THE IMPORTANCE OF AUDIOLOGICAL SCREENING IN THE EARLY DETECTION OF AGE-RELATED HEARING LOSS IN OLDER PATIENTS

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Abstract. Age-related hearing loss is one of the most common sensory disorders among older adults and may gradually affect speech perception, social communication, emotional well-being, and overall quality of life. Since hearing impairment often develops progressively and may remain unnoticed during its early stages, timely identification is essential for preventing further functional decline and initiating appropriate interventions. This paper examines the importance of audiological screening in the early detection of age-related hearing loss in older patients. Particular attention is given to the role of screening approaches and basic audiological assessment methods in identifying early changes in hearing function before severe communication difficulties occur. The paper also considers major risk factors associated with age-related auditory decline and discusses the clinical value of regular hearing assessment in older populations. Early audiological screening can facilitate timely referral, more detailed diagnostic evaluation, appropriate rehabilitation, and preventive counselling. Integrating systematic hearing screening into routine medical care for older adults may therefore contribute to earlier diagnosis, preservation of communicative abilities, and improvement of patients' quality of life.

Keywords. age-related hearing loss, presbycusis, older adults, audiological screening, early detection, hearing assessment, prevention.

Introduction. Age-related hearing loss (ARHL), commonly referred to as presbycusis, is one of the most prevalent chronic sensory impairments affecting older adults. It is characterized by a gradual decline in auditory function associated with ageing and may significantly interfere with speech perception and everyday communication. The prevalence of hearing impairment increases markedly with age. According to the World Health Organization (WHO), more than 25% of people over the age of 60 experience disabling hearing loss, indicating that age-related auditory decline represents an important clinical and public health problem [1].

One of the major challenges associated with ARHL is its gradual and frequently unnoticed progression. Older individuals may initially experience difficulty understanding speech in noisy environments, following group conversations, hearing telephone speech, or recognizing certain everyday sounds. Because these changes often develop slowly, patients may adapt to them and delay seeking professional care until hearing impairment begins to substantially affect daily communication. Consequently, ARHL remains

underdiagnosed and undertreated in a considerable proportion of older adults. Recent clinical guidelines also emphasize that age-related hearing loss is commonly overlooked despite its potential effects on communication, psychological well-being, cognitive function, and general health [2].

Early detection is therefore an essential component of effective management of age-related hearing loss. Identification of auditory impairment at an earlier stage provides an opportunity for timely diagnostic assessment, counselling, hearing rehabilitation, and modification of potentially preventable risk factors. The WHO identifies older adults as one of the priority groups for systematic hearing screening and emphasizes that early identification followed by appropriate intervention can reduce the negative functional consequences of hearing impairment [1]. Regular assessment is particularly important because subjective complaints alone may not accurately reflect the degree of auditory decline.

Audiological screening provides a practical approach for identifying individuals who may have previously unrecognized hearing impairment and who require further diagnostic evaluation. Screening may include brief hearing-related questionnaires, simple hearing tests, technology-based screening tools, and basic audiometric procedures. Individuals who fail initial screening should subsequently undergo comprehensive audiological evaluation, including pure-tone audiometry when appropriate. Current clinical practice recommendations for age-related hearing loss specifically advise obtaining or referring patients for an audiogram when screening indicates possible hearing impairment [3]. Furthermore, the development of accessible digital screening technologies has expanded opportunities to conduct hearing assessment not only in specialized audiology centres but also in primary health care and community settings [3,4].

Thus, systematic audiological screening may play an important role in reducing delayed diagnosis of age-related hearing loss and facilitating timely preventive and rehabilitative measures among older adults. Incorporating hearing assessment into routine health evaluation of elderly patients may contribute to the preservation of effective communication, social functioning, and quality of life. The aim of this article is to evaluate the importance of audiological screening in the early detection of age-related hearing loss in older patients and to analyse the main screening approaches that can facilitate timely identification and further audiological assessment.

Clinical Characteristics and Risk Factors of Age-Related Hearing Loss. Age-related hearing loss is a progressive, predominantly sensorineural hearing disorder associated with degenerative changes in the peripheral and central auditory system. It usually develops gradually and affects both ears, with high-frequency hearing commonly becoming impaired at an earlier stage. As a result, older patients may continue to hear sounds but experience increasing difficulty in understanding speech, particularly in noisy environments or during conversations involving several speakers. Such difficulties may

initially be subtle and are therefore often interpreted by patients as a normal consequence of ageing rather than as a condition requiring audiological evaluation.

The likelihood and severity of hearing impairment increase considerably with advancing age. According to the World Health Organization, more than one quarter of adults aged over 60 years have disabling hearing loss. However, chronological ageing alone does not fully explain individual differences in auditory decline. Age-related hearing loss is considered a multifactorial condition resulting from the interaction of biological ageing with genetic, environmental, lifestyle, and systemic health factors.

