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Vanderbilt Audiology Journal Club: Hearing Aids in the 'Real World'

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Managing Editor, AudiologyOnline*

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Vanderbilt Audiology Journal Club: Hearing Aids in the 'Real World'

Erin M. Picou, AuD, PhD

Todd A. Ricketts, PhD



Disclosures

- **Presenter Disclosure:** Todd Ricketts: Financial: Todd Ricketts is employed by Vanderbilt University. He has received research funding on a topic that may be discussed in this course from Resound, Signia, Starkey, Sonova, Oticon, Widex, Persona Medical, Frye Electronics, the Department of Veterans Affairs Rehabilitation Research & Development Service (VA RR&D), the National Institute of Disabilities and Rehabilitative Research (NIDRR), the Patient-Centered Outcomes Research Institute (PCORI) and the National Institute on Deafness and Other Communication Disorders (NIDCD). Non-financial: Todd Ricketts has no relevant non-financial relationships to disclose. Erin Picou: Financial: Erin Picou is employed by Vanderbilt University. She has received research funding on a topic that might be discussed in this course from: WSAudiology, Starkey, Oticon, Widex, ASHFoundation, and Sonova. Non-financial: Erin Picou is a Section Editor for Ear and Hearing and the American Journal of Audiology.
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Learning Outcomes

After this course, participants will be able to:

- List new key journal articles on the topic of hearing aid benefits in the real world.
- Describe the purpose, methods and results of new key journal articles on realistic hearing aid benefits.
- Explain some clinical takeaway points from new key journal articles on hearing aids.

Today's Spotlight

- Hearing aid performance in 'real world' situations
- Hearing aids and emotion

Auditory Environments and Hearing Aid Feature Activation Among Younger and Older Listeners in an Urban and Rural Area

Jorgensen, E., Xu, J., Chipara, O., Oleson, J., Galster, J., & Wu, Y-H

Ear & Hearing, 44 (3), 603–618

What they asked...

- "The purpose of this study was to investigate potential differences in auditory environments and hearing aid feature activation between urban and rural locations as well as the role of age and hearing loss in these differences" (pg. 603)

A little background...

- Adult hearing aid users might not generally encounter very diverse or demanding auditory environments.
 - Smeds et al. (2015) - hearing aid users rarely encountered environments with negative signal to noise ratios (~5 dB on average)
 - Wu et al. (2018)- older adult hearing aid users most commonly encountered quiet with speech front
 - Klein et al. (2018) - older adults spent the most time in quiet (40%), followed by television watching (26%), and then meaningful speech (12%). Noise was rare (~6% of the time)

A little background...

- Data logging from cochlear implant users suggests that the types of auditory environments cochlear implant users encounter may depend on their country (Busch et al. 2017).
- 2010 Census
 - 19.3% of the population (59.5 million people)
 - 97% of the land area as rural
- Lifestyle differences can affect health outcomes (Eberhardt & Pamuk 2004; Haggerty et al. 2014)

A little background...

Urban

- Louder
- Man-made noises
- Larger social networks
- More friends



Rural

- Quieter
- Sounds of nature
- Smaller social networks
- More family



A little background...

Younger

- More socially active
- Larger social networks
- Higher noise levels

Older

- Less socially active
- Smaller social networks
- Lower noise levels

Why it matters...

- Auditory environments and hearing aid feature activation may differ between
 - Urban and rural dwellers
 - Younger and older adults
- Could affect hearing aid performance and benefits
 - (Re)-interpretation of existing studies
 - Clinical expectations

What they did...

- Collected data from daily lives of participants
 - Hearing aid measurements (SPL, feature activation)
 - Ecological momentary assessment (self-reported listening activity and noise level)



What they did...

- Participants (n = 46)
 - Younger group in rural area (normal hearing)
 - Younger group in urban area (normal hearing)
 - Older group in rural area (hearing loss)
 - Older group in urban area (hearing loss)
- Recruitment cities
 - Rural – Iowa City, IA (2713 people / sq mile)
 - Urban – Berkeley, CA (11,474 / sq mile)
- Populations
 - Older – retired but active outside the home
 - Younger – working professionals or students

What they did...

- Hearing aid fitting
 - Starkey Halo 2 i2400
 - Receiver-in-the-canal
 - Recorded processing state on smartphone
 - 24 channels
 - Normal hearing participants
 - Zero gain
 - Acted as sensors
 - Participants with hearing loss
 - Matched gain of their own hearing aids
 - Acted as sensors

What they did...

- Hearing aid data
 - Periodic collection (power constraints)
 - Every 10 minutes attempted (without EMA)
 - Every 40 minutes attempted (with EMA data)
 - Measures
 - SPL estimate (mean and variance)
 - Sound classification (quiet, speech, noise, music, machine, wind)
 - Feature activation (directional microphone, gain reduction)

What they did...



