

Cochrane Corner: Hearing aids for mild to moderate hearing loss in adults

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Abstract

This Cochrane Corner features the review entitled “Hearing aids for mild to moderate hearing loss in adults” published in 2017. In their review, Ferguson et al. identified five randomised controlled trials (RCTs) involving 825 participants, with moderate quality of evidence shown for all domains except adverse effects. Results showed a large beneficial effect of hearing aids on hearing-specific health-related quality of life and listening ability, and a small yet significant beneficial effect on overall health related quality of life. Ferguson et al. concluded that according to the available evidence, hearing aids are effective at improving hearing-specific health-related quality of life, general health related quality of life and listening ability in adults with mild to moderate hearing loss. The evidence supports the widespread provision of hearing aids as the first-line clinical management for those seeking help for hearing difficulties.

Background

Hearing aids are a routine treatment for patients suffering from hearing loss. Whilst alternative interventions exist for hearing loss, including rehabilitation and communication programs that support self-management and other assistive hearing devices, hearing aids are the most widely used treatments for mild to moderate hearing loss. However, despite this, non-use of hearing aids varies from 3% (Bertoli et al., 2009) to 24% (Lupsakko et al., 2005). For those that do use their hearing aids, typical daily usage is for 8 to 12 hours and there are no significant differences in hearing aid use for adults with mild or moderate hearing loss, nor is age or gender a significant predictor of daily hearing aid usage (Timmer et al., 2017). Hearing loss increases with age (Akeroyd et al., 2014), and with an ageing population the number of people suffering from hearing loss will continue to increase along with the quality of life and economic burdens associated with this condition (Mathers, 2008). This makes it ever more important to examine the evidence base for a common intervention, such as hearing aids, to establish whether this intervention provides a sufficient improvement in quality of life and other key outcome measures. A Cochrane review by Ferguson et al. (2017) investigates this important topic by examining the effectiveness of hearing aids for adults with mild to moderate hearing loss.

The primary outcomes for this Cochrane review were hearing-specific health-related quality of life, with participation as the key domain, and pain associated with hearing aids. Secondary outcomes of interest were health-related quality of life, functional measure of listening ability, and adverse effects of noise-induced hearing loss. The review included five RCTs (825 participants) from USA and Europe published between 1987 and 2017. To measure hearing-specific quality of life all studies used the Hearing Handicap Inventory for the Elderly (HHIE), and found a large effect size that favoured hearing aids. The World Health Organization Disability Assessment Schedule II (WHO-DAS II) and Self Evaluation of Life Function (SELF) questionnaires were used to measure health-related quality of life, and a small but significant beneficial effect size of hearing aids was shown. Listening ability was measured with either the Profile of Hearing Aid Performance (PHAP) or Abbreviated Profile of Hearing Aid Benefit (APHAB) measures and a large beneficial effect of hearing aids was shown. As Ferguson et al. reported, there was inconsistent use of outcome measures. Only one study attempted to measure adverse effects and reported no adverse pain or noise-induced hearing loss with hearing aids, therefore there is little information to adequately assess the risk of adverse events. For an intervention that is so widespread, there is a surprising paucity of high-quality trials evaluating its benefit – as is evidenced by the inclusion of only 5 RCTs in the Ferguson et al. review.

Cochrane review abstract from Ferguson et al (2017)

Background

The main clinical intervention for mild to moderate hearing loss is the provision of hearing aids. These are routinely offered and fitted to those who seek help for hearing difficulties. By amplifying and improving access to sounds, and speech sounds in particular, the aim of hearing aid use is to reduce the negative consequences of hearing loss and improve participation in everyday life.

Objectives

To evaluate the effects of hearing aids for mild to moderate hearing loss in adults.

Search methods

The Cochrane ENT Information Specialist searched the ENT Trials Register; the Cochrane Register of Studies Online; MEDLINE; PubMed; EMBASE;

CINAHL; Web of Science; ClinicalTrials.gov; ICTRP and additional sources for published and unpublished trials. The date of the search was 23 March 2017.

Selection criteria

Randomised controlled trials (RCTs) of hearing aids compared to a passive or active control in adults with mild to moderate hearing loss.

Data collection and analysis

We used the standard methodological procedures expected by Cochrane. The primary outcomes in this review were hearing-specific health-related quality of life and the adverse effect pain. Secondary outcomes were health-related quality of life, listening ability and the adverse effect noise-induced hearing loss. We used GRADE to assess the quality of the evidence for each outcome; this is indicated in *italics*.

Main results

We included five RCTs involving 825 participants. The studies were carried out in the USA and Europe, and were published between 1987 and 2017. Risk of bias across the studies varied. Most had low risk for selection, reporting and attrition bias, and a high risk for performance and detection bias because blinding was inadequate or absent. All participants had mild to moderate hearing loss. The average age across all five studies was between 69 and 83 years. The duration of the studies ranged between six weeks and six months.

