

## Causes of Hearing Impairment Observed in Clinical/Hospital Setting

MEHREEN BABAR<sup>1</sup>, FATIMA USMAN<sup>2</sup>, WAJIH UD DIN SHINWARI<sup>3</sup>, SAJID RASHID NAGRA<sup>4</sup>, SALMAN AFTAB AHMED<sup>5</sup>

<sup>1</sup>Assistant Professor, FCPS, CHPE, Wah Medical College & POF Wah

<sup>2</sup>Assistant Professor, Akhter Saeed Medical and Dental college, RWP

<sup>3</sup>Associate Professor, Frontier medical college, Abbottabad

<sup>4</sup>Associate Professor ENT, Rai medical college, Sargodha

<sup>5</sup>Assistant Professor, Department of ENT, Rai Medical College Teaching Hospital, Sargodha

Corresponding author: Wajih Ud Din Shinwari, Email : [drwajihshinwari@hotmail.com](mailto:drwajihshinwari@hotmail.com)

### ABSTRACT

**Objective:** Aim of current study was to determine the causes of hearing impairment among patients visited to hospital.

**Study Design:** Observational study

**Place and Duration:** Frontier medical college, Abbottabad, May, 2021 to April, 2022.

**Methods:** Total 122 patients of both genders had complained of hearing impairment were included. After obtaining informed written consent detailed demographics were recorded. An extensive history, thorough E.N.T. examination, and pertinent radiological and audiological tests were performed. Frequency of causes for hearing impairment was assessed. SPSS 20.0 was used to analyzed all data.

**Results:** Among all cases, 68 (55.7%) patients were males and 54 (44.3%) were females. Mean age of the patients was 17.5±11.50 years. 72 (59.02%) cases were from rural areas and 75 (61.5%) cases had poor socio-economic status. We found that conductive hearing loss was the most common found in 63 (51.6%) cases, followed by mixed hearing loss in 35 (28.7%) cases and sensorineural hearing loss found in 24 (19.7%) cases. Chronic Suppurative Otitis Media was the most common cause of hearing impairment found in 61 (50%) cases, followed by infection, physical trauma, prenatal causes, postnatal causes, drug related and other problem.

**Conclusion:** We concluded in this study that COSM was the most common cause of hearing impairment among all cases. Most common hearing loss was conductive, mixed and sensorineural. It is possible to reduce the incidence of sensorineural hearing loss by preventing variables that occur both during and after pregnancy.

**Keywords:** Hearing Loss, Hearing Impairment, COSM, SNHL

### INTRODUCTION

The ability to hear and speak is fundamental to social interaction. Patients with reduced hearing or deafness often have difficulty speaking, leading to a breakdown in two-way communication between the patient and their surroundings. Hearing is the process by which sound is taken in through the outer ear and transmitted to the inner ear via the acoustic impedance matching system of the middle ear. Cochlea's job is to interpret the noises around it and send that information on to the brain. [1,2] Deafness and hearing loss, whether conductive, sensorineural, or mixed, are the results of any dysfunction in this system. [3]

Those with hearing loss can fall into one of two categories: those who are completely deaf or those who are hard of hearing. Impairment severity is described by the sum of the two terms. Those with pre-lingual or post-lingual hearing loss that is not severe enough to prohibit the formation of any spoken language are considered hard of hearing, as are those with normal pre-lingual hearing who develop post-lingual hearing loss. Their impairment is classified as "less severe" than that of the deaf. According to Bryan (1975), it is widely established that deaf children do more poorly than hard-of-hearing and normal-hearing children on arithmetic problems that require reading skills. As a result, accurate diagnosis is crucial for classifying children with hearing loss accurately and helping them reach their highest potential. [4,5]

In contrast to more affluent regions of the world, sub-Saharan Africa tends to have a higher prevalence of hearing impairment. According to WHO data, the rate of people aged 15 and up with hearing loss (classified as Hearing loss >35 dB) was 15.7% higher in sub-Saharan Africa than it was in high-income nations (4.9% vs. 1.5%, respectively). The frequency was predicted to be 1.9% for children in sub-Saharan Africa between the ages of 5 and 14, compared to 0.4% in high-income nations. The evaluation only included 11 research (8 published and 3 unpublished), and all of them relied on school-based hearing exams; hence, the estimations for Africa are based on a very limited evidence foundation. Because many nations have difficulty conducting relevant population-based surveys utilising standardised protocols and classification methodologies, there is a severe deficiency in available data. [6]

