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ONLINE CONTINUING EDUCATION FOR THE LIFE OF YOUR CAREER

A Dementia Primer for Speech-Language Pathologists

Barbara E. Weinstein, PhD

Moderated by:
Amy Hansen, MA, CCC-SLP, Managing Editor, SpeechPathology.com

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A Dementia Primer for Speech-Language Pathologists

Barbara E. Weinstein, Ph.D.
Graduate Center, CUNY
New York University Medical Center
NEW YORK, NEW YORK

CONTINUED

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Learning Outcomes

After this course, participants will be able to:

- List the causes and modifiable risk factors for dementia and the significant role of hearing loss in the equation.
- Describe the implications of the communication changes and behaviors that occur with dementia and their implications for speech-language pathologists.
- Describe the hearing interventions options that have proven successful for persons with dementia and hearing loss and criterion for use and referral.

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ABOUT ME

- Ph.D. – 1980; ARHL and SI
- A public health perspective - work with all stakeholders to ensure best outcome for the population as a whole
- A clinical perspective - focus on the individual patient, advocate to insure best outcome for each patient, person/family centered. Convinced that stakeholders must see ARHL within context of health care for older adults

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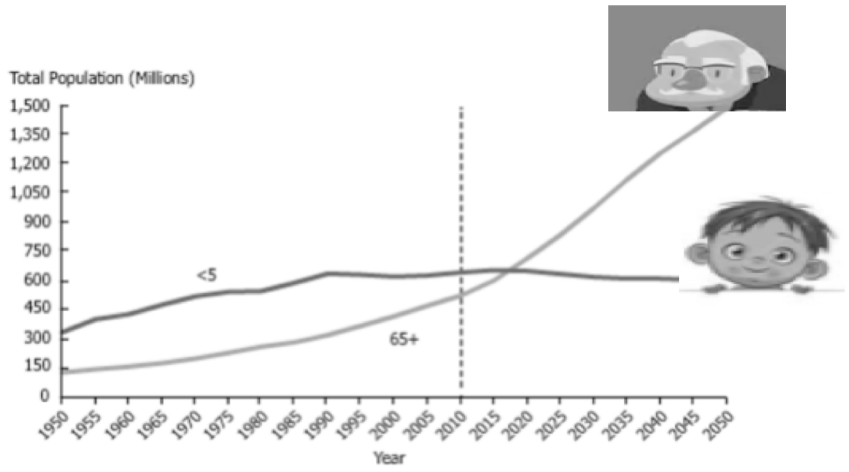
DEMOGRAPHIC REVOLUTION



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AGING in the 21st Century

- Older Adults Are
  - Healthier
  - Living longer
  - Retiring later
  - Socially engaged
  - Politically engaged
  - Dedicated to living purposeful lives

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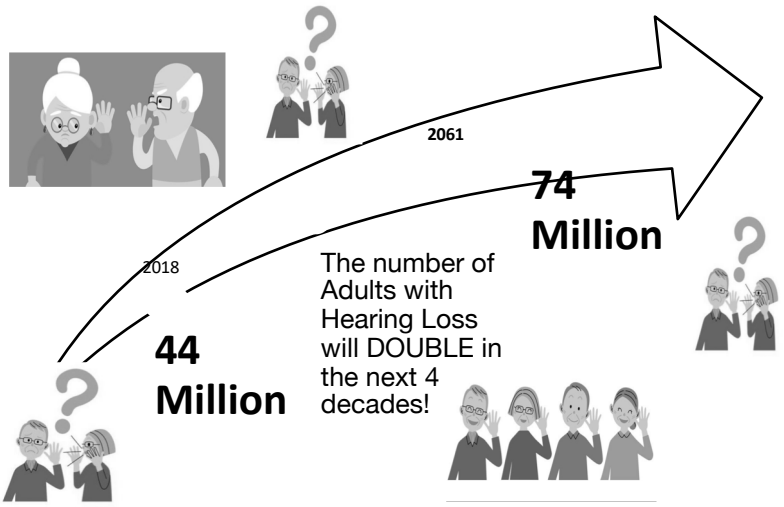
Hearing Loss in the 21st Century



