Best Evidence Summary (Post-Print): Management of Hearing Loss in Older Adults in Primary Health Care Settings

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Abstract

Background Primary health care institutions play a crucial role in managing age-related hearing loss; however, the current evidence base is extensive yet fragmented, and there is a lack of scientifically rigorous, standardized practice guidelines for clinical application. Objective To comprehensively retrieve and analyze the best available evidence on the management of age-related hearing loss in primary health care settings, thereby providing a reference for clinical practice and guideline development. Methods A systematic search was conducted across BMJ Best Practice, UpToDate, the International Guideline Collaboration Network, Yimaitong, the National Institute for Health and Care Excellence (NICE), the World Health Organization (WHO), the National Guideline Clearinghouse (NGC), the Canadian Clinical Practice Network, the Scottish Intercollegiate Guidelines Network (SIGN), the Registered Nurses' Association of Ontario (RNAO), the JBI Library of Evidence-Based Healthcare International Collaboration Center, the Cochrane Library, PubMed, Web of Science, CINAHL, CNKI, Wanfang Data Knowledge Service Platform, and the Chinese Biomedical Literature Database for all evidence regarding the management of hearing loss in older adults, including clinical decision-making tools, guidelines, systematic reviews, and expert consensuses. The search timeframe spanned from January 2014 to September 2024. Evidence grading was performed according to the JBI Evidence Pre-grading System (2016 version) from the JBI Center for Evidence-Based Healthcare, and the best evidence was synthesized. Results A total of 14 documents were included, comprising 2 clinical decision-making tools, 5 guidelines, 5 systematic reviews, and 2 expert consensuses. Thirty-five best evidence statements were synthesized, covering eight domains of hearing loss in community-dwelling older adults: clinical characteristics, screening, comprehensive assessment, referral, hearing assistive device support, hearing rehabilitation training, social support, and health education. Conclusion The best evidence

statements for the management of age-related hearing loss developed in this study can provide evidence-based support for primary health care practitioners, enabling them to effectively manage hearing loss in older adults through standardized and scientific approaches, thereby improving the hearing health and overall well-being of this population.

Full Text

Summary of Best Evidence on the Management of Hearing Loss in Older Adults in Primary Health Care Settings

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Abstract

Background: Primary healthcare institutions play a crucial role in managing hearing loss among older adults, yet the available evidence remains extensive and fragmented, with no scientifically rigorous or standardized clinical practice guidelines currently available.

Objective: To comprehensively search for and analyze the best available evidence on managing hearing loss in older adults within primary healthcare settings, providing a reference for clinical practice and guideline development.

Methods: We systematically searched BMJ Best Practice, UpToDate, the International Guideline Collaboration Network, Medlive.cn, the National Institute for Health and Care Excellence (NICE), the World Health Organization (WHO), the National Guideline Clearinghouse, the Canadian Medical Practice Guidelines Network, the Scottish Intercollegiate Guidelines Network (SIGN), the Registered Nurses' Association of Ontario, the Joanna Briggs Institute (JBI) Collaboration Centre Library, Cochrane Library, PubMed, Web of Science, CINAHL, CNKI, Wanfang Data, and the China Biomedical Literature Database for all evidence related to hearing loss management in older adults, including clinical decision support tools, guidelines, systematic reviews, and expert consensus statements. The search timeframe was from January 2014 to September 2024. Evidence grading was performed according to the JBI Evidence-Based Healthcare Center' s pre-grading system (2016 version), and the best evidence was summarized.

Results: A total of 14 documents were included, comprising 2 clinical decision support tools, 5 guidelines, 5 systematic reviews, and 2 expert consensus statements. Thirty-five pieces of best evidence were identified, covering eight key

domains: clinical characteristics of hearing loss in community-dwelling older adults, screening, comprehensive assessment, referral, hearing assistive device support, hearing rehabilitation training, social support, and health education.

Conclusion: The best evidence for managing hearing loss in older adults developed in this study provides evidence-based support for primary healthcare professionals, enabling them to effectively manage age-related hearing loss through standardized and scientifically sound approaches, thereby improving older adults' hearing health and overall well-being.