Little is known about the causes of hearing loss in Africa, which is necessary for determining what kinds of preventative and treatment measures should be taken. Being hard of hearing is a form of disability that does not necessarily draw attention to itself. For this reason, advocates and health officials may miss it. As a result, we need more information ('hard data') on the prevalence, causes, and consequences of hearing impairment in the general population, as well as on the services accessible to those with hearing loss. Evidence-based campaigning for those living with hearing loss in poor and middle-income countries will be greatly aided by the availability of such information (LMIC).[7,8]

Due to the well-documented harmful effects of hearing impairment, a rapid expansion of available services is urgently required. Disabling hearing loss in children hinders speech and language development, putting those children at risk for lower levels of scholastic and occupational achievement [7,8]. It's possible that kids with hearing loss are more likely to be violent. Disabling hearing loss as an adult can result in shame, isolation, loneliness, social stigmatisation, abuse, psychological disorder, depression, strained relationships with spouses and children, limited employment options, increased stress at work, and lower pay. [9,10]

Because hearing loss is so prevalent and can cause serious communication and mental health issues, this study set out to determine its prevalence and the factors that contribute to it in a tertiary care hospital. The results of this research will shed light on this issue, increasing the likelihood that preventative and remedial action will be implemented.

### MATERIAL AND METHODS

This observational study was conducted at Frontier medical college, Abbottabad, May, 2021 to April, 2022 and comprised of 122 patients. After obtaining informed written consent detailed demographics were recorded. Patients who reported hearing loss but had no objective evidence of it were not included.

Hearing loss that had been present for one month or longer, in either ear, was required as a selection criterion for patients in order to rule out cases of psychogenic and malingering hearing loss. Following the completion of a detailed history intake, a comprehensive clinical examination was performed. In every case

with a patient older than five years old, pure tone audiometry was carried out. In several instances, impedance audiometry and speech discrimination testing were carried out. The Brain Stem Auditory Evoked Potential, or B.E.R.A., was performed on patients who were profoundly deaf as well as patients less than 5 years old who were unable to comprehend and carry out pure tone audiometry (P.T.A).

An extensive history, thorough E.N.T. examination, and pertinent radiological and audiological tests were performed. Frequency of causes for hearing impairment was assessed. SPSS 20.0 was used to analyzed all data. Mean standard deviation, frequencies and percentages were used for categorical variables.

**RESULTS**

Among all cases, 68 (55.7%) patients were males and 54 (44.3%) were females. Mean age of the patients was 17.5±11.50 years. 72 (59.02%) cases were from rural areas and 75 (61.5%) cases had poor socio-economic status.(table 1)

Table-1: Baseline characteristics of enrolled cases

Variables	Frequency	Percentage
Mean age (years)	17.5±11.50	
Sex		
Male	68	55.7
Female	54	44.3
Area of Residence		
Rural	72	59.02
Urban	50	40.98
Poor-Socioeconomic status		
Yes	75	61.5
No	47	38.5

We found that conductive hearing loss was the most common found in 63 (51.6%) cases, followed by mixed hearing loss in 35 (28.7%) cases and sensorineural hearing loss found in 24 (19.7%) cases.(figure 1)

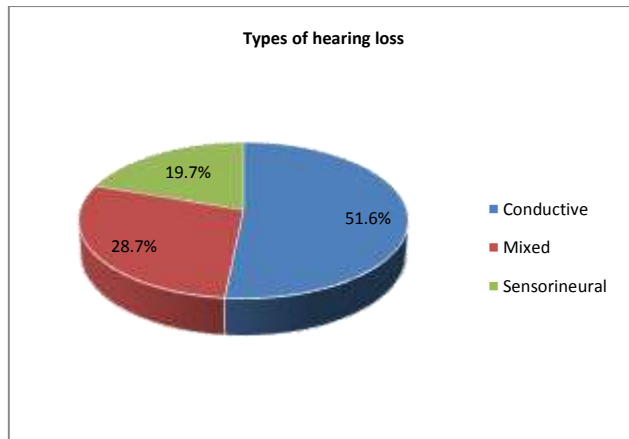


Figure-1: Different hearing loss among all cases

Chronic Suppurative Otitis Media was the most common cause of hearing impairment found in 61 (50%) cases, followed by infection, physical trauma, prenatal causes, postnatal causes, drug related and other problem.(table 2)

Table-2: Causes of hearing impairment among all cases

Variables	Frequency	Percentage
Causes		
COSM	61	50
infection	20	16.4
physical trauma	15	12.3
prenatal causes	10	8.2
postnatal causes,	8	6.6
drug related	6	4.9
other	2	1.6

