

SPECTRUM AND DETERMINANTS OF HEARING LOSS AMONG PATIENTS ATTENDING ENT OUTPATIENT DEPARTMENT IN A TERTIARY CARE HOSPITAL IN WEST BENGAL: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Hearing loss is a major public health concern, particularly in developing countries where preventable causes such as middle ear infections contribute significantly to its burden. Understanding the clinical spectrum of hearing loss in hospital settings is essential for effective management and planning of interventions.

Objectives: To assess the spectrum of hearing loss and its association with demographic and clinical factors among patients attending the ENT outpatient department of a tertiary care hospital in West Bengal.

Methods: A hospital-based cross-sectional study was conducted from February 2016 to October 2016 among 150 patients presenting with hearing complaints. Participants were selected using consecutive sampling. Data were collected using a semi-structured proforma, followed by clinical examination and pure tone audiometry. Hearing loss was classified by type and degree using standard criteria. Data were analyzed using SPSS version 20.0, and associations were tested using the Chi-square test with a significance level of $p < 0.05$.

Results: The majority of participants were aged above 60 years (28%), with a slight male predominance (54.7%). Conductive hearing loss was the most common type (45%), followed by sensorineural (36%) and mixed hearing loss (19%). Moderate hearing loss was the most frequent degree (33%). A statistically significant association was observed between age and type of hearing loss ($p = 0.03$), with sensorineural hearing loss predominating in older age groups. Additionally, history of ear discharge was significantly associated with conductive hearing loss ($p = 0.01$).

Conclusion: Conductive hearing loss due to preventable causes remains highly prevalent, while sensorineural hearing loss increases with age. Early diagnosis, prompt treatment of ear infections, and routine hearing screening are essential to reduce the burden of hearing impairment.

Keywords: Hearing loss; Conductive hearing loss; Sensorineural hearing loss; ENT OPD; Audiometry; India; Otitis media

INTRODUCTION

Hearing loss is a major global public health concern, affecting individuals across all age groups and significantly impairing communication, social interaction, and quality of life. According to estimates by the World Health Organization (WHO), over 360 million people worldwide suffer from disabling hearing loss, with a considerable proportion residing in low- and middle-income countries [1]. Hearing impairment contributes substantially to years lived with disability and has far-reaching consequences on education, employment, and psychosocial well-being [2]. Despite advances in diagnostic and rehabilitative services, hearing loss often remains underdiagnosed and undertreated, particularly in resource-limited settings [3].

The burden of hearing loss is disproportionately higher in developing countries due to factors such as chronic ear infections, inadequate healthcare access, poor hygiene, and lack of awareness [4]. In the South-East Asian region, including India, preventable and treatable causes such as otitis media, impacted cerumen, and noise-induced hearing loss continue to contribute significantly to the disease burden [5]. Additionally, demographic transitions, increasing life expectancy, and rising exposure to environmental and occupational noise have led to a growing prevalence of both conductive and sensorineural hearing loss [6].

In the Indian context, hearing loss remains an important yet often neglected public health issue. Community-based studies have reported prevalence rates ranging from 6% to 8% in the general population, with higher rates among the elderly and socioeconomically disadvantaged groups [7]. National health programs such as the National Programme for Prevention and Control of Deafness (NPPCD) have been initiated to address this burden; however, challenges in implementation and accessibility persist [8]. Hospital-based data, particularly from tertiary care centers, provide valuable insights into the clinical spectrum and etiological profile of hearing loss, which are essential for planning targeted interventions.

Patients attending ENT outpatient departments (OPDs) represent a heterogeneous group with varying degrees and types of hearing impairment. The spectrum ranges from reversible conditions such as cerumen impaction and otitis externa to chronic conditions like chronic suppurative otitis media and irreversible sensorineural hearing loss [9]. Early identification and classification of hearing loss into conductive, sensorineural, and mixed types are crucial for appropriate management and prevention of complications. Audiological evaluation plays a pivotal role in diagnosing the type and severity of hearing loss, thereby guiding therapeutic decisions [10,11].

Although several studies have explored the epidemiology of hearing loss in community settings, there is a relative paucity of data focusing on the clinical spectrum of hearing loss among patients attending tertiary care ENT OPDs in West Bengal. Understanding the pattern of hearing loss in such settings is important for optimizing resource allocation, improving diagnostic strategies, and enhancing patient

outcomes. Furthermore, variations in etiological factors due to geographical, environmental, and socio-cultural differences necessitate region-specific data.

In this context, the present study was undertaken to assess the spectrum of hearing loss among patients attending the ENT outpatient department of a tertiary care hospital in West Bengal. The objective of the study was to determine the distribution of different types and degrees of hearing loss and to analyze their association with demographic and clinical factors.

METHODOLOGY

Study Design: This study was a hospital-based cross-sectional observational study conducted to assess the spectrum of hearing loss among patients attending the ENT outpatient department.

