



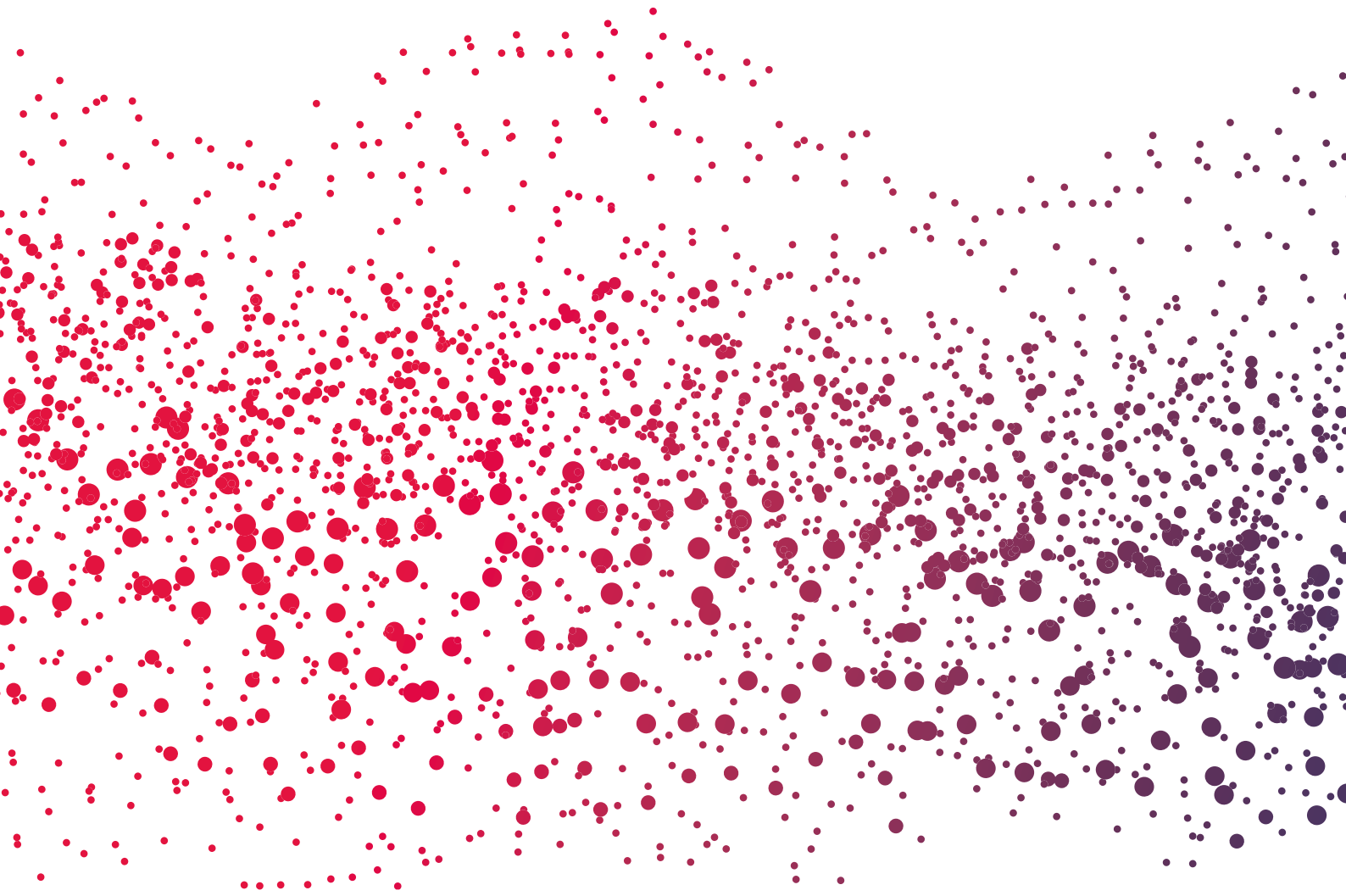
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Otology & Audiology Article Review

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Significance of endolymphatic sac surgery with and/or without simultaneous cochlea implant surgery.

A Nationwide Population-Based Study for the Recurrence and Comorbidities in Sudden Sensorineural Hearing Loss.

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EDITORIAL



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Dear Reader, the Amplifon Centre for Research and Studies, CRS, houses one of the finest private libraries in the field of audiology and otorhinolaryngology, offering the sector's most important international journals. Every quarter, a team of Amplifon Audiologists from around the globe select the most relevant publications in the field of Otology and Audiology and make a comprehensive review. The Amplifon Centre for Research and Studies coordinates the development of this quarterly review. We are happy to share these new reviews with you. For this issue, our team reviewed 10 interesting articles published in the first quarter of 2024.

This review covers five studies related to hearing aid fitting, each shedding light on different aspects of this field. Firstly, the Australian ENHANCE prospective longitudinal study of cognitive outcomes after three years of hearing aid use in older adults concludes that the use of hearing aids may delay the decline in cognition for older subjects with presbycusis. Another paper discusses the impact of hearing aids on individuals with normal hearing who struggle with speech understanding in noise. Our reviewers also explored a comparison between self-reported outcomes and behavioural speech perception tasks, offering insights into the effectiveness of hearing aids in noisy settings. Another area of focus is the predictive capabilities of the revised hearing handicap inventory compared to the pure tone average in determining hearing aid usage. Lastly, we bring to your attention a particular topical paper investigating the differences in amplification accuracy between hearing aids and direct-to-consumer devices for various types of hearing loss.

In addition to these studies, the review examines an article on how adults articulate and communicate the listening difficulties they experience to their hearing care practitioner; as well as another on how school-age children perceive voice cues with hearing aids.

Furthermore, we explore the significance of endolymphatic sac surgery with and/or without simultaneous cochlea implant surgery in managing vertigo and speech perception in patients with Menière's disease.

We also present a review on the potential of virtual clinics to enhance accessibility of ENT specialists for patients requiring more urgent face-to-face appointment?

Lastly, we conclude this journal with a review of a nationwide population-based study focusing on the recurrence and comorbidities associated with sudden sensorineural hearing loss.

We hope you enjoy this issue of our CRS Scientific Journal.

Mark Laureyns

Global International CRS & Medical Scientific
Research Manager





ENHANCE: A COMPARATIVE PROSPECTIVE LONGITUDINAL STUDY OF COGNITIVE OUTCOMES AFTER 3 YEARS OF HEARING AID USE IN OLDER ADULTS



Sarant JZ., Busby PA., Schembri AJ., et al.
Front Ageing Neurosci (2024): 15, 1302185
 doi: 10.3389/fnagi.2023.1302185.
 By Mark Laureyns, Italy, Belgium.

The participants using hearing aids showed stable results for the cognitive test battery, whereas the control group, who did not use hearing aids, showed a significant decline over the three-year period covered by the study.

INTRODUCTION

It has been established that medication has minimal impact on dementia, current efforts focus on treating modifiable risk factors. Hearing intervention may play a key role in mitigating dementia risk, with three hypotheses explaining the potential causal mechanisms linking hearing loss and dementia:

The brain structure and functionality are altered as a result of the reduced auditory input impacting mental processes. Cognitive resources (such as attention, memory, and mental effort) are reallocated from one task to another and eventually exhausted due to prolonged mental effort to compensate for the reduced and distorted auditory functionality.

Hearing loss (HL) leads to limited social contacts and interactions, contributing to feelings of solitude and depression, ultimately resulting in changes in the brain.

The authors outline the limitations of earlier research on the impact of hearing care on the relationship between HL and cognition and/or dementia. Most of these studies were retrospective, used inadequate or non-validated cognitive test-batteries unsuitable for people with HL, had short follow-up periods, failed to assess changes in HL over time, and often lacked a proper control group.

In particular, the authors reference the ACHIEVE study, the first randomised control trial on this topic (see the review in our CRS Scientific Journal Vol 6.4 2023, page 63), highlighting several limitations, including the use of cognitive test batteries requiring auditory inputs for people with HL and the reliance on telephone assessments during the COVID-19 pandemic, which were compared to in person assessment for some subjects.

