

Age-Related Hearing Loss in Underprivileged Population of Pakistan

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ABSTRACT

Objective: To determine the frequency and severity of age-related hearing loss.

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the Department of ENT Head & Neck Surgery, Lahore Medical and Dental College, Ghurki Trust and Teaching Hospital Lahore from 1st January 2024 to 30th June 2024.

Methods: Three hundred and eighty adults patients aged between 60-85 years, diagnosed with hearing loss were enrolled. Participants underwent otoscopy examination, tympanometry, and pure tone audiometry. All patients reporting with hearing loss, tinnitus, or vertigo were included. History of ear surgery, chronic discharge, impacted wax or ototoxic medications and noise exposure were excluded.

Results: 15.7% of patients with ear-related symptoms had incidental findings of hearing loss. 10.5% had mild, 28.9% had moderate, 25.4% had moderately severe, 31% had severe, 4.2% had profound in sensorineural hearing loss. 1.2% of cases had predominantly mild to moderate was found conductive hearing loss. 30.6% of cases were in moderate to severe ranges. 71.3% had type A findings in mixed hearing loss. According other types, type As 0.7%, Ad 8.3%, B 10% and C 9.1%. Incidental findings were 15.7% of total, with non-incidental findings at 84.3%. Moderate and moderately severe hearing loss was the most common. Sensorineural hearing loss (SNHL) was prevalent with severe cases, while conductive hearing loss (CHL) was rare and generally mild of hearing loss severity. Overall, severe SNHL and mixed hearing loss were the most frequent types of hearing loss, with few cases of CHL.

Conclusion: The high rates of moderate to severe sensorineural and mixed hearing loss in Pakistan's underprivileged population highlight the urgent need for early detection and better healthcare access to address age-related hearing loss.

Key Words: Age-related hearing loss, Presbycusis, Cochlear aging, Auditory system deterioration, Ototoxic drugs, Hearing aids, Cochlear implants, Sound localization, Social isolation.

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INTRODUCTION

Hearing loss in the elderly, commonly known as presbycusis, is a prevalent issue that significantly affects the quality of life among older adults. This condition arises due to factors such as cochlear aging, chronic health conditions, deterioration of the auditory system, prolonged exposure to noise, and ototoxic drug use.^{1,2}

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Presbycusis often results in difficulties with understanding speech in noisy environments, poor sound localization, and diminished central auditory processing.³

In Pakistan, the elderly population is projected to grow substantially, from 7.34 million in 1998 to an estimated 22.07 million by 2023.⁴ This demographic trend highlights the increasing need to address age-related hearing loss, which can lead to social isolation, reduced self-esteem, and greater reliance on others.⁵ Standardized audiometric evaluations are crucial for diagnosing hearing impairment, with hearing aids and cochlear implants serving as the primary treatments for moderate to severe cases.⁶ This study focuses on individuals aged 60 and above to explore hearing loss within this expanding population.

Age related hearing loss or presbycusis is the most common self-reported issue in old age due to hearing impairment. It mainly occurs due to cochlear aging, multiple chronic conditions, deterioration of auditory system, continuous noise exposure and prolonged use of ototoxic drugs. Presbycusis is characterized by difficult speech understanding in noisy surroundings, poor localization of sound source, reduced central

processing of auditory stimuli and impaired hearing. Hearing provide us with crucial environmental information, such as the presence of danger signals, smoke alarms, and warning cries that must be recognized.⁷

Hearing loss is classified into various categories based on the severity of the condition. It can be mild, moderate, moderately severe, severe and profound. With increasing age, hearing sensitivity rises sharply. In 2008, a Pakistani report indicated that the elderly population in our nation was 7.34 million in 1998, and it is projected to increase to 22.07 million by the year of 2023.⁸

Age related hearing loss can lead to feelings of frustration, social isolation, heightened reliance on others for support, diminished self-esteem, loneliness, and the necessity for hospital care. The worldwide consensus is that standardized audiometric evaluation is the predominant method for diagnosing hearing impairment in an individual.⁹

Hearing aids and cochlear implants are the primary tools for treating moderate to severe presbycusis. Utilizing hearing aids greatly enhances the quality of life for patients, making their use highly recommended. There is no consensus on when a person is considered old. Some suggest that the onset of old age begins around 60, approximately the age of retirement in many developed nations.¹⁰ This study will help our primary results of hearing investigation in patients who are 60 years older and above with complain of hearing impairment.