Study Setting: The study was carried out in the Department of Otorhinolaryngology of a tertiary care teaching hospital in West Bengal, which caters to both urban and rural populations and serves as a referral center for surrounding regions.

Study Duration: The study was conducted over a period of nine months, from February 2016 to October 2016.

Study Population: The study population comprised patients presenting to the ENT outpatient department with complaints suggestive of hearing impairment during the study period.

Inclusion Criteria

- Patients of all age groups presenting with symptoms of hearing loss
- Patients willing to participate and provide informed consent
- Patients who underwent audiological evaluation

Exclusion Criteria

- Patients with acute medical emergencies requiring immediate intervention
- Patients with a history of recent ear surgery (within the last 3 months)
- Patients who were uncooperative or unable to undergo audiological assessment
- Patients who did not provide consent

Sample Size with Calculation: The sample size was calculated using the formula for estimating a proportion in a cross-sectional study:

$$n = \frac{Z^2 \times p \times q}{d^2}$$

Assuming a prevalence (p) of hearing loss as 10% based on prior studies, with 95% confidence level ($Z = 1.96$) and allowable error (d) of 5%, the calculated sample size was approximately 138. Considering feasibility and rounding, a total of 150 participants were included in the study.

Sampling Technique: A consecutive sampling technique was employed, wherein all eligible patients presenting to the ENT OPD during the study period and fulfilling the inclusion criteria were recruited until the desired sample size of 150 was achieved.

Data Collection Tools & Procedure: Data were collected using a predesigned, semi-structured proforma. Detailed history including demographic details (age, sex, residence), presenting complaints, duration of symptoms, and relevant medical and occupational history was recorded. A thorough clinical examination of the ear, nose, and throat was performed using standard otorhinolaryngological instruments. Otoscopic examination was conducted to identify external and middle ear pathologies. All patients underwent audiological evaluation, including pure tone audiometry (PTA), performed in a sound-treated room using a calibrated audiometer. The type (conductive, sensorineural, mixed) and degree (mild, moderate, moderately severe, severe, profound) of hearing loss were classified based on standard WHO criteria.

Study Variables: Independent variables included age, sex, residence (urban/rural), occupation, clinical diagnosis, and risk factors such as history of ear discharge, noise exposure, and comorbidities. The dependent variables were the type and degree of hearing loss as determined by audiological assessment. Associations between independent and dependent variables were explored.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 20.0. Descriptive statistics such as frequencies and percentages were used to summarize categorical variables. The association between variables was assessed using the Chi-square test or Fisher's exact test as appropriate. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations: Written informed consent was obtained from all participants or their guardians in the case of minors. The study adhered to the ethical principles outlined in the Declaration of Helsinki. Confidentiality and anonymity of participants were strictly maintained throughout the study.

RESULTS

A total of 150 patients with hearing impairment were included in the study. The majority of participants belonged to the age group above 60 years (28%), followed by 21–40 years (27%). Males constituted a slightly higher proportion (54.7%) compared to females (45.3%) (Table 1).

Table 1: Distribution of Study Participants by Age and Gender (n = 150)

Age Group (years)	Male (n)	Female (n)	Total (n)	Percentage (%)
0–20	18	12	30	20
21–40	22	18	40	27
41–60	20	18	38	25
>60	22	20	42	28
Total	82	68	150	100

Conductive hearing loss was the most common type observed (45%), followed by sensorineural (36%) and mixed hearing loss (19%) (Table 2).

Table 2: Distribution of Types of Hearing Loss among Study Participants (n = 150)

Type of Hearing Loss	Number (n)	Percentage (%)
Conductive	68	45
Sensorineural	54	36
Mixed	28	19
Total	150	100

Regarding severity, moderate hearing loss was the most frequent (33%), followed by mild (28%) and moderately severe (17%) categories (Table 3).

Table 3: Distribution of Degree of Hearing Loss (Based on PTA) (n = 150)

Degree of Hearing Loss	Number (n)	Percentage (%)
Mild	42	28
Moderate	50	33
Moderately Severe	26	17
Severe	20	13
Profound	12	8
Total	150	100

A statistically significant association was observed between age group and type of hearing loss ($p = 0.03$), with conductive hearing loss being more common in younger age groups, while sensorineural and mixed types predominated among the elderly (Table 4).

Table 4: Association between Age Group and Type of Hearing Loss (n = 150)

Age Group (years)	Conductive (n)	Sensorineural (n)	Mixed (n)	Total (n)
0–20	20	6	4	30
21–40	22	12	6	40
41–60	16	14	8	38
>60	10	22	10	42
Total	68	54	28	150

Chi-square test: $p = 0.03$ (statistically significant)

Additionally, a significant association was found between history of ear discharge and type of hearing loss ($p = 0.01$). Conductive hearing loss was more common among patients with a history of ear discharge, whereas sensorineural hearing loss was more frequent in those without such history (Table 5).