The proposed 'Evaluation of Hearing Aids and Cognitive Effects (ENHANCE)' study, explores the impact of hearing

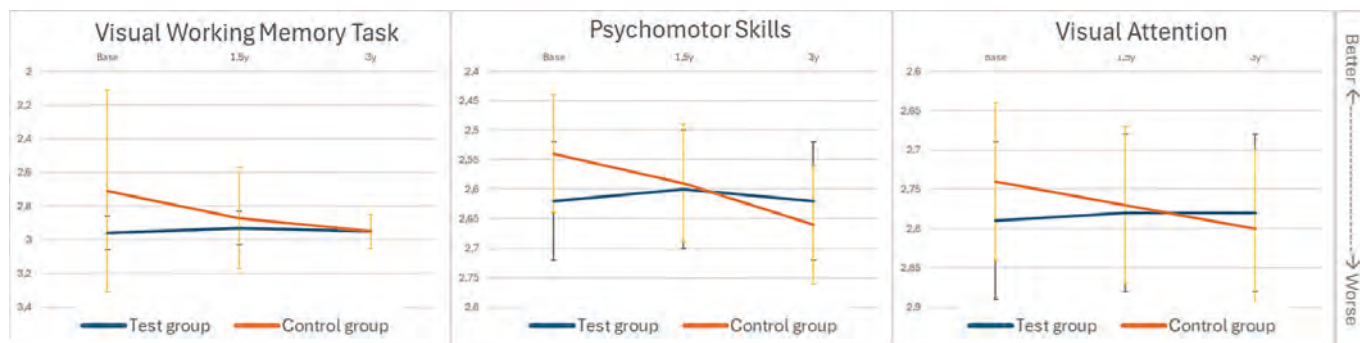
CRITICAL NOTE

This insightful study is a valuable addition to the ACHIEVE study, demonstrating that over a three-year interventional study, subjects with presbycusis using HAs exhibit slower cognitive decline than a control group not using HAs. Unfortunately, the significant dropout in this study (66% for the test group and 82% for the control group) resulted in a very small sample size at the end of the study. While the authors raise valid criticisms of the ACHIEVE study, it is worth noting that only 2% of the 488 test subjects, and 16% of the 462 control subjects dropped out, resulting in a much larger sample size at the study's conclusion, while using a randomised control trial design, which is widely regarded as more evidence-based.

aid (HA) use for subjects with presbycusis using a validated visual cognitive test battery in order to avoid any potential influence of HL on the results, over a three-year period. The study also evaluates the effectiveness and daily HA usage hours over time. These results were compared against a control group, using the same test battery over the same three-year period.

METHODOLOGY

In this study, 160 subjects aged 60 years or older (avg. age=73y / 49% female), with a WHO index (PTA4) of 20dBHL or higher, who passed the cognitive test battery and accepted to be enrolled in the study, were fitted with HAs by experienced audiologists, following a quality clinical protocol. All subjects underwent the cognitive test battery and hearing evaluation at baseline, at 1,5 years and 3 years after initial fitting.



The results were compared against a control group of 102 participants (avg. age=74y / 56% female) from the Australian Imaging, Biomarker and Lifestyle Flagship Study of Ageing (AIBL) study, who did not use HAs, and were administered the same test battery at identical intervals.

The cognitive test battery used was the visually presented 'Cogstate computerised Brief Battery'. Following a brief training session, participants completed the computer-based test individually, in a room devoid of any auditory inputs. This test battery is designed to evaluate cognition and track performance changes over time, across a range of cognitive domains including: 'psychomotor skills'; 'visual working memory'; 'visual attention'; and 'visual learning'.

Hearing was evaluated using pure tone audiometry (PTA) with headphones and speech audiometry both in quiet and in noise, in free field conditions. For HA users, these were also conducted in the aided condition.

Additional aspects evaluated across both groups include: Medical Anamnesis; APOE 4 allele gene; the HADS (Hospital Anxiety and Depression Scale); the IPAQ (International Physical Activity Questionnaire); and subjects level of education (more or less than 12 years of education).

RESULTS

Of the 160 subjects in the test group at baseline, 99 dropped out before the 1.5-year assessment, and an extra 7 dropped out before the 3-year assessment. From the 102 subjects in the control group (AIBL) at baseline, 53 dropped out before

the 1.5-year assessment and an additional 31 dropped out before the 3-year assessment.

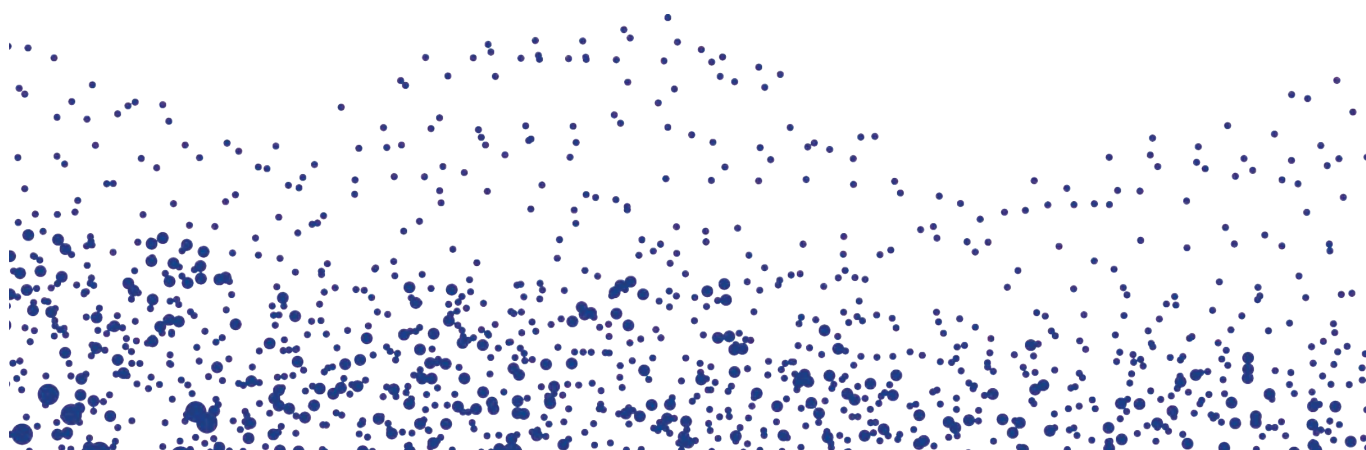
At baseline, the control group scored significantly higher than the test group in all aspects of the cognitive test battery. However, at follow-up, the test group did not exhibit a decline over time for three of the four aspects of the cognitive test battery, except for Psychomotor skills (-0.4%). In contrast, the control group showed a significant decline in Working Memory (-3.1%), Psychomotor skills (-1.2%) and Visual Attention (-0.8%).

STUDY LIMITATIONS

The authors caution against generalising the results due to the limited sample size at the 3-year assessment period, which they attribute to the COVID-19 lockdown. They also highlight potential bias in participant selection, as the test group entered the study with the expectation of being fitted with HAs, whereas the control group only agreed to have the assessment. It is important to stress that, as such, this is not a randomised control trial.

CONCLUSIONS

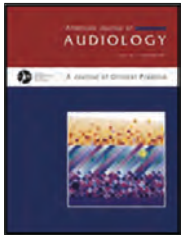
The HA group maintained stable cognitive performance across the battery over the three-year period, whereas the control group, without HAs, experienced a significant decline in working memory, psychomotor skills, and visual attention over the same period. These findings suggest that the use of HAs may delay the decline in cognition for older subjects with presbycusis. •





COMPARING DIRECT-TO-CONSUMER DEVICES TO HEARING AIDS:

AMPLIFICATION ACCURACY FOR THREE TYPES OF HEARING LOSS



Sheffield SW., Jacobs M., Ellis C Jr, et al.

Am J Audiol. (2024): 33 (01), 139–50

doi: 10.1044/2023_AJA-22-00170.

By Katrien Cambier, Belgium

The authors assess the accuracy of amplification provided by over-the-counter hearing aids compared to conventional hearing aids for the three most prevalent types of hearing loss.

In response to the growing demand for greater accessibility to hearing health care, the FDA (Food and Drug Administration) in the US enacted legislation allowing for the sale of over-the-counter hearing aids (OTC-HAs). This legislation contains specific guidelines that these devices must meet. The goal of this study was to compare the accuracy of amplification of these devices compared to traditional hearing aids (HAs), across three types of the most common forms of hearing losses (HL).

BACKGROUND:

With traditional models, dispensing HAs always involves an accurate fitting by a qualified hearing care professional (HCP). Taking into account individual goals and the specific nature of patients' hearing impairment, the HCP selects appropriate HAs and performs a fitting according to a specific target rule. The objective is to achieve the best possible speech understanding by reaching an amplification within 5dB difference to the prescribed target.

The category of direct-to-consumer devices (DTCDs) includes both OTC-HAs and personal sound amplification products (PSAPs). PSAPs are designed to offer support in certain listening situations, they do not compensate for specific forms of HL. The FDA's recent regulations primarily apply to the OTC-HAs; however, the authors included both categories in this study.

METHOD:

Four categories of devices were included: high-technology HAs; basic-level HAs, PSAPs; and OTC HAs available to the public on the online market. All devices were tested in a 2cc coupler and fit to best approximate the NAL NL2 target rule within the frequency range of 250Hz- 8000Hz. These measurements were performed for three distinct audiometric

CRITICAL NOTE:

The availability of DTCDs is poised to continue growing in the coming years, the FDA bill is a first step in regulating this online market in the US, and no doubt this trend will spread to Europe. Further research and regulation will be necessary to ensure the quality of available 'self-fitting' devices, and for safeguarding consumers from potentially exacerbating their hearing loss with incorrect adjustments. While this study examined different degrees of neurosensory hearing loss, it did not look at more complex configurations, such as those involving a bone conduction component. Despite the surge in the online market, HCPs can still make a difference by maintaining fitting quality through detailed anamnesis, adequate goal definition and real ear measurements.

configurations: mild to moderate sloping sensorineural hearing loss (SSHL); mild to severe sloping SSHL; flat moderate SSHL. These configurations were selected because consumers purchasing a DTCD online often lack awareness of their specific hearing impairment and its severity.

