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Pattern of Hearing Impairment in a Tertiary Institution in Ado Ekiti, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author WAA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors SBA and OO managed the analyses of the study. Authors GTO and SKA managed the literature searches. All authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

Background: Hearing impairment is a common sensory impairment affecting all age group worldwide.
Aims: This study aimed at determining the prevalence, sociodemographic features, aetiology, audiometry findings, impact on quality of life and management of hearing impairment in a tertiary health institution in Ado-Ekiti, Nigeria.
Materials and Methods: This was a prevalence hospital-based study of patients with complaints of hearing impairment in the ear, nose and throat department of Ekiti state university teaching hospital, Ado Ekiti.
The study was carried out from May 2017 to April 2018. Consent was obtained from the patients/parents/guardian.

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Data were obtained by using pretested interviewers assisted questionnaire.
All the data obtained were collated, documented and analyzed using SPSS version 18.
Results: Prevalence of hearing impairment was 21.2%. There were 36.5% males and 63.5% female with a male to female ratio of 1:1.5. Bilateral hearing impairment was predominant and accounted for 51.9%.
Common aetiologic factors of hearing impairment among the patients were; 20.2% earwax impaction, 13.5% ototoxicity, 12.5% otitis media, 11.5% presbyacusis, 11.1% otitis externa and 10.1% febrile illnesses.
Common clinical features were earwax, earache, hard of hearing/ear blockage, ear discharge and tinnitus in 49.5%, 45.2%, 40.4%, 36.5% and 29.8% respectively.
The most Common type of hearing impairment was a sensorineural hearing loss in 46.2%. Type A tympanometry (normal) was the commonest findings in 47.1%. Pure tone audiometry revealed mild, moderate and moderate-severe hearing impairment to be 44.7%, 27.9%, and 20.2% respectively.
Common effect on quality of life was the embarrassment, aggressiveness, social dysfunction and poor academic performance of 13.9%, 11.5%, 10.1% and 6.7%.
Majority of the patients in 63.5% had prehospital treatment. Conservative treatment was done in 26.9%. The surgery/procedure were done in 47.6%. Amplification and speech therapy in 13.5% and 6.7% respectively.
Conclusion: Hearing impairment is a hidden and common otologic disease with significant associated negative effect on quality of life in Ado- Ekiti, Nigeria.

Keywords: Hearing impairment; pattern; aetiology; treatment.

1. INTRODUCTION

The hearing is said to be impaired when there is a reduction in hearing acuity. This can be picked during conversation or otorhinolaryngology hearing assessment. The ear is one of the five special senses with which a human is gifted, and it is the most affected and neglected sensory organ in our body [1,2]. Moreover, hearing impairment is more expensive to manage than sight [1,2].

World Health Organization (WHO) estimates that prevalence of hearing impairment is 4% worldwide [1]. However, the prevalence of hearing impairment varies from one place to another. A prevalence of 6.3% was reported in a study in India [2]. Shaheen MM et al observed a prevalence of 11.9% in Bangladesh [3]. Furthermore, 10.4% and 9.8% prevalence were documented in two separate studies in Turkey [4-5] and prevalence of 14.3% was observed in Iran [6]. All this high prevalence of hearing impairment was due to ear diseases, an ever-aging society and the growing use of personal listening devices such as mobile phone and transistor [7].

There are several aetiologic factors of hearing impairment and this includes congenital or genetic predisposition such as maternal rubella, birth asphyxia, and ototoxicity. Acquired disorders such as ageing, an infection like meningitis, chronic ear infections, use of ototoxic drugs, and exposure to excessive noise [8]. The epidemiologic factors in developing hearing impairment are augmented by male sex, less education status, occupational hazard like noise from transportation, industrial or military service [9,10].

Hearing impairment is usually secondary to some chronic disorders. The manifestation has a negative consequence on quality of life. Hearing loss may limit meaningful communication, interaction and social connectivity and further leading to a lower health-related quality of life [11]. It may decrease the physical and cognitive function of the sufferers [12]. Affected quality of life in hearing impaired individual that are mostly implicated includes depression, isolation, and dementia [13-15].