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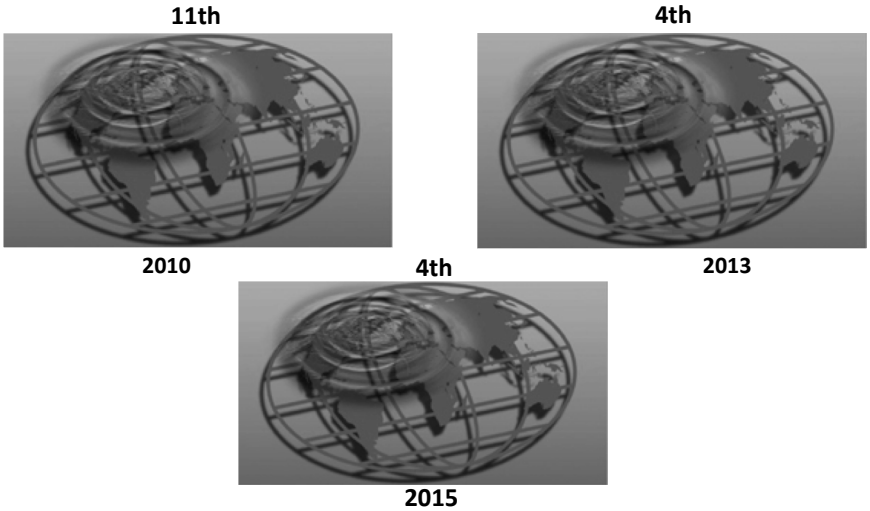
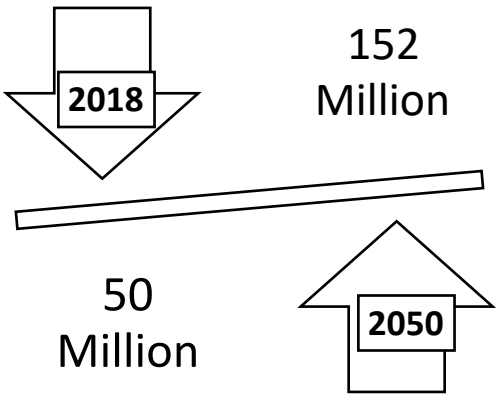
Global Burden of Disease-Years Living with Disability: ARHL



Dementia Projections Worldwide (WHO, 2017)



GLOBAL COST

http://www.who.int/mental_health/neurology/dementia/en/

- 10 million new cases every year
- If global dementia care were a country, it would be the 18th largest economy in the world exceeding market value of GOOGLE!!!
- $818 billion – majority of care by family members
- 7th leading cause of mortality

DEMENTIA in the 21st Century

Dementia - Greatest Global Challenge for Social and Health Care

Hearing Loss – Greatest Chance for Prevention of Dementia

- ***More than 90% of persons with dementia have**
- **hearing loss (Martini et al., 2015)**
- ***Most persons with dementia and hearing loss do not use hearing aids: 21%** (Nirmalasari, Mamo, et al., 2016)
- ***Fitting hearing aids earlier may have a mitigating effect on memory loss trajectory (Maharani, Dawes, et al., 2018)**

*Ms. S has to work hard to follow what others are saying especially in noisy environments — at a party, an office gathering, on the street — her cognitive energies are focused on deciphering what is said. She is introduced to someone whose name she does not know. She asks again what is the person's name. She still does not quite catch the name

*The conversation goes on from there, and within a couple of minutes she has lost track of the subject, guessing at responses, making noncommittal replies, smiling and nodding her head

*When she walks away she has no idea about what the people were talking

HEARING LOSS OR DEMENTIA???