There was a large beneficial effect of hearing aids on hearing-specific health-related quality of life associated with participation in daily life as measured using the Hearing Handicap Inventory for the Elderly (HHIE, scale range 1 to 100) compared to the unaided/placebo condition (mean difference (MD) -26.47, 95% confidence interval (CI) -42.16 to -10.77; 722 participants; three studies) (*moderate-quality evidence*).

There was a small beneficial effect of hearing aids on general health-related quality of life (standardised mean difference (SMD) -0.38, 95% CI -0.55 to -0.21; 568 participants; two studies) (*moderate-quality evidence*). There was a large beneficial effect of hearing aids on listening ability (SMD -1.88, 95% CI -3.24 to -0.52; 534 participants; two studies) (*moderate-quality evidence*).

Adverse effects were measured in only one study (48 participants) and none were reported (*very low-quality evidence*).

Authors' conclusions

The available evidence concurs that hearing aids are effective at improving hearing-specific health-related quality of life, general health related quality of life and

listening ability in adults with mild to moderate hearing loss. The evidence is compatible with the widespread provision of hearing aids as the first-line clinical management in those who seek help for hearing difficulties. Greater consistency is needed in the choice of outcome measures used to assess benefits from hearing aids. Further placebo-controlled studies would increase our confidence in the estimates of these effects and ascertain whether they vary according to age, gender, degree of hearing loss and type of hearing aid.

Comments

One of the key aims of the IJA Cochrane Corner is to gain some additional insights into the implications of Cochrane reviews for clinical practice. Each review is a significant undertaking to the authorship teams, and they are essential in developing the evidence-base within audiology. Here we discuss some of the key clinical implications of this review with lead author Dr Ferguson.

Brennan-Jones: Your findings that evidence supports the use of hearing aids will not come as a shock to most audiologists, so why was it important to do this review?

Ferguson: Yes, this has been pointed out by quite a few people already! There are three pillars to evidence-based practice one of which is individual clinical expertise (e.g. the audiologist), the other two are patient values and preferences, and research evidence Sackett et al., 2000). Here, we are presenting the research evidence based on the published literature. As you know, systematic reviews including meta-analyses provide the highest level of evidence when considering evidence hierarchy and scientific rigour, with Cochrane reviews as the ‘gold standard’. The review itself was prompted for two reasons. First, the previous systematic review on hearing aids included studies that were published up until 2004 (Chisolm et al., 2007), so more than a decade on it seemed that the time was right to update the evidence from the published literature. Second, in 2014 a number of clinical commissioning groups, who commission and pay for UK National Health Service (NHS) healthcare, considered withdrawing the provision of hearing aids for adults with mild and/or moderate hearing loss. Hearing aids in the UK have been provided free at the point of delivery to those who need them since the inception of the NHS in 1948. It was clear there was a need for high-quality, up-to-date evidence on the effectiveness of hearing aids for adults with mild to moderate hearing loss. I should add that a more recent systematic

review of hearing aids for adults with mild hearing loss was published (Johnson et al., 2016). However, there were no randomised controlled trials (RCTs) in that review, and we were only interested in RCTs, the highest level of primary research evidence.

Brennan-Jones: What impact do you think this review could or should have on the way we deliver clinical services for those with mild to moderate hearing loss?

Ferguson: I think that our conclusion that “the evidence is compatible with the widespread provision of hearing aids as the first-line clinical management in those seeking help for hearing difficulties” says it all. The evidence, which was moderate quality in all domains except adverse effects, suggests that if people seek help for their hearing difficulties and wear hearing aids, there will be benefits in listening ability, participation in everyday life, and importantly as this had not been shown clearly before, health-related quality of life. We were unable to look at mild and moderate hearing loss separately as the data were not available, so for now and until there is more published evidence on this, those with mild to moderate hearing loss are likely to benefit in the outcome domains we specified. It’s probably worth noting here that while Cochrane reviews provide the evidence, they don’t provide clinical recommendations as such. That lies within the realms of organisations such as the UK’s National Institute for Health and Care Excellence (NICE). Currently, guidelines for adult-onset hearing loss are being developed and will be published in May 2018 (see <https://www.nice.org.uk/guidance/gid-cgwave0833/documents/html-content-2> for draft consultations), and this review forms the basis of the recommendation to offer hearing aids to adults whose hearing loss affects their communication abilities. So overall, I think this review will be impactful, both in the UK and elsewhere. There is a lot of discussion at the moment about ‘over-the-counter’ (OTC) models of delivery, particularly in the United States following their National Academies of Science report (National Academies of Science, 2016). There needs to be a good evidence-base for any new models of service delivery. Humes et al (2017), one of our included studies, provide some good and relevant evidence, but as they say, their evidence is specific to the hearing aids, and population reported.