Devices were programmed using the manufacturer's software (or the included application) with real ear measurements on a KEMAR dummy. Subsequently, data was then gathered on the gain provided by all devices across three speech signals (carrot passage) in low (55dB SPL), medium (65dB SPL) and loud (75dB SPL) input levels.

RESULTS:

A detailed statistical analysis yielded the following findings: High-level HAs exhibit the smallest deviation from target

across all three audiometric configurations, trailed by low-level HAs, PSAPs and last OTC-HAs.

With mild to moderate HL, the deviation from the target was found to be larger in PSAPS, OTC-HAs and low-level HAs, compared to high-level HAs. These differentials remained relatively constant across all input levels and frequencies. For flat moderate HL, the performance of low-level HAs closely resembled that of high-level HAs, although distinctions persisted between high- and low-level inputs.

With mild to severe HL, a significantly higher difference was found between low and high-level HAs, on the one hand, and OTC-HAs and PSAPs on the other.

When examining the impact on the speech signal and assessing a deviation of ± 5 dB from the target, the study reveals that all high-level HAs met the prescriptive targets. Low level HAs performed similarly overall, except for one target, with overamplification in low frequencies). Conversely, results for OTC-HAs and PSAPs show several missed targets by more than 5 dB. The most common deviation obtained in OTCHAs is an overamplification in low frequencies for mild to moderate HL and under-amplification of high frequencies for all three audiometric configurations. PSAPs exhibit a significant over-amplification in low frequencies combined with under-amplification of high frequencies.

Lastly, the effects of compression were analysed through low-, average-, and high-level speech inputs for mild to moderate HL. Results showed that PSAPs and OTC-HAs did not perform as effectively as low- and high level HAs, and failed to adequately adjust gain for the various input levels. PSAPs and OTC-HAs tend to prioritise meeting average-level speech input targets first, and then try to adjust to high- and low-level input.

DISCUSSION

Using real ear measurements, the authors were able to assess the potential of each type of device to approach the NAL NL2 target rule, across three levels of degrees of HL. As can be anticipated, HAs, both high and low levels, demonstrated superior performance in meeting these targets. Greater variability in results was measured for DTCDs. This variability

can be attributed to variations in the degrees of HL as well as the specific devices selected for the study. Overall, the study shows that among the chosen DTCDs, low frequencies meet – or exceed – the target, while often failing to provide adequate amplification at high frequencies. This aligns with previous studies (Reed et al 2017).

Regarding compression, DTCDs offer a more linear gain compared to HAs.

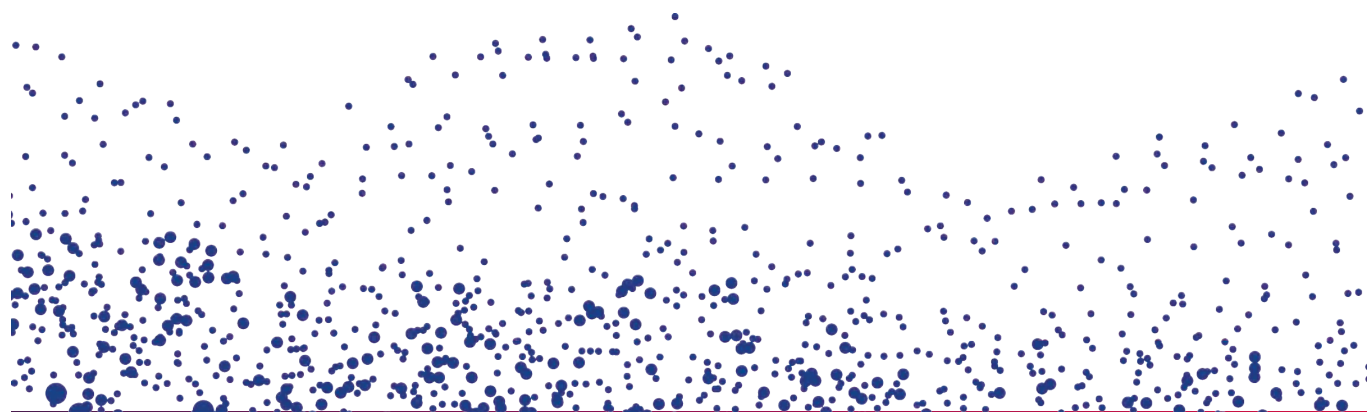
As for the fitting process, it is important to note that in this study, measurements were performed by trained clinicians with the required expertise. It is unlikely that untrained individuals could achieve similar results. That being said, the goal of DTCDs is not to be programmed according to prescriptive targets to ensure optimal sound quality and improvement in speech understanding.

The new law, passed in mid-October 2022, aims to broaden access to OTC-HAs for a larger segment of the US population with mild to moderate HL, thereby removing the financial barrier to treating HL. This law states that tests and tools for fitting these devices should be available to consumers, but not how this self-fitting process should be conducted. However, if this personalisation is not overseen by a HCP, concerns arise regarding the quality of the fitting of the device. Previous studies show that particularly vulnerable populations require more support. and that satisfaction with self-fitted devices tends to be lower compared to HAs fitted by an audiologist.

CONCLUSION

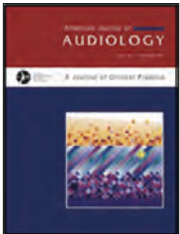
With the implementation of the FDA's new law, OTC-HAs are expected to become increasingly prevalent in the years ahead. However, there is a wide variability in the quality and functionality of these devices, particularly for HL greater than mild to moderate.

One key reflection around these findings is that the fittings were conducted by trained clinicians, not by average individuals with HL, lacking prior knowledge. It is doubtful that untrained individuals could achieve the same fitting precision. Further research around how effectively consumers can fit their own DTCDs without health care support is warranted. •





THE REVISED HEARING HANDICAP INVENTORY AND PURE-TONE AVERAGE PREDICT HEARING AID USE EQUALLY WELL



Dillard LK., Matthews LJ. & Dubno JR.

Am J Audiol. (2024): 33, 199–208

doi: 10.1044/2023_AJA-23-00213.

By Carrie Meyer, US

This study drew upon participants from a longitudinal cohort study focusing on age-related hearing loss. Its objectives were twofold: first, to determine the optimal cut point values on the 18-item Revised Hearing Handicap Inventory (RHHI) and pure tone average (PTA) for predicting the necessity of hearing aids; and second, to determine the accuracy of both assessments in predicting hearing aid candidacy.

INTRODUCTION:

Hearing loss (HL) poses a significant public health issue, especially among older adults. Assessment of hearing function stands as a critical component in identifying and treating HL. While pure tone testing is widely recognised as the most accurate diagnostic tool, accessibility can be a challenge in areas with scarce trained clinicians or limited testing facilities. Self-reported hearing surveys can be a low-cost method of evaluation used to establish hearing aid (HA) candidacy and determine which patients may benefit from a complete audiometric evaluation.

The Revised Hearing Handicap Inventory (RHHI) is an 18-item survey adapted from the Hearing Handicap Inventory for the Elderly (HHIE) and the Hearing Handicap Inventory for Adults (HHIA). Unlike pure tone audiometry, which measures hearing thresholds, the RHHI describes the effects of HL on functional communication skills.

In this study, the researchers evaluated the ability of RHHI and PTA to predict the need for HAs. They established a set of cut point values for both the RHHI and PTA. Any individuals whose PTA or RHHI score exceeded the established cut point value would be referred for audiologic evaluation to determine their need for HAs.

METHODOLOGY:

Participants were recruited from the Medical University of South Carolina (MUSC) Longitudinal Cohort Study of Age-Related Hearing Loss, an ongoing (1988-current) community-based cohort study based in Charleston, South Carolina.

From a total of 1,776 cohort participants, 581 participants were included, meeting the criteria of having completed RHHI and PTA data from at least two examinations, conducted at

CRITICAL NOTE

Pure tone audiometry remains the benchmark for hearing assessment, in areas with limited resources, alternate evaluations of hearing function that require little or no equipment can be a cost-effective tool to identify patients in need of further evaluation. The RHHI is an accessible hearing survey, requiring nothing more than pencil and paper to administer. This study evaluates the effectiveness of the RHHI in identifying patients with reduced hearing ability and establishes RHHI and PTA cut points to aid in identifying potential candidates for hearing aids.

least six months apart. None of the participants were HA users at the time of the study.

The HHIE/A was administered using paper and pencil before participants underwent health history and audiometric testing. RHHI scores were derived from HHIE/A responses. Possible responses were 'Yes' (4), 'Sometimes' (2), and 'No' (0); the total score was obtained by summing all the response, the higher the score, the greater the hearing difficulties.

Audiometric assessments were conducted in a sound treated booth with ANSI calibration, using TDH 39 headphones. PTA measurements were obtained for the poorer ear and used for all analyses. PTA was calculated using frequencies of 0.5; 1; 2; and 4 kHz for each ear.