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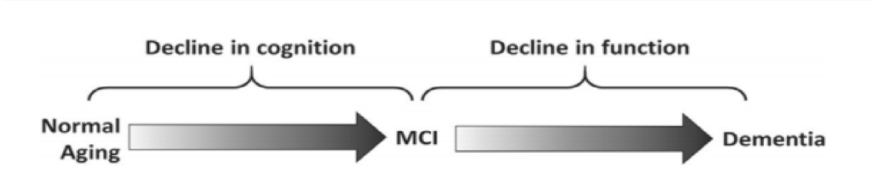
- What is dementia?
  - A. A disease
  - B. A term synonymous with Alzheimer's Disease
  - C. An umbrella term, a group of symptoms involving cognitive deterioration
  - D. A wastebasket term which is over-used

NOT A DISEASE

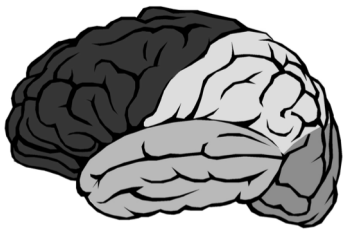
- An umbrella term for a range of conditions that affect the brain; a **group of symptoms** affecting ability to process thought; affects memory, COMMUNICATION, thinking, behavior, and social activities severe enough to interfere with daily living and independent functioning
  - Progressive
  - Gradual in onset, and often overlooked
  - **Communication impaired**
  - Difficulty performing activities of daily living
  - Memory loss
  - Personality changes
  - Impaired reasoning
  - Decline in ability to learn new information

Not A Normal Part of Aging: The Trajectory (Moga, et al., 2017)



DEMENTIA: MULTIFACTORIAL

ALZHEIMER'S-A PROGRESSIVE BRAIN DISORDER - MOST COMMON CAUSE OF DEMENTIA

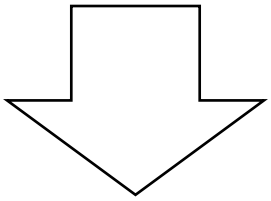


Parietal Lobe (language, spatial perception, reading, writing)
Frontal (judgment, attention, carrying out tasks and behavior)
Temporal (language, recognition of faces and objects)
Hippocampus, new memory formed)
CONNECTIONS BETWEEN REGIONS DESTROYED,CORTEX SHRINKS

DEMENTIA: A HIGHLY VARIABLE CONDITION

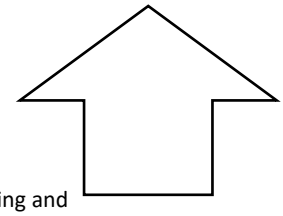
- Individual differences in the amount of pathology required for the initial expression of clinical symptoms
- Some people with neuropathological brain changes do not have dementia
- People who have good cognitive reserve can tolerate more neuropathology - before develop dementia
- Less cognitive reserve leads to earlier development of dementia
  - reserve may be related to either the brain anatomical substrate, adaptability of cognition, resilience

Persons participating in a variety of leisure activities characterized as intellectual (eg, playing games, going to classes) or social (eg, visiting friends or relatives etc.) are 38% less to develop dementia (Scarmeas, Levy, Tang, et al., 2001)



PARTICIPATION IN SIX OR FEWER LEISURE ACTIVITIES – HIGHER RISK

PARTICIPATION IN MORE THAN SIX LEISURE ACTIVITIES – 38% LOWER RISK OF DEVELOPING DEMENTIA



Cognitive activity strengthens the functioning and plasticity of neural circuits

- Dementia – A complex, multifactorial process; a group of syndromes characterized by progressive loss of mental function severe enough to interfere with social and communicative function, performing everyday activities; impaired processing of emotional prosody is often present
- Hearing Loss – An auditory-cognitive-based condition that interferes with communication, cognitive function, performing everyday activities; impaired processing of emotional prosody, 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

COMMUNICATION DEFICIT TRAJECTORY

- Loss of memory impacts ability to remember words and their meaning
- Increased difficulty using words to express needs and feeling and understanding what others are saying- reliance on gestures and tonality when words fail
- Ability to communicate is impaired, need/desire to communication remains

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HEARING LOSS AND DEMENTIA

It's your brain that hears. Not your ears.

WHICH IS IT DEMENTIA OR ARHL??