Several potentially modifiable factors may contribute to the development or progression of hearing impairment in older adults. Long-term occupational or recreational noise exposure, smoking, diabetes mellitus, hypertension, cardiovascular disorders, recurrent ear diseases, and exposure to ototoxic medications have been associated with an increased risk of hearing deterioration. These factors are particularly important from a preventive perspective because identifying them during routine clinical assessment may help distinguish individuals who require closer audiological monitoring.

Clinical manifestations of early age-related hearing loss are not always limited to a subjective perception of reduced hearing. Patients may report difficulty understanding speech in background noise, frequently asking others to repeat themselves, increasing television or telephone volume, missing parts of conversations, difficulty following group discussions, or tinnitus. Because patients may gradually adapt their communication behaviour to compensate for these problems, reliance on self-reported hearing difficulties alone can result in delayed diagnosis. The presence of such symptoms should therefore be considered an indication for further hearing assessment.

This gradual and frequently unrecognized course highlights the importance of systematic audiological screening in older patients. Screening makes it possible to identify individuals with suspected hearing impairment before communication difficulties become severe and to select those who require comprehensive audiological examination. Current clinical recommendations indicate that when hearing screening suggests hearing loss, the patient should undergo or be referred for an audiogram to determine the type and degree of auditory impairment. Thus, screening serves as an important link between early suspicion of age-related hearing decline and timely audiological diagnosis.

Audiological Screening Methods for Early Detection of Age-Related Hearing Loss. Audiological screening in older adults is aimed at identifying individuals with possible hearing impairment before the condition becomes sufficiently severe to cause substantial communication difficulties. Screening should be distinguished from comprehensive diagnostic audiometry. Its primary purpose is not to establish the final type or degree of hearing loss, but to identify patients who require further audiological assessment. The World Health Organization recommends regular hearing screening in older populations and indicates that screening may be performed in primary care facilities, hospitals, community settings, or even at home, depending on available resources [5].

One of the simplest approaches is questionnaire-based screening. Brief self-report tools can identify difficulties related to speech understanding, communication, and the social consequences of hearing impairment. The Hearing Handicap Inventory for the Elderly–Screening Version (HHIE-S) is among the most widely studied instruments for this purpose. However, subjective questionnaires should not be used as the only screening method because some older patients may underestimate their hearing problems or gradually adapt to them. A recent systematic review found that instruments such as the HHIE-S, single-question screening, the whispered voice test, and smartphone-based screening can demonstrate useful diagnostic accuracy when compared with pure-tone audiometry, although their performance varies across populations and degrees of hearing loss [6].

The whispered voice test represents another simple and inexpensive screening method that can be used in primary care or community settings when specialized equipment is unavailable. The patient is asked to repeat words or numbers spoken quietly from a standardized distance while each ear is assessed separately. Failure to correctly recognize whispered speech may indicate the need for formal audiological evaluation. In a study involving adults aged 65 years and older, the whisper test demonstrated sensitivity and specificity above 70% for detecting disabling hearing loss, supporting its usefulness as a basic screening procedure [7].

More objective screening can be performed using pure-tone screening. In this approach, selected frequencies are presented at a predetermined intensity level to determine whether the individual responds to the test signal. WHO guidance for older adults describes screening of both ears at frequencies of 1, 2, and 4 kHz at 35 dB HL as one possible protocol. Failure to respond at one or more frequencies in either ear indicates the need for further assessment. Pure-tone screening is particularly useful because high-frequency hearing is commonly affected during the early stages of age-related hearing loss [5].

Another important approach is speech-in-noise or digits-in-noise testing. These methods assess the ability to recognize speech or numerical stimuli against background noise and may therefore reflect everyday communication difficulties more realistically than simple tone detection. This aspect is particularly relevant in age-related hearing loss because many older adults initially report that they can hear speech but cannot understand it clearly in noisy environments. The WHO-developed hearWHO application is based on validated digits-in-noise technology and can be used for hearing screening and monitoring over time. WHO reports that the test has sensitivity and specificity exceeding 85% under validated conditions [8].

Digital technologies have further expanded the possibilities for accessible hearing screening. Smartphone- and tablet-based applications may enable hearing assessment outside specialized audiological centres, particularly in primary health care and community-based programmes. In 2026, WHO introduced the WHOears application, a tone-based screening tool designed for use by trained health-care providers in community

and primary-care settings. The application provides a standardized screening protocol and indicates whether the individual passes the screening or requires referral for further assessment. Importantly, such tools are screening instruments and do not replace comprehensive examination by an audiologist or otorhinolaryngologist [9].

Despite the usefulness of brief screening methods, pure-tone audiometry remains essential for diagnostic confirmation when hearing impairment is suspected. It allows hearing thresholds to be determined across different frequencies and provides information about the severity and pattern of auditory loss. Therefore, patients who fail screening, report persistent hearing difficulties, or demonstrate risk factors for progressive hearing deterioration should undergo comprehensive audiological examination.

