The Medical Treatment Of Hearing Loss: A Cost Benefit Analysis

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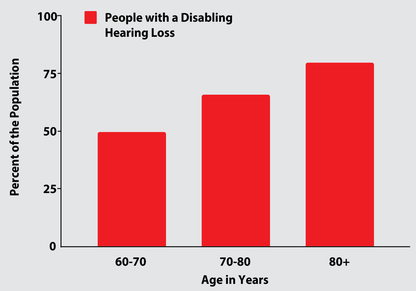
INTRODUCTION

Hearing loss, a progressive degenerative disorder, is the most prevelant (common) sensory disorder aflicting adults across the globe[1]. In the United States, the Department of Health and Human Services has listed hearing loss as the 3rd most chronic condition affecting older adults[2]. Each individuals' suseptibility to hearing loss significantly increases with age. Presbycusis, i.e. age-related hearing loss, is estimated to impact up to 50% of adults between the age of 60-70 years; increasing to nearly 80% in people over the age of 80[3].

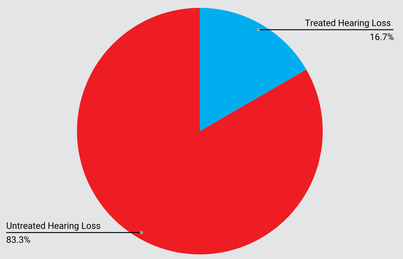
Common symptoms of hearing loss include tinnitus (a phantom sound heard in the ears and/or head), difficulty following a conversation in backgrond noise (auditory deprivation) and memory issues[4].

% of Older Adults w/ Disabling Hearing



RATES OF TREATMENT ADOPTION

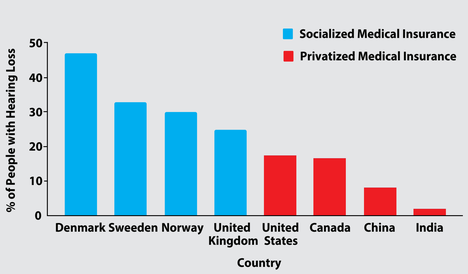
% of Older Adults Treating Hearing Loss



In the United State, nearly 48 million people suffer with hearing loss. Unfortunately, only 8 million (~17%) of these individuals are currently receiving treatment for their disorder[5]. There are several reported factors that contribute to this low treatment rate, including the price and lack of percieved value in hearing healthcare [6] .On average, individuals wait 7-10 years before they seek treatment, i.e. they only decide to begin treatment once there is a significant and apparant restrictionin thier activities of daily living[7].

Globally, fewer than 50% of all hearing-impaired individuals adopt treatment of their hearing loss with hearing aids[8]. There are two persistent in hearing care that seem to impact adoption rates: the cost and lack of percieved value of treatment[9,10,11,8,12]. Education, proper outreach, and communication from healthcare professionals can have a positive impact on the adoption rates of treating hearing loss[13].

Treatment Adoption Rates Across the Globe

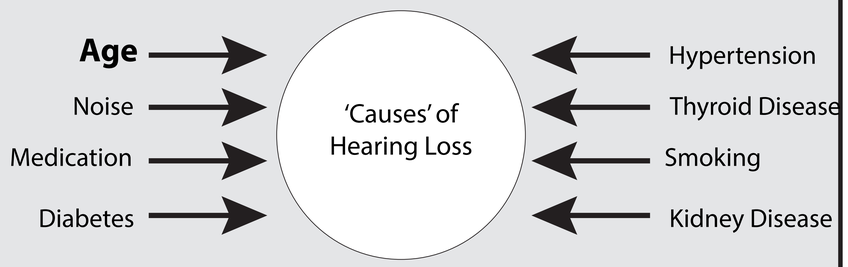


In developing countries, adoption rates range from 1-11% 14. China has the largest hearing-impaired population in the world. Regardless, only two percent of their population has access to adequate hearing healthcare 8. In western countries, many do not take advantage of the accessibility of care. In places such as Finland and the United Kingdom, where hearing aids are issued free of charge or at 50% cost to the, adoption rates are rarely above 25%[8].

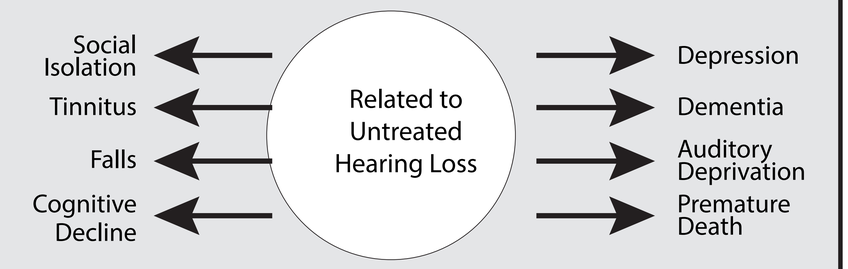
METHODS

Over one-hundred sources were consulted with various data on hearing loss, its risk factors, and its impact. Both Pubmed.gov and Google Scholar (https://scholar.google.com) search engines were utilized to locate scholarly peer-reviewed articles. Data was also aquired from the Center for Disease Control and the World Health Organization.

