

Pattern of Hearing Loss among Patients Attending the ENT Department of a Tertiary Care Hospital: An Observational Study

Authors:

Dr. Waseem Ahmad Shah¹, Dr. Mir Iffat Khurshid², Dr. Jyotsna Kitchlu^{3*}, Dr. Rayees⁴

¹Assistant Professor, Dept of ENT(Otorhinolaryngology, Kashmir Medical College & Hospital, I.E Sempora Medicity, Srinagar, J&K-191101.

²Senior Resident, Department of Anatomy, GMC, Udhampur.

^{3*}Assistant Professor, Department of Anatomy, GMC, Udhampur.

⁴Department of ENT, GMC, Jammu.

Corresponding Author:

Dr. Jyotsna Kitchlu, Assistant Professor, Department of Anatomy, GMC, Udhampur.

DOI: <https://doi.org/10.5281/zenodo.21988128>

Article Received: 21 July 2026, Accepted: 11 August 2026, Online First: 18 August 2026

ABSTRACT

Background: Hearing loss is a common health problem affecting individuals across the life course. Its clinical pattern varies according to age, type of ear disease, noise exposure, chronic systemic illness and other environmental and individual factors. Characterizing the pattern of hearing loss among patients attending tertiary ENT services can assist in identifying high-risk groups and planning appropriate diagnostic and rehabilitative services. **Objective:** To describe the demographic and clinical pattern of hearing loss among patients attending the ENT department of a tertiary care hospital and to assess selected factors associated with the type and severity of hearing loss. **Methods:** A hospital-based observational cross-sectional study was conducted among 300 patients with hearing loss attending the ENT outpatient department of a tertiary care hospital in Jammu. Demographic characteristics, laterality, type and degree of hearing loss, associated symptoms and selected risk factors were recorded. Hearing assessment was performed using appropriate clinical and audiological evaluation. Descriptive statistics were used to summarize the findings. Associations between categorical variables were assessed using the chi-square test, with a p-value of less than 0.05 considered statistically significant. **Results:** The mean age of the study participants was 52.4 ± 15.8 years. Males constituted 56.3% of the participants. Bilateral hearing loss was observed in 65.3% of patients. Sensorineural hearing loss was the predominant type, accounting for 57.7% of cases, followed by conductive hearing loss (27.7%) and mixed hearing loss (14.6%). Moderate hearing loss was the most frequently observed degree of impairment (32.0%). Tinnitus was reported by 39.3% of patients. A significant association was observed between age group and type of hearing loss ($\chi^2 = 25.84, p < 0.001$). Sensorineural hearing loss was particularly frequent among patients older than 60 years. Noise exposure was also significantly associated with sensorineural hearing loss ($p = 0.001$). **Conclusion:** Sensorineural hearing loss was the predominant pattern among patients attending the tertiary ENT service, with bilateral involvement being more common than unilateral disease. Increasing age and noise exposure were significantly associated with sensorineural hearing loss. Early identification of hearing impairment and systematic audiological assessment may help facilitate timely intervention and rehabilitation.

Keywords: Hearing loss; sensorineural hearing loss; conductive hearing loss; audiometry; tinnitus; ENT; observational study.

INTRODUCTION

Hearing is fundamental to communication, education, employment and social interaction. Hearing loss can occur at any stage of life and may result from congenital

or genetic conditions, chronic ear disease, exposure to excessive noise, ototoxic medicines, infections, trauma and ageing.¹ The clinical consequences depend not only

on the severity of hearing impairment but also on its age at onset, laterality and underlying cause.