The most effective screening strategy may involve a combination of subjective and objective methods. A brief questionnaire or single hearing-related question can be used as an initial assessment, followed by a whispered voice test, pure-tone screening, or validated digital screening when necessary. Patients with abnormal results should then be referred for full audiological evaluation. Such a stepwise approach may improve the feasibility of hearing screening among older adults while allowing limited specialist resources to be directed toward patients with the highest probability of clinically significant hearing loss.

Clinical Importance of Early Detection and Preventive Measures. Early detection of age-related hearing loss is clinically important because auditory impairment may influence not only hearing ability but also communication, social participation, independence, and overall quality of life. When hearing deterioration remains unrecognized, older patients may experience increasing difficulty communicating with family members, participating in social activities, and understanding information in everyday situations. Untreated hearing loss has also been associated with loneliness, social isolation, and adverse cognitive outcomes, although the relationships between auditory impairment, social functioning, and cognitive decline are complex and influenced by multiple factors.

Timely identification of hearing impairment allows appropriate intervention to begin before communication difficulties become severe. Patients identified through screening can be referred for comprehensive audiological examination and, when indicated, receive counselling, hearing aids, assistive listening devices, or other forms of auditory rehabilitation. Such measures may improve access to speech and facilitate more effective participation in everyday communication. Early detection is particularly relevant because a considerable number of individuals with progressive hearing loss may remain unaware of their auditory deficit for a long period. WHO therefore emphasizes regular hearing checks, particularly among individuals over 60 years of age and other groups at increased risk of hearing impairment.

The preventive approach to age-related hearing loss should also focus on modifiable factors that may contribute to additional deterioration of auditory function. Although degenerative changes directly associated with ageing cannot be completely prevented or

reversed, exposure to avoidable auditory risk factors can be reduced. Protection from excessive occupational and recreational noise remains one of the most important measures. Older adults and individuals approaching older age should be encouraged to avoid prolonged exposure to loud sounds and to use appropriate hearing protection when exposure cannot be avoided.

The rational use of potentially ototoxic medications is another important preventive consideration. Medication history should be reviewed in patients at risk of hearing impairment, particularly when drugs with recognized ototoxic potential are used for prolonged periods or in combination with other risk factors. When such treatment is medically necessary, appropriate hearing monitoring can facilitate earlier recognition of auditory changes. Prevention should therefore involve cooperation between otorhinolaryngologists, audiologists, primary-care physicians, and other specialists involved in the management of older patients.

General health and lifestyle factors should also be considered. WHO guidance highlights healthy nutrition, regular physical activity, avoidance of cigarette smoking, and appropriate management of conditions such as hypertension and diabetes as relevant measures that may help reduce factors predisposing to hearing deterioration in older age. Prevention of ear diseases, timely treatment of ear-related symptoms, and avoidance of unsafe ear-cleaning practices are additional components of maintaining hearing health.

An effective strategy for older adults should therefore combine regular hearing screening, recognition of risk factors, timely referral, and preventive counselling. Hearing screening should not be viewed as an isolated diagnostic procedure but rather as the initial stage of a broader hearing-care pathway. Individuals who pass initial screening may benefit from periodic reassessment, whereas those with abnormal findings should undergo comprehensive audiological evaluation and appropriate management. WHO identifies older adults among the priority populations for systematic detection of hearing loss and emphasizes that early identification followed by suitable intervention can reduce the functional consequences of unaddressed hearing impairment.

From a practical perspective, incorporating simple hearing screening into routine medical examinations of older patients may facilitate earlier recognition of age-related auditory decline. The use of brief questionnaires, validated screening tests, and accessible digital technologies can make such assessment feasible even where specialist audiological resources are limited. However, screening programmes are effective only when abnormal results are followed by appropriate diagnostic evaluation and intervention. Therefore, establishing a clear pathway from initial screening to audiological assessment, otorhinolaryngological consultation, rehabilitation, and subsequent monitoring is essential for improving hearing care among older adults.

Conclusion

Age-related hearing loss is a common and gradually progressive condition among older adults that may remain unrecognized until significant communication difficulties

develop. Audiological screening provides an important opportunity to identify hearing impairment at an earlier stage and to determine which patients require comprehensive diagnostic assessment. The combined use of brief questionnaires, simple clinical screening procedures, pure-tone screening, speech-in-noise testing, and validated digital tools can increase the accessibility of early hearing assessment in both clinical and community settings.

Regular hearing screening should therefore be incorporated into the routine health assessment of older adults, particularly those with additional risk factors for auditory deterioration. Early identification should be followed by timely audiological evaluation, counselling, rehabilitation when required, and measures aimed at reducing modifiable risk factors such as excessive noise exposure, smoking, inappropriate use of ototoxic medications, and inadequate management of associated chronic conditions. A systematic approach combining screening, prevention, referral, and follow-up may contribute to the preservation of communicative function, social participation, and quality of life in older patients.

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