- Occurs insidiously and frequently unrecognized
- Frequently attributed to aging
- Delayed recognition – detrimental to health
- Earlier detection may improve patient outcomes
- Stigma
- General practitioners (GPs) often dismissive and unhelpful
- A threat to safety
- Associated with falls
- Cognitive reserve deficit - for remembering, responding, analyzing and even thinking

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Distinctive Features of HL and Dementia

- Rapidly increasing in prevalence
- Major cause of disability
- Affect social functioning
- Threat to safety
- Costly to individual and society
- Largely underestimated and under-treated
- Lack of awareness of far-reaching consequences of ignoring
- Feared by many
- Long term condition

THE LANCET COMMISSION REPORT

THE CHARGE

- A group of 24 scientists were commissioned to review available evidence and to produce recommendations regarding how best to manage and/or treat dementia

RATIONALE FOR REPORT

- Generally diagnosed late in life
- A clinically silent condition that likely begins mid-life with silent pathologic brain changes
- A costly condition for which there are no known disease modifying treatments

Key Philosophy Underlying Lancet's Goal of Identifying Modifiable Risk Factors

- No known cure for dementia
- Cognitive resilience in later life likely enhanced by building brain reserve earlier in life through education, physical exercise, intellectual stimulation **engagement in leisure activities) over the lifespan**
- May be a window of opportunity to intervene in middle age by identifying and eliminating possible modifiable risk factors at different stages of life – **ıife span approach**
- Reduce dementia incidence via lifestyle interventions designed to **optimize/maintain social engagement**

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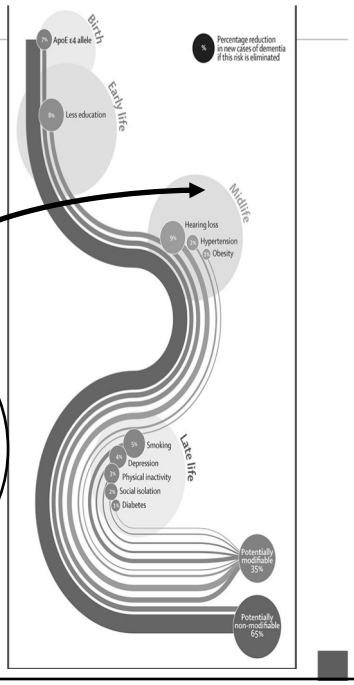
Dementia Is Modifiable (Lancet Commission Report (2017)

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



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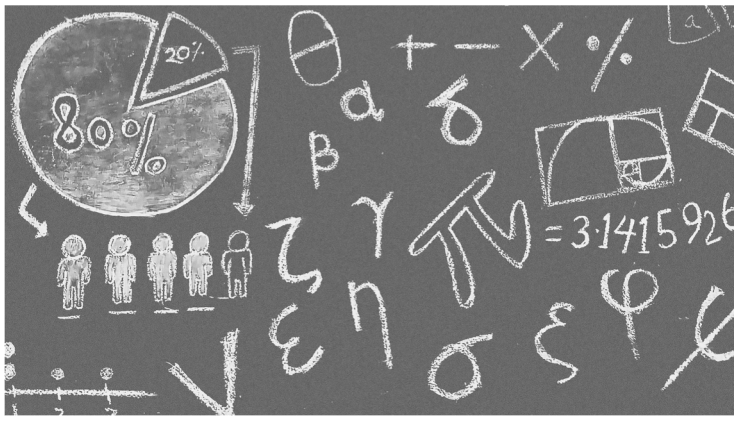
WHAT WE KNOW



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PREVALENCE

- Prevalence of hearing impairment among persons with cognitive impairment (32% MCI; 68% Dementia)*
  - MCI: 53% had hearing loss
  - Dementia: 63% had hearing loss
  - Hearing aid use 10% mild; 50% moderate

** Prevalence of cognitive impairment among persons with severe to profound hearing loss**
  - Before CI – 45% had MCI (usually 3-19% in this age group)

*Nimalasari, et al., 2017

**Mosnier, et al., 2018

Systematic Review and Meta-Analysis (Loughrey, Kelly, Kelley, et al. 2018)

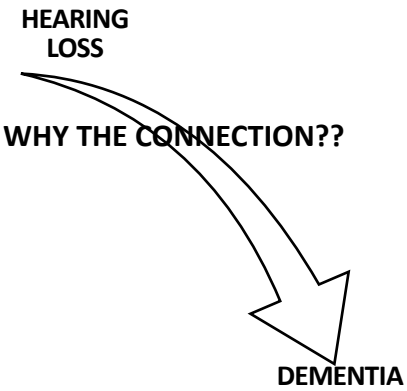
- 36 studies (N=20,264)
- Age-related hearing loss is a possible biomarker and modifiable risk factor for cognitive decline, cognitive impairment, and dementia (not for AD or vascular dementia)
- Cohort studies indicate that age-related hearing loss (ARHL) precedes the onset of clinical dementia by 5 to 10 years

