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Research Article

Burden of hearing loss in Subsaharan Africa: Snapshot from an ENT clinic in Nigeria

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Summary

Background: Disabling hearing loss is a prevalent public health issue, with significant impact on patients' communication. The disability associated with hearing loss depends on the severity of the hearing loss. There are limited rehabilitative measures in resource challenged environment. This study assesses the incidence, the factors for hearing impairment and the management outcome.

Methods: A descriptive three-year chart review of patients managed for hearing loss in a tertiary health center in a developing country. The data collected include demographic data, clinical presentation and risk factors for hearing loss, audiometric reports, rehabilitative measures and management outcome.

Results: The patients with ear symptoms managed within the study period were 1350, of whom 498 (36.8%) had hearing loss of varying degrees. These included 145 (29.1%) males and 353 (70.9%) females with male to female ratio of 1:2.4. The age ranged from 8 to 80 years (median age of 35.7). Disabling hearing loss in the better-hearing ear occurred in 216 (43.4%) of cases. Increasing age and chronic supportive otitis media were associated with disabling hearing loss. The hearing thresholds improved with hearing aids and ear surgical procedures; nonetheless the patients' rehabilitation was impaired by limited resources.

Conclusion: There is poor rehabilitation of people with hearing loss, though management outcome is commendable in a few of them. Health education will reduce the risk factors for disabling hearing loss and improved rehabilitative measures are needed for these individuals.

More Information

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Introduction

Hearing loss is due to inadequacy of any part of the auditory system, from the pinna to the auditory cortex in the brain [1]. It is a continuum varying from undetectable degree of disability to a profound loss of hearing [2-4]. Hearing loss is the most prevalent sensory deficit worldwide [5]. The global prevalence of hearing loss is on the increase with two-thirds of these hearing impaired people residing in developing countries [6,7]. The global increase in hearing loss is partly due to increasing uncontrolled environmental noise exposure [8-10], the use of ototoxic medications in patients' medical care [11] and increase in life expectancy with aging population in developed countries [12,13]. The hearing loss in developing countries is relatively fostered by lack of standard protocols for early detection and rehabilitation of hearing loss [14,15], and also by inadequate vaccination coverage against preventable viral agents implicated in hearing loss in the national immunization programme [16-18].

People with disabling hearing loss often have difficulty in interpreting speech sounds, which results in ineffective communication, delay in language acquisition, educational disadvantage, social isolation, stigmatization and poor quality of life [19-21]. Hearing rehabilitation are conservative or surgical measures that eliminate or reduce communication problems [22]. Surgical procedures eradicate ear diseases and restore hearing, while conservative hearing rehabilitation

preserve the residual hearing and improve the hearing threshold with the use of hearing-aids or assistive listening devices. Captioning and sign language are valuable to those with severe hearing loss. However, the hearing-aid production has not meet global need and most amplification devices are available in industrialized economies while the majority of individuals with disabling hearing loss live in low- and middle-income countries [23]. Uptake of hearing aid in developing countries is influenced by the cost which is out of reach of patients and also by the post fixing maintenance services that is not readily available in the community [23]. The environmental risk factors for hearing loss such as noise exposure, ototoxic medications, head injury and ear infections can be controlled or prevented through health education. Immunization against infective agents such as rubella, mumps, and measles are primary preventive measures for hearing loss [18,24]. This clinical audit determines the incidence of disabling hearing loss and limitations in rehabilitating patients with hearing loss in a tertiary hospital in Southwestern Nigeria.

Methodology

This is a 3-year (January 2015 to April 2018) descriptive chart review of patients with hearing loss managed at the Otorhinolaryngology clinic of Ladoke Akintola University of Technology Teaching Hospital, Ogbomosho, in a semi-urban community in Southwestern Nigeria. Institutional ethical approval (LTH/OGB/EC/2016/105) was obtained for the study. The hospital records of all patients that presented with hearing loss were retrieved and analysed, there was no missing record. The data on demographic characteristics, clinical presentation, risk factors and rehabilitative measures for hearing loss with treatment outcomes were extracted using a proforma. The diagnosis of hearing loss was made by consultant Otorhinolaryngologists after preliminary evaluation. The pure tone audiometry assessment was done using MAICO 53 diagnostic audiometer (UK), in a sound-proof booth. Pure-tone averages of hearing threshold levels (HTL's) for the better ear (BE) and worse ear (WE) over four frequencies 500 Hz, 1000 Hz, 2000 Hz and 4000 Hz were determined. Type of hearing loss was classified as Conductive, Sensorineural and Mixed [25]. The degree of hearing level was defined according to the World Health Organization classification system [4]. Hearing loss was categorized as conductive where air–bone gap was ≥ 15 dB [6]. In this study, disabling hearing loss was defined in children under the age of 15 years as a permanent unaided hearing threshold level in the better ear of 31 dB or greater" while the disabling hearing loss in adults refers to hearing loss of 40 dB or greater in the better hearing ear [4]. The data were analyzed using the IBM-Statistical Package for Social Sciences (IBM-SPSS version 20). The test of association was done using Chi-square and Fishers exact. p - values < 0.05 were set as statistically significant level at 95% confidence interval.