The RHHI and PTA were modelled separately and then together. The Youden Index was used to determine optimal cut point values, where sensitivity and specificity are equally important. This study established the optimal cut point using the Youden index for the RHHI score to predict audiometric

HL, defined as PTA > 25dB HL in the poorer ear. RHHI scores increase as the PTA increases.

RESULTS:

This study determined that the RHHI is comparable to the PTA in predicting the need for HAs. Given its affordability, its simplicity to administer and the fact that it requires no special equipment or personnel, the RHHI can be used in settings where standard audiometry is not available. The authors propose that the RHHI could serve as a HL screening tool, to identify individuals who require more comprehensive assessment and treatment for HL.

STUDY LIMITATIONS:

This study may be limited by the relatively small and specific patient population evaluated. Using participants who were not HA users and who also had at least two examinations that included RHHI data resulted in only 581 study participants.

Moreover, this study drew from a clinical population rather than a broader demographic, potentially affecting the study outcome. Clinical populations tend to skew older and exhibit more pronounced HL compared to the general population.

Lastly, the use of a community-based cohort means that the study participants hail from a limited geographic area, which, in turn, may limit the generalisability of the study's findings.

CONCLUSIONS:

This study highlights that both PTA and the RHHI are good predictors of HL and HA use. However, it also indicates that combining the RHHI and PTA yields improved predictive accuracy. The authors state that: 'the RHHI and PTA capture some overlapping, yet some distinct constructs related to hearing'.

PTA is renowned for its ability to objectively assess impairment. In contrast, RHHI is a self-reported survey of hearing, and appears to better reflect functional impairment, limitations in activities, and the overall burden HL places on daily life participation.

While both the RHHI and PTA are valuable in identifying potential HL, in areas with limited resources, the RHHI could serve as a practical alternative to gauge the functional impact of HL and guide referrals for more comprehensive audiologic assessment and management. •

HEARING AIDS REDUCE SELF-PERCEIVED DIFFICULTIES IN NOISE FOR LISTENERS WITH NORMAL AUDIOGRAMS



Mealings K., Valderrama JT, Mejia J., et al.

Ear Hear. (2024): 45(1), 151–63

doi: 10.1097/AUD.0000000000001412.

By Lynn Stephenson, US

This study aimed to assess the effectiveness of hearing aids as a potential solution for individuals with normal hearing who experience difficulties understanding in noise.

BACKGROUND AND INTRODUCTION

A segment of the adult population has normal audiograms yet report difficulty hearing in noisy environments. These individuals have a higher level of hearing handicap and are more motivated to pursue treatment. However, clinicians can at times be at a loss as to recommending appropriate treatment for them. Only a few studies have explored mild gain hearing aids (HAs) as a treatment option; however, the

CRITICAL NOTE:

Hearing aids are an effective treatment option for individuals with normal hearing who experience hearing challenges in noisy environments. It is important to counsel that although diagnostic tests may indicate normal hearing function, the actual assessment of benefit lies in the consumer's real-world experience and perception.

outcomes have not provided sufficient cost justification for this treatment.

PARTICIPANTS

The authors defined four inclusion criteria for this study: participants ranged in age from 18 to 70 years old; had normal air conduction thresholds as measured at 500–4000 Hz; described subjective difficulty hearing in noise; and were proficient in English.

DESIGN

The study consisted of two phases and include three experimental visits. In Phase I, participants were asked to rate their hearing in noise difficulties using the Speech, Spatial and Qualities of Hearing (SSQ) speech subscale and using an ‘ecological momentary assessment’ (EMA) application installed on their smartphone for six weeks across a variety of noisy environments.

In Phase II, using a double-blind model, participants were randomly assigned into either the control group or the experimental group. All participants wore Phonak Marvel Audeo M50-312 HAs binaurally. The HAs of the control were configured so as to provide no amplification or other advanced features, such as directionality and noise suppression. In contrast, the experimental group was fit with mild (6 dB average gain 1–8 kHz) gain HAs and a Speech in Noise program utilising noise reduction and directionality. Fittings were verified using Real Ear measures. Participants were asked to use the HAs for an additional period in noisy situations and complete the EMA surveys.

At the final appointment, both groups were asked to complete the SSQ-Speech questionnaire, the Satisfaction with Amplification in Daily Life (SADL) questionnaire as well as an end-of-study open-ended questionnaire regarding HA use and whether they would consider purchasing the devices.

MEASURES

All participants completed two objective measures to evaluate speech in noise performance in unaided and aided conditions as well as a mental effort assessment. The Everyday Conversational Sentences in Noise (ECO-SiN) test, a relatively new test that uses recorded real-world background noise and naturally produced speech to determine listening ability, was employed to assess listening ability. This enabled the researchers to determine the SRT-50.

The mental effort assessment involved a dual task of listening to an auditory stimulus in noise and responding with a visual task based on the gender of the auditory stimulus. This was measured in terms of intelligibility, reaction time from onset of stimulus to press of the button, and self-reported effort. Participant completed two trials of each for both unaided and aided conditions.

RESULTS

All participants reported difficulty hearing in noise as measured by the SSQ-Speech in unaided condition. However, in the aided condition, the experimental group reported significantly lower levels of difficulties. On measures of the Satisfaction with Amplification in Daily Life (SADL), the experimental group showed higher levels of satisfaction with the HAs than the control group. The end-of-study questionnaire revealed that 91% of the experimental group reported improved hearing in noisy environments with the HAs, and 73% reported they would use them in similar situations in the future. Conversely, the majority of control group users did not find the devices helpful and showed no interest in using them in the future. None of the participants in either group were willing to purchase the devices, indicating the perceived benefits do not justify the cost.

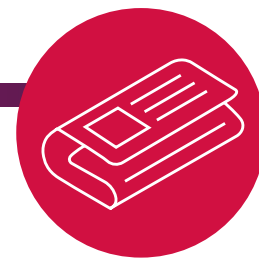
The EMA data was categorised into three factors: hearing experience; device performance; and acoustical challenge. Among the experimental group, there was a 25% median increase in hearing experience and device performance when aided, compared to the control group. The experimental group also rated the environments as less challenging when aided, unlike the control group.

There were no significant differences in Speech-in-Noise performance between the aided and unaided conditions for either group. Additionally, all measures of mental effort were comparable between the two groups, indicating no significant differences in intelligibility, reaction time and effort between aided and unaided measures.

DISCUSSION

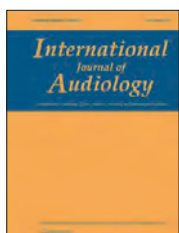
The results of this study are consistent with previous research suggesting that mild gain HAs subjectively reduce difficulty hearing in noise. The EMA real-world data indicated that the experimental group reported a better hearing experience, even in challenging acoustic environments. As the first study to leverage EMA data, it provides valuable insights into patient-reported benefit.

Although subjective benefits were reported, objective measures fail to corroborate these findings. The authors suggest that objective tests assess specific processes and might not fully capture real-world listening experiences. Lastly, the authors debate the impact of HA benefits on uptake rates, as consumers do not feel the benefits are significant enough relative to the cost. This poses implications for the PSAP or hearable market. The authors advocate for further research comparing the efficacy of hearables to HAs to determine viable solutions for individuals facing hearing difficulties. •



A SCOPING REVIEW EXPLORING HOW ADULTS SELF-DESCRIBE

AND COMMUNICATE ABOUT THE LISTENING DIFFICULTIES THEY EXPERIENCE



McNeice Z., Tomlin D., Timmer B., et al.

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By Michael Joseph, US

The manner in which adults articulate their listening challenges to their audiologists remains unclear. This scoping review aims to explore how adults self-describe the listening difficulties they experience, and communicate them to professionals.

BACKGROUND & INTRODUCTION

Hearing loss (HL) is a prominent public health issue in Australia, ranking third among common chronic health conditions. Left untreated, HL can lead to various issues, including fatigue and social withdrawal. Hearing aids (HAs) are typically prescribed for adults with HL, offering improve access to sound and easing listening challenges. However, despite advancements in HA technology, the proportion of people who own HAs remains disproportionately low relative to the prevalence of HL. For instance, only 33% of older Australian adults with bilateral HL reported owning HAs. Existing literature in audiology has shown that HA uptake rates are negatively impacted by patient-centred care, emphasising the importance of audiologists truly grasping their patients' needs to boost overall HA adoption. However, interviews with patients show that that is not the experience that is always reported.

Some patients express concerns that audiologists do not always fully understand their listening difficulties or address the psychosocial concerns they have. This sentiment is echoed by prior studies that show that audiologists tend not to respond appropriately to the concerns expressed by patients (Manchaiah et al. 2019).

In current practice, audiologists assess patients' listening difficulties using self-report questionnaires or interviews, which may lack depth. Ecological Momentary Assessment (EMA) has emerged as a promising approach, allowing patients to document their experiences in real time. Integrating EMA into digital tools for pre-appointment use or ongoing monitoring could improve patient-centred care. Understanding how patients describe their listening difficulties is essential for informing the development of such tools.