- Moderate and poor objective and self-reported hearing difficulty cross-sectionally associated with physician-diagnosed dementia (Davies, et al., 2017; Yuan, Sun, Sang, et al., 2018)
- Over an 11-year period incidence of dementia 39% higher in individuals with moderate self-reported hearing and 57% higher in those with poor self-reported hearing than in those with normal hearing (Davies, et al., 2017)

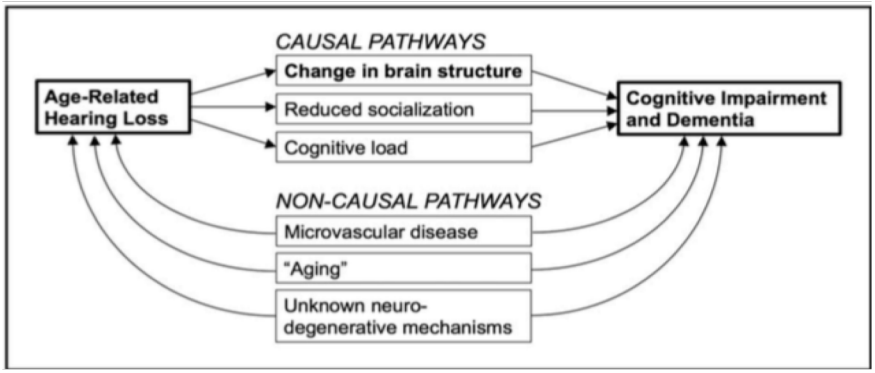
- Dose effect of the association between hearing loss and dementia – more severe the hearing difficulties, greater the risk for dementia (Ford, et al., 2018)
- Attributable risk of dementia associated with hearing impairment - approximately 36%

  (Lin, et al., 2011)
- Most studies cross sectional or cohort - NO causal relationship uncovered

- Age 55 youngest mean age at which HI associated with risk for dementia (Gallacher, et al., 2012)
- HL can confound cognitive test results resulting in overestimation of the level of cognitive impairment in persons with hearing loss (Weinstein & Amsel, 1986; Dupuis, et al., 2015)
- Approximately 9% of dementia cases could be attributable to hearing loss that set in during midlife (Livingston, et al., 2017)



POSSIBLE MECHANISTIC PATHWAYS



POSSIBLE MECHANISTIC PATHWAYS (CAUSAL)

1. ARHL may result in a change in brain structure, which may, in turn, increase the risk of cognitive impairment and dementia
2. ARHL reduces socialization, which may in turn reduce cognitively stimulating input to the brain, which may in turn, increase the risk of cognitive impairment (cascade/auditory deprivation/sensory deprivation)
3. ARHL increases demand on cognitive function (so much attentional effort expended decoding sounds into words) with little brain capacity remaining to process the actual meaning of the message, resulting in chronically reduced cognitively stimulating input to the brain, possibly increasing risk of CI (cognitive load)(Information degradation hypothesis)

POSSIBLE MECHANISTIC PATHWAYS (NON CAUSAL-A SECOND HIT)

1. Unidentified neurodegenerative process may cause ARHL and cognitive impairment
2. Shared pathways
3. Set of events causing aging leads to CI and HL

HI – Second Hit on the Brain

- HI may add to brain pathology resulting from other disorders (e.g. amyloid-beta accumulation, neurofibrillary tangles, and microvascular disease-plaques noted in auditory system)
- Cortical reorganization following HI- Impoverished auditory signals and reduced stimulation from the impaired cochlea may precipitate changes in cortical reorganization and brain morphometry

BRAIN MORPHOLOGY, HL, DEMENTIA

(Lin, et al., 2014; Uchida, et al., 2018)