Results

All patients with ear problems managed within the study period were 1350, of whom 498 patients had hearing loss. Disabling hearing loss in the better ear was observed in 216 (43.4%) patients (Table 1). The male to female ratio was 1:2.4 and the age ranged from 8 to 80 years (median age of 35.7 years). Disabling hearing loss was associated with advanced age (p = 0.001) with high occurrence in female population as shown in table 1. The degree of hearing loss varied among the patients; female patients were affected more than male patients both in adult and children populations as shown in table 2.

The risk factors for hearing loss were identified in 155 (71.8%) patients with disabling hearing; of which chronic suppurative otitis media is a major factor in this study (Table 3).

Only 35 (16.2%) patients with disabling hearing loss had medical or surgical treatment and hearing rehabilitative

Table 1: Demographic characteristics of the patients.

Parameter	Disabling hearing loss		Total (n = 498) n (%)
	Present (n = 216) n (%)	Absent (n = 282) n (%)	
Age group (years)			
≤ 10	2 (0.4)	15 (3.0)	17 (3.4)
11 - 20	40 (8.1)	31 (6.2)	71 (14.3)
21 - 30	54 (10.8)	44 (8.8)	98 (19.6)
31 - 40	24 (4.8)	45 (9.0)	69 (13.8)
41 - 50	26 (5.2)	53 (10.6)	79 (15.8)
51 - 60	25 (5.0)	40 (8.0)	65 (13.0)
61 - 70	14 (2.8)	32 (6.4)	46 (9.2)
71 - 80	31 (6.2)	22 (4.4)	53 (10.6)
Sex			
Male	86 (17.3)	59 (11.9)	145 (29.1)
Female	130 (26.1)	223 (44.7)	353 (70.8)
Socio-economic status			
Low	146 (29.3)	183 (36.7)	329 (66.1)
Middle	48 (9.6)	75 (15.1)	123 (24.7)
High	22 (4.4)	24 (4.8)	46 (9.2)
Type of Hearing impairment			
Conductive	2 (0.5)	61 (12.2)	63 (12.7)
Sensorineural	195 (39.1)	197 (39.6)	392 (78.7)
Mixed	19 (3.8)	24 (4.8)	43 (8.6)
Degree of Affectation			
Right Ear	7 (15.5)	20 (4.0)	97 (19.5)
Left Ear	139 (27.9)	262 (52.6)	401 (80.5)
Other symptoms**			
Ear ache	12 (2.4)	47 (9.4)	59 (11.8)
Ear discharge	141 (28.3)	197 (39.5)	338 (67.8)
Tinnitus	45 (9.1)	26 (5.2)	71 (14.3)
Vertigo	7 (1.4)	7 (1.8)	14 (2.8)
Sensation of fullness in ear	21 (4.2)	94 (18.9)	115 (23.1)

**Some had more than one symptoms

Table 2: Hearing threshold of the patients with disabling hearing loss.

Variable	Degree of hearing impairment					
	Mild n (%)	Moderate n (%)	Moderately severe n (%)	Severe n (%)	Profound n (%)	TOTAL n (%)
Age						
Children	2 (0.9)	5 (2.3)	8 (3.7)	5 (2.3)	4 (1.9)	24 (11.1)
Adults	0 (0)	79 (36.6)	44 (20.3)	57 (26.4)	12 (5.6)	192 (88.9)
Sex						
Male	0 (0)	35 (16.2)	28 (12.9)	19 (8.8)	4 (1.9)	86 (39.8)
Female	2 (0.9)	49 (22.7)	24 (11.1)	43 (19 .9)	12 (5.6)	130 (60.2)
TOTAL	2 (0.9)	84 (38.9)	52 (24.1)	62 (28.7)	16 (7.4)	216 (100)

Table 3: Distribution of factors for disabling hearing loss among patients.

	Factors	Total *n* (%)
Infective factors *n* = 89 (100%)	Chronic suppurative otitis media 59 (66.3) Meningitis 11 (12.4) Measles 8 (9.0) HIV/AIDS 5 (5.6) Varicella zoster infection 4 (4.5) Mumps 2 (2.2)	
Non-Infective factors *n* = 66 (100%)		
	Presbyacusis	11 (16.7)
	Neonatal jaundice	8 (12.1)
	Noise induced	7 (10.6)
	Birth asphyxia	6 (9.1)
	Cerebrovascular accident(Stroke)	6 (9.1)
	Ototoxicity	7 (10.6)

155 patients had risk factors for disabling hearing loss.

measures; 23 (10.1%) of whom had some improvement in hearing threshold at 6months after intervention. The rehabilitation outcomes were not excellent but still commendable as shown in table 4. Hearing aids were recommended for amplification in 12 (5.5%) patients, but only 3 (1.4%) of them could procure the device due to financial constraints. Also the devices were procured in another center which is hundreds of kilometers away due to non-availability of these services in our center.

