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Listening Effort, Fatigue, Social Isolation, & Dementia: Correlates of Age Related Hearing Loss

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Listening Effort, Fatigue, Social Isolation, & Dementia: Correlates of Age Related Hearing Loss

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Learning Outcomes
As a result of this course, participants will be able to:

- Identify psychosocial consequences of age related hearing loss which may or may not relate to the audiogram and will impact clinical practice.
- Describe how to distinguish between listening effort and fatigue; loneliness and social isolation; dementia and age related hearing loss.
- Explain how to optimize communication and safety when working with persons with age related hearing loss that interferes with communication and daily function.

WHO AM I

Dementia and Age Related Hearing Loss
Identification of Persons with Hearing Loss
Public Health Challenges Posed by Age Related Hearing Loss
Philosophy Underpinning My Work with Older Adults

- Lifespan approach
- Person centered
- Ability to hear and communicate are cornerstones of successful and healthy aging
- Hearing loss linked to SI via listening effort, fatigue and motivation!!
- Becoming part of the solution in health care settings

Public Health Challenges – 21st Century

- Age-Related Hearing Loss
- Dementia
- Social Isolation

21st Century Challenges
Communication is a Basic Human Right

Being able to communicate effectively is the most important of all life skills.

COMMUNICATION

- The Ability to be Understood and to Understand Others
  - Involves use of a common system
  - Hearing essential to the ability to understand what others are saying
  - Memory impacts ability to remember words, their meaning and what others have said (aka ability to communicate)
  - People with significant difficulty hearing/understanding have difficulty remember what others have said
  - When the ability to communicate is impaired our social history and networks are impacted
Age-Related Hearing Loss (ARHL) makes it difficult to hear certain speech sounds.

- Vowel sounds are LOUD and low-pitch
- Consonant sounds are soft and high-pitch

Brain has to fill in the blanks, and does not always get it right.
Hidden Hearing Loss

- Audiometric thresholds DO NOT reflect the communication difficulties experienced by older adults with ARHL (Tremblay, et al., 2015)
- Many older adults experience hearing difficulty (HD) in presence of multiple talkers and competing noise despite having normal thresholds
Hearing Loss is Invisible

You cannot tell an individual who has Hearing Loss from someone who has normal hearing just by looking at them. Hearing Loss transcends gender, race, socio-economic status, wealth, etc.

Prevalence of Hearing Loss on the Rise

The number of adults with Hearing Loss will DOUBLE in the next 4 decades!
Older adults (>65 years) are predicted to live for more than half of their remaining years with at least mild levels of hearing loss, with more than half of remaining life lived with moderate hearing impairment for adults >/=75 years

(Kiely, Mitchell, Gopinath, et al., 2016)

**Signs of Age-Related Hearing Loss**

- Conversation is an effort
- Missed opportunities for information, humor, emotional connection
- Difficult to remain engaged socially
- Fatigue when socializing
- Cannot join in at restaurants due to the noise
- Problems with participation in groups
- Asking “What?” a lot
- Thinking people are mumbling
- Arguing with people because information was misheard
- Feeling left out, anxious, depressed, angry
- Cannot hear TV
- No longer enjoying programs, films, lectures, worship
- Trouble hearing on the phone
- Issues making appointments by phone
- Mis-hearing the doctor, therapist, pharmacist
- Fear of falling
- Fear of going outside

(Kiely, Mitchell, Gopinath, et al., 2016)
The Communication Challenge Posed by Age-Related Hearing Loss (Peelle, 2017)

**A** Acoustic challenge
- Peripheral audity
- Incomplete language
- Temporal processing
- Localized accent
- Underarticulation
- Unfamiliar speaker
- Background noise
- Competing behaviors
- Assistive device

**B** Listening effort
- Behavioral
- Memory
- Response time
- Subjective effort

Increased difficulty listening in background noise/multiple talker scenarios and locations where acoustics are poor/degraded

Listening effort increases, communication becomes even more challenging

Communication becomes fatiguing/significantly effortful. No longer motivated to participate; feelings of exclusion