METHODS

This cross-sectional study was conducted at Audiology clinic within the ENT Department of Ghurki Trust Teaching Hospital, Lahore from 1st January 2024 to 30th June 2024 vide IRB letter No. LMDC/20575/23 dated 6th December 2023. A total of 380 adults aged between 60 and 85 years who had been diagnosed with hearing impairment were enrolled. Participants were selected using a convenience sampling approach. The assessment included otoscopy, tympanometry, and pure tone audiometry. The study concentrated on individuals reporting audiological issues similar as hearing loss, tinnitus, vertigo, dizziness, or a sensation of fullness in the ears. Both men and women within the specified age range were included, while those with a history of ear surgery, chronic ear discharge, impacted ear wax or exposure to ototoxic substances or loud noises were excluded. Each participant passed an otoscopic examination to check the external ear canal and tympanic membrane, tympanometry to assess middle ear function, and pure tone audiometry to measure the level of hearing loss. The data was entered and analyzed through SPSS-25.

RESULTS

Incidental findings of hearing loss in patients suffering from ear related symptoms were 15.7% whereas non-incident findings account for 84.3%. This showed that a significant majority of the findings were expected (non-incident) [Fig. 1]. 68.9% of patients presenting with hearing related symptoms presented with sensorineural hearing loss of which 10.5% were mild, 28.9% were moderate, 25.4% were moderately severe, 31% were severe and 4.2% were profound as observed. Conductive hearing loss is predominantly mild to moderate, with very few cases of severe or profound hearing loss. Sensorineural hearing loss exhibits a range of severities, with a significant number of cases in the moderately severe to profound categories. Mixed HL also shows a higher severity, with a notable number of cases in the severe to moderately severe range (Fig. 2). In tympanometry, it was found that 71.3% of patients presented with type A findings. For Type As, Ad, B, and C the findings were 0.7%, 8.3%, 10% and 9.1% respectively. The audiometry findings appear to show a significant concentration of findings in one category, suggesting a common pattern or trend in hearing loss measurements across the sample, the primarily encountered non-incident findings in hearing loss cases. Sensorineural hearing loss (SNHL) was the most common type of hearing loss observed, and the severity of hearing loss often ranged from moderate to moderately severe. Mixed hearing loss was also significant, with a high proportion of cases in the severe to moderately severe categories. Conductive hearing loss (CHL) was much less frequent and typically mild to moderate. These results suggest that severe hearing loss, particularly SNHL and mixed HL, is prevalent among the population studied, with fewer cases of CHL (Fig. 3).

Conductive hearing loss accounts for 1.3% of cases, sensorineural hearing loss for 63.9% and mixed hearing loss for 34.8%. In terms of severity, normal hearing was observed in 1.3% of cases, mild hearing loss was noted in 9.3% of cases, moderate hearing loss was seen in 21.3% of cases, moderately severe in 28.9% of cases, severe in 30.3% and profound in 8.9%. This shows that moderate and moderately severe hearing loss is the most common severity observed (Table 1). For CHL, all cases were either mild or moderate, there was a distribution across all severity levels, with a notable increase in severity from moderate to profound SNHL and mixed HL exhibited a similar trend to SNHL, with most cases being moderately severe or severe (Table 2).

Table No. 1: Frequency of hearing loss and its types (n=380)

Variable	Frequency (%)
CHL	5 (1.3%)
SNHL	243 (63.9%)

Mixed hearing loss	132 (34.8%)
Severity	
Normal	5 (1.3%)
Mild	35 (9.3%)
Moderate	81 (21.3%)
Moderately severe	110 (28.9%)
Severe	115 (30.3%)
Profound	34 (8.9%)