Hearing loss represents a substantial global health burden. The World Health Organization currently estimates that more than 1.5 billion people worldwide live with some degree of hearing loss, while approximately 430 million people have disabling hearing loss requiring rehabilitation.^{2,3} The burden is expected to increase substantially with population ageing and continuing exposure to potentially damaging environmental and recreational noise.²

The distribution of hearing loss is not uniform across populations. Age is particularly important, with the prevalence of disabling hearing loss increasing substantially among older adults. Chronic middle ear disease remains an important contributor to conductive or mixed hearing loss, particularly in settings where access to early diagnosis and treatment is limited. Noise exposure is another potentially preventable contributor, especially among occupationally exposed populations and individuals exposed to loud recreational sounds.^{2,4}

In clinical practice, patients presenting to ENT outpatient departments may have very different patterns of hearing impairment. Conductive, sensorineural and mixed hearing loss may coexist within the same clinical population.⁵ In addition, symptoms such as tinnitus, vertigo, ear discharge and aural fullness may provide important clues regarding the underlying pathology.

Indian studies have demonstrated considerable variation in the clinical pattern and burden of hearing loss across different populations. Garg et al. reported associations between hearing loss and demographic and environmental characteristics in an epidemiological study conducted in Delhi.⁶ Raghavan et al. conducted an observational cross-sectional study involving 300 patients attending an ENT outpatient department and specifically examined the pattern of sensorineural hearing loss among military personnel and civilians.⁷

Although population-based studies provide useful estimates of burden, hospital-based studies remain valuable because they describe the spectrum of hearing disorders encountered in routine ENT practice. Local data are particularly useful for understanding the characteristics of patients presenting for specialist assessment and for identifying groups who may benefit from targeted hearing screening and preventive measures. The present study was therefore undertaken to describe the pattern of hearing loss among patients attending the ENT department of a tertiary care hospital and to examine the association of selected demographic and clinical factors with the type and severity of hearing impairment.

MATERIALS AND METHODS

Study design and setting

A hospital-based observational cross-sectional study was designed to assess the pattern of hearing loss among patients attending the ENT department of a tertiary care GMC Jammu over one year period.

Study population

The study population consisted of patients presenting to the ENT outpatient department with a complaint or clinical evidence of hearing impairment.

Sample size

A total of 300 patients with hearing loss were included in the study.

Inclusion Criteria

Patients were included if they:

1. presented to the ENT outpatient department with hearing difficulty or were found to have hearing impairment during clinical assessment;
2. underwent appropriate audiological evaluation; and
3. provided consent to participate in the study.

Exclusion criteria

Patients were excluded if they:

1. were unable to undergo reliable hearing assessment;
2. had incomplete clinical or audiological records; or
3. declined participation in the study.

Data collection

Demographic and clinical information was recorded using a structured data collection proforma. Variables included age, sex, laterality of hearing loss, type and degree of hearing impairment, associated symptoms and selected risk factors.

Information regarding tinnitus, ear discharge, ear fullness, vertigo and otalgia was recorded. Relevant exposure and medical history, including significant noise exposure, chronic ear disease, diabetes mellitus, hypertension, family history of hearing loss and previous ear surgery, was also documented.

Audiological Assessment

All participants underwent routine ENT examination followed by appropriate audiological assessment. Hearing loss was classified according to the type of impairment as conductive, sensorineural or mixed. The degree of hearing loss was categorized as mild, moderate, moderately severe, severe or profound according to the audiological classification used by the study centre.

Statistical Analysis

Data were entered into a Microsoft Excel spreadsheet and analysed using statistical software. Continuous variables were summarized using mean and standard deviation, while categorical variables were expressed as frequencies and percentages. The association between

categorical variables was assessed using the chi-square test. The relationship between age group and type of hearing loss, as well as selected risk factors and sensorineural hearing loss, was examined. A two-sided p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 300 patients with hearing loss were included in the analysis. The mean age of the participants was 52.4 ± 15.8 years, with an age range of 12–82 years. Males constituted 56.3% of the study population, while females accounted for 43.7%.

Demographic characteristics

The largest proportion of participants belonged to the 51–60-year age group (22.3%), followed by the 61–70-year group (19.7%). Participants aged 41–50 years accounted for 18.3% of the sample.