Despite this level of prevalence of hearing impairment worldwide, there is a paucity of documents on this subject in developing country, Nigeria inclusive [16,17].

This study aimed at determining the prevalence, sociodemographic features, aetiology, audiometry findings, impact on quality of life and management of hearing impairment at the ear, nose, and throat (ENT) department of Ekiti state university teaching hospital, Ado Ekiti, Nigeria.

2. MATERIALS AND METHODS

This was a prevalence hospital-based study of patients with complaints of hearing impairment at the ENT department of Ekiti state university teaching hospital, Ado Ekiti.

The study was carried out over a period of one year, from May 2017 to April 2018. Consent was obtained from the patients/parents/guardian.

Data were obtained by using pretested interviewers assisted questionnaire. The information obtained includes their biodata such as age, sex, occupation, religion, marital status. Detailed history on hearing impairment on duration, onset, nature, aggravating factors, relieving factors, associated symptoms was obtained and documented. Other otorhinolaryngological, head and neck history on various diseases were obtained. Past medical, drug and surgical history were obtained and documented. Their occupation, family and social history of alcohol consumption and smoking were obtained. Detailed clinical otorhinolaryngological, head and neck examination were done with an emphasis on otological/otoscopy. Anterior with or without posterior rhinoscopy and oropharyngeal examination was also carried out.

Inclusion criteria were patients with hearing impairment in the study center. While exclusion criteria were patients without hearing impairment and those that decline.

Participants had audiometric investigations done to arrive at the diagnosis. Minor ear procedures were given where indicated.

All the otorhinolaryngological, head and neck data obtained were collated, documented and analyzed. This analysis was done using SPSS version 18. The obtained information was processed by the descriptive method and illustrated by using percentage, frequency tables, bar chart and pie charts.

Ethical clearance was sought and obtained for this study from the ethical committee of the institution.

3. RESULTS

The total number of patients seen in the ENT department during the study period was 983. Of these 208 patients had complaints of hearing impairment were enrolled in this study. The prevalence of hearing impairment was 21.2%. All the age group was involved with bimodal peak age value of 46 (22.1%) patients and 47 (22.6%) patients at age group (1-10) and >60 years respectively. Table 1 demonstrated age group distribution of the studied patients.

Table 1. Distribution of the patients by age group

Age group (years)	Number	Percentage (%)
1-10	46	22.1
11-20	23	11.1
21-30	16	7.7
31-40	22	10.6
41-50	24	11.5
51-60	30	14.4
>60	47	22.6
Total	208	100

3.1 Sociodemographic Characteristics

There were 76 (36.5%) males and 132 (63.5%) females. Male to female ratio was 1:1.5. Majority of the studied patients were Christians which accounted for 191 (91.8%) patients, while the minority were 17 (8.2%) Muslim. The patients' residents comprised 122 (58.7%) urban and 86 (41.3%) rural. Patients educational level were nil formal and primary education in 71 (34.1%) and 53 (25.5%) respectively. Others were 48 (23.1%) post-secondary education and 36 (17.3%) secondary school certificate holders. Based on patients' occupation status majority 53 (25.5%) were artisan followed by 49 (23.6%) civil servant, 42 (20.2%) petty business and 33 (15.9%) subsistence farming. The sociodemographic features of patients were illustrated in Table 2. In this study, the commonest source of referral was general practitioners in 85 (41.7%), followed by 50 (24.0) from paediatricians, 46 (22.1%) self-reporting and 27 (13.2%) from others.

3.2 Aetiologic Factors of the Hearing Impairment

The most common aetiologic factor of hearing impairment among the patients in this study was ear wax impaction in 42 (20.2%) patients, followed by 28 (13.5%) patients with ototoxicity, 26 (12.5%) otitis media, 24 (11.5%) presbyacusis, 23 (11.1%) otitis externa and 21 (10.1%) febrile illnesses. Others were 13 (6.3%) noise exposure, 9 (4.3%) ear trauma and 4 (1.9%) neonatal jaundice. Table 3 demonstrated aetiology of hearing impairment among pupils.