Brennan-Jones: You mention that more consistent use of outcome measures in future studies would be beneficial. We are lucky to have a range of hearing-specific health-

related quality of life measures. Which outcome measure(s) should prospective clinicians and researchers be using to evaluate their programs?

Ferguson: This is the 64,000 dollar question! I'm not sure 'lucky' is the word I would use about the raft of outcome measures that are out there. The systematic review by Granberg et al (2014) reported that 51 self-report questionnaires had been used in 122 adult hearing loss studies (and even more behavioural outcome measures, such as speech testing). Just one instrument had been used twice, and the HHIE, which was the most commonly used self-report measure, was only used 5 times in the studies included in their review. Another study identified 139 hearing-specific questionnaires (Akeroyd et al., 2015). The use of many questionnaires means that it is difficult to decide on the primary outcome measure for clinical trials and conduct meta-analyses for systematic reviews across studies (although we were able to do this for hearing-specific health-related quality of life using the HHIE). In part, this is because the consequences of hearing loss are complex and multifactorial. The use of a Core Outcome Set (COS) is one method that is suggested can standardise outcome measurement. A COS is a collection of outcomes for a particular condition that key stakeholders agree are critically important when deciding whether an intervention has worked or not. Currently, a COS is being identified for tinnitus (Hall et al., 2015) and for cochlear implants, and we are working towards developing a COS for adults with sensorineural hearing loss. So for now, I think the jury is out. However, in terms of hearing-specific health-related quality of life, we now include the HHIE in our studies for the reasons given above. In terms of health-related quality of life, questionnaires such as the WHO-DAS 2.0 (which has superseded the WHO-DAS II) and the Health Utilities Index Mk III, which include some aspects of quality of life specific to hearing, are more likely to show effects of hearing-related interventions than more generic measures such as the EQ-5D (McArdle et al., 2005, Chisolm et al., 2005, Barton et al., 2004, Davis et al., 2007).

Weeda: Some studies included in this review were published in the 1980s. Given the progress in technology over that time, can outcomes from recent studies be compared to outcomes of hearing aids of 30 years ago?

Ferguson: That's a very good question. We can see in our review that the Humes et al (2017) study showed a smaller although still large effect size of hearing aids on the HHIE compared to the two older studies (Mulrow et al., 1990, McArdle et al., 2005)

in our post-hoc analysis. This resulted in high heterogeneity (97%). There were many differences between these studies, which we discuss in the review. For example, different populations (US Department of Veteran Affairs (VA) clients vs community dwellers), gender split (veterans were mainly male – versus community dwellers which had a more even male:female split), in-the-ear and behind-the-ear hearing aid provision, and whether they were provided at no cost (VA clients) or purchased (community), or controls who had no hearing aids (VA clients) compared to placebo hearing aids (Humes et al., 2017, Adrait et al., 2017) thereby minimising the effects of intervention and outcomes blinding, and poorer hearing thresholds in the VA samples compared to the community dwellers. On the basis of the evidence we had, we were unable to say what caused these differences. If we want to drill down to establish what the effects these numerous factors have on outcomes, we would need to conduct well-designed trials, which we discuss in the Implications for Research.

Weeda: The inclusion of a study where all participants have Alzheimer’s disease is of interest. This is an important, increasing and sometimes challenging clinical population; are the results comparable to populations with typical cognitive function?

Ferguson: The study on participants with Alzheimer’s Disease was a well-conducted study, with limited risk of bias. However, this study showed no effect of hearing aids on the primary outcome, a neuropsychological test battery (Adrait et al., 2017) or other cognitive measures (Nguyen et al., 2017). The sample was quite small (N=48), and the average age was 83 years, about 10 years greater than the average for first-fitting of hearing aids. The participant sample in this study in terms of cognitive status was very different to those of the included studies (i.e. Alzheimer’s disease vs normal cognitive function), so no, I don’t think they are comparable. There is an ongoing study on Alzheimer’s disease (NCT03002142) and other studies are likely to look at this over the coming years. It may be that fitting hearing aids to adults with hearing loss in mid-life as part of a longitudinal study would show some beneficial effects of hearing aids on cognitive decline, as hearing loss has been identified in a recent review commissioned by The Lancet to be the top modifiable risk for dementia (Livingston et al., 2017) – but this is merely speculation. High-quality RCTs are needed to measure and understand the benefits of hearing aids in this population and in those with mild cognitive decline to answer this question.

Conclusion

This review by Ferguson et al. (2017) offers a comprehensive overview of the evidence for prescription of hearing aids and highlights the lack of consensus in the literature regarding outcome measures for hearing research. The review provides robust recommendations for the use of hearing aids in mild to moderate hearing loss, supporting current clinical practice.

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