Table 1: Sociodemographic characteristics of study participants

Characteristic	n	%
Age group (years)		
≤20	18	6.0
21–30	32	10.7
31–40	41	13.7
41–50	55	18.3
51–60	67	22.3
61–70	59	19.7
> 70	28	9.3
Sex		
Male	169	56.3
Female	131	43.7

Bilateral hearing loss was more frequent than unilateral hearing loss. Bilateral involvement was observed in 196 (65.3%) participants, whereas 104 (34.7%) had unilateral hearing loss.

Sensorineural hearing loss was the predominant type, accounting for 173 (57.7%) cases. Conductive hearing loss was observed in 83 (27.7%) patients and mixed hearing loss in 44 (14.6%).

Table 2: Pattern of hearing loss according to laterality and type

Parameter	n	%
Laterality		
Unilateral	104	34.7
Bilateral	196	65.3
Type		
Conductive	83	27.7
Sensorineural	173	57.7
Mixed	44	14.6
Total	300	100.0

Moderate hearing loss was the most frequent degree of impairment, occurring in 96 (32.0%) participants. Moderately severe hearing loss was present in 68 (22.7%), while mild hearing loss was present in 61 (20.3%). Severe and profound hearing loss accounted for 16.3% and 8.7% of the study population, respectively.

Table 3: Degree of hearing loss among study participants

Degree of hearing loss	n	%
Mild	61	20.3
Moderate	96	32.0
Moderately severe	68	22.7
Severe	49	16.3
Profound	26	8.7
Total	300	100.0

Tinnitus was the most frequently reported associated symptom, occurring in 118 (39.3%) participants. Ear discharge was reported by 67 (22.3%), while ear fullness and vertigo were reported by 18.0% and 14.0% of patients, respectively.

Table 4: Common associated symptoms among study participants

Symptom	n	%
Tinnitus	118	39.3
Ear discharge	67	22.3
Ear fullness	54	18.0
Vertigo	42	14.0
Otalgia	38	12.7
No associated symptom	72	24.0

The type of hearing loss differed significantly according to age group ($\chi^2 = 25.84$, $p < 0.001$). Conductive hearing loss was relatively more frequent among younger participants, whereas sensorineural hearing loss predominated among older patients. Among participants aged over 60 years, 71.9% had sensorineural hearing loss.

Table 5: Type of hearing loss according to age group

Age group	Conductive	Sensorineural	Mixed	Total
≤40 years	39 (42.9)	36 (39.6)	16 (17.5)	91
41–60 years	29 (20.0)	91 (62.8)	25 (17.2)	145
> 60 years	15 (23.4)	46 (71.9)	3 (4.7)	64
Total	83 (27.7)	173 (57.7)	44 (14.6)	300

Significant noise exposure was reported by 63 participants. Among these, 48 (76.2%) had sensorineural hearing loss compared with 52.7% among participants without reported significant noise exposure. The association between noise exposure and sensorineural hearing loss was statistically significant ($p = 0.001$).

Diabetes mellitus and chronic ear disease were also significantly associated with the type of hearing loss in the present dataset.

Table 6: Selected risk factors associated with sensorineural hearing loss

Risk factor	Sensorineural HL	Other HL	p-value
Significant noise exposure			
Present	48 (76.2%)	15 (23.8%)	0.001
Absent	125 (52.7%)	112 (47.3%)	
Chronic ear disease			
Present	27 (34.2%)	52 (65.8%)	<0.001
Absent	146 (66.1%)	75 (33.9%)	
Diabetes mellitus			
Present	35 (74.5%)	12 (25.5%)	0.018
Absent	138 (54.5%)	115 (45.5%)	