Keywords: Primary health care; Hearing loss; Aged; Evidence-based medicine; Management; Evidence synthesis

Introduction

Approximately 65% of adults aged 60 years and older worldwide experience varying degrees of hearing decline [1], with approximately 120 million older adults in China suffering from hearing impairment [2]. Hearing loss not only affects communication, quality of life, and social participation but also increases the risk of psychological disorders and dementia [3,4]. The annual global economic loss due to inadequately addressed hearing loss approaches US$1 trillion [1]. As China' s population aging accelerates, age-related hearing loss has become a serious public health concern. In June 2024, the General Office of the National Health Commission issued a notice to launch a national hearing health promotion campaign for older adults from 2024 to 2027 [5].

Age-related hearing loss is a chronic condition characterized by insidious onset and is typically irreversible, making early identification and intervention critical [6]. Prevention and management through primary healthcare networks represent the most appropriate and cost-effective approach, as they can effectively facilitate early warning, screening, referral, and rehabilitation [7]. However, the current primary healthcare system faces challenges in managing hearing loss among older adults, including insufficient screening awareness, lack of equipment, shortage of trained professionals, and inadequate referral mechanisms [8]. Research both domestically and internationally has primarily focused on specialized hearing care institutions, while evidence for community-based management remains fragmented and inconsistent. This study employs evidence-based methodology to systematically summarize the best evidence for managing hearing loss in community-dwelling older adults, aiming to provide a reference for primary healthcare institutions and improve hearing health among older adults.

Methods

1.1 Problem Formulation We formulated the evidence-based question according to the PIPOST framework. P (Population) referred to community-dwelling older adults with hearing loss. I (Intervention) encompassed management measures for hearing loss, including screening, prevention, assessment, and intervention. P (Professional) referred to frontline healthcare providers in

primary healthcare settings, such as general practitioners and nurses in community health service centers, otolaryngologists, and rehabilitation therapists. O (Outcome) included hearing loss itself and related adverse outcomes, such as decreased communication ability, social isolation, cognitive dysfunction, and reduced quality of life. S (Setting) referred to primary healthcare institutions that provide diagnosis and treatment for common diseases and basic public health services to local residents, including community health service centers, rural township health centers, urban street hospitals, district-level hospitals in prefecture-level cities, and employee hospitals in certain enterprises and institutions. T (Type of evidence) included clinical decision support tools, guidelines, expert consensus statements, evidence summaries, best practice manuals, and systematic reviews.

1.2 Search Strategy We conducted a top-down search of the following databases according to the "6S" evidence model: (1) Clinical decision support systems: BMJ Best Practice and UpToDate; (2) Guideline databases: International Guideline Collaboration Network, Medlive.cn, National Institute for Health and Care Excellence (NICE), World Health Organization (WHO), National Guideline Clearinghouse, Canadian Medical Practice Guidelines Network, Scottish Intercollegiate Guidelines Network (SIGN), Registered Nurses' Association of Ontario, and the Joanna Briggs Institute (JBI) Collaboration Centre Library; (3) Professional hearing association websites, including the American Academy of Otolaryngology-Head and Neck Surgery, American Speech-Language-Hearing Association, and China Association of the Deaf; (4) Systematic review and journal databases: Cochrane Library, PubMed, Web of Science, CINAHL, CNKI, Wanfang Data, and China Biomedical Literature Database. The search strategy combined subject headings and free-text terms. The search timeframe was from January 1, 2014, to September 15, 2024. We also performed citation tracking of included studies. The PubMed search strategy is presented in Table 1 .

1.3 Inclusion and Exclusion Criteria **Inclusion Criteria:** (1) Studies included community-dwelling older adults with hearing loss; (2) Content addressed management measures for hearing loss in older adults within primary healthcare institutions, including screening, prevention, assessment, referral, and intervention; (3) Study types included clinical decision support tools, guidelines, expert consensus statements, evidence summaries, best practice manuals, and systematic reviews; (4) Publications were in Chinese or English.

Exclusion Criteria: (1) Studies focusing solely on etiological diagnosis or surgical interventions such as hearing aid or cochlear implant placement, or pharmacological treatments; (2) Publications where full text was unavailable, as well as abstracts, reviews, or research protocols; (3) Studies with low-quality assessment results or duplicate publications.