There is limited research regarding how adults communicate

CRITICAL NOTE

Although some studies included in this review had a narrow scope, the author's incorporation of a wide range of contexts offers valuable insights into this topic. However, the lack of information on participant characteristics and research settings limit the generalisability of its findings. Further research is needed regarding how adults communicate their difficulties to audiologists, potentially leveraging digital tools for real-time recording. Such tools hold the potential to enhance communication, empowering patients to conveying their experiences effectively.

their listening difficulties to audiologists, and little is known about adults' preferences for discussing these difficulties with their audiologist. Understanding how adults express their listening challenges and their communication preferences is vital for improving their experience during audiology appointments. The review under study seeks to bridge this gap by exploring existing literature on how adults describe and communicate their listening difficulties, particularly in clinical settings.

METHOD

An initial search of existing literature was completed, revealing a lack of literature available. Therefore, a scoping review was chosen as the most suitable review type given its exploratory nature. Studies were included if they met specific criteria: studies that included: adults who experienced or had experienced listening difficulties; participants identified and/or described listening difficulties that they experienced; and the study was in English.

RESULTS

Literature and Characteristics of Included Studies

In September 2022, a literature search yielded 10,224 studies after removing duplicates. After screening titles and abstracts, 448 studies underwent full-text assessment, however three full-text articles were unavailable, resulting in a total of 445 articles to be assessed. Of these, 383 were excluded, leaving a total of 62 studies which were analysed in greater depth, with seven being later excluded. Ultimately, 55 studies were included for analysis.

The study encompassed various qualitative research methods such as interviews (structured or semi-structured), focus groups, questionnaires, and case histories. Questionnaire-based studies included open-ended questions. Sample sizes varied greatly, ranging from 1 to 4,266 participants, all of whom were adults experiencing varying levels of HL. Study populations included both hearing device users and non-users. Studies were conducted across diverse geographic locations, including Australia, Canada, China, Denmark, Italy, Spain, Sweden, New Zealand, the Netherlands, the United Kingdom and the United States. Three overarching themes emerge, each with its corresponding subcategories.

Reasoning and explanations for listening difficulties.

Adults provided descriptions of situations in which they experienced listening difficulties. Situations ranged from understanding amplified noise (e.g. TV, radio, telephone, etc.) to difficulties in listening in more complex and dynamic situations (e.g. such as background noise, group conversations, noisy environments, etc.), and challenges in hearing environmental warning sounds as clearly (e.g. doorbells, telephone rings, car indicators).

The reported hearing difficulties often included factors known to make listening more challenging, such as reverberant rooms. Participants also reported how certain speaker attributes, such as speed, pitch and tone of voice, impacted their ability to understand. In certain instances, adults with HL recognised that they resorted to making excuses to account for the communication breakdowns, such as blaming others for not speaking loudly enough.

Many adults described strategies they would implement to overcome perceived difficulties. A common response was to try to enhance the incoming signal, such as adjusting the volume on the TV or the radio or repositioning themselves in the optimal location for listening. Some reverted to written communication where possible, preferring mediums such as email or text. There were even some instances where individuals opted to write notes rather than relying on lipreading. Lastly, some admitted to concealing their HL

altogether, by pretending to hear and saying, 'yes, yes' in an effort to cover up missed information.

IMPACTS OF LISTENING DIFFICULTIES

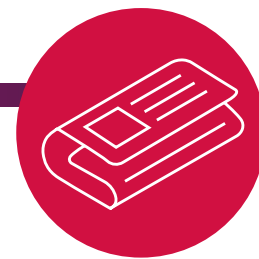
Listening challenges can profoundly impact both individual wellbeing and lifestyle. Socially, individuals might find themselves participating less in social settings, or struggling to engage fully due to communication hurdles. This can lead to social isolation, strained relationships, and feelings of frustration. Physically, the heightened effort required to overcome listening difficulties can result in increased stress and fatigue. Emotionally, individuals may grapple with feelings of sadness, anxiety, embarrassment, or dependency on others. Lifestyle impacts include limitations in various situations, such as work environments where communication is essential, and in some instances even posing risks to safety when warning sounds are not heard.

DISCUSSION

This literature review provides a comprehensive synthesis of adults' qualitative descriptions of their listening difficulties, enriching our understanding of the issue. Adults convey their listening difficulties by detailing contextual factors, describing their own responses, and discussing the impacts. The diverse descriptions highlight the extent to which listening difficulties are individualised, consistent with studies showing personalised psychosocial impacts. Adults stress the importance of sharing their experiences with clinicians, enhancing their involvement in decision-making. While some studies had relatively narrow scopes, the review's incorporation of varied contexts can deepen the understanding of clinicians. Nonetheless, incomplete participant characteristics and unclear settings hinder the generalisability of this review's findings. Further research is needed on how adults communicate their difficulties to audiologists, potentially facilitated by digital tools enabling real-time recording. Such tools could improve communication and empower individuals to express their experiences more effectively.

CONCLUSION

This review reveals that when adults discuss their listening difficulties, they often provide detailed contextual information, articulate their difficulties, outline their own coping mechanisms, and discuss the impacts. However, the authors' review found no literature on what aspects of their difficulties adults struggle to communicate or what they would choose to share in a clinical setting. This gap is significant, given that adults often report feeling misunderstood by their audiologists. Future research could investigate what adults find challenging to communicate and develop clinical tools to facilitate personalised communication between adults and audiologists. •



PERCEPTION OF VOICE CUES IN SCHOOL-AGE CHILDREN WITH HEARING AIDS



Babaoğlu G., Rachman L., Ertürk P., et al.

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doi: 10.1121/10.0024356.

By Pierre Devos–France

Intelligibility in competing noise is well known to be related to audibility and signal-to-noise ratio among hearing impaired subjects. This study investigates other speech cue factors influencing speech understanding in noise, facilitating voice segregation and locutor selection, and their evolution in childhood in children who use hearing aids.

Large bandwidth audibility, signal dynamic and signal-to-noise ratio are widely recognised as important for speech intelligibility in noise. Understanding in multi-taker environment also relies on voice segregation, relaying speaker-specific characteristics such as gender, age and size attributes. Both fundamental voice frequency (F0) and vocal-tract length (VTL) play pivotal roles in this process. F0 is directly correlated to the audibility of low frequencies and conveys linguistic and emotional information, while VTL analysis is based on the detection of temporal envelope cues and spectro-temporal modulations. These speech cues provide insights into locutor size, impacts vowel quality and globally contributes to speech intelligibility.

This study is the first step of a global Turkish project titled 'Perception of Indexical Cues in Kids and Adults in Turkish (PICKA-tr)'. The authors' objective is to investigate the measurable Just Noticeable Differences (JNDs) of F0 and VTL among school-aged children with hearing aids (HAs). The researchers further explored age-correlated evolution in of F0 and VTL JNDs, and subsequently, compared the JNDs results with average hearing levels.

The protocol was based on detecting one stimulus across three presentations of CVCVCV non-word items, during an adaptative task presented in the form of an electronic game interface. Items were generated using a female talker F0 and VTL were manipulated to find the Just Noticeable Differences (JNDs) detected by each subject. The effect of hearing thresholds on JNDs was further analysed using these three hearing level average calculations: PTA4 (0,5–4kHz); LFPTA (250 & 500 Hz), ELFPTA (125 & 250 Hz).

Participants:

- 55 bilateral paediatric HA users aged from 5.4 to 17.8 y (test group)
- 86 normal hearing (NH) children aged from 6 to 17.1 y (control group)
- 68 NH adults (control group)

CRITICAL NOTE:

This original study provides compelling arguments for early fitting, emphasising the importance of addressing fundamental frequency (F0) and vocal-tract length (VTL) as critical factors in speech understanding in noise. While some conclusions should be treated with caution, due to a potential socio-economic bias between tested and control groups, which could ultimately impact auditory experience. However, overall, the findings of the authors do draw attention to speech cues which are often overlooked by hearing care professionals (i.e. Fundamental F0 and Vocal-tract Length), inviting to reconsider them as playing an active part in speech understanding in noise. These results suggest that we, as professionals, need to reconsider our practices when testing children and fitting HAs (for children), paying particular attention to lower frequencies and HA (frequency) compression systems.

INCLUSION CRITERIA:

- Test group: HA user for a minimum of six months, whatever the degree and etiology of HL
- Control group: hearing thresholds < 20 dB HL between 500 and 4000 Hz

Exclusion: no ANSD profile for test group

RESULTS:

- (A) F0 JNDs: both groups exhibited age-related changes, significantly differing from each other between the ages of seven and 12. No significant difference was found before the age of seven or after the age of 12. This suggests that both NH and HI children undergo developmental progress in F0 analysis during early childhood (immaturity at birth!)

and that F0 analyses of HI subjects can equal NH individuals by adulthood (for permanent HA users)

- (B) VTL JNDs appears to develop with age only among the HI group, while JND values vary significantly between the control group and the test group irrespective of age. HI children consistently demonstrate poorer VTL analysers compared to their NH counterparts/subjects.
- When comparing JNDs results to HL averages of PTA4 or LFPTA, there was no correlation found with hearing level.
- F0 is correlated to hearing level average when compared to ELFPTA (extended low frequency pure tone average), highlighting the importance of audibility in very low frequencies during HA fittings. Frequencies around 125 Hz were considered to contribute to the analysis of voice fundamental frequency.