Sound Deprivation, Withdrawal from social situations; **Social Isolation**, Cognitive Decline

Age-Related Hearing Loss: The Trajectory
Age-Related Hearing Loss

High Emotional and Physical Impacts
High Economic Burden

Under-Diagnosed
Under-Treated

GLOBAL BURDEN
(WILSON, TUCCI, MERSON, O'Donoghue, 2017)

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The updates reflect increasing appreciation of the importance of hearing loss for gauging overall health and wellbeing.
Age-Related Hearing Loss: a Modifiable Risk Factor

- Social Isolation/Loneliness
- Dementia
Social Isolation / Loneliness (Gopinath et al., 2012)

Age-Related Hearing Loss
= poor communication / lost connection to others

Social Isolation: 29% increased risk of premature death

Loneliness: 26% increased risk of premature death

Impaired cognitive & physical function
Neuro-biological effects of stress and inflammation caused by poor social engagement

Premature Death

HEARING LOSS and DEMENTIA

- Dementia – Refers to a progressive loss of mental function; neurocognitive symptoms include mental and communicative impairments, difficulty performing everyday activities; impaired processing of emotional prosody, musical, and nonverbal vocal emotions often present

- Hearing Loss – An auditory-cognitive-based condition that interferes with communication, cognitive function, performing everyday activities; impaired processing of emotional prosody, musical, and nonverbal vocal emotions often exists; impaired auditory encoding in the cochlea and impaired decoding in the brain

BECAUSE OF DIFFICULTY COMMUNICATING AND MAINTAINING INTERPERSONAL RELATIONS THERE IS A TENDENCY TO DISENGAGE FROM SOCIAL INTERACTIONS
More than 90% of persons with dementia have hearing loss (Martini et al., 2015)

Older adults with cognitive impairment and hearing loss are doubly challenged when trying to communicate verbally because of impaired auditory encoding in the cochlea and impaired decoding in the brain

Hearing Loss and Dementia: The Risk (Lin, et al., 2011)

- Hearing loss **INDEPENDENTLY** associated with incident, all-cause dementia (11.9 year fu)
- Risk of incident dementia is associated with baseline hearing loss
  - Risk increases with baseline hearing loss-severe hearing loss 5X more likely to develop dementia; mild HL 2X more likely
35% of Dementia is Preventable

1. Hearing Loss – 9%
2. Less education – 7%
3. Smoking – 5%
4. Depression – 4%
5. Physical Inactivity – 3%
6. Hypertension – 2%
7. Social Isolation – 2%
8. Obesity – 1%
9. Diabetes – 1%

Simple health behavior changes could prevent a third of dementia cases

WHY HEARING LOSS MATTERS

- Strongest midlife risk factor for dementia is hearing impairment
- Lancet report showed that approximately 9% of dementia cases are attributable to hearing loss in midlife
  - WHY? The cascade hypothesis claims that prolonged reduction in hearing function leads to insufficient stimulation, which may cause cognitive decline in later life
Cascade Model vs. Common Cause Model vs. Cognitive Burden vs. Multi-Level Model

(Stahl, 2017)

CASCADE

Prolonged reduction in hearing function leads to insufficient stimulation; the auditory deprivation (due to impoverished sensory input) cascades into decreased social interactions and into impoverished cortical sensory input which in turn cascade into cognitive decline/dementia.
Hearing Interventions Inaccessible and Unaffordable

- Hearing aid use and satisfaction lag behind current design improvements and technological advances
- 80% of those who could benefit, do not use hearing aids
- Majority of persons who use hearing aids are older; the majority of older adults with hearing loss do not use hearing aids
Untreated Hearing Loss – A Threat to Healthy Aging

Healthy Aging

- Process of developing and maintaining functional ability that enables well being
  - A process that spans the entire life course
  - Depends on accumulation of strengths and deficits across the life course
  - Actions people can take to improve the trajectory toward healthy aging
  - Intrinsic capacity + environmental variables are determinants
  - Social engagement and physical activity are key
Ecology Theory of Aging (ETA)  
(Lawton, 1982)