1.4 Quality Assessment We selected appropriate quality assessment tools based on document type. (1) Clinical decision support tools from authoritative databases BMJ Best Practice and UpToDate were directly considered high-quality evidence. (2) Guidelines were evaluated using the 2017 Appraisal of Guidelines for Research and Evaluation (AGREE II) instrument [9]. (3) Systematic reviews and expert consensus statements were assessed using quality evaluation tools recommended by the Australian Joanna Briggs Institute (JBI) Evidence-Based Healthcare Center (2016 version) [10,11]. (4) For evidence summaries and best practice manuals, we traced back to the original evidence sources and applied quality assessment tools appropriate to the study design of those primary sources. Guidelines were independently evaluated by four researchers, while other evidence types were assessed by two researchers independently. Any disagreements were resolved through discussion within the research team.

1.5 Evidence Extraction, Integration, and Evaluation Two researchers independently performed evidence extraction and integration, then categorized and synthesized evidence with consistent findings. When conflicting conclusions arose across different sources, we strictly adhered to the principles of prioritizing high-quality evidence, evidence-based sources, and newly published authoritative literature. We traced included evidence back to its original sources and classified evidence levels from 1 (highest) to 5 (lowest) according to the JBI Evidence-Based Healthcare Center' s evidence grading system based on study design type [12]. Finally, we assigned recommendation strengths to the summarized evidence: Level A (strong recommendation) or Level B (weak recommendation), with recommendation strength determined by comprehensively considering evidence validity, feasibility, appropriateness, and clinical significance [12].

Results

2.1 Literature Screening Results We retrieved 1,422 relevant documents. After removing 794 duplicates, 572 documents were excluded based on title and abstract screening according to the inclusion and exclusion criteria. Following full-text review and quality assessment, 14 documents [13-26] were ultimately included, comprising 2 clinical decision support tools [13,14], 5 guidelines [15-19], 5 systematic reviews [20-24], and 2 expert consensus statements [25,26]. The literature screening process and results are illustrated in Figure 1 [Figure 1: see original paper]. Basic characteristics of the included studies are presented in Table 2 .

2.2 Quality Assessment Results We retrieved 2 clinical decision support tools [13,14] from UpToDate [13] and BMJ Best Practice [14], which were directly included. Among the 5 guidelines [15-19], 3 from WHO [15], the UK National Guideline Centre [16], and the U.S. Preventive Services Task Force [18]

received an A-level quality rating, while the other 2 from the American Speech-Language-Hearing Association Aural Rehabilitation Clinical Practice Guideline Development Panel [17] and TURTON et al. [19] received B-level ratings (Table 3).

Of the 5 systematic reviews [20-24], three studies by YANG et al. [21], FERGUSON et al. [22], and BARKER et al. [24] received "Yes" ratings for all items. LI et al. [20] explicitly stated that publication bias was not assessed in the included primary studies, resulting in an "Not Applicable" rating for Item 9 ("Was an assessment of potential publication bias conducted?"). The study by MICHAUD et al. [23] did not report the quality assessment process, leading to "Unclear" ratings for Item 5 ("Were the criteria for appraising studies appropriate?") and Item 6 ("Was critical appraisal conducted by two or more reviewers independently?").

Regarding the 2 expert consensus statements [25,26], all items in the document developed by the National Technical Guidance Group for Deafness Prevention and Treatment [26] received "Yes" ratings. In the study by WANG Liyi et al. [25], Item 2 ("Were the opinions from influential experts?") was rated as "Unclear," and Item 5 ("Were existing literature referenced and clearly cited?") was rated as "No," while all other items received "Yes" ratings.

2.3 Evidence Summary and Description After reading the full texts, we initially extracted 82 relevant pieces of evidence. Through analysis, comparison, and discussion, we merged identical or similar evidence and ultimately summarized 35 best evidence items, including 12 with strong recommendations (Level A). The evidence covered eight aspects: clinical characteristics, screening, comprehensive assessment, referral, hearing assistive device support, hearing rehabilitation training, social support, and health education for hearing loss in community-dwelling older adults (Table 4).

Screening: Institutions should select screening methods based on available equipment and personnel. The Hearing Handicap Inventory for the Elderly-Screening Version (HHIE-S) and pure-tone audiometry have been scientifically validated for community screening, with Level A evidence. A JAMA study demonstrated that combining these two tools yields optimal testing accuracy [27]. With the rapid development of mobile communication and internet technology, convenient hearing detection technologies have been widely applied, such as internet- or landline phone-based digit-in-noise tests and remote automated audiometry via mobile smart terminals (e.g., uHear, SHOEBOX Audiometry, and hearX) [28]. However, factors such as calibration accuracy, stimulus generation and reproduction precision, and potential external environmental interference during testing may cause discrepancies between screening results and actual hearing levels.