- Participant data (EMA)
 - Approximately every 40 minutes
 - Not self initiated
 - Questions
 - Were you actively listening most of the time?
 - Yes, no
 - What did your active listening involve?
 - Live conversation, electronic conversation, speech/music listening live, speech/music listening media, environmental sounds listening
 - Overall, how loud were the background sounds?
 - Very loud, loud, medium, soft, very soft

What they found...

- 8412 snapshots
 - 2667 were EMA-associated
 - Average of ~8 EMA surveys per day
- Broadband level
 - Young normal hearing group had higher input levels than older group (~ 4 dB)
- Environments
 - Most samples were quiet (28%), speech (30%), or noise (48%)
 - No differences between groups

What they found...

- Feature activation
 - Directional microphones more likely to be active for younger group than the older group with hearing loss
 - In rural AND urban settings
 - Directional microphones less likely to be active for older adults with hearing loss in rural setting than for younger adults with normal hearing
 - Driven by input level

What they found...

- EMA surveys
 - Groups spent similar times in conversation on a device, live speech/music, and media music
 - No effect of group on noise ratings
 - Few surveys had loud or very loud noise

Why this is important...

- Mixed support for location and age to affect auditory environments
 - Young, urban dwelling group had more demanding and diverse auditory environments and more feature activation

Why this is important...

- Demographics and setting can affect acoustics, auditory demand, and feature activation
- Older adults have less diverse and demanding listening environments than younger adults
 - Different patterns of benefit or preferences for hearing aid fittings than younger adults with hearing loss
 - Existing work demonstrating non-significant benefits of technology level could be related to older, rural-living participants

Does it matter clinically?

- Interpretation complicated because young participants did not have hearing loss or routinely wear hearing aids
- Generalizability limited by several factors
 - Small sample size
 - 1 week of data collection
 - Heterogeneous population

Focusing on positive listening experiences improves hearing aid outcomes in experienced hearing aid users

Lelic, D., Parker, D., Herrlin, P., Wolters, F.
& Smeds, K.

International Journal of Audiology

What they asked...

- Does focusing on positive listening experiences improve hearing aid outcomes in experienced hearing aid users?

A little background...

- Not all hearing aid owners use their hearing aids regularly
 - ~ 20% in the UK (Dillon et al., 2020)
 - ~ 30% in Europe (EHIMA 2018-2022)
- Hearing aid acceptance and use drive by satisfaction and benefit

A little background...

- Benefits can be affected by counseling
 - Positive narratives about hearing aids leads to better speech in noise scores with a hearing aid
 - Compared to neutral or negative narratives (Rakita et al., 2022)
 - "New" hearing aids can affect speech-in-noise scores
 - Compared to "conventional" hearing aids (Dawes et al. 2013)
 - Patients report more benefit of "digital" technology
 - Compared to "analog" technology (Bentler et al., 2003)

A little background...

- Negativity bias
 - Negative events subjectively more potent and salience than positive event of similar magnitude (Rozin & Royzman, 2001)
- Positive focus might counteract negativity bias
 - Internalizing beneficial experiences improves cognition and happiness (Hanson et al. 2023)



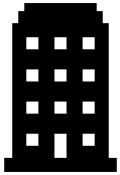
Why it matters...

- Counseling could be an intervention
- Focusing on positive effects of hearing aids could improve perceived benefit and satisfaction
- Improving benefit and satisfaction could improve hearing aid acceptance and use

What they did...

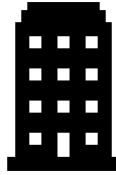
- Randomized, single-blind, parallel-arm study
- Participants were all told the same study purpose
 - "to learn more about hearing aid users' experiences with hearing aids so that we can better understand the behavior and needs of hearing aid users"
 - Experienced hearing aid users, SNHL, smartphone app experience
 - Control group = 10 adults
 - Focus group = 11 adults

What they did...



Baseline

Randomize
Personality
Satisfaction
IOI-HA



Visit 1

Audiogram
COSI
HA fitting



Visit 2

COSI follow-up
Exit interview



1 week home

EMA

Own hearing aids



3 week home

positive focus

Second week:

Satisfaction, IOI-HA

Third week: EMA

What they did...

- EMA questionnaire
 - Every 2 hours from 9a – 9p
 - Location, listening task, hearing difficulty, satisfaction
- Client-Oriented Scale of Improvement (COSI)
 - Identify 5 most critical situations where they want to improve hearing

What they did...

- Hearing aid fitting
 - Widex MOMENT
 - Receiver-in-canal
 - Fit to Compass GPS targets
 - No special programs
 - Instructed not to use app to make changes

What they did...

- Positive Focus Group
 - "I am very interested to hear about situations where the study hearing aids are helping you. Please use the app to report every time you encounter a positive listening experience. These types of situations could, for example, be:
 - Great communication at a party
 - Hearing the sounds of crickets in the forest
 - Other situations where your hearing is noticeably good"
 - Reports were always self-initiated
 - Not asked to report negative experiences

What they found...