RISKS AND CONSEQUENCES

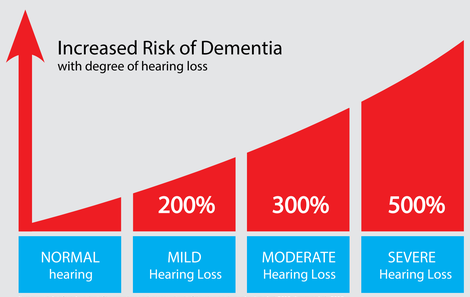


Hearing loss is most often the result of direct and/or indirect compromise of cellular and neural activity within the inner ear. Specifically, age (the leading cause of hearing loss), noise exposure and ototoxic medications directly impact cochlear function. Comorbid disorders, including diabetes, hypertension, thyroid and kidney disease, and smoking can compromise blood flow and neural activity of the auditory system.[15, 16, 17 18, 19, 20]



Untreated hearing loss can significantly impact social, emotional, physical and cognitive health. Some of the more common associated corelates of untreated hearing loss include increased risk of social isolation, de - pression, tinnitus, dementia, auditory deprivation, cognitive decline, and premature death.[21, 22, 23, 21, 24, 25]

HEARING LOSS AND DEMENTIA

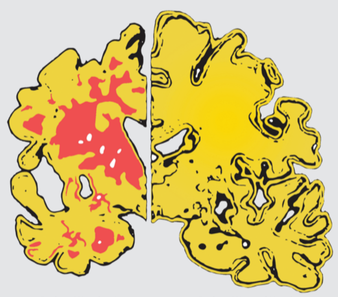


Summary data of relationship of hearing loss and increased risk of developing dementia. Lin et al. 2011; Amieva et al., 2015

Aquired hearing loss can increase the risk of social isolation, cerebral atrophy and cognitive overload[21, 4, 24]; each thought to increase the risk of cognitive decline in these patients.

One of the most significant physical changes in people with age-related hearing loss may be accelerated volume decline in whole brain and temproal cortex[30]. The MRI imaging of individuals with hearing loss is reminiscent of the global cerebral atrophy observed in individuals with dementia (see illustration of brain). Further studeis are needed to elucidate the mechanistic basis of the observed associations are needed.

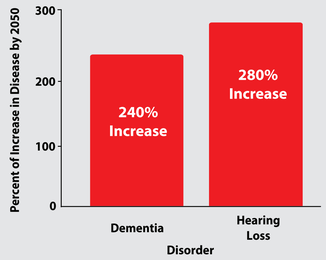
Untreated hearing loss may significantly increase the risk of cognitive decline and dementia by as much as 200-500%[26]. The degree of increased risk appears related to the degree of hearing loss. Individuals with hearing loss scored lower on the Mini Mental State Exam (MMSE) when compared to those with normal hearing[27]. It is estimated that 60% of those with dementia have a mild or moderate hearing loss[28]. However, given that it can be difficult to test hearing in patients with dementia, it is suspected that rates may be as higher[29].



Schematic representing the potential cerebral atrophy in an individual with age-related hearing loss.

THE FUTURE

Projection for Hearing Loss and Dementia Epidemic by 2050



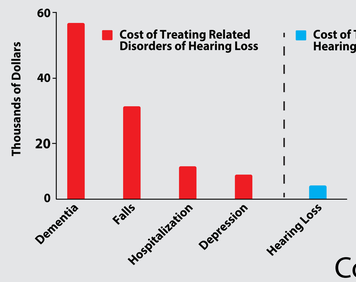
Between 2000 and 2015, the number of people with hearing loss had increased by 44%; including both hearing loss and deafness[31]. Based on this trend, it is predicted that 900 million people worldwide will have a disabling hearing loss by 2050.

Currently, an estimated 46.8 million people worldwide are living with dementia. This rate is anticipated to dramatically increase to roughly 131.5 million by 2050[32].

Around two-thirds of all cases of dementia are in developeing countires, but less than one-tenth of all population-based research is about this population[33]. This data comes from culturaly and educationally sensitive evaluations and assessments[34]. There is no plan in place currently to manage the influx of patients.

COST BENEFIT ANALYSIS

Costs Associated with Treatment

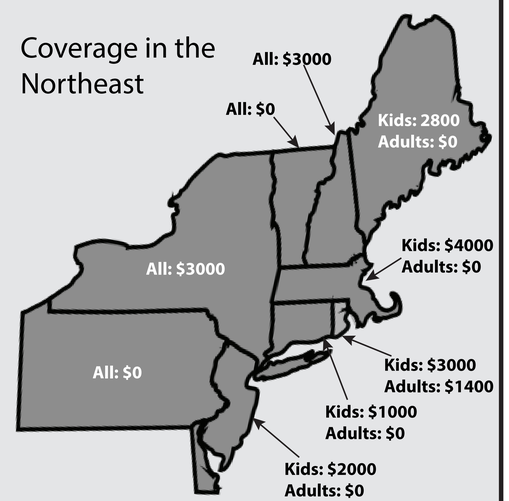


The costs invovled in caring for a patient with dementia averages $57,000 per year[32]. The cost of care for someone with a mental health disorder can total upwards of $8,000 annually[35]. Nearly $30,000 dollars are spent with every fall and an additional $10,000 spent with every hospital visit[36, 37, 38]. Over $750 billion is spent globally on unaddressed hearing loss and its comorbidities. The average cost of treating a hearing loss with a hearing aid is approximately $2,300[39]. The costs for a complete diagnositc evalaution can is approximately $250 without insurance[40].

Currently, there are only three states in the Northeast that offer any fiscal support for hearing healthcare in adults. One of the three states that offers financial aid reduces the benfits by 50% for adults[41, 42, 42, 43, 44, 45]. There is no consistency accross the Northeast when it comes to an age cut off for pediatrics; some cut off as early as 12 years old and others as late as 21[46,47, 48].

In Massachusetts, the current cut off for coverage is age 21[49]. There are two attempts being made currently to change this legistlation. The initial goal is to increase the age of benefit coverage to 26 years old to match the Affordable Care Act. The long-term goal is to supply coverage for everyone regardless of age. Senator Moore (Second Worcester District) and Representative Durant (Sixth Worcester District) have worked diligently to influence and support these changes.

Coverage in the Northeast



REFERENCES