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Original Article

Prevalence and Risk Factors of Hearing Loss at Bugando Medical Centre Mwanza Tanzania

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Hearing enable us to communicate and interact all over the world. When hearing is reduced or not there at all then is a major problem. In Africa more so in the Sub Sahara, this problem is on the rise due to the activities that are been carried out. There is no clinical data that is available from our national and zonal referral hospital, this study is a stepping stone for more studies. The outcome will show the burden of the people with reduced or has no ability to hear, distribution of hearing loss and the contributing factors. The engagement was conducted in a tertiary hospital serving more than five regions of the country. It's a descriptive cross-sectional study. The study spanned from July 2020 to December 2020 with the total number of patients visited the otorhinolaryngology and audiology clinic being 6,234 the ones hearing loss 526. The study found prevalence of 8.4% for reduce/inability to hear. Females found to be more by 1.3%. Sensorineural hearing was the leading (51%), followed by conductive hearing (41%). The group most affected by sensorineural hearing were 40-59 (53.7%). On conductive hearing, the leading group being affected were 3-39 years (46.6%). In the distribution of sensorineural hearing the leading one was mild hearing in the age group of 3-39 (63%), followed by moderate hearing at 25.5%. The contributory factors were inflammation, such as allergic rhinitis (38%), otitis (34%), and wax (9.5). These factors contributed to about 60% of hearing loss. A group of young adults have been found to have mild hearing (63%); this shows that in a few years, the majority of the young group will have severe hearing problems, hence decreasing the manpower of our economy. Public knowledge about ear care should be offered to people, and this should be done by the media and the health sector as a whole.

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INTRODUCTION

Hearing impairments (HI) is when the ability to hear is greater than 40 dB in the better-hearing ear in adults (15 years or older) or greater than 30 dB in the better-hearing ear in children (0 to 14 years) (1). Worldwide 5.0% of the population or one-third of adults over 65 years would require treatment due to hearing (2). In years of 2050 almost 2.5 billion people are expected to have some degree of hearing problems and about 700 million require hearing rehabilitation. Above 1 billion young adults are at risk of permanent due to unsafe listening practices (1).

World Health Organization (WHO) approximated in 2018 that approximately 466 million people globally live with disabling Hearing impairment (6.1% of the world population), of which 34 million are children and 49 million live in sub-Saharan Africa (1). Hearing impairment affects 6 per 1000 live births in sub-Saharan Africa, with lower incidence of 1 per 1000 live births in developed countries (3,4).

Hearing has being graded as per WHO grades of hearing impairment therefore 0-25 dB is regarded as normal hearing, 26-40 dB mild hearing, 41-55 dB moderate hearing, 56-70 dB moderately severe hearing, 71-90 dB severe hearing and >90 dB profound hearing (9). WHO states that 50% of hearing problems are primarily preventable, as the remaining can be readily solved in secondary or tertiary prevention [4].

Hearing impairment may be caused by environmental and genetics. Many cases, it's not easy to establish a definite aetiology (5,6). Environmental factors example of meningitis, measles or ototoxicity are the leading causative of

hearing impairment (HI) in low- and middle-income countries, while the same conditions are lower in high-income countries (6,7,8,9). Inability to hear limits a person's participation in daily life opportunities for employment causing spiritual, social, and emotional problems. If it occur in early life, causes delayment of speech and hence educational development difficulties (6). The economic burden of disease studies are lacking mostly in developing countries, but economic impact of hearing problems has also been shown to be significant in developed countries (4). Hearing impairment may be either a congenital or acquired cause. It's congenital can be of hereditary and nonhereditary genetic factors, whom are maternal rubella, syphilis, low birth weight, birth asphyxia, drugs such as (aminoglycosides, cytotoxic) and neonatal jaundice in a severe form (17,18)

Acquired hearing can occurs at any time in human life. The causes are infectious diseases such as meningitis, measles, and mumps. Also other causes includes chronic ear discharge, ototoxicity, noise-induced, and ageing (18). Studies show that acquired causes of hearing problems are more compared to hereditary in developing countries (19,20). Hearing impairment is diagnosed by auditory testing to detect loss in hearing acuity. Hearing ability is measured in decibels and is considered normal if the lowest level (threshold) at which a sound can be perceived is between 0 and 25 dB (16,21). Hearing acuity can be readily measured quantitatively and objectively via numerous physiologic tests, including auditory brainstem response, impedance testing (tympanometry), and otoacoustic emissions (OAE).

