

A photograph of a middle-aged man and woman smiling and exercising on a stationary bike outdoors. The man is wearing a teal tank top and the woman is wearing a white tank top. They are both looking towards the camera with happy expressions. The background is a blurred green field.

# HEALTH-RELATED QUALITY OF LIFE BENEFITS OF AMPLIFICATION IN ADULTS

*An executive summary of the American Academy of Audiology's Task Force on Health-Related Quality of Life Benefits of Amplification in Adults is presented on the following pages. Carole Johnson and Jeffrey Danhauer prepared this summary on behalf of the Task Force. The Task Force members were Theresa Chisolm (co-chair), Craig Newman (co-chair), Carole Johnson, Jeffrey Danhauer, Harvey Abrams, Sharon Lesner, Patricia McCarthy, and Laural Portz (public member). The entire final report will be published in a future issue of the Journal of the American Academy of Audiology and will be posted on the Academy web site.*

**A**lthough sensorineural hearing loss (SNHL) can have a substantial negative impact on the lives of numerous patients and their families, many individuals are uncertain about the potential benefits that might be derived from hearing aid use. In the spirit of evidenced-based practice (EBP), audiologists, their patients, and other interested parties deserve to know whether research is available to support the premise that hearing aids can have positive effects on the lives of those with SNHL.

Most hearing aid research has focused on the acoustic benefits of amplification that are verified through audiologic testing and/or self-report instruments which assess users' improved audibility in various listening situations. However, Health-Related Quality of Life (HRQoL) benefits are measured by examining individuals' perceived changes in the psychosocial problems associated with hearing loss that they experience as a result of using hearing aids compared to their unaided condition. Documenting the effects of hearing aid use as a major component of the rehabilitative context as a whole on the HRQoL of adults with acquired SNHL is important for EBP and securing reimbursement for audiologic services including hearing prostheses.

EBP involves integrating current, high-quality research findings with practitioner expertise and patient preferences and values into the process of making the best possible clinical decisions (American Speech-Language-Hearing Association, 2005). The evaluation of available scientific evidence assessing the efficacy of rehabilitative interventions is best

accomplished through a systematic review process. This quantitative systematic review described the findings of specific studies relevant to the topic and included a meta-analysis that combined the results of several studies, which by averaging, increased the accuracy and efficiency in estimating the population parameter of the individual investigations and resulted in an aggregate indication of the effectiveness of hearing aid use in adults. This review involved establishing criteria for: (1) including studies, (2) searching/retrieving relevant studies, (3) assessing the quality of included studies, and (4) qualitatively and quantitatively analyzing the results, which are briefly summarized here.

### **ESTABLISHING CRITERIA FOR INCLUDED STUDIES**

We included only information from studies published in refereed journals in order to enhance our chances of gleaning evidence at the highest levels. Studies accepted for inclusion in this quantitative systematic review involved: Level 1 – randomized, controlled trials (RCTs); Level 2 – quasi-experimental controlled trials that used non-randomized, parallel group, or crossover designs; and Level 3 – well-designed non-experimental studies, particularly those using pre-test/post-test designs with adequate descriptions.

The participants in the included studies had to be at least 18 years of age and have SNHL with unaided severity ranging from mild to profound, normal cognitive function, and independent or assisted living accommodations, and be new or previous hearing aid users. The criteria for amplification used was broad and did not account for differences in hearing aid style, signal processing

circuitry, microphone technology, or fitting strategy.

Included studies were required to use validated generic (applicable across diseases and disorders) and/or disease-specific (designed for use with a particular patient population) HRQoL outcome measures that assess the degree to which participants' health status affects their self-perception of daily functioning and well being. The *Medical Outcome Study 36-item Short-Form Health Survey* (MOS SF-36; Ware and Sherbourne, 1992) is an example of a generic HRQoL outcome measure, while audiologists are probably more familiar with disease-specific self-report instruments like the *Hearing Handicap Inventory for the Elderly* (HHIE; Ventry and Weinstein, 1982) which measure the effects of hearing loss in psychological, social, and emotional domains.

### **SEARCH AND RETRIEVAL OF RELEVANT STUDIES**

A full search strategy was used to identify studies to include in this systematic review. Over 50 search strings were created and submitted to several databases, which identified 171 relevant abstracts, of which 97 were duplicates. Thus, 74 studies were acquired for full-article retrieval and were scrutinized to ensure that they met the a priori inclusion criteria. Only 16 articles met the criteria; the remaining 58 failed to do so and were excluded from further consideration. Readers can find the entire list of references for the studies in the upcoming detailed article in *JAAA*.