WHAT DOES THAT MEAN?

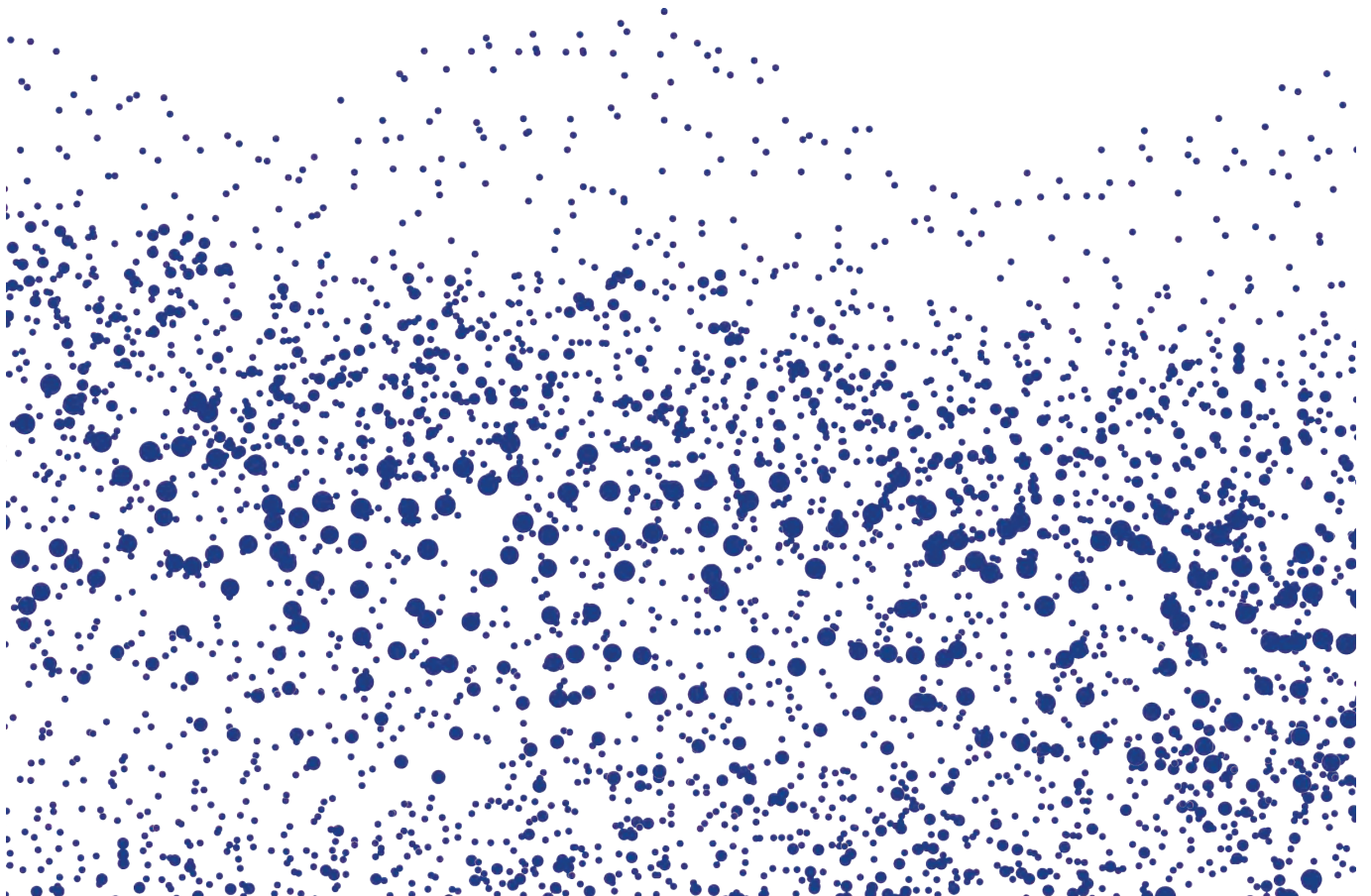
Concretely, these findings provide compelling arguments for very early intervention in HI children. Early fitting can result in a greater ability to use F0, and this study proves that rehabilitation is possible when HAs are used consistently. Conversely, this study does not establish the possibility of HI children reaching equal results as NH users in VTL analysis capabilities. However, this does not rule out that possibility! It appears that HI children consistently lag behind their NH counterparts in Vocal-tract Length analyses, likely due to the highly larger and multimodal mechanisms than only spectral resolution as well as the lack of audibility on the

entire bandwidth. Moreover, the authors highlight a potential bias concerning hearing experience between the test and control groups. It is plausible that greater hearing experience could result in a greater VLT analysis capacity. The children from the control group may have been perceived as having had a more comprehensive hearing experience than test group, possibly due to socio-economical differences across the two groups, and differences in recruitment modalities between the groups.

Whatever, the impact of these findings on hearing evaluations and HA fitting are substantial!

Considering F0 analyses capacities and its evolution with age, it is clear that the 125 Hz frequency deserves more attention than it currently receives! It must be accurately measured and restored appropriately with HAs. This implies a particular focus on amplification values, their evaluation and earmold quality. Additionally, there may be a need to critically reassess paediatric-specific gain calculations, as they often overlook this frequency area.

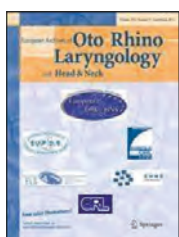
VTL analyses are influenced by audibility and spectro-temporal detection difficulties. Therefore, compressions ratios (WDRC) deserve particular attention during fitting in order to maximise the largest possible residual dynamic range. Additionally, frequency lowering systems should only be activated when the lack of audibility justifies their use and, when activated, these systems must be fitted precisely to minimise non-necessary signal (and envelope) distortions. •





SIGNIFICANCE OF ENDOLYMPHATIC SAC SURGERY WITH AND/OR

WITHOUT SIMULTANEOUS COCHLEA IMPLANT SURGERY IN RESPECT OF VERTIGO CONTROL AND SPEECH PERCEPTION IN PATIENTS WITH MENIÈRE'S DISEASE



Spiegel JL., Weiss BG., Mueller J., et al.
Eur Arch Otorhinolaryngol. (2024): 281 (2), 639–47
 doi: 10.1007/s00405-023-08122-6
 By Karen Lovelock, Australia

This study examined the impact of endolymphatic sac surgery (ESS) and/or cochlear implantation on the reduction of vertigo and hearing outcomes in patients with Meniere's disease.

The treatment of Meniere's disease (MD) focuses on reducing symptoms of vertigo while preserving hearing. A 2017 international consensus recommended a staged approach to treatment, including: 1. Changes in diet and lifestyle, vestibular rehabilitation and oral betahistidine; 2. Intratympanic corticosteroid injections; 3. Endolymphatic sac surgery (ESS); 4. Intratympanic gentamycin injections; 5. Labyrinthectomy. However, research into the efficacy of ESS has shown mixed results. Additionally, the potential impact on symptoms following manipulation of the perilymph associated with cochlear implantation (CI) has not been thoroughly explored. In order to address this gap, this study examined the impact of these two procedures – ESS and cochlear implantation, –on the management of vertigo and hearing outcomes in participants with Meniere's disease.

PARTICIPANTS:

A retrospective analysis was conducted on data from 86 patients who had been diagnosed with definitive or probable MD and who underwent ESS (45 patients), CI (12 patients), or both (29 patients).

METHOD:

Patients underwent ESS, and/or CI using a Cochlear Ltd or Medel device, using a round window approach. The ESS procedure involved either endolymphatic sac decompression or endolymphatic sac incision with the insertion of an endolymph-mastoid shunt. For patients receiving both procedures, endolymphatic sac decompression was performed first, followed by CI.

Following surgery, and a recovery period, patients were assessed for improvements in vestibular symptoms, as

CRITICAL NOTE

While the authors concede there are several limitations associated with the long-term retrospective nature of the study, their findings, thanks to the substantial sample size and longitudinal design provide valuable insights into the viability of CI in the elderly population. These insights are not only informative, but also generalisable.

well as residual hearing (using pure tone audiometry) and speech recognition ability (using monosyllabic wordlists).

RESULTS:

Demographic analysis revealed that the CI and CI + ESS groups were similar in age, while the ESS alone group was significantly younger, on average. Gender distribution was balanced across all groups. Participants in the CI alone group predominantly had a definitive Meniere's disease diagnosis; whereas the participants in the other groups generally had a probable diagnosis.

The greatest improvement in vertigo symptoms was observed in the CI alone group, with none of these participants requiring further treatment. In contrast, some participants in both the ESS and CI + ESS group required further treatment for vertigo symptoms. Objective vestibular function measurements were only available for a limited number of participants, primarily in the CI alone or CI + ESS groups.

Pure tone findings showed that the ESS alone group had better hearing function preoperatively. However, postoperatively, participants who had received a CI had better hearing as measured by pure tones in the free field.