METHODOLOGY

Study Area

ENT clinic, E9 ward and audiology clinic of Bugando Medical Centre were the place study was conducted. Bugando Medical Centre ENT department is one of the surgical departments with eight specialists and four registrars; the audiology clinic has one train audiologist and 2 trained nurses.

Study Population and Study Design

All patients who attended in otorhinolaryngology department at Bugando Medical Centre during the study period were enrolled.

It's a hospital-based descriptive cross-sectional study. Data were collected from July 2020 to December 2020.

Data Collection

Socio-demographic data, clinical examination findings were obtained from hospital registries, computerized databases for patient files. The information was counterchecked and corrected whenever necessary by using a designated coded questionnaire. Pure tone audiometry (PTA) was performed by a trained audiologist in using an audiometer machine (COM. Hear CH33).

Air and bone conduction were tested at frequencies ranging 250 HZ to 8000 HZ. Hearing

was graded as per WHO grades of hearing impairment whereby 0-25 dB was regarded as normal hearing, 26-40 dB mild hearing, 41-55 dB moderate hearing, 56-70 dB moderately severe hearing, 71-90 dB severe hearing and >90 dB profound hearing (9). The type and severity of hearing loss were assessed in each ear as stipulated on the audiogram charts. The patient was given his/her results by the doctor. Management was done accordingly in relation to the findings and the history together with the physical examination.

Data Analysis

Data were analysed using SPSS software for Windows version 21.

Ethical Considerations

The CUHAS/BMC joint ethics and review committee gave approval of the study.

RESULTS

In this study, 6234 patients attending the otorhinolaryngology department were recruited, and of these, 526 (8.4%) had hearing impairment. The predominant type of hearing impairment was sensorineural hearing, 269(51%), followed by conductive hearing, 218(41%) and mixed hearing, 39(7%) (*Table 1*)

Table 1: Distribution of patients with hearing impairment according to type

Type of hearing	Number of patients with HL
Sensorineural hearing	269
Mixed hearing	39
Conductive Hearing	218
Total	526

Sensorineural hearing was the leading by 51%, followed by conductive hearing 41%.

Table 2: Distribution of patients with hearing impairment in age and sex

Age(years)	Male	Female	Total
0-2 yrs	1	0	1
3-39 yrs	120	179	299
40-59 yrs	58	68	126
60 yrs>	55	45	100
Total	234	292	526

Females were 53.6%, and males were 46.2%. This shows females and males were in a ratio of 1.3:1.

Table 3: Distribution of the types of hearing impairment according to age

Age (years)	Sensorineural hearing loss	Mixed hearing loss	Conductive hearing loss	Total	P value
3-39	149(50.0)	10(3.36)	139(46.64)	298(100)	<0.001
40-59	72(53.73)	4(2.99)	58(43.28)	134(100)	
>60	48(51.06)	25(26.60)	21(22.34)	94(100)	
	269(51.14)	39(7.4)	218(41.44)	526(100)	

There is statistically significant between the type of hearing impairment and age of the participants (p value<0.001")

Table 4: Distribution of the type of hearing impairment by gender

Gender	Sensorineural hearing loss	Mixed hearing loss	Conductive hearing loss	Total	P value
Male	121 (51.71)	24 (10.26)	89 (38.03)	234 (100)	0.055
Female	148 (50.68)	15 (5.14)	129 (44.18)	292 (100)	
Total	269 (51.14)	39 (7.14)	218 (41.44)	526 (100)	

There is not any statistically significant relationship between gender and the type of hearing loss (p value=0.055)

Table 5: Types of Sensory neural hearing for patients with hearing impairment according to age

Age (years)	Mild hearing	Moderate hearing loss	Moderate-severe hearing	Severe hearing	Profound hearing	Total	P value
3-39	94 (63.06)	38 (25.50)	8 (5.37)	3 (2.01)	6 (4.03)	149 (100)	0.001
40-59	34 (47.22)	27 (37.50)	5 (6.94)	5 (6.94)	1 (1.39)	72 (100)	
>60	7 (14.58)	9 (18.75)	4 (8.33)	23(47.92)	5 (10.42)	48 (100)	
	135 (50.19)	74(27.51)	17 (6.32)	31 (11.52)	12 (4.46)	269 (100)	

There is significant statistically in relationship of the age groups of the participants and severity of the types for sensorineural hearing loss (p value=0.001), as the majority of the older group patients were found with severe hearing loss with 47.92% with only mild hearing loss being 14.58%

