ORIGINAL ARTICLE

THE PATTERN OF HEARING LOSS AS SEEN AT THE UNIVERSITY OF BENIN TEACHING HOSPITAL, BENIN CITY, NIGERIA

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ABSTRACT

Background: Hearing loss is a major cause of disability in developing countries. It presents with enormous problems in Nigeria. The objectives of this study were to determine the gender and age distribution, types, severity and the aetiological factors for hearing loss.

Material and Methods: This study was carried at the Department of ENT, University of Benin Teaching Hospital, Benin City, Nigeria from September 2004 to August 2005. All patients with hearing loss aging above ten years were included. Very ill and suspected psychiatric patients were excluded. Pure tone air conduction thresholds were measured for the frequencies 250Hz, 500Hz,1000Hz, 2000Hz, 4000Hz and 8000Hz and bone conduction thresholds at 500Hz, 1000Hz, 2000Hz and 4,000Hz. Gender, age in years and age group were demographic while PTA level, type, severity and aetiology of hearing loss were the research variables. The type of hearing loss was deduced from the audiogram. Continuous data was analyzed as minimum, maximum, mean and SD, and ordinal and nominal data as frequency and percentage.

Results: Out of 980 patients seen in the ENT clinic during the period of study, 281 (28.7%) had hearing loss, but only 257 were included in study. There were 139 males (54.1%) and 118 females (45.9%). The mean age of the sample was 40.5±19.4 (10.0-100.0) years. Major causes of hearing loss were ototoxicity (15.7%), chronic suppurative otitis media (14.9%), presbyacusis (13.2%), wax impaction (8.9%) and rhinosinusitis (7.4%).

Conclusion: Out of 980 patients, 281 (28.7%) had hearing loss. 22 aetiological factors were implicated for hearing loss but ototoxicity, Chronic Suppurative Otitis Media (CSOM) and presbyacusis were commonest.

KEY WORDS: Hearing loss; Deafness; Pure Tone Audiometry; Ototoxicity; Suppurative Otitis Media; Ear Wax; Rhinosinusitis; Otitis Externa.

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INTRODUCTION

The World Health Organization (WHO) applies the term deaf to persons whose hearing impairment is so severe that they cannot benefit from amplification.[1] It will be difficult for this definition to find relevance in the context of a developing country like Nigeria where hearing aid facilities are not widely available and the few available ones cannot be adequately maintained.[2,3] Those persons who are deaf according to the above definition, are either totally without hearing or have profound hearing impairment (>90dB). The latest WHO global estimates put the number of people suffering from disabling hearing loss at 360 million, which is five percent of the world population.[4]

Research workers have identified very little survey data as the bane of estimating hearing loss in sub-Sahara Africa. Some models that were evaluated predicted unusual high prevalence compared with survey data for areas with very little data, making the estimates unreliable.[5] Hearing loss is a major cause of disability in developing countries,[6] unfortunately it is usually ignored as compared to other disabling conditions. This neglect may be due to the fact that hearing loss produces an unseen disability.

Research workers at the National Ear Care Centre, Kaduna, Nigeria, got a hearing impairment frequency of 26.2% (1435 out of 5485 patients), affecting 9 months to 90 years old individuals with a male preponderance of 56.5%.[7]

The objectives of this study were to determine the gender and age distribution, types, severity and the aetiological factors for hearing loss. This will

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assist in establishing a baseline for the planning of policies for the holistic management of patients with hearing loss. It will also serve as a useful background study for similar research on hearing loss in this region.

MATERIAL AND METHODS

This cross-sectional study was carried at the Department of Ear, Nose, Throat, Head and Neck Surgery, University of Benin Teaching Hospital, Benin City, Nigeria from September 2004 to August 2005. This hospital is the main referral hospital in Edo, Delta, Anambra, Ondo and Kogi states of Nigeria, with a total population base of about 25 million.

The operational definition of hearing loss in this study was hearing threshold greater than 30dB in at least two of the frequencies (500 Hz, 1 KHz, 2 KHz, and 4 KHz) for air and/ or bone conduction and an air-bone gap above 15dB.[8]

All patients with hearing loss aging above ten years were included. Very ill and suspected psychiatric patients were excluded.