Table 2. Sociodemographic features of the patients

Sociodemographic features	Number	Percentage (%)
Sex		
Male	76	36.5
Female	132	63.5
Religion		
Christian	191	91.8
Muslim	17	8.2
Residential		
Urban	122	58.7
Rural	86	41.3
Education level		
Nil	71	34.1
Primary	53	25.5
Secondary	36	17.3
Post-secondary	48	23.1
Occupation status		
Students/apprentices	31	14.9
Business	42	20.2
Artisan	53	25.5
Civil servant	49	23.6
Farming	33	15.9

Table 3. Aetiology of hearing impairment among the patients

Aetiology	Number	Percentage (%)
Febrile illnesses	21	10.1
Birth asphyxia	3	1.4
Neonatal jaundice	4	1.9
Otitis media	26	12.5
Otitis externa	23	11.1
Ototoxicity	28	13.5
Earwax impaction	42	20.2
Congenital anomalies	3	1.4
Ear trauma	9	4.3
Noise exposure	13	6.3
Presbyacusis	24	11.5
Others	12	5.8

3.3 Lateralization of the Hearing Impairment

In this study, bilateral hearing impairment was observed in 108 (51.9%) patients, whereas unilateral hearing impairment occurred in 100 (48.1%) patients. In unilateral hearing impairment, right hearing impairment accounted for 54 (26.0%) while left hearing impairment accounted for 46 (22.1%). This is illustrated in Fig. 1.

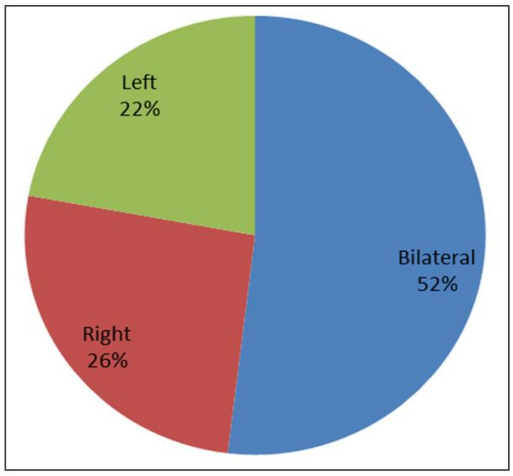

Fig. 1. Lateralization of hearing impairment

3.4 Clinical Features in the Patients with Impaired Hearing

Common clinical features encountered during otorhinolaryngology examination of the patients were earwax, earache, hard of hearing/ear blockage, ear discharge and tinnitus in 103 (49.5%), 94 (45.2%), 84 (40.4%), 76 (36.5%) and 62 (29.8%) patients respectively. Additionally, tympanic membrane perforation in 19 (9.1%) patients, vertigo in 17 (8.2%) patient and retracted tympanic membrane in 16 (7.7%) patients. Table 4 revealed clinical features among the patients.

Table 4. Clinical features of hearing impairment among the patients

Clinical features	Number	Percentage (%)
Ear discharge	76	36.5
Vertigo	17	8.2
Tinnitus	62	29.8
Earwax	103	49.5
Earache	94	45.2
Hard of hearing/ear blockage	84	40.4
Rhinorrhea	36	17.3
Fungal debris	22	10.6
Hyperaemic tympanic membrane	9	4.3
Retracted tympanic membrane	16	7.7
Perforated tympanic membrane	19	9.1
Adenotonsillar hypertrophy	8	3.8

3.5 Types of the Hearing Impairment

In this study, the most common type of hearing impairment was the sensorineural hearing loss which constituted 96 (46.2%), patients. conductive and mixed hearing losses were 78 (37.5%) and 34 (16.3%) patients respectively. Types of hearing impairment among patients are demonstrated in Fig. 2.