- Old age is profoundly influenced by the physical environment in which people reside and how they cope with environmental challenges – poor fit leads to stress
The Person-Environment Fit Model/Theory (P-E Fit) (Harrison, 1989, 1985)

- Stress arises when there is a “misfit” between an individual and the environment
- Amount of stress depends on the degree of misfit and the person’s ability/inability to meet demands posed by environment
  - Stress is higher and well being lower when the fit between the person’s coping capacity and environmental demands is poor

Features of the Environment which Produce Stress for Persons with Hearing Loss (Pichora-Fuller, 2016)

- Novelty
- Unpredictability
- Sense of a Lack of Control
- Threat to Self
Person-Environment Fit (P-E Fit) Model*

**PERSON'S HEARING/COMMUNICATION ABILITY**

**FATIGUE & STRESS**

**PERCEIVED DEMANDS OF ENVIRONMENT**


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**Listening Effort and Fatigue**
The Trajectory

- Difficulty Communicating
- Listening Effort Required to Communicate
- Motivation to Make the Effort Declines
- Fatigue Sets In
- Handicapping, Withdrawal/Disengagement

No Correlation Between Measured Hearing Level and Fatigue
Implications of Sustained Listening Effort

- Mental Fatigue (- extreme tiredness/exhaustion that results from exerting sustained listening effort)
- Communication Disengagement
- Decreased Subjective Well-Being
- Negative Effect on Q of L

Did You Know?

- Adults seeking help for their hearing difficulties – more likely to report low energy (vigor deficit) and increased fatigue than older adults of comparable age in the general population
- Mental fatigue tends to be greater than physical fatigue (reduced ability or desire to perform a physical task)
Implications of Fatigue

- Depression
- Lack of desire to engage in life activities and social interaction
- When ignored it leads to decline in numerous functions and health problems
- Negative effect on Q of L
- Hearing impaired listeners report increased levels of fatigue as compared to an age matched control sample; 15% of participants with hearing loss reported severe fatigue (Alhanbali, et al., 2016; Hornsby, et al., 2016)
- CI users, SSD, HA users report comparable levels of fatigue

Social Isolation

Loneliness

Social Inaction

Unable to Take Part
What Matters Most as People Age

- Older adults value relationships with family and friends second only to health (Victor, et al., 2000)
- Social engagement – predictor of longevity and life expectancy
- The social environment matters

Value of Social Integration

- People with more social ties live longer, and have better health
- Better social connectedness related to reduced risk of subsequently developing dementia (Fratiglioni, Wang, Ericsson, Maytan, and Winblad, 2000)
The Facts

- “Individuals lacking social connections … are at risk for premature mortality,” with risk levels comparable to those of obesity, lack of physical activity or substance abuse” (Holt-Lunstad, 2015)

The Cycle

INABILITY TO COMMUNICATE SUCCESSFULLY → DIFFICULTY PARTICIPATING, LOW REWARD → WITHDRAWAL FROM SOCIAL ACTIVITIES
Sociology 101

- **Loneliness** - A psychological state; a subjective discrepancy between one’s actual and preferred level of social contacts
  - Lonely people are more prone to experience depressive symptoms
- **Emotional loneliness** – the absence of a significant other
- **Social loneliness** – the absence of a social network
- **Social isolation** – an objective state referring to the number of social contacts or interactions, social network size
- **Social Inaction**- behavior not oriented toward others
  - Bottom line - smaller social networks and older age are not necessarily associated with increased loneliness

Heylen (2010)

Higher Satisfaction with Social Relationships

Lower the Risk of Social Loneliness

Better ones Appraisal of Number of Good Friends
Are Your Patients Lonely?

Hearing impaired older adults are at increased risk of experiencing emotional distress and restrictions in social engagement after five years (Gopinath, Hickson, Schneider, et al., 2012).

Hearing ability in noise significantly associated with incident social and emotional loneliness (N=5-8) (Stam, et al., 2016).

Self perceived hearing handicap and difficulty understanding distorted speech relate to loneliness and SI (Weinstein, 1983).

DID YOU KNOW?