### **CHARACTERISTICS OF INCLUDED STUDIES**

The 16 included studies were fairly heterogeneous regarding level of evidence, participant characteristics, and outcome measures. Only two of the

studies used RCTs, while five employed quasi-experimental and nine involved pre-test/post-test designs. The studies used males and females (28 to 95 years of age) with mild to profound SNHLs, who were both new and experienced hearing aid users obtained from different delivery systems (e.g., private pay, national health care systems, Department of Veterans Affairs National Hearing Aid Program). Five generic and four disease-specific HRQoL outcome measures were used across the 16 studies.

### QUALITY ASSESSMENT OF INCLUDED STUDIES

The quality of the evidence provided by each of the 16 studies was examined according to: level of evidence (two at Level 1; one at Level 2; 13 at Level 3), use of a power analysis to ensure appropriate sample size (only one did), assignment of participants to experimental and control groups and assurance of equivalence of the groups at baseline (only three did), adequate detail of participant inclusion and exclusion criteria allowing for generalization and study replication (12 did), well-described hearing aid fitting and verification protocols (nine did), application and reporting of statistical analyses (all 16 did), and accounting for any dropout of participants from the studies (10 did, but only five provided sufficient reasons for their participants' failure to complete the protocols).

### QUALITATIVE AND QUANTITATIVE ANALYSES

Comparing pre-test/post-test results for generic HRQoL measures revealed that some studies revealed significantly improved health states for participants following hearing aid use, while others showed no difference or even a signifi-

cant reduction in health functioning post-hearing aid fitting. However, most of the results for the disease-specific HRQoL outcome measures (e.g., the HHIE) showed strong reductions in emotional and social impacts of hearing loss for participants as a result of hearing aid use. All but one of the studies provided sufficient data for inclusion in the meta-analysis. Effect sizes and confidence intervals indicated that the overall between-subjects effects data supported the effectiveness of hearing aid use for improving the HRQoL for adults with acquired hearing loss.

Assigning a grade to a systematic review of the literature is a way of indicating the extent to which the evidence supports a particular healthcare recommendation from the evidence. A high grade suggests that more confidence can be given to the evidence for a particular procedure (in this case, the use of hearing aids), while a low grade means that a recommendation must be made with great caution. Overall, the findings of this quantitative systematic review suggest that a grade of "B" seems warranted for the use of hearing aids to improve adults' HRQoL considering the levels of evidence and quality of the included studies. Improvement in HRQoL is the most likely outcome, particularly when hearing related effects are directly assessed.

Unlike other chronic health conditions that may have multiple treatment alternatives, the only viable option for most cases of SNHL is indeed the use of hearing aids, which relegates clinical decision-making to one of whether to pursue amplification. In doing so, patients and their health care professionals must weigh the risks and

benefits of pursuing amplification, a comparatively non-invasive, low-risk treatment with considerable potential benefits. Most states now require trial periods for hearing aids so that patients face little financial risk if they are not completely satisfied with the results of their purchase. Therefore, the modest evidence of benefits in HRQoL provided by this systematic review become quite powerful when considering that hearing aid use is the only viable treatment for SNHL, a condition with insidious and potentially devastating effects when left untreated.

### CONCLUSIONS

The results of this systematic review support the notion that hearing aid use (a comparatively non-invasive, low-risk option with considerable potential benefits, which is the only viable treatment for SNHL) improves adults' HRQoL by reducing psychological, social, and emotional effects of SNHL, an insidious, potentially devastating chronic health condition if left unmanaged.

The quantitative systematic review process provided a powerful method for assessing the HRQoL benefits of amplification; however, its conclusions are only as robust as the studies that are included in the review, and it is a time-sensitive endeavor that needs to be updated periodically in order to reveal the best and most current evidence for particular treatments.

Although the field of audiology appears to have a sufficient battery of disease-specific tools, it should strive to use, adapt, or develop generic instruments that are sensitive to and appropriate for assessing changes in hearing aid users' and their families' HRQoL as a result of amplification.




In the future, researchers should exercise great care in designing, conducting, and reporting their studies in order to maximize their contributions to EBP.

Future research in this area should strive to use RCT designs and generic HRQoL measures that are sensitive to the effects of and treatments for hearing loss. Investigators should conduct power analyses, employ both experimental and control groups, use double blinding, adequately describe participant inclusion/exclusion criteria, provide intention-to-treat analyses, discuss dropouts, and compute effect sizes and confidence intervals for statistically significant results whenever possible.

The audiologic community, patients with hearing loss and their families,

physicians and other health-care providers, and third-party entities should be encouraged that hearing aids can provide considerable HRQoL benefits for the increasing numbers of the adult population having SNHL.

The task force cautions readers that the conclusions presented here relate to the particular patient population and treatments investigated in this review, and they may not necessarily apply to other groups such as children or different forms of amplification such as cochlear implants. While separate systematic reviews are warranted for other populations and treatments, and we hope that future investigations will justify similar conclusions for them, audiologists and their adult patients can now be more confident that there is evidence to

support what many of them have known all along - hearing aid use does provide HRQoL benefits for adult users. 

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## REFERENCES

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