Table 6: Distribution of contributory factors for hearing impairment

Contributory factors	Frequency
Ototoxicity(drugs)	12
Allergic rhinitis	120
Otitis media	108
Chronic ear conditions	18
Noise-induced hearing	1
Ear conditions with vertigo	4
Tumours (parotid, nasopharyngeal carcinoma)	4
Obstructive tonsillitis	18
Impacted wax	30
Total	315

The leading condition that causes hearing loss was allergic rhinitis (38%) followed by otitis media (34%), wax (9.5%), chronic ear conditions (5.7%), obstructive tonsillitis (5.7%), ototoxicity (3.8%), ear conditions with vertigo (1.2%) and tumours (1.2%), noise induced hearing impairment (0.3%). The risk factors shown in the table above contribute about 60% of the hearing loss.

DISCUSSION

Hearing impairment is currently a major public health problem as it interferes with one's ability to work and interact with the environment. This problem is rising, especially in the developing countries. In this countries, the number of motor vehicles, modernised instruments such as earphones and industries are increasing rapidly while sound protection is not highly taken care of. We found a prevalence of 8.4% for this study, nearly the same as that of other studies done elsewhere (11,12). Females were more than males; this is probably due to the early seeking behaviour of health care, this findings are almost the same with the study done in Nigeria (15).

Regarding the distribution of hearing impairment, the leading was sensorineural hearing at 51.7%, followed by conductive hearing at 38%, and the mixed type. The study done in Tanzania (11,12) showed the leading pattern to be conductive, which is contrary to this finding, probably due to the increased access to medical services currently or awareness of the people towards health services. Other studies done in Nigeria's and Tanzania's coastal regions had similar results to this study (14,15).

Regarding sensorineural hearing, the predominant type was mild hearing about 63%, followed by moderate hearing which was 25.5%, compared to the other types of hearing impairment. The leading age group with mild hearing was young age. These findings are similar to the Shuaibu et al. study, which was 63% on combining mild and moderate (15), although its age group is more adult, while this study shows the distribution in the young age group category. This may be

probably due to using earphones, eating sugar-content foods, and swimming frequently, predisposing them to the diseases.

The older adults were leading by having severe hearing loss by 47%, which tallies with the literature. As the age increases the outer hair cells tend to decrease in number, contributing to hearing impairment. Out hair cell decrease caused mainly by sensorineural hearing which is attributed genetic causes and similar occurrence of other related disease conditions as hypertension, vascular, diabetics, tumors, trauma, infections, immunological and inflammatory conditions [14,15,16].

This study found that the leading risk factors were inflammatory conditions such as allergic rhinitis 38% followed by otitis 34% then impacted wax 9.5% and others, which contributed about 60%; other causes of hearing loss that doctors did not identify remain unknown was 40%. This may be one of the hereditary causes of hearing loss. Other studies should be done to ensure this. Patients were managed according to the condition of the disease, and those with severe hearing loss due to age were kept on neuro support or neurotoxin and monthly follow-up and hearing aid plus counselling.

CONCLUSION

The prevalence of hearing loss is 8.4%; this finding is from a tertiary hospital that serves more than five regions. People should be educated on how to care for their ears, especially when taking a shower and working in areas with higher noise, for example, airports, mining areas, Disco's, and bus stations. A group of young adults have been found to have mild hearing loss, about 63%; this shows that in years to come majority of the young group will have severe hearing loss, hence decreasing the manpower of our economy.

Recommendation

Public knowledge about ear care should be offered to people via media, hospitals and health sector as a whole should do this. Protected gear should be given to people working in areas with

high sound; this is well-taken care for those in big mining and airports but for local mining still not yet and those in bus stations.

Ethical approval: Informed consent was verbal and was approved by the CUHAS ethical committee, and consent for publication:

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Authors` Contributions

OMK-drafting the manuscript, data collection and discussions.

HS-Discussion and management of patients

FM-discussion of the manuscript and literature

BN-Results and discussion of the manuscript

AM-Discussion and management of patients

ZSA- Results and Discussion of the Manuscript

ER-General overview of the manuscript and discussion.