- Hearing impaired older adults are at increased risk of experiencing emotional distress and restrictions in social engagement after five years (Gopinath, Hickson, Schneider, et al., 2012).
- Hearing ability in noise significantly associated with incident social and emotional loneliness (N=5-8) (Stam, et al., 2016).
- Self perceived hearing handicap and difficulty understanding distorted speech relate to loneliness and SI (Weinstein, 1983).
Greater hearing loss associated with a greater degree of loneliness, with each 10 dB increase of PTA associated with a 1.26-point increase (95% CI = [0.52, 2.00]) (Sung, et al., 2015).

Severe/profound hearing loss was associated with UCLA scores that were 13.6 points higher when compared with the “normal” hearing category.

Self reported handicap moderate correlation with loneliness (r=.50).
DID YOU KNOW?

- Improving Audibility has a Protective Effect on Loneliness
  - Hearing Aids
  - Cochlear Implants
  - Assistive Technology

Conclusions on Efficacy of Sensory Interventions

- There is no direct effect of hearing aids on cognitive decline; rather, depressive symptoms and social isolation may mediate the association (Dawes et al., 2015; Amieva et al., 2015)
- By facilitating improved communication, hearing aids may improve mood, reduce anxiety, improve quality of social interaction, and increase social engagement, thereby perhaps impacting scores on cognitive tests (Amieva et al., 2015)
- Patients may feel less exhausted after an hour of socializing – and can engage more with family and friends
- There is a positive effect of implants on depression and cognitive status – and of HA use on depression and social and emotional loneliness (Castiglione et al., 2016; Weinstein et al., 2016; Boi et al., 2012)
Clinical Implications

CLINICAL IMPlication # 1

Assess social network size, loneliness, listening effort and fatigue
CLINICAL IMPLICATION #2: Reframe the Conversation

- Hearing is often referred to as the “social sense;” it plays an important role in developing and maintaining intimate relationships, social connections with family, friends, coworkers, and acquaintances
- **Goal of hearing health care interventions should be to optimize social engagement**
- Consider range of hearing health care interventions targeting situation specific challenges

CLINICAL IMPLICATION #3: Public Health Approach

- Emphasize optimizing audibility across social networks
- Intervene in several different aspects of social environment
  - Increase availability of social support within existing networks
  - Increase social integration by creating and nurturing ties between individuals and his/her community
  - Reduce negative interactions via improved audibility
TAKE AWAYS (Maharani, et al., 2018)

- Hearing loss is a potentially modifiable risk factor for loneliness and healthy aging (Shankar, McMunn, Banks, & Steptoe, 2011)
- Hearing aids may allow better hearing input and delay cognitive decline by preventing the adverse effects of auditory deprivation or facilitating lower levels of depression symptoms, greater social engagement, and higher self-efficacy, which protect cognitive function.
- Screening and treating older adults for hearing impairment could plausibly reduce loneliness and improve quality of life.

- REFER
- REFER
- REFER
- MAKE SURE HEARING AID IS WORKING
- USE ASSISTIVE TECHNOLOGY
- CONSIDER CI REFERRAL
Hearing and our ability to engage with the people and environment around us, is the foundation for much of our daily experience and should be our goal as professionals working with persons with hearing loss.

ARHL has a cascading and impactful consequence on individual well-being and broader public health.

Ensuring that older adults with hearing loss, can effectively engage with the people around them is key to optimizing their health and well-being.

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**FINAL TAKE AWAYS & THANK YOU**

- **MODIFIABLE RISK FACTORS FOR DEMENTIA**
  Some of these risk factors for dementia are social isolation, physical inactivity, depression, and possibly hearing loss.

- **ROLE OF HEARING INTERVENTIONS**
  Alleviate social isolation, physical inactivity, depression, and hearing loss by restoring communication abilities and allowing for cognitively stimulating activities.

- **HEARING AIDS MAY DELAY THE ONSET OF SENILE DEMENTIA**
  Hearing aids may delay the onset of dementia or cognitive decline in older adults because they promote social connectedness.
References


References Continued

QUESTIONS