**DISCUSSION**

People have always had a fundamental urge to communicate with one another and exchange information and knowledge. Cave drawings, patterns, roaring, screeching, and shouting were just some of the ways prehistoric man communicated before the dawn of civilization. A million or more people are assumed to be profoundly deaf, making up a significant portion of the estimated 200 million people (or 4% of the global population) who have some form of hearing impairment that significantly impacts their daily lives. [11] The majority, or around two-thirds, of the world's deaf people live in developing nations. As a result of the widespread poverty and lack of access to clean water and sanitary facilities, 52% of our country's population is hearing impaired or deaf. UNDP estimates put our literacy rate at 37%; our average age at 54; and our per capita income at US\$480 per year. However, only 2% of our GDP is allocated to education, and another 2% to healthcare. [12]

When comparing hearing loss thresholds and assessment techniques, there was a large discrepancy. Pure tone audiometry (PTA) was employed in most of the included investigations for both initial screening and final threshold assessment. Since PTA has various restrictions in population-based studies, this approach may not have been optimal. The initial cost of purchase is high. After that, you'll need properly calibrated machinery. True thresholds, especially at 500 Hz, are particularly difficult to establish if the surrounding noise is beyond 40 dB. Some researchers neglected to include 500 Hz. Self-reported hearing loss was used in four trials. Although self-reports of hearing loss may be an indicator of perceived hearing handicap, they are not sensitive to age effects and hence cannot be used as a solid basis for calculating the frequency of age-related hearing loss [13]. Self-reports of hearing loss are often inaccurate. Using a straight query and pure tone audiometry, the prevalence of self-reported hearing loss in Malaysia was 24.3% and 36.9%, correspondingly [14]. However, there is a lack of comprehensive data on self-reported data, thus firm conclusions cannot be drawn.

In our study 122 patients were presented. Among all cases, 68 (55.7%) patients were males and 54 (44.3%) were females. Mean age of the patients was 17.5±11.50 years. 72 (59.02%) cases were from rural areas and 75 (61.5%) cases had poor socio-economic status. Previous study presented same results.[15] The only thing that can be done to stop hearing loss is to spread awareness about the issues that contribute to it and how they may be fixed. For instance, maternal infection is avoidable through immunisation, and the use of ototoxic medicines should be discouraged. Genealogical reasons are avoidable with the help of genetic counselling. Rubella and syphilis are preventable diseases. The same immunizations that protect against diseases like mumps, measles, and meningitis also protect against birth defects like hypoxia, low birth weight, and kernicterus.

We found that conductive hearing loss was the most common found in 63 (51.6%) cases, followed by mixed hearing loss in 35 (28.7%) cases and sensorineural hearing loss found in 24 (19.7%) cases.[16] In our study, Chronic Suppurative Otitis Media was the most common cause of hearing impairment found in 61 (50%) cases, followed by infection, physical trauma, prenatal causes, postnatal causes, drug related and other problem. Because of its immediate impact on human life and the fact that hearing loss worsens with exposure to increasingly loud noise over time, Itrat et al. conclude that noise exposure poses a significant risk to human health. [17] The Occupational Safety and Health Administration (OSHA) has established an 8-hour, 5-day-a-week, or 40-hour-a-week environmental noise limit either of 85 or 90 dB(A). [18]

The problem is that many of the research did not adequately explain why people experience hearing loss. Deafness from unknown (cryptogenic) causes, cerumen impaction, and infectious diseases were the leading causes. Children with impacted wax have a higher risk of permanent hearing loss and more episodes of otitis media, according to a retrospective study by Olusanya [19]

(in 359 matched children). Hearing loss that improves after earwax removal is likely attributable to the wax, given how frequently it accumulates in the ear canal. Hearing loss due to cerumen impaction is completely avoidable and can be treated simply by a primary care provider. This calls for a concerted effort to detect and treat the condition, especially among young people. [20]

## CONCLUSION

We concluded in this study that COSM was the most common cause of hearing impairment among all cases. Most common hearing loss was conductive, mixed and sensorineural. It is possible to reduce the incidence of sensorineural hearing loss by preventing variables that occur both during and after pregnancy.