- Positive focus group reported an average of 38 positive listening experiences over 3 weeks
 - "Watching tv with others. Hear everything"
 - "Eating lunch with several. Separation of sounds is good"
 - "Door open. I can hear traffic and the rain"
 - "The forest sounds completely different. Interesting"

What they found...

- Scores were higher in the Positive Focus group than the control group
 - IOI-HA satisfaction
 - Single item satisfaction scores
 - COSI benefit scores and final ability scores
- Participants who submitted more positive experiences also had higher degree of change ratings on the COSI

Why this is important...

- Non-audiological interventions can influence hearing aid outcomes
- Asking people to reflect on their positive experiences could help achieve positive hearing aid outcomes
- Relatively short-term effect
- Data support a collaborative, iterative approach to follow-up visits and measures of satisfaction

Does it matter clinically?

- Future work necessary to evaluate long-term effects
- Could be done without an app
 - Paper/pen diary
 - Notes in the native environment
 - Conversation
- Benefits could domino – practice talking about positive experiences could translate to discussing positive experiences with friends

A qualitative investigation of the hearing and hearing-aid related emotional states experienced by adults with hearing loss

Holman, J.A., Ali, Y.H.K., & Naylor, G.

International Journal of Audiology, 62, 973-982

What they asked...

1. What hearing-related emotions are experienced by adults with hearing loss in everyday life, and how do they occur?
2. What impact does hearing-aid use have on emotion in the hearing-aid wearer?
3. To what extent does the experience of hearing-related emotions vary between adults with hearing loss?

A little background...

- Emotion
 - Instinctive or intuitive feelings deriving from one's circumstances, mood or relationships
 - Distinct from moods, which are non-specific and slow acting
- People experience emotions daily, which then influence their daily-living situations
 - Guides satisfaction
 - Healthcare uptake
 - Well-being

A little background...

- Hearing loss and emotion
 - Reduced range of emotional responses (Tawdrous et al. 2022)
 - Frustration /irritation during conversations (Bennett et al. 2022)
 - Anxiety and embarrassment (Wallhagen 2010)
 - Depression risk (Lawrence et al. 2020)
 - Anxiety risk (Jayakody et al. 2018)

A little background...

- Emotions and hearing aids
 - Pleasant feelings increase relative to unaided (Contrera et al. 2016)
 - Negative feelings towards devices (Heffernan et al 2016)
 - Stigma (Ruusuvuori et al. 2021)
 - Practical difficulties (Dawes et al. 2014)

Why it matters...

- A better understanding of the specific causes of positive and negative emotional reactions to hearing-dependent situations and hearing devices would assist future attempts to improve clinical assessment and counselling, as well as improving the targeting of interventions and the setting of expectations

What they did...

- Phenomenological qualitative methodology
 - Semi-structured interviewing
 - Set of pre-determined questions that guide the interviewer
 - Participants have flexibility to discuss concepts and experiences relevant to them
- Remote interviews in 2020 (mostly telephone)
 - Field notes
 - Recorded and transcribed
 - 29- to 71-minute interviews (mean 42.5)

What they did...

- Participants
 - 17 adults with hearing loss
 - Variable sample
 - Age: 60 years, range 44-74 years
 - PTA better ear: 42 dB HL, range 26-87 dB HL
 - Gender: 8 male, 9 female
 - Hearing aid use history:
 - 3 none
 - 4 unilateral
 - 10 bilateral

What they did...

- Interview guide
 - Introductory section
 - History of hearing loss and associated emotions
 - Impact of COVID-19 restrictions
 - Main questions – what do they do, experienced emotions, role of hearing loss and hearing aid use
 - Social
 - Leisure
 - Work
 - Daily chores
 - Coordination of emotion
 - How well participants express and understand emotions
 - List discrete emotions feel about hearing and hearing aids

What they found...