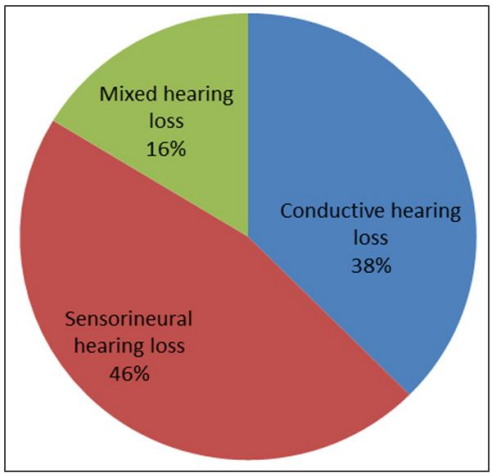

Fig. 2. Types of hearing impairment among the patients

3.6 Audiometric and Tympanometric Findings among the Patients

In this study, type A tympanometry (normal) was the commonest findings in 98 (47.1%) patients, followed by type B tympanometry in 26 (12.5%) patients and type C tympanometry in 4 (1.9%) patients. Subjective test of pure tone audiometry revealed mild, moderate and moderate-severe hearing impairment to be 93 (44.7%) patients, 58 (27.9%) patients, and 42 (20.2%) patients respectively. Severe hearing impairment was found in 9 (4.3%) patients and profound hearing impairment in 6 (2.9%) patients. Table 5 showed audiometric findings among the patients.

3.7 Quality of Life among the Patients with Hearing Impairment

In this study, the common effects of hearing impairment on quality of life were the embarrassment, aggressiveness, social dysfunction and poor academic performance in 29 (13.9%) patients, 24 (11.5%) patients, 21 (10.1%) patients and 14 (6.7%) patients. Others were isolation in 12 (5.8%) patients and depression in 6 (2.9%) patients. Table 6 illustrated quality of life among the patients.

Treatment received by the patients.

Table 5. Audiometric and tympanometric features among the patients

Audiometric and tympanometric findings	Number	Percentage (%)
Tympanometric findings		
Type A	98	47.1
Type B	26	12.5
Type C	4	1.9
Others (not done)	80	38.5
Audiometric findings		
Mild	93	44.7
Moderate	58	27.9
Moderate severe	42	20.2
Severe	9	4.3
Profound	6	2.9

Table 6. Quality of life among the patients

Quality of life	Number	Percentage (%)
Poor academic	14	6.7
performance	12	5.8
Isolation	24	11.5
Aggressiveness	29	13.9
Embarrassment	21	10.1
Social dysfunction	6	2.9
Depression	102	49.1
No effect		
Total	208	100

One hundred and thirty-two patients (63.5%) had prehospital treatment (over the counter medication, local herbs, sacrifices, and prayers) prior to hospital presentation. Conservative treatment of causes of conductive hearing loss such as ear wax impaction, otitis media and external was done in 56 (26.9%). Surgery/ procedure such as ear syringing, aural toileting/dressing and surgical treatment of conditions like, earwax impaction, foreign body impaction, suppuration, adenoid and tonsillar disorders were done in 99 (47.6%). Based on audiometric findings, recommendations were hearing aids for amplification and speech therapy in 28 (13.5%) and 14 (6.7%) respectively. The cochlear implant was required in 11 (5.3%) patients and these were referred to health institutions with facilities for cochlear implantation. Management of hearing

impairment among patients is demonstrated in Table 7.

Table 7. Treatment received by the patients

Treatment	Number	Percentage (%)
Prehospital	132	63.5
Conservative	56	26.9
Surgery/procedure	99	47.6
Augmentation	28	13.5
Speech therapy	14	6.7
Referral	11	5.3

4. DISCUSSION

The prevalence of hearing impairment in this study was 21.2%. This prevalence is high and may be due to the cut-off level used for measuring hearing impairment in this prevalence study. Common cut-offs used for hearing impairment ranges between 15 dB HL and 40 dB HL. Cut-off 25 dB was used in this study. High prevalence was reported among lower primary school children in another study [18]. Contrastingly, lower prevalence was reported among children with middle ear diseases in some studies [3,19-22].

Females had a significantly higher sex prevalence of hearing impairment than males in this study. High personal ear hygiene and parental overprotection of female child delicate nature may be responsible. Contrarily, most studies reported hearing impairment occurs more commonly in male due to their overactivity [23-24]. Females have a shorter stiffer cochlear which provides a more sensitive frequency response and the hair cells are stiffer and therefore more sensitive. This significantly increases noise-induced hearing loss among female as also noticed in this study.