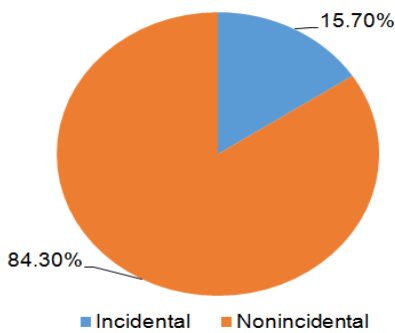


Figure No. 1: Findings of incidental and non-incident

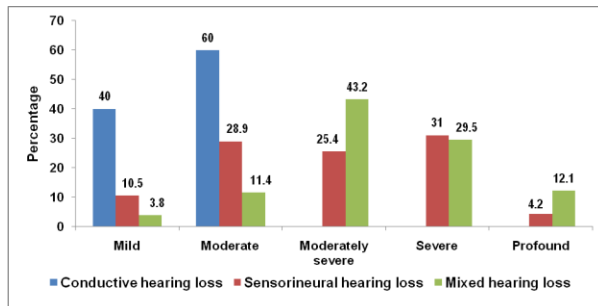


Figure No. 2: Frequency of type of hearing loss

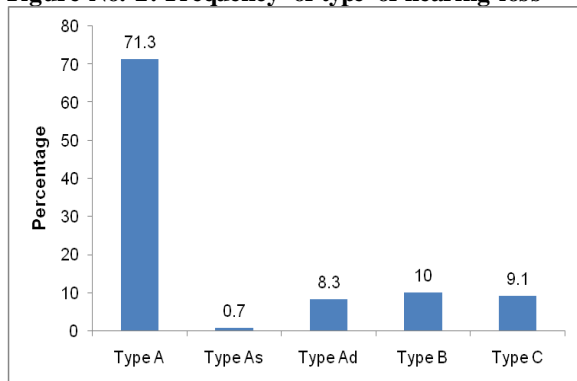


Figure No. 3: Frequency of audiometry findings

DISCUSSION

The results of this study on age-related hearing loss (ARHL) in the underprivileged population of Pakistan provide a detailed overview of the distribution and severity of hearing loss within this group. The data indicate that non-incident findings are predominant

(84.3%), suggesting that hearing loss was largely expected among the sampled population. Sensorineural hearing loss (SNHL) was the most common type, accounting for 66.4% of cases, with moderate to moderately severe hearing loss being the most frequently observed severity.¹¹

These findings align with other research conducted in Pakistan. For instance, a study in rural Punjab found that SNHL was the most prevalent type of hearing loss among the elderly, with a significant number of individuals experiencing moderate to severe levels.¹² Similarly, research from Karachi reported that SNHL was predominant among older adults, particularly in underprivileged areas, where factors such as poor healthcare access, lack of awareness, and environmental noise exposure contribute to its high incidence.¹³ This study corroborates the high percentage of moderate to moderately severe hearing loss noted in these regions.¹⁴ The Karachi study also highlighted that moderate to moderately severe SNHL was particularly prevalent in low-income areas, attributed to untreated ear infections, prolonged noise exposure, and limited access to hearing aids and medical interventions.¹⁵ The substantial incidence of SNHL in the moderate to moderately severe range underscores a significant public health concern. Age-related hearing loss impacts communication, quality of life, and social engagement, especially where healthcare access is limited.¹⁶

The low incidence of conductive hearing loss (CHL) observed in this study (1.2%) is notable. Conductive hearing loss is usually linked with treatable conditions such as ear infections or wax build-up; its lower prevalence might indicate either a lower rate of these conditions or a lack of medical treatment leading to underreporting.¹⁷ This contrasts with some rural studies where CHL was more common due to untreated infections.¹⁸ Mixed hearing loss, encompassing both SNHL and CHL, was significant, comprising 30.6% of cases, indicating that many individuals experience multiple contributing factors to their hearing loss, complicating diagnosis and treatment.¹⁹

The audiometric findings reveal a consistent pattern of hearing loss, potentially reflecting common aetiologies such as noise-induced hearing loss, ototoxicity from medications, or age-related auditory degeneration. The concentration of findings in one category suggests a predominant underlying cause, such as chronic loud noise exposure or high rates of untreated chronic ear diseases.²⁰ The study's results are consistent with other research conducted in underprivileged populations in Pakistan, where SNHL and moderate to severe hearing loss are prevalent. The low incidence of CHL may reflect different health profiles compared to rural areas where ear infections are more common.²¹

Overall, these findings highlight the critical need for enhanced public health interventions, including hearing screenings, awareness programs, and improved access

to medical care, to address ARHL in Pakistan's underprivileged communities. Further research should investigate the underlying causes and assess the effectiveness of intervention strategies. Comparing these results with other studies emphasizes the substantial burden of hearing loss in Pakistan's underprivileged population and the need for concerted efforts for early detection and management to improve outcomes and quality of life.

CONCLUSION

The significant prevalence of moderate to severe sensorineural and mixed hearing loss in the underprivileged population of Pakistan underscoring the urgent need for targeted public health interventions. The findings emphasize the necessity for early detection and improved access to healthcare to mitigate the impact of age-related hearing loss in these communities.

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