<https://www.tandfonline.com/doi/full/10.1080/14992027.2022.2111373>

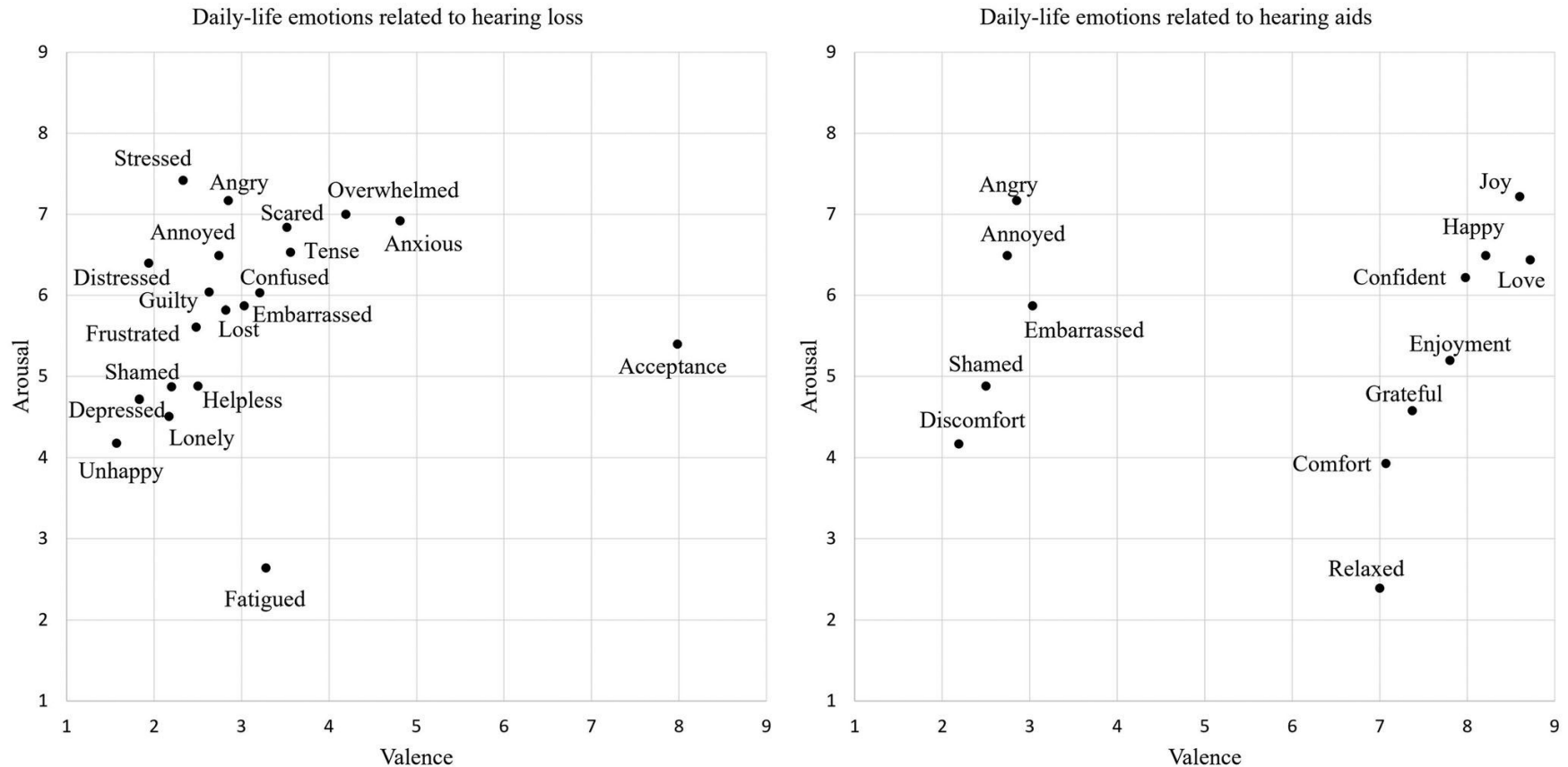


Figure 1. Graphical depiction of discrete emotions related to hearing loss and hearing aid(s) expressed by participants, on a valence/arousal scale (Bradley and Lang 1999). Valence: 1.negative, 5.neutral, 9.positive. Arousal: 1.low, 9.high.

What they found...

<https://www.tandfonline.com/doi/full/10.1080/14992027.2022.2111373>

A: Identity and self-image

- A1: View of self and supposed perception of others
- A2: Isolation in group settings
- A3: Importance of prior relationship
- A4: Development of hearing loss
- A5: Perception and progression of hearing loss
- A6: Emotions influenced by the relationship with hearing aid(s)

B: Autonomy and control

- B1: Work Stressors
- B2: Unavoidable social events
- B3: Anticipation of difficult conversations
- B4: Attribution of blame dictates impact on relationships and strength of emotion
- B5: Passive listening
- B6: Spatial and situational awareness

C: Personality and dominant emotional states

D: Situational cost/benefit analysis with respect to use of hearing aids

- D1: Maintenance of positive emotions and reduction of negative
- D2: Issues leading to negative emotions

E: Specific additional Information

- E1: Coordination of emotion
- E2: Communication technology
- E3: Tinnitus
- E4: Impact of COVID-19 on emotions

Why this is important...

- Hearing loss causes negative hearing related-emotions due to identity or situational control factors
 - Annoyance, worry, frustration, loneliness, anger, guilt, fatigue, embarrassment
- Hearing aid use allows for experience of positive emotions
 - Enjoyment, happiness, relaxation
 - Can also be irritation, frustration

Why this is important...

- Helps to understand the emotional experience of adults with hearing loss and hearing aid users
- Can improve clinical assessment and counseling
- Support for inclusion of significant others
- Relevant factors that influence emotion include:
 - Lifestyle
 - Personality (introversion)
 - Control of a situation (more control)
 - Duration of hearing loss (more longstanding)
 - Relationship with those in conversation (closer relationships)

Does it matter clinically?