After thorough history and otolaryngological, general and systemic examination, investigations relevant to the aetiology were carried for all patients like x-ray of the mastoid temporal bone and paranasal sinuses, blood film for malarial parasite, Widal haemagglutination test, x-ray and CT scan of the post nasal space, ear swab for microscopy, culture and sensitivity, and biopsy of ear tumors. Pure Tone Audiometry (PTA) was performed for all patients, using Amplaid 132 PTA machine (Biomedical Division of Amplifon S.p.A, Milano, Italy) by the same trained and experienced audiology technician employing standard procedures.[8-11] PTA threshold for each ear was determined at 250 Hz, 500 Hz, 1 KHz, 2 KHz, 4 KHz and 8 KHz by air conduction. Also bone conduction measurements were obtained at 500 Hz, 1 KHz, 2 KHz and 4 KHz with the appropriate bone vibrator placed on the respective mastoid bone to confirm the presence of hearing loss.

Gender, age in years and age group were demographic variables. PTA level, type, severity and aetiology of hearing loss were the research variables. The age grouping was decade wise into eight groups. The severity of the hearing loss was stratified with the air-conduction average according to the severity scale in common use: 0-30 Normal, 31-50 Mild, 51-70 Moderate, 71-90 Severe, above 90 dB Profound.[12] The type of hearing loss for a particular aetiological factor, was determined by calculating the average air-bone gap and air conduction threshold of all the ears with that aetiological factor. The severity of hearing loss was deduced from the audiogram. Age in years and PTA level were continuous data, age group and severity of hearing loss were ordinal data while gender, type and aetiology of hearing loss were nominal data. Continuous data was analyzed as minimum, maximum, mean and SD, and ordinal and nominal data as frequency (number) and relative frequency (%).

RESULTS

Out of 980 patients seen in the ENT clinic during the period of study, 281 (28.7%) had hearing loss, but only 257 patients met the criteria for inclusion in the study. There were 139 males (54.1%) and 118 females (45.9%) giving a male to female ratio of 1.2:1. The mean age of the sample was 40.5±19.4 (10.0-100.0) years. Table 1 shows the age distribution of patients with hearing loss.

Eighty two patients had unilateral hearing loss while 175 patients had bilateral involvement, giving a total of 432 ears that were studied and are analyzed here.

Mean PTA level at frequencies of 500 Hz, 1000 Hz, 2000 Hz and 4000 Hz for the patients with hearing loss was 59.3 (30.4-100) dB.

Table 1: Age groups of patients with hearing loss.

S.No.	Age group (in years)	Frequency	Percentage (%)
1	10-19	30	11.7
2	20-29	69	26.8
3	30-39	43	16.7
4	40-49	24	09.3
5	50-59	37	14.4
6	60-69	29	11.3
7	70-79	23	08.9
8	≥ 80	02	00.8
	Total	257	100.0

Table 2: Severity of hearing loss in 432 ears.

Severity	PTA hearing threshold (dB HL)	Frequency (number)	Relative frequency (%)
Mild	31-50dB	192	44.5
Moderate	51-70dB	103	23.8
Severe	71-90dB	71	16.4
Profound	91dB and above	66	15.3
Total		432	100.0

PTA= Pure Tone Audiogram, dB HL=decibel Hearing level

Table 3: Frequency of 22 aetiological factors for 432 ears/ 471 causes with hearing loss.

S.No.	Aetilogical factor	Frequency	%	S.No.	Aetilogical factor	Frequency	%
1	Ototoxicity	74	15.7	13	ASOM	8	1.7
2	CSOM	70	14.9	14	OME	5	1.1
3	Unknown causes	50	10.6	15	Neonatal Jaundice	4	0.8
4	Presbyacusis	62	13.2	16	Meniere's disease	4	0.8
5	Wax impaction	42	8.9	17	Septicaemia	3	0.6
6	Rhinosinusitis	35	7.4	18	Insufflation of discharge into the eustachian tube from the nasopharynx	2	0.4
7	Trauma to ear	30	6.4	19	Guillain Barre syndrome	2	0.4
8	Febrile illness	32	6.8	20	Convulsion	2	0.4
9	Noise induced	14	3.0	21	Tumor of the ear/external auditory canal	1	0.2
10	Otitis externa	11	2.3	22	Redundant canal wall	1	0.2
11	Nasopharyngeal CA	10	2.1	Total		471	100.0
12	Hereditary	09	1.9				

CSOM=Chronic Suppurative Otitis Media, CA= Carcinoma, ASOM= Acute Suppurative Otitis Media, OME=Otitis Media with Effusion

Out of 432 ears, the hearing loss was conductive in 155 (35.9%), sensorineural in 147 (34.0%) and mixed in 130 (30.1%).