*Hearing impairment accelerates rates of whole brain atrophy and paracampus

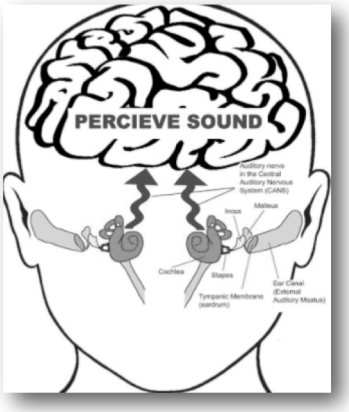
*HI associated with specific volume declines in the right superior, middle, and inferior temporal gyri over a mean 6.4 years of follow-up

*Peripheral hearing ability correlated with hippocampal volume

*HI had significantly smaller hippocampal volume as compared to non-hearing impaired counterparts

*Poorer the hearing, smaller the hippocampal volume

DO AUDITORY INTERVENTIONS WORK?



PRINCIPLES UNDERLYING DEMENTIA CARE (WHO, 2017)

- Early diagnosis in order to promote early and optimal management
- Optimize physical health, cognition, activity and well-being
- Identify and treat accompanying physical illnesses
- Detect and treat challenging behavioral and psychological symptoms
- Provide information and long-term support to carers

MANAGEMENT GOALS

- Maintaining social engagement
- Maximize ability to communicate
- Reduce caregiver burden
- Optimize safety in the home

PRIMARY CATEGORIES OF HEARING HEALTH CARE INTERVENTIONS

- Hearing Aids
- Cochlear Implants
- Hearing Assistive Technologies
- Facilitate and encourage Social Engagement

Hearing clearly leaves greater cognitive reserve for remembering, responding, analyzing and even thinking

Rationale : Optimizing audibility may reduce sensory deprivation, may encourage social engagement, and may leave greater cognitive reserve for remembering, responding, analyzing and even thinking

- Is there a connection between hearing aid use and dementia onset?
- Does hearing intervention facilitate clinical management?
- Can hearing interventions slow down transition to dementia?

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Efficacy of Sensory Interventions

- 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

- Average age of first time HA use – 62 years; 18 year FU
- A decline in episodic memory (immediate and delayed recall; backward count) leading up to self rated hearing aid use in ALL participants
- Episodic memory continued to decline after HA use BUT rate of cognitive decline (episodic memory task) was less steep in persons with hearing loss after they began using hearing aids
  - Hearing aid use may allow for better hearing input and delay cognitive decline by preventing adverse effects of auditory deprivation (e.g. depression, social engagement and self efficacy – supports cascade hypothesis)!!

*(Maharani, et al., 2018)

(SENSE-Cog Multi-Phase Study-18 month follow-up)

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WHY A SLOWER RATE OF DECLINE (Maharani, et al., 2018)?

- Hearing aids may improve audibility allowing for greater auditory input
- By reducing auditory deprivation and increasing auditory input we may prevent adverse effects such as listening fatigue, depression, social isolation which may protect cognitive function
- Hearing aid use may enhance self efficacy – individuals may believe they can succeed in self managing in selected situations

- Do hearing interventions facilitate clinical management?
- Can hearing interventions slow down transition to dementia

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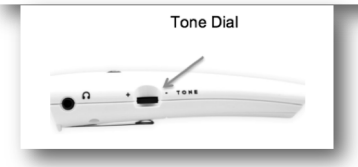
Value of Hearing Assistance Technologies
Mamo, et al., (2017)

- AR with interventionist: One 2-hour session with patient, caregiver
- Technology – choice of
  - Williams Sound Pocketalker®
  - Sound World Solutions® CS-50



Note: 65% of participants with dementia wore the amplification device at least one hour per day

Improvement in Communication Behaviors - Qualitative

- Historical stories retold more accurately
- Questions posed in smoother sentences
- Stronger willingness to make decisions and the decisions made more sense
- Social engagement improved – listened to music more; seemed to understand what was on television (laughed or smiled at appropriate times)
- Spoke louder, asked more questions, followed conversation better, read more often
- Connected with life in a renewed way

- **DO OUR INTERVENTIONS**

IMPROVE COGNITIVE FUNCTION

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Mosnier, Vanier, Bonnard, et al (2018)