- Represents 17 adults in the UK
- Sample during a pandemic
- Tech savvy participants
- Potential for bias in interview responses

Considering issues around cognition and hearing loss

More background than usual –This topic has again highlighted that we need to be careful with potential for overhyping and public fear

It is important to explore new information regarding previously published studies.

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ARTICLES | [VOLUME 8, ISSUE 5, E329-E338, MAY 2023](#)

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RETRACTED: Association between hearing aid use and all-cause and cause-specific dementia: an analysis of the UK Biobank cohort

[Fan Jiang, PhD](#) • [Shiva Raj Mishra, PhD](#) • [Nipun Shrestha, PhD](#) • [Prof Akihiko Ozaki, PhD](#) • [Prof Salim S Virani, PhD](#) • [Tess Bright, PhD](#) • et al. [Show all authors](#) • [Show footnotes](#)

[Open Access](#) • Published: April 13, 2023 • DOI: [https://doi.org/10.1016/S2468-2667\(23\)00048-8](https://doi.org/10.1016/S2468-2667(23)00048-8)

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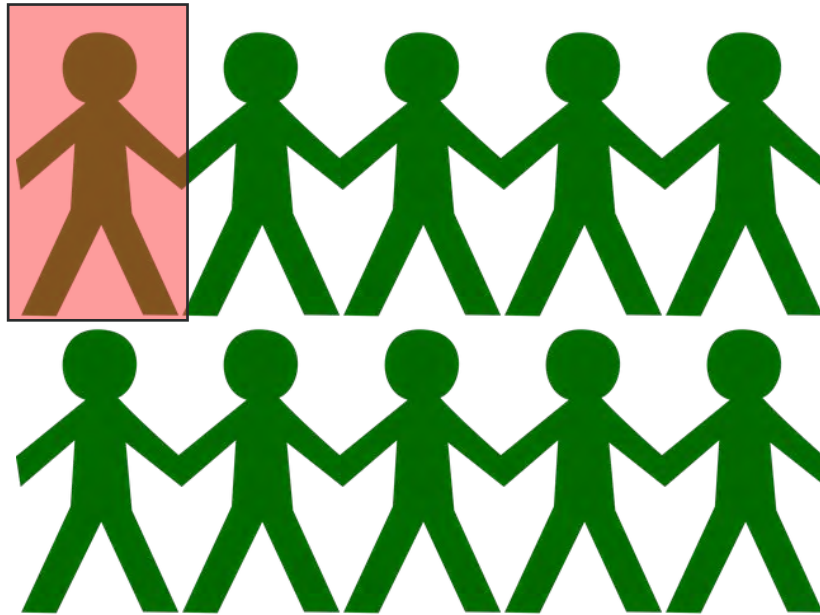
Retracted without explanation: Validity of the conclusions?

up to 8% of dementia cases could be prevented with proper hearing loss management,

A little terminology: What does it mean for my patients?

- Prevalence (total cases / total population) – For example: “What percentage of those 60-69 years old have a disease/disorder?”
- Incidence (number of new cases in a defined population during a specified time) – For example: “The incidence was 4 cases per 100,000 people last year.”
- However, what many want to know is – “**What are my chances?**”. Harder to estimate, but commonly referred to as “**Lifetime Risk**”, this is not the same as prevalence or incidence.
- Regardless of the type, this information usually comes from studies and reflects estimates, so you may see a range rather than a single number.

Individuals over 65 years of Age with Alzheimer's?

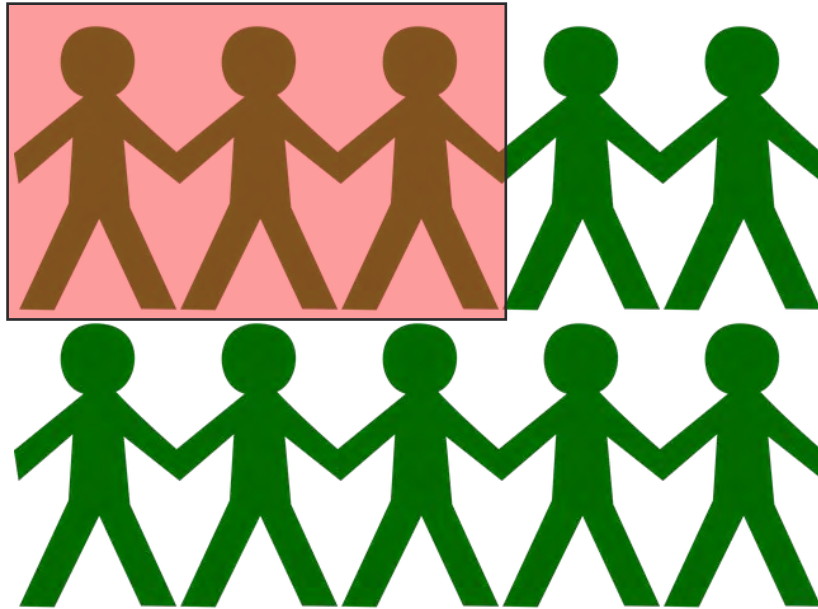


Prevalence goes up with age.