DISCUSSION

In the present study of 300 patients, the mean age was 52.4 ± 15.8 years, with males comprising 56.3%. The largest proportion belonged to the 51–60-year age group (22.3%), followed by 61–70 years (19.7%). This age distribution is comparable with the findings of Raghavan et al., who studied 300 patients with hearing loss and reported a predominance of patients in the 51–70-year age group. The male predominance in the present study (56.3% vs. 43.7% females) is also comparable with other hospital-based studies. Raghavan et al. reported an even greater male predominance of 68%, although their study population included military personnel, all of whom were male, which would naturally increase the proportion of males in the overall sample.⁷ Similarly, Khanal P et al., report that among their 1360 patients, 66% were male and 34% were female, which is akin to our study. Bilateral hearing loss was observed in 196 (65.3%) patients, while 104 (34.7%) had unilateral involvement.⁸ This predominance of bilateral disease is clinically relevant because bilateral impairment is frequently encountered in age-related and other progressive sensorineural disorders. The finding is closely comparable with the study by Raghavan et al., in which bilateral sensorineural hearing loss was reported as the commonest pattern among both military personnel and civilians (more than 91%).⁷ Similarly, Khanal P et al., documented bilateral sensorineural hearing loss in 68.24% patients, which is consistent with our study. Sensorineural hearing loss was the predominant type in our study (57.7%), followed by conductive (27.7%) and mixed hearing loss (14.6%).⁸ These findings closely resemble those of Santosh J et al study, which reported 58.1% sensorineural, 24.2% conductive and 17.7% mixed hearing loss.⁹ Moderate hearing loss was the commonest degree in our study (32.0%), followed by moderately severe (22.7%) and mild (20.3%) impairment. Similarly, Puthukudy et al. reported moderate hearing loss as the most frequent category, accounting for 27.5% of right-ear and 25.1% of left-ear findings in their tertiary hospital audiometry study.¹⁰ The relatively high proportion of moderate-to-profound impairment in our cohort may reflect the tertiary-care setting, where patients with more clinically significant hearing difficulties are more likely to present. Santosh et al., reported mild hearing loss was the most common (34.8%), followed by moderate loss (31.3%), while moderately severe, severe and profound impairment accounted for 17.2%, 11.6% and 5.1%, respectively.⁹ This difference may partly reflect the fact that the present study was conducted among patients attending a tertiary ENT service across a much broader age range, whereas the comparison study was restricted to individuals aged ≥ 60 years.

The present study demonstrated a significant association between age and type of hearing loss ($p < 0.001$). Conductive hearing loss was relatively more frequent among younger participants, whereas sensorineural hearing loss predominated in older patients, accounting for 71.9% among those aged > 60 years. This pattern is consistent with a large retrospective study of Khanal P et al involving 1,360 patients, which similarly reported that conductive hearing loss was more common in younger age groups, while sensorineural hearing loss predominated among older patients, similarly, Li S et al., found that the severity of hearing impairment increased progressively with age, with moderate and severe loss becoming more frequent in the older age groups.^{8,11} Noise exposure was significantly associated with sensorineural hearing loss in the present study ($p = 0.001$). Among the 63 participants with significant noise exposure, 48 (76.2%) had sensorineural hearing loss, compared with 125 (52.7%) among those without reported exposure. This finding is consistent with evidence from India, wherein Basu S, in a systematic review and meta-analysis of 22 studies estimated the pooled prevalence of noise-induced hearing loss among occupationally exposed workers at 49% (95% CI: 22%–76%).¹² The higher proportion of sensorineural loss among noise-exposed participants in our study therefore supports the established relationship between excessive noise exposure and cochlear hearing damage. Diabetes mellitus was also significantly associated with the type of hearing loss in the present dataset, which is supported by a meta-analysis of Horikawa C et al., which reported more than a twofold increased odds of hearing impairment among diabetic individuals (OR 2.15, 95% CI 1.72–2.68).¹³ More recently, Kim CH et al., found clinically significant hearing loss in 53.0% of diabetic patients compared with 25.2% of controls, with an RR of 2.3 (95% CI 1.1–4.8); sensorineural hearing loss accounted for 46.2% of hearing loss among diabetic patients.¹⁴ The significant association with chronic ear disease is also clinically plausible, as chronic middle-ear pathology is traditionally linked to conductive hearing impairment and may additionally be associated with sensorineural deterioration. Papp Z et al., in a study of 121 patients with chronic suppurative otitis media, reported that longer duration of disease was associated with progressively higher bone-conduction thresholds, supporting an association between chronic middle-ear disease and sensorineural hearing impairment.¹⁵ The present study should be interpreted in light of several limitations. First, it was conducted in a tertiary care hospital, and therefore the findings may not represent the hearing-loss pattern in the general community. Patients referred to tertiary services may have more severe, persistent or complicated disease.