While speech perception results were not available for all participants, available data indicated that the ESS alone group generally had the best preoperative speech perception scores, and the worst scores postoperatively.

DISCUSSION:

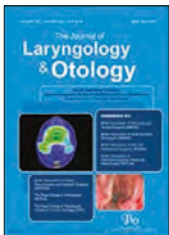
The objective of this study was to assess the impact of ESS and/or CI on the management of vertigo and speech discrimination postoperatively.

Among the three groups studied, the CI alone group showed

the most reduction in vertigo; whereas the ESS alone group showed the least reduction in vertigo. However, variations in group characteristics may have influenced these results. The CI alone group had the highest proportion of people with a definitive diagnosis of MD, and whose preoperative hearing was poorest, possibly suggesting late-stage MD. Additionally, the lack of standardisation for the measurement of vertigo both pre- and post-operatively also limits the conclusiveness of the findings. •



VIRTUAL CLINIC FOR HEARING LOSS AND NON-PULSATILE TINNITUS: INITIAL EXPERIENCE OF 210 CASES



Baron T., Whinney D. & Reddy V.
J Laryngol Otol. (2024): 138, 38–42
<https://doi.org/10.1017/S0022215123000518>.

By Julin Teo, Italy, Australia

An evaluation of a virtual clinic's effectiveness as an enhanced triage process streamlining the identification of patients with hearing loss and/or non-pulsatile tinnitus who may not require a face-to-face ENT appointment.

As the population affected by hearing loss continues to grow, there has been a surge in the need for audiological evaluations within the UK's public health care system. Moreover, the backlog of ENT appointments resulting from the COVID-19 pandemic has exacerbated the situation, leading to extended waiting times of up to 12 months.

In response to the need to prioritise urgent presentations, a virtual clinic has been established to streamline the identification process for patients experiencing hearing loss (HL) and/or non-pulsatile tinnitus, thereby reducing the demand for face-to-face ENT appointments. Eligible candidates for the virtual clinic include patients aged 16 years and above, and who either present with subjective bilateral HL and/or non-pulsatile tinnitus which did not meet the criteria for direct referral to audiology, or those with subjective asymmetrical sensorineural hearing loss (SSNHL) or subjective unilateral non-pulsatile tinnitus. However, individuals with cognitive, vision, or motor impairments that may hinder the use of an

iPad, symptoms necessitating a face-to-face appointment, or those previously assessed by an ENT specialist are not suitable candidates for the virtual clinic.

Patients first complete a questionnaire on their symptoms, expectations and perceived severity of their HL and tinnitus. Subsequently, an iPad-based, user-operated audiometric screening tool, known as SHOEBOX Audiometry, is used to obtain the screening audiogram of the patient. This process is performed with calibrated headphones under the guidance of a health care assistant in a quiet setting.

The screening results are then categorised based on the following thresholds: normal (≤ 25 dB); mild (26–50 dB); moderate (51–70 dB); severe (71–90 dB); or profound (> 90 dB). Following the consultation, patients may either be discharged, referred for a formal audiological assessment, or further referred to hearing therapy, imaging, or a face-to-face review.

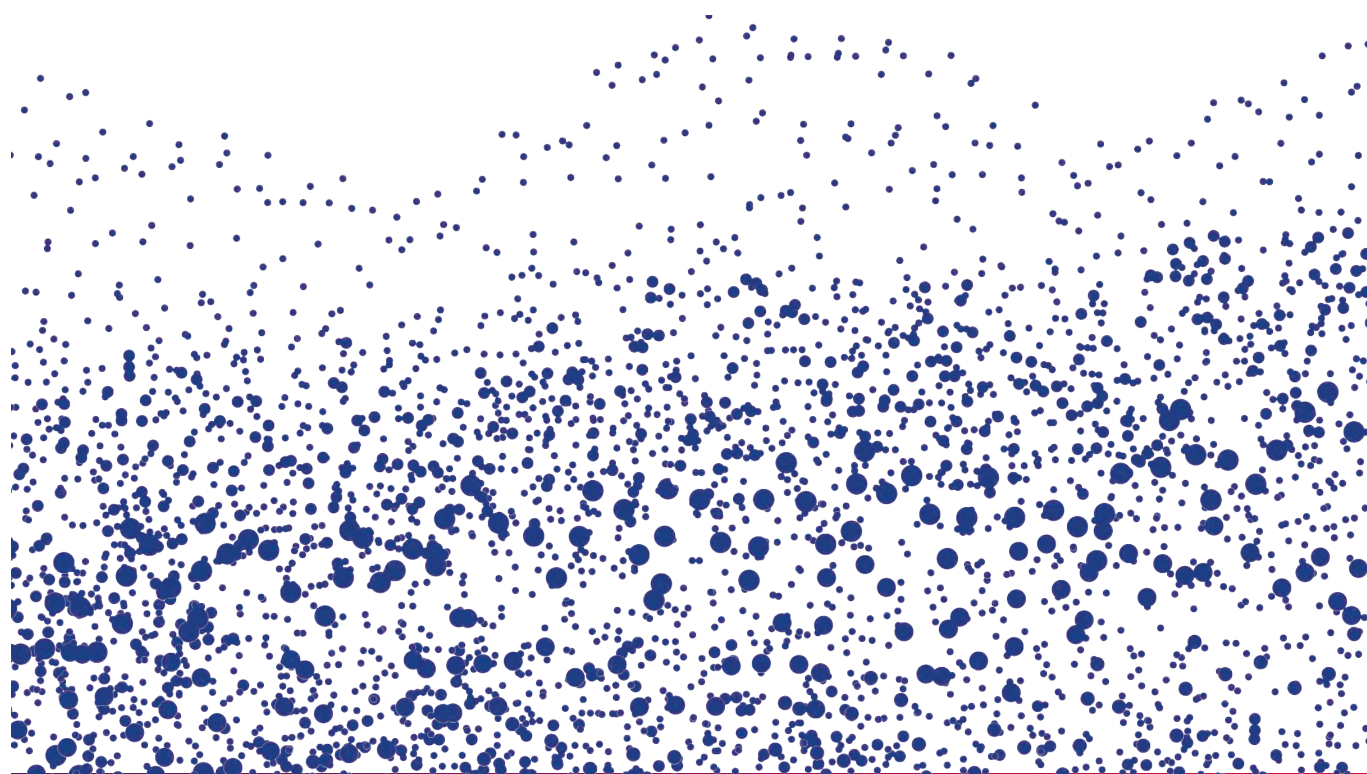
The evaluation of 210 patients from June 2020 to January 2021 indicates that 34.8% were discharged after their virtual assessment with advice and information, obviating the need for further intervention. Of these, 80% exhibited normal hearing, while 24% were found to have mild impairment. Patients who presented HL worse than mild necessitated further investigation. This included 51.9% referred for formal audiological assessment, 36.7% for imaging, and only 13.8% requiring an in-person ENT appointment. Interestingly, a mere 1.4% of the total population was subsequently diagnosed with vestibular schwannoma, 57.8% of whom were ultimately fitted with HAs.

Other studies, as well as the findings of this research, have examined the reliability of SHOEBOX Audiometry and similar tablet-based audiometry tools, which have demonstrated a high level of accuracy, within 10dB of gold standard conventional audiometry. When combined with patient questionnaires, these tablet-based audiometry tools achieved an impressive test accuracy of 86.1%. However, the virtual clinic model faced limitations, including the exclusion of patients with cognitive, vision, or motor impairments which might not be apparent at the time of referral for screening. Additionally, elderly patients may exhibit lower test performance due to limited technological literacy.

Nonetheless, this study showcased how the virtual clinic effectively freed up ENT clinic resources, prioritising patients with more immediate needs for face-to-face appointments. Looking ahead, there is promise for expanding the use of virtual clinics into community settings, potentially decentralising hearing assessment services. •

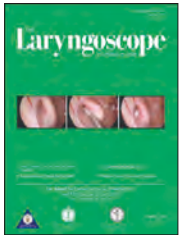
CRITICAL NOTE

This study explores the performance of a virtual clinic for managing hearing loss and non-pulsatile tinnitus, specifically in terms of its ability to discharge patients without requiring face-to-face ENT appointments. It demonstrated that the combined use of tablet-based audiometry alongside patient questionnaires in the virtual clinic had successfully reduced the need for ENT appointments. About 34.8% of patients were discharged from the virtual clinic, without need for further evaluation; only 13.8% ultimately needing in-person ENT appointments. The remainder were either referred for formal audiological assessment or imaging. While the authors touched upon the reliability of the accuracy (86.1%) of tablet-based audiometry, substantiated by existing research, it could have gone deeper into the specific reliability and accuracy within the virtual clinic context. The study also acknowledges some of the limitations of the virtual clinic, such as its exclusion of patients with cognitive, vision, and motor impairment, as well as elderly patients with limited technological proficiency, although no data was provided on the extent of these exclusions. It's unfortunate that the authors didn't use the WHO 2019 classification of the levels of hearing loss.





A NATIONWIDE POPULATION-BASED STUDY FOR THE RECURRENCE AND COMORBIDITIES IN SUDDEN SENSORINEURAL HEARING LOSS



Ko HY., Nam HJ. & Kim MH.