Those that live longer will be in a group with higher prevalence.

Generally considered “delayed” and “compressed”, but a lot of individual and group variability.

Individuals over 65 with Age Related Hearing Loss (affected by NIHL)

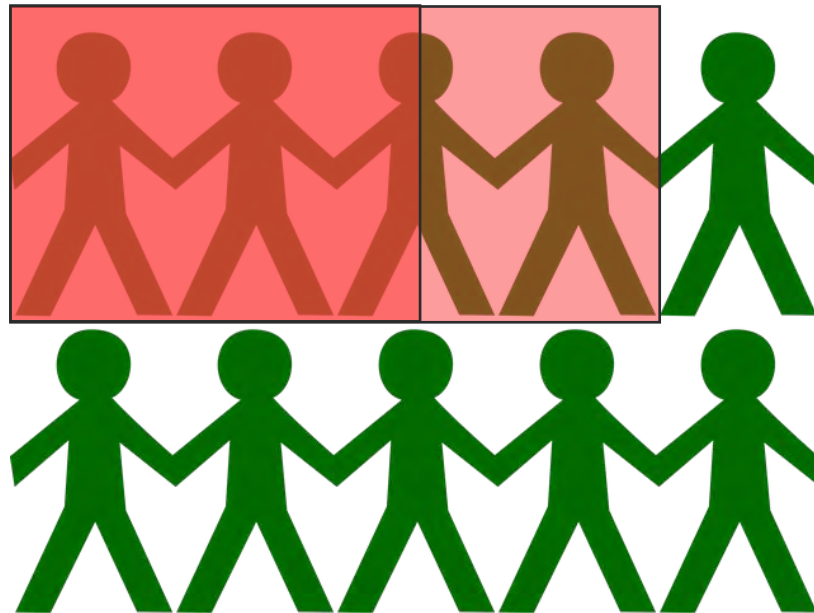


Prevalence goes up with age.

Those that live longer will be in a group with higher prevalence.

Generally “progressive” - acquired at a mild level at a younger age (compared to dementia) and gets worse with increasing age.

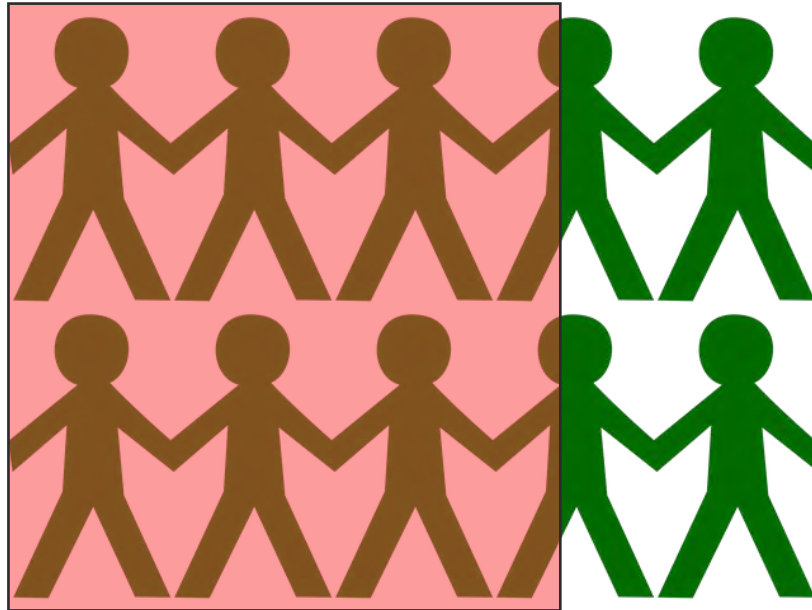
Lifetime Risk of Dementia: 37% women, 24% men (Mean age of onset 83 (79))



About 35-40% of individuals 90+ have some form of dementia.

Hale JM, Schneider DC, Mehta NK, Myrskylä M. Cognitive impairment in the U.S.: Lifetime risk, age at onset, and years impaired. SSM Popul Health. 2020 Mar 31;11:100577. doi: 10.1016/j.ssmph.2020.100577. Erratum in: SSM Popul Health. 2020 Dec 10;12:100715. PMID: 32300635; PMCID: PMC7153285.

Lifetime Risk of Hearing loss



About 90% of individuals 80+ have some form of hearing loss (Cruickshanks, Wiley, Tweed, et al.)

The majority of older individuals experiencing cognitive decline will also experience hearing loss (often, but not always, HL is experienced first).

Lin FR, Thorpe R, Gordon-Salant S, Ferrucci L. Hearing loss prevalence and risk factors among older adults in the United States. *J Gerontol A Biol Sci Med Sci*. 2011 May;66(5):582-90. doi: 10.1093/gerona/glr002. Epub 2011 Feb 27. PMID: 21357188; PMCID: PMC3074958.