Second, the cross-sectional design allows identification of associations but does not establish causal relationships. Third, some exposure histories, particularly noise exposure and previous ear disease, were based on participant reporting and may therefore be affected by recall bias. Finally, the study did not attempt to establish the precise etiological diagnosis for every case. Despite these limitations, the study provides a useful description of the spectrum of hearing impairment encountered in a tertiary ENT setting. The findings also reinforce the importance of paying particular attention to older adults and individuals with substantial noise exposure.

CONCLUSION

Sensorineural hearing loss was the predominant type of hearing impairment among patients, while bilateral involvement was more common than unilateral hearing loss. Moderate hearing loss was the most frequent degree of impairment, and tinnitus was the commonest associated symptom. Age showed a significant association with the type of hearing loss, with sensorineural impairment becoming increasingly predominant among older patients. Significant noise exposure was also associated with sensorineural hearing loss, highlighting the importance of preventive hearing conservation measures. Routine identification of individuals at increased risk, timely audiological evaluation and early rehabilitation may help reduce the functional and social consequences of hearing impairment. Larger community-based studies would be useful to determine the population-level burden and etiological distribution of hearing loss.

Ethical Considerations

Not required

Conflict of Interest

The authors declare no conflict of interest.

Funding

No external funding was received for the study.

Consent for Publication

Written informed consent was obtained from the participants for publication of the study findings. No personally identifiable information, photographs, or other identifiable patient information is presented in this manuscript.

Data Availability Statement

The data generated and/or analyzed during the current study are available from the corresponding author on reasonable request, subject to applicable institutional and ethical restrictions.

Authors' Contributions

Dr. Waseem Ahmad Shah contributed to the conception and design of the study, clinical assessment, data collection, interpretation of findings, and manuscript preparation. Dr. Mir Iffat Khurshid, Dr. Jyotsna Kitchlu, and Dr. Rayees contributed to data collection, clinical evaluation, interpretation of the results, and critical revision of the manuscript. All authors contributed to the preparation and critical review of the manuscript, approved the final version, and agreed to be accountable for all aspects of the work.

Acknowledgements

The authors sincerely thank the patients who participated in the study and the staff members of the ENT Department and audiology services for their cooperation and support during data collection and clinical assessment.

REFERENCES

1. Committee on Accessible and Affordable Hearing Health Care for Adults; Board on Health Sciences Policy; Health and Medicine Division; National Academies of Sciences, Engineering, and Medicine; Blazer DG, Domnitz S, Liverman CT, editors. Hearing Health Care for Adults: Priorities for Improving Access and Affordability. Washington (DC): National Academies Press (US); 2016 Sep 6. 2, Hearing Loss: Extent, Impact, and Research Needs
2. World Health Organization. Deafness and hearing loss. Geneva: World Health Organization; 2026. Available from: <https://www.who.int/en/news-room/fact-sheets/detail/deafness-and-hearing-loss>
3. Tao Y, Zhang H, Wang D, Li W. The prevalence and related factors of hearing loss among adults: a systematic review and meta-analyses. *Ann Otol Rhinol Laryngol*. 2025;134(2):93-101. doi:10.1177/00034894241293045.
4. World Health Organization. Hearing loss and the role of health care providers: fact sheet. Geneva: World Health Organization; 2024. Available from: <https://www.who.int/publications/m/item/hearing-loss-and-role-of-health-care-providers-fact-sheet>
5. World Health Organization. Global standard for safe listening video gameplay and esports.

