

**HEARING LOSS IN ADULTS: ETIOLOGY, DIAGNOSTIC CHALLENGES,
AND CONTEMPORARY MANAGEMENT**

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Annotation: *Hearing loss in adults is a prevalent sensory disorder that significantly affects communication, social integration, and quality of life. It may develop gradually or suddenly and can result from conductive, sensorineural, or mixed pathologies. Global data indicate that over 466 million people suffer from disabling hearing loss, with prevalence increasing with age, noise exposure, ototoxic medication, infections, and metabolic diseases. The growing burden of hearing impairment underscores the importance of understanding its etiological diversity and the need for accurate diagnosis and effective rehabilitation strategies. Early identification and intervention are essential to prevent cognitive decline, depression, and social isolation associated with auditory dysfunction. Advances in audiological diagnostics, imaging, and auditory rehabilitation have greatly improved clinical outcomes, but diagnostic challenges persist due to overlapping symptoms, delayed presentation, and multifactorial causes.*

Keywords: *Hearing loss, sensorineural hearing loss, audiometry, cochlear implant, ototoxicity, presbycusis, auditory rehabilitation.*

Objective: *The objective of this study is to investigate the main etiological factors, diagnostic difficulties, and current management strategies of adult hearing loss, emphasizing the role of modern diagnostic tools and rehabilitation methods in improving auditory outcomes and quality of life.*



Materials and Methods: The study included 200 adult patients aged 20–75 years who presented with varying degrees of hearing loss at tertiary otolaryngology centers between 2021 and 2025. Each patient underwent detailed medical and occupational history assessment, otoscopic examination, pure tone and speech audiometry, tympanometry, otoacoustic emissions, and auditory brainstem response (ABR) testing when indicated. Radiological imaging, including temporal bone CT and MRI, was performed in selected cases to identify retrocochlear pathology. Laboratory tests were used to detect metabolic, autoimmune, and infectious causes. Patients were categorized based on etiology into presbycusis, noise-induced, ototoxic, infectious, and idiopathic groups. Management outcomes were evaluated following medical therapy, hearing aid fitting, or cochlear implantation, with a follow-up period of 12 months to assess auditory performance and patient satisfaction.

Results: Among the participants, 40% had sensorineural hearing loss due to presbycusis, 25% were noise-induced, 15% ototoxic, 10% infectious, and 10% idiopathic. Audiometric profiles showed a bilateral high-frequency loss pattern in age-related cases, while asymmetrical loss predominated in noise-induced hearing loss. Ototoxicity was mostly associated with aminoglycoside and chemotherapeutic drug exposure. MRI identified retrocochlear lesions in 5% of patients. Hearing aids significantly improved auditory function in 70% of mild-to-moderate cases, while cochlear implantation yielded excellent speech perception results in 85% of severe-to-profound loss patients. Early diagnosis and appropriate intervention correlated strongly with improved hearing outcomes and psychosocial adaptation. Patients with delayed diagnosis exhibited poorer rehabilitative response and higher communication-related disability.

Discussion: The findings highlight that adult hearing loss is a multifactorial condition requiring a comprehensive diagnostic approach. Presbycusis remains the leading cause due to progressive degeneration of cochlear hair cells and neural pathways, while occupational noise and ototoxic medications are preventable contributors. Diagnostic challenges often arise from late presentation, subtle onset, and limited awareness of hearing impairment in early stages. Objective audiological and electrophysiological assessments, along with imaging, are essential for differentiating cochlear from retrocochlear lesions. Management strategies have evolved with the advent of digital hearing aids, bone-anchored devices, and cochlear implants that provide substantial auditory rehabilitation. Multidisciplinary care involving otolaryngologists, audiologists, and speech therapists ensures optimal functional



recovery. Preventive measures such as noise control, regular hearing screening, and ototoxic drug monitoring are vital components of public health strategies against adult hearing loss.

Conclusion: Hearing loss in adults is a widespread and complex disorder with significant medical, social, and psychological implications. A thorough understanding of its diverse etiologies and accurate diagnostic evaluation is critical for successful management. Modern rehabilitation techniques, including advanced hearing aids and cochlear implants, have transformed auditory recovery and quality of life for affected individuals. Early detection, preventive education, and individualized treatment approaches remain key to mitigating the burden of adult hearing loss and promoting long-term auditory health in the aging population.

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