Hearing intervention versus health education control to reduce cognitive decline in older adults with hearing loss in the USA (ACHIEVE): a multicentre, randomised controlled trial.

Lin, Pike, Albert, Arnold, Burgard, Chisolm, Couper, Deal, Goman, Glynn, Gmelin, Gravens-Mueller, Hayden, Huang, Knopman, Mitchell, Mosley, Pankow, Reed, Sanchez, Schrack, Windham & Coresh

Lancet 402(10404): 786-797.

What they asked...

- Potential for 3-year change (before and after interventions) in global cognition (comprehensive neurocognitive battery).
 - Is a comprehensive hearing healthcare program that includes hearing aids associated with a protective affect for cognitive decline?

A little background...Top Risk Factors for Dementia (Cognitive Decline)

- **Age**
- **Genetics**
- **Sex**
- **Ethnicity**
- Individual differences in how well your brain copes with disease (referred to commonly as “cognitive reserve”)
- Other non-modifiable health conditions
- **Modifiable Factors (estimated to be up to 40% of the risk)**
 - About 2/3 of dementia risks are thought to be genetic, but it may be possible to delay onset (when considering the group as a whole) by addressing modifiable risk factors.

Why it matters...

- While potential modifiable risks may have little or no effects for an individual person, even small delays in disease onset/progression can have very significant effects on public health costs

Potential Modifiable Risks

- Physical inactivity
- Smoking
- Excessive alcohol consumption
- Air pollution
- Head injury
- Infrequent social contact
- Less education
- Obesity
- Hypertension
- Diabetes
- Depression
- Hearing impairment

Why might treating hearing loss protect against cognitive decline?

- Two possibilities are that hearing loss forces the brain to work harder when listening, potentially affecting mental processes crucial for functions like memory and thinking (information degradation) or that sensory deprivation changes brain integrity (structural effects).
 - Treating hearing loss reduces listening effort and therefore it could reduce the negative impact on cognition.
- Another possibility is that hearing loss contributes to social isolation, which has been associated with increased dementia risk.
 - Treating hearing loss reduces social isolation and therefore could indirectly reduce cognitive decline by limiting another risk factor.
 - Rather than protecting against cognitive decline, treating hearing loss could treat or off-set some of the symptoms/manifestation of cognitive decline.

What they did...

- Multicenter RCT (randomized controlled trial) of 977 adults aged 70–84 (mean age 76.8)
 - All participants had untreated hearing loss and no cognitive impairment
- Randomly assigned to receive:
 1. Comprehensive audiological care/counselling and hearing aids
 2. Individual health education sessions (control)

What they found...

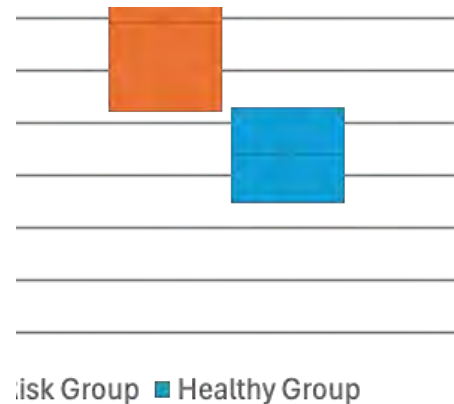
- Cognitive outcomes (change) was not significantly different between the hearing intervention and health education control groups.
- However, this analysis included two different groups of people:
 1. 739 [76% of total] “healthy volunteers” represented by individuals who were generally participating because of interest and were reportedly quite “health conscious.” It is speculated that these individuals are likely to have been in better than average health and were in a position to take better than average care of themselves.
 2. 238 [24% of the total] higher risk individuals. These individuals had had more risk factors for cognitive decline, and had lower baseline cognitive scores.

What they found...

- However, when looking at all participants (dominated by the “healthy” group), cognitive scores before and after intervention were not different for the hearing aid or the no hearing aid interventions.
- One interpretation of these findings?
It was not possible to see whether hearing aids had a potentially positive protective affect on cognitive decline (reduction in modifiable risk) because no significant cognitive decline occurred.
 - Importantly, the study will continue to look at a longer time window for the healthy volunteers...
- However, let’s look at just the “high risk” group

High Risk Group – Hearing Aid Use Benefits?

- Participants in the high-risk group who received audiologic care including hearing aids had no average decline in global cognition. There was a significant decrease for participants who received the health education intervention (no hearing aids).
 - Evidence of a potential protective effect?



Why else are the study findings important...
Hearing aids have benefits for all
(regardless of cognition)!