In this study, hearing impairment was significantly high among low education cadre, artisans, and civil servants. Similarly, the previous report revealed that hearing loss is more common in less educated patients [25]. This may probably be due to their lower socioeconomic status, poorer access to good health, the poorer standard of living and increased risk of recurrent ear infections [26]. Mode of patients' referral to the specialist in our center is mainly by general practitioners, paediatricians, and self-reporting. Otorhinolaryngologist, Head, and Neck surgeons are also mainly distributed in the city. This makes accessibility difficult for rural dwellers.

Common aetiologic factors of hearing impairment in this study were ear wax impaction, ototoxicity, otitis media, presbyacusis, otitis externa and febrile illnesses. Earwax impaction usually due to self-ear cleaning as reported in a study from Nigeria [27]. Chronic outer and middle ear infections were reported the common cause of hearing loss among Nigerians [28,29].

In this study, hearing impairment was mainly bilateral. A similar finding was reported in children with hearing impairment in a profile study [30]. A contrary finding was reported in another study [31]. Further analysis revealed right hearing impairment was commoner than left hearing impairment. This may be due to the fact that most patients in this study were right-handed. Making right hand easier and more commonly used in ear cleaning as reported in a study [32].

Common clinical findings in this study were earwax, earache, hard of hearing/ear blockage, ear discharge and tinnitus. This results from the effect of the otologic pathology leading to hearing impairment. The clinical findings in this study were similar to reports from other studies [33,34].

Sensorineural Hearing Loss was the most common type of hearing impairment seen among the patients. This is followed by conductive hearing impairment. This is contrary to the findings reported by the study done in another center [35-38]. The Sensorineural hearing loss might likely be the result of an irreversible neutral damage from infection, ototoxicity or trauma. Conductive hearing impairment was due to pathologies such as cerumen impaction in the external auditory canal, fluid in the middle ear and CSOM. These disorders are common in an individual with low immune status.

In this study, based on the degree of hearing impairment the most prevalent was mild hearing impairment while the least common were profound hearing impairment. Presumably, severe and profound hearing impairment were either on street begging for Alms or could not afford the hospital bill. Additionally, this finding is in agreement with studies on hearing impairment in children [37,38]. Main middle ear pathology from tympanometry findings was type B followed by type C. This was similar to reported findings in another study [21].

In this study, the common effect of hearing impairment on quality of life was the embarrassment, aggressiveness, social dysfunction and poor academic performance. This is similar to reported findings in a hearing profile study [39].

Management of patients with hearing impairment depends on the cause, associated complications, degree, type of loss and effect on quality of life. In this study, the group that had conservative treatment were those that had earwax impaction removal by using Jobson Hornes' prop or ear syringing after softening with cerumen solvent agent. Chronic suppurative otitis media and otitis externa were managed by administration of broad-spectrum antibiotics and topical aural dressing. The surgery/ procedure such as mastoidectomy, middle ear surgery and adenoid and tonsillar surgeries based on our findings to eliminate the potential source of middle ear infection and tympanoplasty were done to restore hearing apparatus. Assistive hearing devices and amplification are not readily available and affordable, and they are difficult to maintain by the majority of our patients. This has limited few of the patients to acquire the recommended hearing aids. Treatment for severe and profound hearing impairment often require cochlear implant [40,41]. None of the patients referred for a cochlear implant in this study accept it because they could not afford this treatment due to high cost and availability in lower income countries including Nigeria. Commonly, most patients that required cochlear implant either go to special schools for the hearing impaired or end up on the street begging for alms. Unfortunately, hearing impairment among patients that required cochlear implant was secondary to preventable causes. These were febrile illnesses, ototoxicity, and noise-induced hearing impairment.

5. CONCLUSION

Hearing impairment is a hidden and common otologic symptoms with associated effect on quality of life. Common causes are preventable and treatable conditions with irreversible sensorineural hearing in this study. Hearing screening and regular ear check are essential in developing countries. Facilities for cochlear implant should be available, accessible and affordable in developing a country like Nigeria.

6. LIMITATION OF THIS STUDY

It is a hospital based-study; therefore, it may not reflect the true picture of hearing impairment in the community. A community-based study is required to show the true burden of this disease in our community.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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