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doi: 10.1002/lary.31024

By Whitney Qian, Australia

This study investigates the cumulative recurrence rate of SSNHL and explores potential links between comorbidities and SSNHL recurrence.

BACKGROUND

Sudden sensorineural hearing loss (SSNHL) is characterised by a rapid onset of hearing loss (HL) in less than three days, greater than 30dB across three consecutive pure-tone frequencies. Recent studies indicate that the annual incidence of SSNHL is 24 per 100,000, with recurrence rates ranging from 1.4%–5.0%.

This study aims to 1) investigate the cumulative recurrence rate of SSNHL and 2) determine the potential correlation between comorbidities and the likelihood of recurrence of SSNHL.

METHOD

Data source

With 97% of the Korean population covered by the national health insurance, the National Health Insurance Claims Database (NHICD) is as a valuable tool for identifying disease prevalence. The study leveraged data spanning from January 2009 to December 2020.

Participant selection

A patient was identified as having SSNHL if their medical records included diagnostic codes for SSNHL, documented pure-tone audiometry results, and a prescription for systemic or intratympanic steroid treatment. Patients with brain tumours or Meniere's disease (MD) were excluded from the study. Recurrence of SSNHL was defined as an episode of SSNHL at least three months after the first episode of SSNHL, with fifth and subsequent episodes omitted from analysis.

Co-morbidities

Four types of comorbidities were evaluated against a control group: 1) autoimmune diseases (rheumatic and nonrheumatic); 2) metabolic diseases; 3) cancer; and 4) other conditions. Co-morbidities were defined as patients

CRITICAL NOTE

Despite its extensive sample size, this study lacked detailed records regarding factors such as hearing loss severity, the affected ear, and laboratory tests, owing to limitations of the database. Further research is required to clarify some of the findings of this study, as well as to understand the mechanism underlying SSNHL recurrence.

diagnosed in either an inpatient setting or in three or more ambulatory care visits coded, within one year prior to the SSNHL diagnosis.

RESULTS AND DISCUSSION

Recurrence rate

This study found that 6.7% of patients experienced at least one recurrence of SSNHL, aligning with previous studies showing recurrence rates ranging from 0.8% to 40%. Notably, the 40–59 age group had exhibited the highest recurrence rate per 100,000 people, although the <20 age group had the highest recurrence rate, at 7.60%. However, being alive longer inherently increases the likelihood of recurrence risk.

Recurrence rate after SSNHL recurrences

This study found that as the number of SSNHL recurrences rises, so does the recurrence rate. Recurrence rates increase steadily over time, suggesting a heightened likelihood of further recurrences with each repeated recurrence.

Co-morbidities

This study found an increase in recurrence incidence among patients with ankylosing spondylitis, whereas the opposite was observed for patients with type 2 diabetes mellitus, myocardial infarction and haemorrhagic stroke.

ANKYLOSING SPONDYLITIS (AS)

In this study, patients with AS showed an elevated incidence of recurrent SSNHL. While one previous study did not report any significant association between AS and SSNHL, other studies have reported an association between AS and hearing loss (HL). Previous research has suggested a potential ototoxic effect of NSAIDs, which are commonly prescribed long-term for patients with AS. AS typically occurs at a relatively young age, mirroring the younger demographic with a higher SSNHL recurrence rate.

TYPE 2 DIABETES MELLITUS (T2DM)

This study found a decline in SSNHL incidence among patients with T2DM, which contrasts with a previous study which reported a higher prevalence of diabetes mellitus (DM) in SSNHL recurrence cases. This variance could be due to differences in definitions of DM. The T2DM patients in the study under review were identified if they were diagnosed within the year preceding SSNHL diagnosis and were more likely to be treated with antidiabetic drugs. The most commonly used drug among this population is metformin,

and previous research has suggested its potential to lower the risk of SSNHL, or even been used experimentally as a treatment for HL. However, the mechanisms underlying metformin's effects remain unclear

MYOCARDIAL INFARCTION (MI)

In this study, patients with MI were found to present a reduced risk of SSNHL recurrence. This may be attributed to the frequent use of antiplatelet and anticoagulation medications used in the treatment of MI, as these have been proven to both improve the curative rate and decrease the recurrence rate of SSNHL. In addition, the lifestyle improvements after MI may contribute to this lower risk.

Stroke

Research findings on the association between stroke and SSNHL recurrence have been mixed. Interestingly, the authors found a decreased incidence of recurrent SSNHL in patients with haemorrhagic stroke. However, further studies are required to clarify these contradicting findings and to understand the mechanisms underlying the correlation between stroke and recurring SSNHL. •



LISTENING TO SPEECH IN NOISE WITH HEARING AIDS: DO THE SELF-REPORTED OUTCOMES REFLECT THE BEHAVIOURAL SPEECH PERCEPTION TASK PERFORMANCE?



Ertürk P., Aslan F. & Türkyılmaz MD.
Eur Arch Otorhinolaryngol. (2024): 281 (3), 1139–47
doi: 10.1007/s00405-023-08193-5
By Anjana Panikkar, Australia

The authors aimed to study the relationship between objective speech-in-noise test results and subjective self-reported listening in noise outcomes in a cohort of 18 adult hearing aid users.

The authors aimed to study how objective speech-in-noise test results correlate with subjective self-reported listening-in-noise outcomes among 18 adult hearing aid (HA) users. In particular, their focus was on understanding the effectiveness of simple, easy to use self-report questionnaires to evaluate the improvements in speech-in-noise performance with the

use of HAs.

Hearing effectively in the presence of background noise is one of the most desirable and important outcomes for most HA users. This single factor has a vital role to play in the success of the rehabilitation program and overall device usage. It naturally follows that this key aspect should be

assessed in order to verify the effectiveness of the treatment of hearing loss through the use of HAs.

In this study, 18 adult HA users with bilateral long-standing sensorineural hearing loss (SSNHL) were evaluated using three self-report questionnaires which were adapted to the Turkish language—the Hearing Handicap Inventory for Adults (HHI-A); the Speech and Spatial Qualities of Hearing (SSQ); and the Amsterdam Inventory for Auditory Disability and Handicap (AIADH). Cognitive abilities were screened using the Montreal Cognitive Assessment (MoCA) tool. The Turkish matrix sentence test (TMST) was used for the speech-in-noise test.

All the data was collected in a single session, with participants completing the cognitive and self-report questionnaires first, followed by the speech-in-noise test. The listening-in-noise test was completed in a sound booth, starting with the measurement of aided speech intelligibility thresholds at a fixed presentation level of 65dB SPL. This was followed by speech perception in noise test in two presentation modes: first with speech and noise presented from the same direction (S0N0); second, with speech presented from the front and the noise from the right (S0N90).

The findings of the study with regards to its main focus – i.e. to identify the correlation between the self-report questionnaires and the speech-in-noise testing in two presentation modes – revealed a strong correlation between the HHI-A questionnaire and the S0N0 presentation, consistent with existing literature. However, there was no discussion regarding the correlation between the HHI-A and the S0N90 presentation. Interestingly, the study found no correlation between the SSQ subscales and speech-in-noise in either presentation mode (S0N0 or S0N90). The authors attributed this discrepancy to potential variations in the wording of the questions on the SSQ, which could result in different interpretations from different people. Participants' personality, biases and socio-cultural differences could all have played a role in the way in which participants interpreted the questions. On the other hand, the AIADH showed a significant correlation in both presentation modes (S0N0 and S0N90), once again, consistent with previous literature findings.

Despite all participants passing the cognitive screening test, no additional correlation emerged between the self-report questionnaires and the speech-in-noise test. The

CRITICAL NOTE:

Self-reported questionnaires have become a cornerstone in assessing hearing aid outcomes across many clinical practices. While they are simple to administer and are patient-centred, they do present certain limitations. The authors' initiative to look into the correlation between these subjective responses and objective measures within the Turkish clinical context underscores the importance for clinicians to acknowledge both the advantages and limitations of each approach, thereby ensuring that effective treatment outcomes are measured with a combination of both approaches rather than relying solely on one or the other.

This study presents a number of limitations. Firstly, its small sample size – limited to 18 adult hearing aid users. A larger sample size would offer a much more robust foundation for clinicians to draw upon. Secondly, the participants' last hearing assessments were conducted 12 months prior to the study and with no confirmation of hearing aid settings prior to outcome measurement. The participants were experienced and consistent hearing aid users. Their familiarity with their devices may have influenced their reported satisfaction, potentially skewing the correlation between speech intelligibility scores and self-rating questionnaires. Retesting participants and reassessing device settings before administering the self-report questionnaires and testing speech intelligibility could have mitigated this limitation.

authors suggested that using a cognitive assessment tool rather than the screening tool might be more suitable for identifying a link between cognitive ability and speech-in-noise performance.

With regard to the speech intelligibility test, the authors found no significant correlation between the speech intelligibility scores and the self-report questionnaires.

The authors concluded that, while self-report questionnaires are easy to use and are widely used in most patient-centred care delivery models, they must be complemented with objective measures to fully evaluate treatment efficacy. •