REFERENCES

- [1] WHO Estimates. [(accessed on 27 February 2023)]; <https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss>
- [2] WHO (2012) WHO global estimates on the prevalence of hearing loss. http://www.who.int/pbd/deafness/WHO_GE_HL.pdf. Accessed 28 Jan 2019
- [3] Mehra S., Eavey R.D., Keamy DG. The epidemiology of hearing impairment in the United States: Newborns, children, and adolescents. *Otolaryngol. Head Neck Surg.* 2009;140:461–472. doi: 10.1016/j.otohns.2008.12.022.
- [4] Olusanya B.O., Neumann K.J., Saunders J.E. The global burden of disabling hearing impairment: A call to action. *Bull. World Health Organ.* 2014;92:367–373. doi: 10.2471/BLT.13.128728.
- [5] James M., Kumar P., Ninan PJ A study on prevalence and risk factors of hearing impairment among newborns. *Int. J. Contemporary Pediatr.* 2018;5:304–309. doi: 10.18203/2349-3291.ijcp20180018.
- [6] Moctar E.C.M., Riahi Z., El Hachmi H., Veten F., Meiloud G., Bonnet C., Abdelhak S., Errami M., Houmeida A. Etiology and associated GJB2 mutations in Mauritanian children with non-syndromic hearing loss. *Eur. Arch. Otorhinolaryngol.* 2016;273:3693–3698. doi: 10.1007/s00405-016-4036-z.
- [7] Wright A.D.O. The aetiology of childhood deafness in Sierra Leone. *Sierra Leone Med. Dental Assoc. J.* 1991;6:31–45.
- [8] Lebeko K., Bosch J., Noubiap J.J.N., Dandara C., Wonkam A. Genetics of hearing loss in Africans: Use of next-generation sequencing is the best way forward. *Pan Afr. Med. J.* 2015;20:383. doi: 10.11604/pamj.2015.20.383.5230.
- [9] Grindle C.R. Pediatric hearing loss. *Pediatr. Rev.* 2014;35:456–463. doi: 10.1542/pir.35-11-456.
- [10] Ječmenica J., Bajec-Opančina A., Ječmenica D. Genetic hearing impairment. *Childs Nerv. Syst.* 2015;31:515–519. doi: 10.1007/s00381-015-2628.
- [11] Iselin Ertzgaard S, Kristin N, Sofie T, Giske Sin dberg H, Tobias Bang H, Cosmas M, Tron Vedul T, Aslam N, Jon Ø. Prevalence of hearing impairment among primary school children in the Kilimanjaro region within Tanzania. *Int J Pediatr Otorhinolaryngol.* 2020 Mar;130:109797.
- [12] B M Minja, A Machemba. Prevalence of otitis media, hearing impairment and cerumen impaction among school children in rural and

- urban Dar es Salaam, Tanzania. *Int J Pediatr Otorhinolaryngol* 1996 Sep;37(1):29-34.
- [13] Stucki G. International Classification of Functioning, Disability, and Health (ICF): a promising framework and classification for rehabilitation medicine. *American journal of physical medicine & rehabilitation*. 2005 Oct 1;84(10):733-40.
- [14] Abraham Z. A, Kahinga AA. Characteristics of hearing loss in Dar es Salaam, Tanzania. *South Sudan Medical Journal* 2022;15(4):143-146.
- [15] Shuaibu IY, Chitumu D, Mohammed IB, Shofoluwe NA, Usman MA, Bakari A, Lawal LK. The pattern of hearing loss in a tertiary hospital in North Western Nigeria. *Sahel Med J* 2018;21:208-12.
- [16] Michael SH, Murad H, Richard JH. Genetic sensorineural hearing loss. In: Paul WF, Bruce HH, editors. *Cummings Otolaryngology-Head and Neck Surgery*. 5th ed. Philadelphia: Mosby Elsevier; 2010. p. 1606-24.
- [17] Grundfast KM, Atwood JL, Chuong D. Genetics and molecular biology of deafness. *Otolaryngol Clin North Am* 1999;32:1067-88.
- [18] Sujata DE, Sue A, Ray C. Investigation and management of the deaf child. In: Micheal G, editor. *Scott Brown's Otolaryngology-Basic and Paediatrics*. 7th ed. Great Britain: Edward Arnold; 2008. p. 844-57.
- [19] Shuaibu IY, Bakari A, Ahmed AO, Usman MA. The pure tone audiogram assessment of the students of a special school for the deaf in Kaduna. *Arch Int Surg* 2015;5:206-9.
- [20] Olusanya BO, Ruben RJ, Parving A. Reducing the burden of communication disorders in the developing world: An opportunity for the millennium development project. *JAMA* 2006;296:441-4.
- [21] Clark JG. Uses and abuses of hearing loss classification. *ASHA* 1981;23:493-500.