- Improved communication, even in many noisy situations
- Self-perceived benefits in listening and hearing
- Reduced listening effort and fatigue
- Improved social connectedness
- Decreased tinnitus

What this study result (and other evidence) does not say:

- Not using hearing aids will lead to dementia
- Using hearing aids will prevent dementia
- Importance of sending a positive message to patients without overhyping or scaring them.
 - Pichora-Fuller, Kathy. "Is Hearing Loss in Older Adults Predictive of Later Development of Dementia and Does Hearing Care Modify Dementia Risk?." Canadian Audiologist 10, no. 1 (2023).
 - Sarant, J., Lemke, U., Giroud, N., Scherpiet, S. and Weinstein, B., 2023. Promoting hearing and cognitive health in audiologic rehabilitation for the well-being of older adults. International Journal of Audiology, pp.1-11.

A couple of related clinical questions that are hot topics!

- Should we screen patients using “cognitive screeners”?
- Can we determine a cognitive diagnosis from cognitive screening?
- Should we use cognitive screening results for hearing aid counseling?

A little quiz...You have read a lot about audiologist using the MoCA (or other cognitive screeners). You know the “cut-off” for below normal is either 25, or a more conservative 23. You test two older patients who score 22 and 15. You know based on this:

- a) Both are experiencing mild cognitive impairment.
- b) The patient scoring 15 has moderate cognitive impairment and has significantly more issues than the one scoring 22 (who has MCI).
- c) One or both of the patients will require atypical audiologic intervention due to cognitive impairment.
- d) None of the above. The MoCA is a screener aimed at determining the potential need for cognitive testing and is not diagnostic. In fact, some professional organizations suggest it should not be used at all with asymptomatic individuals.

High False-Positive rate which is highest for 70-79 yo (common for HL, early for cognitive decline).

Not aiming to be an alarmist – But what if a patient believes a screening result is diagnostic and this results in suicidal ideation – I am not prepared to counsel that

Factors Associated With Hearing Aid Outcomes Including Social Networks, Self-Reported Mental Health, and Service Delivery Models

Mothemela, B., Manchaiah, V., Mahomed-Asmail, F., Graham, M., & Swanepoel, D. W.

American Journal of Audiology (2023), 32(4), 823-831.

What they asked...

- Are their unexamined patient factors that contribute to HA outcomes?

A little background...

- Many factors have previously been shown to contribute to hearing aid outcomes (either positively or negatively).
 - Fit/comfort, clarity, comfort with loud sounds
 - Word recognition score, use, price of the HA, age.
 - Purchase price, HA problems
- Understanding factors that impact outcomes could lead to interventions that further improve hearing aid outcomes (and/or limit “failures”).

Why it matters...

- Informing individualized care and optimal service delivery model development is a potentially important (and often overlooked) part of improving low hearing aid adoption rates.

What they did...

- An online survey of 398 hearing aid users sent through Hearing Tracker (<http://www.hearingtracker.com>).
- Survey included questions on patient demographics, audiological variables, general health, social factors and hearing aid outcomes (International Outcome Inventory for Hearing Aids - IOI-HA).
- Regression analysis was completed to identify significant patient factors contributing to IOI-HA outcomes .

What they found...

- Positive factors: 1) social network of people with hearing aids, 2) better self-reported mental health, 3) working, 4) good quality of life, and 5) self-reported hearing difficulty.
- Negative factors: 1) social networks of people with hearing loss without hearing aids, and 2) service delivery model of private or university clinic compared to big-box retailers.

Why this is important...

- Social circles matter and the difference between HA users and non-users highlights the continued importance of addressing HA stigma.
- More support that service delivery model/cost likely affect hearing aid outcomes – important to evaluate cost/benefit expectations.
 - People like service, but like low cost too. Finding that balance point for individuals may be an important key to individualization.
- Emerging evidence that more positive people (higher expectations, better self-perceived QOL) and those that perceive more difficult have better outcomes.
 - Perception – not just audiometric hearing loss matters.

Summary and conclusions

- Jorgensen et al (2023)

Q1 • Demographics and setting can affect acoustics, auditory demand, and feature activation

Q2 • Older adults have less diverse and demanding listening environments than younger adults

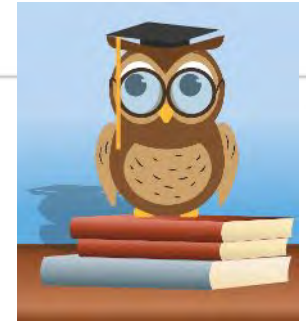
- Lelic et al. (2023)

Q1 • Hearing aid outcomes were significantly better in the group of hearing aid users who focused on positive hearing aid

Q3 experiences than the control group

- Holman et al. (2023)

Q1 • Adults have negative emotions towards hearing loss and positive emotions towards hearing aids



Summary and Conclusions

- Lin et al. (2023)

- The achieve study demonstrated the relationship between hearing aid use and cognition may be individualized.

Q4 • More importantly it showed hearing aids as part of hearing care have many benefits for all users that are in addition to any cognitive benefits.

- Jiang et al. (2023)

- Concluded that biobank data supported HA use decreased cognitive decline, but then a retraction invalidated our ability to make this claim - It is important to explore new information regarding previously published studies.

Q5

Thank you! Questions?

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