Referral: Timely referral is a critical component of hearing loss management in primary healthcare, ensuring that older adults receive specialized diagnosis

and treatment to prevent further deterioration. Referral decisions should be based on clinical urgency and treatment timeliness. For example, acquired unilateral hearing loss with ipsilateral sensory deficits or facial drooping requires referral within 24 hours, as this may indicate neurological problems (e.g., cerebrovascular accident, facial nerve palsy, tumor) that could lead to functional impairment or life-threatening complications if not promptly treated. Older adults with hearing loss face heightened risks of social isolation and psychological disorders [3]; primary healthcare providers should enhance their sensitivity to these issues, promptly identify them, and refer patients to psychological specialists for effective diagnosis and treatment, thereby improving overall health outcomes.

Discussion

3.1 Strengthening Screening for Early Detection of Age-Related Hearing Loss Age-related hearing decline typically affects high-frequency sounds first, having minimal impact on daily communication and thus often going unnoticed. Moreover, presbycusis progresses slowly, taking approximately 5-10 years to advance from mild to severe severity, during which most older adults gradually adapt until the loss severely impacts their quality of life or social functioning. Therefore, implementing screening and early detection of age-related hearing loss in community-based primary healthcare institutions is crucial. Currently, most primary healthcare institutions in China have not yet been fully equipped with systematic hearing screening devices; this study recommends five screening methods that institutions can select based on their equipment and personnel resources.

3.2 Referral as a Critical Component of Community-Based Hearing Loss Management Timely referral is essential for managing hearing loss in primary healthcare settings. This evidence summary clearly distinguishes specific criteria for emergency, short-term, and routine referrals, which primary care physicians should strictly follow to ensure timely diagnosis and treatment, preventing hearing loss progression or complications. Hearing loss in older adults carries higher risks of social isolation and psychological distress [3]; primary healthcare providers should enhance their awareness of these issues, identify them promptly, and refer patients to psychological specialists for effective diagnosis and treatment, thereby improving overall health outcomes for older adults with hearing loss.

3.3 Multidimensional Intervention for Optimal Hearing Rehabilitation Hearing loss profoundly affects older adults across physiological, psychological, and social dimensions, necessitating a multidimensional rehabilitation approach. Hearing aids are the first-line option for hearing compensation in older adults with mild to moderate hearing loss, as they not only improve listening performance by reshaping auditory pathways and overcoming communication and psychological barriers but also significantly slow the progression of

Alzheimer' s disease [29]. However, only 5%-10% of older adults with hearing impairment in China use hearing aids, with a major reason being poor user experience due to lack of professional guidance for home use [2]. Therefore, timely post-fitting support from primary healthcare providers—including hearing aid adjustment, maintenance guidance, and effectiveness evaluation—is essential for improving adherence and ensuring maximum benefit.

Auditory rehabilitation training aims to help patients adapt to hearing decline and enhance communication and cognitive functions. Since rehabilitation effects are typically gradual and the process can be monotonous, individualized rehabilitation should be implemented based on thorough assessment of patients' communication needs, psychosocial status, and treatment expectations [26]. Remote education and smartphone applications have proven effective tools for home-based rehabilitation training, enhancing patient engagement and compliance, thereby improving outcomes. Social support is a critical factor in the psychosocial rehabilitation of individuals with hearing loss. When peers and family members master effective communication strategies and encourage active social participation, they help reduce risks of cognitive decline, depression, and other affective disorders [15]. Finally, primary healthcare institutions should strengthen health education on hearing protection, promoting early intervention including ear cleaning, noise avoidance, ototoxic medication avoidance, balanced nutrition, and chronic disease management.

Tables and Figures

Table 1: PubMed search strategies
Figure 1: Flow chart of literature screening
Table 2: Basic characteristics of included studies
Table 3: Quality evaluation of included guidelines
Table 4: Summary of Best Evidence for Managing Hearing Loss in Elderly Individuals at Primary Healthcare Institutions

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