	28	246	274		

A statistically significant association was observed between education and awareness of hearing test χ^2=6.624, P=0.036

Table 4: Association between awareness of ear test and occupation

Occupation	Aware	Unaware	Total	χ^2	P
Business	1	12	13	23.960	0.007
Civil servant	3	18	21		
Music producer	0	2	2		
Tricycle driver	4	41	45		
Student	22	155	177		
Unemployed	4	12	16		

A statistically significant association was observed between occupation and awareness of hearing test χ^2=23.960, P=0.007

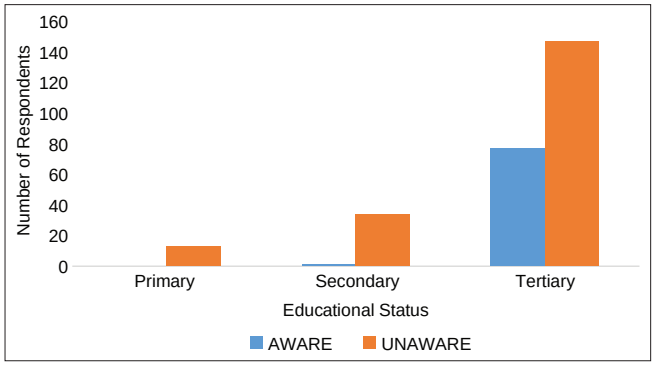

Figure 3: Association between education and awareness of sound levels >85 dB as a cause of noise induced hearing loss. A statistically significant association was observed between education and awareness of noise that can cause hearing loss. χ^2 = 24.56, df = 8, $P \leq 0.0001$

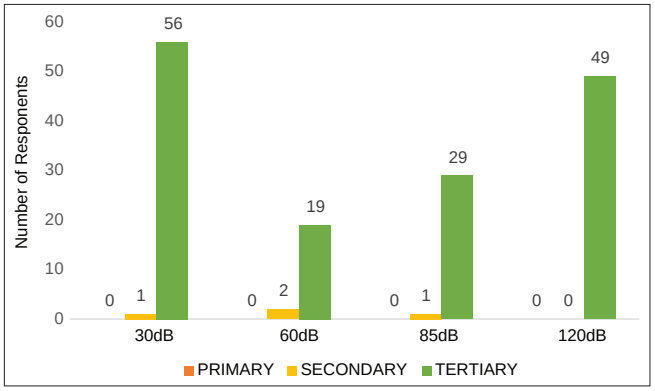

Figure 4: Specific sound level identified by respondents as possible cause of noise induced hearing loss in relation to their education. A statistically significant association was observed between education and awareness of dB that can cause hearing loss. χ^2 = 58.795, df = 8, $P \leq 0.0001$

in the level of knowledge between the age groups could be attributed to the fact that respondents in the age group of 20–29 years were majorly undergraduate students and were more likely to get information from the Internet than other age groups.

There was a poor level of awareness among the respondents that the numerical value of noise levels above 85 dB could cause damage to hearing. Only about a third of the study participants, 79 (28.8%) could ascertain that sound levels above 85 dB are dangerous to the ear. This implies that ear health is either not properly taught or adequately emphasized during primary or secondary school education. The study done by Delgiacco *et al*. reported 28% of elementary school, and 46% high school participants were aware of hearing health and sources of noise exposure.[22] Whereas Callaham *et al*. in their study reported 76% of participants with prior hearing health education at high school, 48.4% at junior high school, and 42.6% at elementary school.[23]

There was a poor level of awareness of hearing tests in our study setting. Only 28 (10.2%) respondents with tertiary

Table 5: Previous history of ear discharge

	Ear infections		Total (n=274)	χ^2	P
	Ear infection (n=45)	No ear infection (n=229)			
Age range					
10-19	1	16	17	9.10	0.105
20-29	39	151	190		
30-39	2	33	35		
49-49	0	16	16		
50-59	1	5	6		
≥60	2	8	10		
Gender					
Male	34	168	202	0.093	0.460
Female	11	61	72		
Education					
Primary	1	12	13	2.78	0.249
Secondary	3	32	35		
Tertiary	41	185	226		

Table 6: Ear pain

	Ear pain		Total (n=274)	χ^2	P
	Yes (n=100)	No (n=174)			
Age range					
10-19	6	11	17	59.03	<0.0001
20-29	75	115	190		
30-39	9	26	35		
49-49	2	12	16		
50-59	2	4	6		
≥60	4	6	10		
Gender					
Male	79	123	202	4.09	0.395
Female	19	51	72		
Education					
Primary	6	7	13	9.09	0.335
Secondary	7	28	35		
Tertiary	87	139	226		