Table 5: Association between History of Ear Discharge and Type of Hearing Loss (n = 150)

History of Ear Discharge	Conductive (n)	Sensorineural (n)	Mixed (n)	Total (n)
Present	40	10	12	62
Absent	28	44	16	88
Total	68	54	28	150

Chi-square test: $p = 0.01$ (statistically significant)

DISCUSSION

The present hospital-based cross-sectional study evaluated the spectrum of hearing loss among patients attending an ENT outpatient department in a tertiary care hospital in West Bengal. The findings revealed that conductive hearing loss was the most common type, followed by sensorineural and mixed hearing loss. Moderate degree hearing loss was the predominant severity category. A statistically significant association was observed between age and type of hearing loss, as well as between history of ear discharge and type of hearing loss.

The predominance of conductive hearing loss (45%) in this study is consistent with findings from developing countries, where middle ear pathologies such as chronic suppurative otitis media (CSOM) and cerumen impaction are highly prevalent [4,5]. Similar hospital-based studies in India have reported conductive hearing loss as the leading type among ENT OPD attendees, primarily due to preventable and treatable conditions [7]. This pattern reflects gaps in early diagnosis, inadequate treatment, and poor awareness regarding ear hygiene and infections. In contrast, studies from high-income countries have documented a higher proportion of sensorineural hearing loss, attributed to aging populations and noise exposure [6].

Sensorineural hearing loss (36%) in the present study was more commonly observed in older age groups, with a significant association between advancing age and type of hearing loss. This finding aligns with the established understanding of presbycusis as a major contributor to hearing impairment in the elderly [2]. Age-related degeneration of the cochlea and auditory pathways leads to progressive, irreversible hearing loss. Similar age-related trends have been reported in epidemiological studies, where sensorineural hearing loss increases significantly after the fifth decade of life [3]. The higher prevalence in the elderly population underscores the need for routine screening and early rehabilitative interventions such as hearing aids.

Mixed hearing loss (19%) observed in this study likely represents long-standing or inadequately treated middle ear conditions superimposed on age-related or sensorineural components. The coexistence of conductive and sensorineural elements complicates management and highlights the importance of timely intervention in early stages of ear disease.

The analysis of severity revealed that moderate hearing loss was the most common degree, followed by mild hearing loss. This distribution is comparable to previous studies where most patients present with moderate impairment, possibly due to delayed healthcare-seeking behavior [9]. Mild hearing loss may often go unnoticed or be neglected, while severe and profound losses are less frequent but associated with significant disability. The findings emphasize the importance of early detection strategies to prevent progression to more severe forms.

A statistically significant association between history of ear discharge and type of hearing loss was observed, with conductive hearing loss being more common among patients with such history. This is clinically plausible, as chronic ear discharge is often indicative of middle ear pathology, particularly CSOM, which primarily results in conductive hearing loss [10]. Similar associations have been reported in other studies, reinforcing the role of recurrent or chronic infections as key contributors to hearing impairment in developing regions. Effective management of ear infections at the primary care level could substantially reduce the burden of conductive hearing loss.

From a public health perspective, the findings of this study highlight the dual burden of preventable conductive hearing loss and age-related sensorineural hearing loss. Strengthening primary healthcare services, promoting awareness regarding ear hygiene, early treatment of infections, and implementation of national programs like NPPCD are essential strategies. Additionally, integrating routine hearing screening, especially for high-risk groups such as the elderly and those with recurrent ear infections, can facilitate early diagnosis and intervention.

The strengths of the present study include the use of standardized audiometric evaluation and inclusion of a diverse patient population across different age groups. The study provides valuable hospital-based data that can aid clinicians and policymakers in understanding the local pattern of hearing loss.

However, certain limitations must be acknowledged. Being a hospital-based study, the findings may not be generalizable to the community at large. The cross-sectional design limits causal inference between risk factors and outcomes. Additionally, detailed evaluation of etiological factors such as occupational noise exposure or socioeconomic determinants was limited. Future studies with larger sample sizes and community-based designs are recommended to provide a more comprehensive understanding of hearing loss patterns.

CONCLUSION

The present study highlights that hearing loss remains a significant clinical burden among patients attending ENT outpatient services, with conductive hearing loss being the most common type, followed by sensorineural and mixed varieties. Moderate hearing loss constituted the predominant degree of impairment. Advancing age was significantly associated with sensorineural and mixed hearing loss, while a history of ear discharge showed a strong association with conductive hearing loss, indicating the role of preventable middle ear pathologies. These findings underscore the need for early identification and timely management of ear diseases, particularly at the primary healthcare level, to prevent progression and complications. Strengthening public health initiatives such as awareness programs on ear hygiene, early treatment of infections, and routine hearing screening—especially among high-risk groups like the elderly—can substantially reduce the burden of hearing impairment. Integration of audiological services into routine clinical care and reinforcement of national programs like NPPCD are recommended to improve hearing health outcomes.

DECLARATIONS

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Conflict of Interest: The authors declare no conflict of interest.

Consent: Written informed consent was obtained from all participants or their guardians.

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