Table 2 shows severity of hearing loss. Mild loss was the most frequent one.

Table 3 shows 22 aetiological factors for hearing impairment of 432 ears with ototoxicity, CSOM and presbyacusis being the commonest causes. Some ears had multiple aetiological factors, hence giving 471 causes for 432 ears of 257 patients.

DISCUSSION

Out of the 257 patients enrolled for the study, 82 patients had unilateral hearing loss. However 175 patients had bilateral hearing loss; this is to be expected, as both ears are often exposed to the same systemic aetiological factors.

Whereas hearing impairment accounted for 48.7% (875 cases out of 1797) of the new cases, seen at the ENT clinic, of Jos University Teaching Hospital, between 1982 to 1983,[13] it accounted for only 28.7% (281 out of 980) of the new cases during the one year study period in our case. No clear diagnostic criteria for ascertaining hearing loss was mentioned in the study at Jos. It is likely that different criteria were used in the assessment of hearing loss, which gave rise to a relatively high percentage of patients at Jos.

The age distribution in our study showed a preponderance of patients (67.2%) between 20-59 years of age. This is similar to the findings in Lagos in 2002[14] and at Jos.[15] This is the working productive age group that hearing loss is more likely to be a challenge to and they are more likely to seek medical advice promptly.

The gender distribution showed that there were more males than females in our study. This agrees with previous works by da Lily Mariah et al,[15] Ijaduola,[16] McPherson et al,[17] and Holborow et al.[18] .This is however at variance with the study by Olusesi[14] which showed a slight female preponderance and Billings et al that noted almost equal male and female distribution of sensorineural hearing loss.[19]

Most of our patients (68.3%) had mild and moderate types of hearing loss. It is hoped that with the right preventive and therapeutic measures aimed at the aetiological factors, the outcome would be likely favorable.

Twenty two aetiological factors were found for hearing loss in this study. Ototoxicity, chronic suppurative Otitis media (CSOM), presbyacusis, impacted ear wax, rhinosinusitis, febrile illness and ear trauma were the common causes of hearing loss in Benin City in decreasing order of frequency. The common causes of drug ototoxicity in this study were: chloramphenicol 22 ears (29.7%), quinine 10 ears (13.5%), and chloroquine 8 ears (10.8%). Olusesi, Ad Lily-Tariah et al, and Ibekwe have highlighted the role of these therapeutic agents in the causation of audiological impairment in their studies in Lagos, Jos and Enugu respectively.[14,15,20] Ogisi in an earlier work

on ototoxicity implicated similarly: chloraphenicol (40%), chloroquine (22.5%) and quinine (12.5%) in Benin City.[21]

The incidence of CSOM in our environment is high[22] and environmental and socio-economic factors are the main culprits.[23,24] Da Lily-Tariah et al,[15] Ezeanolue et al,[25] Paparella et al,[26] English et al[27] and their co-workers have demonstrated CSOM as aetiological factor for hearing loss.

However in 10.6% cases of hearing loss, the aetiology was unknown. This is a reflection of the poor or at times absent diagnostic facilities for the proper evaluation of patients in our environment. Some patients in this study had multiple aetiological factors responsible for the hearing loss in a particular ear as noted by other workers.[14,15]

The overall pattern of hearing loss in Benin City does not appear substantially different from other parts of Nigeria. It is therefore recommended: health education campaigns to enlighten the public on the aetiology, prevention, treatment and rehabilitation of hearing loss, avoidance of drug misuse, provision of appropriate diagnostic facilities, and proper evaluation of hearing impaired patients to identify and treat the various aetiological factors.

CONCLUSION

Out of 980 patients seen in the ENT clinic, 281 (28.7%) had hearing loss. 22 aetiological factors were implicated for hearing loss, but ototoxicity, CSOM and presbyacusis were the commonest.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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None declared.