Ear surgeries were suggested to 32 (14.8%) patients, of whom 29 (13.4%) patients declined due to the cost of surgery. Hearing threshold improved marginally with eradication of middle ear disease in some patients, while hearing loss persisted as shown in (Table 4). All the patients with disabling hearing loss were educated on the risk factors for hearing loss and measures to prevent deterioration of the residual hearing.

Discussion

Over 5% of the world's population has disabling hearing loss with significant impact on daily activities, causing isolation and feelings of loneliness [2,6]. The prevalence of disabling hearing loss in this study was 43.4%. This high prevalence may be due to the fact that it is a hospital-based study, unlike 5.2% prevalence reported in a community study in Brazil. This high proportion of disabling hearing loss in this study may affect the social and economic development of the community and the country negatively [26]. In this study, disabling hearing loss increases with age, similar to previous studies [9,27,28]. This may be due to the decline in serum aldosterone levels with increase in age, with consequent loss of its protective effect on auditory pathways [29]. In this study, disabling hearing loss was preponderant among females, unlike previous studies [27,28]. Though females have protective effect of estrogen hormone on their hearing [30], it has been demonstrated in animal and human research that unnatural levels of progesterone may be harmful to hearing in females [31,32]. However this study did not determine the use of progesterone hormonal agents for birth control or therapeutic use among the patients, further study is required to determine this possibility. The principal factor for disabling hearing loss was chronic suppurative otitis media similar to previous studies in developing countries [33,34]. Poor hygiene, gastroesophageal reflux disease, and dysfunctional immune system are predisposing factors for suppurative otitis media [35].

Despite the benefits of hearing aids to enhancing speech comprehension and effective communication, its usage was hampered by cost and non-availability in this study. Similar to previous reports that hearing rehabilitation is hindered by the high cost and non-availability of hearing aid devices [23,24]. This gap can be bridged through improved funding of health sector and exploring low-cost interventions for low income countries to meet the demand for hearing aids. The average cost of hearing aids in Nigeria is beyond the reach of the general populace [36]. This is due to poor economy in a country with monthly minimum wage of 18,000 Naira ($51.4 USD) and the cost of hearing aid is 125,000 Naira ($357). Less than 1% of hearing impaired individuals in developing countries use hearing aids due to the high cost of the device [37,38]. Although, hearing-aid enhances hearing, its usage, however, is facilitated by self-perceived hearing difficulty and not the degree or severity of the hearing loss [37]. Lack of funds debars patients from surgical procedures, since cost

Table 4: Therapeutic care and management outcomes of patients with disabling hearing loss

Management	Number of patients *n* (%)	Mean Hearing level before management (dB)	Mean Hearing level post management (dB)	Mean hearing threshold gain (dB)	Clinical result
Hearing aid	3 (8.6)	58 ± 0.1	32 ± 5.4	25 ± 0.8	Improvement in hearing level
Medication/ topical ear dressing for CSOM	17 (48.6)	53 ± 2.8	39 ± 0.2	14 ± 0.2	Healed with neo-membrane formation Improvement in hearing level
Medication and topical ear dressing for CSOM	12 (34.3)	59 ± 1.4	59 ± 1.7	0	Eradication of the disease but with persistent tympanic membrane perforation No improvement in hearing level
Myringoplasty	1 (2.8)	45	38	7	Neomembrane formation Improvement in hearing level
Tympanomastoidectomy	2 (5.7)	63.4	53.8	9.6	Extirpation of the disease and neomembrane formation Improvement in hearing level
Total	35 (100)				

*CSOM - Chronic suppurative otitis media. Only 35 (16.2%) had rehabilitation out of the 216 patients with disabling hearing loss of which 23 (10.1%) had some improvement in hearing threshold at 6 month after intervention.

of health care is paid out of pocket by the patients. This can be prevented by ensuring health insurance scheme for all the populace. The rehabilitation of patients with hearing loss is poor in this study, though management outcome of the few rehabilitated patients was good with improvement in hearing threshold, in spite of the limited resources.

Regardless of the fact that certain cases of hearing loss are preventable, hearing loss still abounds in resource challenged settings like Nigeria [39,40]. Hearing loss due to infections are preventable by good healthy ear-care practices, immunisation against childhood diseases (measles, meningitis, rubella, and mumps), early detection of hearing loss, and initiating appropriate medical care, which is economical than rehabilitative measures [2]. This can be achieved through health education, public awareness and by incorporating ear-care into primary health care system.

Conclusion

Disabling hearing loss is high among patients presenting with hearing loss. There is a need for the introduction of inexpensive and sustainable aural rehabilitation services in developing countries in spite of limited resource. Health education and early intervention will reduce preventable hearing loss.

Limitations

This is a retrospective study which will account for lack of details on patients' information. It is a hospital-based study from one geopolitical part of a country and not a population based data, thus it might not adequately represent the occurrence of hearing loss and challenges in hearing rehabilitation among the populace. In spite of these limitations this study gives us an idea about hearing problems in Nigeria, and the need for resources in the health care system to address the problems.

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