There was statistically significant between ear pain and age distribution P<0.0001

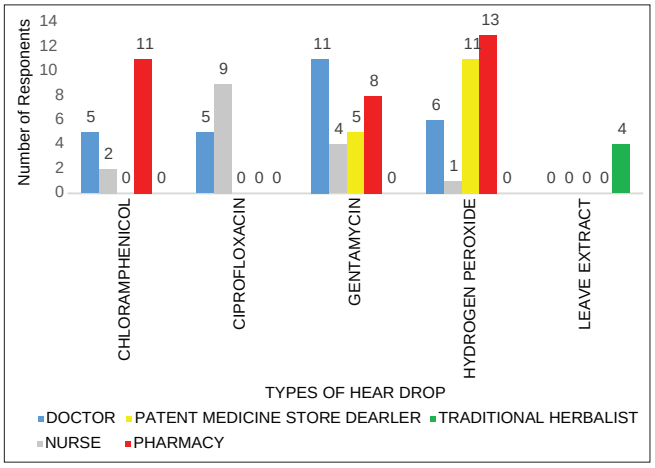

Figure 5: Association between types of ear drop/substance and attendant health personnel or facility. A statistically significant association was observed between the types of ear drops used by the respondents and the personnel that gave the recommendation. χ^2 = 681.02, df = 25, $P \leq 0.0001$

education reported having had a hearing test in the past, while the entire respondents with primary and secondary education have never had a hearing test. Special Education Students 8.0% accounted for the highest number of respondents that reported having previously had a hearing testing. The entire respondents in occupations prone to noise exposure such as music producers and geologists had never had a hearing test. This implies that ear health is either not properly taught or emphasized during primary or secondary education and even in the cause of training of vulnerable occupations.

Our study further revealed poor awareness of ear health care as well as utilization of available/appropriate ear health-care facilities in our region. Most of the ear drops or substances dispensed to the respondents in relation to their symptoms showed ignorance of ear health care by the attendant health-care providers.

Twenty-eight percent (77) of male respondents had previously instilled ear drops or substances obtained from the pharmacy shop (33.6%), doctors (28.4%), patent medicine shop (16.8%), nurses 5.8%, and traditional healers (1.45%). The eardrops or substances used include hydrogen peroxide 32.6% (31), chloramphenicol 18.9% (18) 29.4% gentamicin (28), ciprofloxacin 14.7% (14), and leave extracts 1.45% (4). Similar findings were reported in Kenya, where chicken fat, industrial lubricants and 13 plant species were used to manage ear infections.[24] Similarly, in a study done in Limpopo Province of South Africa, sweet oil, cooking oil, fish oil, chicken oil fat, glycerin, and castor oil were instilled into the ears.[25] However, Joubert *et al*. reported in their study that 78% of participants would consult health-care workers for hearing problems, either in the clinic or hospital.[25]

Table 7: Sociodemographic, ear drop/substance used by respondents

	Ear drop		Total ($n=274$)	χ^2	*P*
	Yes ($n=95$)	No ($n=179$)			
Age range					
10-19	8	9	17	14.515	0.151
20-29	72	118	190		
30-39	8	27	35		
49-49	2	14	16		
50-59	0	6	6		
≥60	5	5	10		
Gender					
Male	77	125	202	6.34	0.042
Female	18	54	72		
Education					
Primary	5	8	13	5.33	0.256
Secondary	7	28	35		
Tertiary	83	143	226		
Occupation				31.68	0.547
Business	1	12	13		
Civil servant	4	17	21		
Music producer	0	2	2		
Tricycle driver	4	41	45		
Student	37	140	177		
Unemployed	4	12	16		

Conclusion

There is a poor level of awareness of ear health care among urban city dwellers in Calabar, South-South, Nigeria. Although most young adults aged 20–29 years knew that loud noise could be hazardous to hearing, there was gross ignorance on the objective numerical noise levels that are harmful to hearing. There is also low knowledge on the importance of having a hearing test and the utilization of appropriate ear care facilities for the treatment of ear diseases. The early introduction of ear health care into primary and secondary schools' curricular is highly advocated. This study did not address the preventive aspects of ear/hearing ailments; therefore, further studies are recommended.

Recommendation

1. A public health education on appropriate ear health care is highly recommended
2. Future study on ear health care should be conducted among health-care providers and ear health-care seminars should be periodically organized in our communities.

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Conflicts of interest

There are no conflicts of interest.

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