- Geneva: World Health Organization; 2025. Available from: <https://www.who.int/publications/i/item/9789240108028>
6. Garg S, Kohli C, Mangla V, Chadha S, Singh MM, Dahiya N. An epidemiological study on burden of hearing loss and its associated factors in Delhi, India. *Ann Otol Rhinol Laryngol*. 2018;127(9):614–619. doi:10.1177/0003489418781968.
 7. Raghavan A, Patnaik U, Bhaudaria AS. An observational study to compare prevalence and demography of sensorineural hearing loss among military personnel and civilian population. *Indian J Otolaryngol Head Neck Surg*. 2022;74(Suppl 2):2950–2955. doi:10.1007/s12070-020-02180-6.
 8. Khanal P, Acharya S, Lageju N. Pattern of Hearing Loss Among Patients Attending ENT Department of a Tertiary Hospital in Nepal: A Retrospective Study. *Indian J Otolaryngol Head Neck Surg*. 2022 Aug;74(Suppl 1):559-562. doi: 10.1007/s12070-021-02392-4. Epub 2021 Jan 21. PMID: 36032901; PMCID: PMC9411476.
 9. Santosh J, Vikas W. Pattern of Hearing Loss and Associated Etiological Factors Among Elderly Patients Visiting ENT OPD: A Prospective Study. *Journal of Contemporary Clinical Practice*. 2017 ;3(1):66-69.
 10. Puthukudy PA, Feshan M, Karuthedath S. A 3 years retrospective observational study of pure tone audiometry in a tertiary railway hospital. *Int J Otorhinolaryngol Head Neck Surg* 2022;8:348-55.
 11. Li S, Ye H, Chen A, Lan L, Yang S, Ji F. Characteristics of hearing loss in elderly outpatients over 60 years of age: an annual cross-sectional study. *Acta Otolaryngol*. 2021 Aug;141(8):762-767. doi: 10.1080/00016489.2021.1912386. Epub 2021 Jul 28. PMID: 34319845.
 12. Basu S, Aggarwal A, Dushyant K, Garg S. Occupational Noise Induced Hearing Loss in India: A Systematic Review and Meta-Analysis. *Indian J Community Med*. 2022 Apr-Jun;47(2):166-171. doi: 10.4103/ijcm.ijcm_1267_21. Epub 2022 Jul 11. PMID: 36034244; PMCID: PMC9400345.
 13. Horikawa C, Kodama S, Tanaka S, Fujihara K, Hirasawa R, Yachi Y, Shimano H, Yamada N, Saito K, Sone H. Diabetes and risk of hearing impairment in adults: a meta-analysis. *J Clin Endocrinol Metab*. 2013 Jan;98(1):51-8. doi: 10.1210/jc.2012-2119. Epub 2012 Nov 12. PMID: 23150692.
 14. Kim CH, Lauritsen KL, Nguyen SA, Meyer TA, Cumpston EC, Pelic J, Labadie R. Characteristics of Hearing Loss in Type 2 Diabetes Mellitus: A Systematic Review and Meta-Analysis. *Otolaryngol Head Neck Surg*. 2025 Dec;173(6):1317-1327. doi: 10.1002/ohn.1378. Epub 2025 Aug 4. PMID: 40760922; PMCID: PMC12661477.
 15. Papp Z, Rezes S, Jókay I, Sziklai I. Sensorineural hearing loss in chronic otitis media. *Otol Neurotol*. 2003 Mar;24(2):141-4. doi: 10.1097/00129492-200303000-00003. PMID: 12621323.