- Prospective, Longitudinal Observational Study Of Cognitive Function In Older Post-lingually Deafened Adults 65 Years + Who Were Implanted (6.8 Years Mean Follow-up Time)(N=70)(Mean age implanted -72 years)
  - Verbal Auditory Memory Tasks Were Administered With Visual Stimulation And Written Explanations
  - Average Duration Of Hearing Loss – 33 Years; Duration Of Profound Loss- 12 Years
  - An MD Specializing In Cognitive Disorders Classified Participants As Normal, Having Mci, Or Dementia

- Before CI
  - 55% of sample had normal cognitive function and 44% were classified as having MCI (general population prevalence typically 3 to 19%)
- After CI
  - No evidence of statistically significant change in proportion of participants with MCI or dementia from before (45%) to 7 years after CI (48%)

RESULTS (N=70)*

- Performance on tests of EF and global CF stable one year after implantation
- Performance on speech tests remained stable between one and seven years after CI in quiet and noise (best aided)
- Scores on self report measure of self-esteem, activity level, social interaction levels, speech production, sound perception scales were stable between one to seven years

*Participants had rehab

CI PRESERVED COGNITIVE FUNCTION

- 7 Years post CI – 61% of persons with MCI before implantation remained stable; 32% returned to normal cognitive function
- Of participants with normal cognitive fx before CI, 68% remained stable and 32% developed MCI
- 7 Years after CI, 3% of people (N=2) developed dementia
- There was a lower rate (6%) of progression to dementia of individuals with MCI as compared to the general population where more than 50% of persons with MCI develop dementia in five years

Conclusion-Benefit of CI Hearing Restoration

- Cochlear implantation contributes to preservation of cognitive function in older adults
- By improving oral communication and reducing listening effort perhaps the CI optimized potential for improvement in social activities, reduction in SI and improved CI explaining why there was little progression in cognitive function 7 years post CI
- Substantial and sustained benefits experienced by older adults who were implanted in terms of oral communication, neurocognitive function and Q of L
- Stemmed progression from MCI to dementia

• Behaviors To Note When Working with Patients

- Ability to learn and retain new information
- Ability to handle complex tasks
- Reasoning ability
- Trouble following a conversation
- Change in behavior, mood or personality
- Change from pre-morbid behaviors
- Difficulty performing familiar tasks
- Difficulty deciphering colors (red vs. blue)
- Forgets newly learned information
- Unable to learn and retain new information

- Communication Behaviors That Should Trigger a Referral
  - Loses thread of a sentence or conversation and repeating words or questions
  - Relevance of response to your questions
  - Limited or change in range of vocabulary
  - Caregiver responding rather than patient
  - Reported changes in reaction to sound
  - Not able to follow directions
  - Asking same question over and over again

CONNECTING WHEN WORKING WITH PERSONS WITH ARHL and DEMENTIA

- Be patient, flexible, understanding, supportive
- Avoid interrupting when they are speaking; they may lose their train of thought
- Allow individual to interrupt you, or they may forget what they want to say
- Limit distractions during communication (e.g. keep office door closed) and reduce noise; Make sure face always visible
- Increase use of gestures and other non-verbal communication techniques
- Observe the individual to recognize non-verbal communication and their mode of communicating
- Retrofit the communication environment to include sound-absorbing acoustical tile and soft fabrics on the surfaces

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1. Hearing Loss is Invisible

You cannot tell apart 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. REFER

2. ARHL – A MODIFIABLE RISK FACTOR - REFER

Dementia is the greatest global challenge for Social and Health Care

Hearing Loss – Greatest Chance for Prevention of Dementia due to High Prevalence

Remember; Maintain empathy, ensure you are facing the person when talking to them in a well-lit area; must improve audibility - speaking up can make a big difference or use a personal amplifier

3. Hearing + Communication= Engagement

- By partially restoring hearing and communication abilities, hearing treatments may help people to remain socially engaged and enable participation in cognitively stimulating abilities
- Social engagement is critical to brain health and longevity- hearing health interventions are critical to well being!!!!

4. OPTIMIZE AUDIBILITY

- ARHL can hamper communication and maintenance of social interactions with profound socio-emotional and cognitive consequences
- USE A PERSONAL AMPLIFIER DURING THERAPY
- REFER, REFER, REFER

THANK YOU

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