## REFERENCES

- 1 John S.Oghalai, William E. Brownell. Anatomy and Physiology of the Ear. In: Lalwani AK. Current Diagnosis and Treatment in Otolaryngology Head and Neck Surgery, 2nd ed. Mc Graw Hill, 2008, pp 611-30.
- 2 Adams DA. Causes of Deafness. In: Scott Brawn WG, Kerr AG, Groves J, eds. Scott-Brown's Otolaryngology, 6th ed. Butter worth Heinemann, 1997; pp 35-53.
- 3 Maki-Torkko EM, Lindholm PK, Vayrynen MR, Leisti JT, Sorri MJ. Epidemiology of moderate to profound hearing impairment in northern Finland. Any changes in ten years? Scand Audiol 1998; 27: 95-103.
- 4 Idowu, A.I (2004) Guidance and counseling in Education, Ilorin. Indemac Ltd. Mba,'P.O. (1995). Fundamentals
- 5 Alade E.B and Abosi C.O.(1991). The effect of degree of hearing impairment on the academic achievement of the deaf in E.D Ozoji, J.U. Umuolu, S.O Olaniyan (eds). Contemporary issues in mainstreaming the exceptional child in Nigeria's 63-3-4 system of education. Jos: Ehindero Press.
- 6 Olusanya B, Neumann K, Saunders J. The global burden of disabling hearing impairment: a call to action. Bull World Health Organ 2014; 92: 367– 373.
- 7 Daud MKM, Noor RM, Rahman NA, Sidek DS, Mohamed A. The effect of mild hearing loss on academic performance in primary school children. Int J Pediatr Otorhinolaryngol 2010; 74: 67– 70.
- 8 Olatoke F, Ologe FE, Nwawolo CC, Saka MJ. The prevalence of hearing loss among children with CSOM in Nigeria and its effect on academic performance. Ear Nose Throat J 2008; 87: 5– 5.
- 9 North-Matthiassen C, Singh SA. The hearing profile among learners in schools in the Western Cape, South Africa. Int J Pediatr Otorhinolaryngol 2007; 71: 113– 118.
- 10 Clark JL. Hearing loss in Mozambique: current data from Inhambane Province. Int J Audiol 2008; 47 (Suppl. 1): 49– 56.
- 11 Griffith KH. The prevention of hearing and balance disorders. In: Stephens D, ed. Adult Audiology (Scott-Brown's Otolaryngology) Vol 2. 6th ed. Butter worth Heinemann, 1997
- 12 Economic Survey of Pakistan 1994-95: State of economy. Economic Review 1995; pp 6-7.
- 13 Kiely KM, Gopinath B, Mitchell P, Browning CJ, Anstey KJ. Evaluating a dichotomized measure of self-reported hearing loss against gold standard audiometry: prevalence estimates and age bias in a pooled national data set. J Aging Health 2012; 24: 439– 458.
- 14 Rosdina A, Leelavathi M, Zaitun A et al. Self-reported hearing loss among elderly Malaysians. Malays Fam Physician 2010; 5: 91– 94.
- 15 Susan Eksteen, Robert H. Eikelboom, Hannah Kuper, Stefan Launer, De Wet Swanepoel, Prevalence and characteristics of hearing and vision loss in preschool children from low income South African communities: results of a screening program of 10,390 children, BMC Pediatrics, 10.1186/s12887-021-03095-z, 22, 1, (2022).
- 16 Mohammed Ayub Musani, Abdul Rauf, Murtaza Ahsan, Faheem Ahmed Khan. Frequency and causes of hearing impairment in tertiary care center. Vol. 61, No. 2, February 2011
- 17 Jawed I, Musani A, Mahmood R, Mahmood I, Mahmood T, Khan FA, et al. Correlation between taffic noise induced hearing loss and occupation. Ann Abbasi Shaheed Hosp Karachi. Med Dent Coll 2008; 13: 36-41.
- 18 Occupational safety and Health Act, USA Section 6. Department of Labour, USA, 1970.
- 19 Olusanya BO, Okolo AA, Ijaduola GTA. The hearing profile of Nigerian school children. Int J Pediatr Otorhinolaryngol 2000; 55: 173– 179.
- 20 Adebolajo Adeyemo, Rabia Faridi, Pama Chattaraj, Rizwan Yousaf, Risa Tona, Samuel Okorie, Thashi Bharadwaj, Liz M. Nouel-Saied, Anushree Acharya, Isabelle Schrauwen, Robert J. Morell, Suzanne M. Leal, Thomas B. Friedman, Andrew J. Griffith, Isabelle Roux, Genomic analysis of childhood hearing loss in the Yoruba population of Nigeria, European Journal of Human Genetics, 10.1038/s41431-021-00984-w, 30, 1, (42-52), (2021).