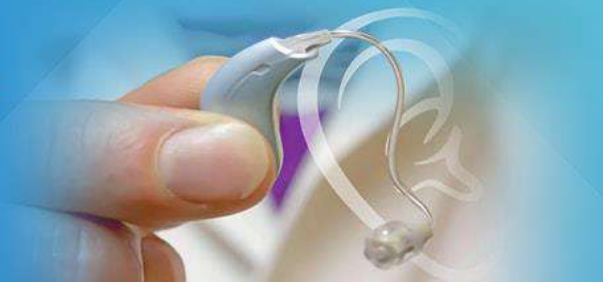


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Importance of hearing and hearing loss treatment & recovery

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Abstract

Over 5% of the world's population – or 430 million people – require rehabilitation to address their 'disabling' hearing loss (432 million adults and 34 million children). It is estimated that by 2050 over 700 million people – or one in every ten people – will have disabling hearing loss. 'Disabling' hearing loss refers to hearing loss greater than 35 decibels (dB) in the better hearing ear. Nearly 80% of people with disabling hearing loss live in low- and middle-income countries. The prevalence of hearing loss increases with age, among those older than 60 years, over 25% are affected by disabling hearing loss. Hearing loss is classified according to the region of the ear affected. Conductive hearing loss is usually diagnosed as defects in the outer and middle ear that prevent sound from being transmitted to the cochlea while sensorineural hearing loss is usually diagnosed as dysfunction of the inner ear, cochlear nerve, or auditory cortex. Many studies have demonstrated that the impact of inherited genetic mutations on hearing impairment (HI) is especially significant. Various mutations in a single gene can cause either syndromic or nonsyndromic hereditary hearing loss (HHL) and result in HI at different stages in life and over seventy chromosomal genes.

Keywords: Sensorineural hearing loss, nonsyndromic, hereditary hearing loss, chromosomal genes, disability

Introduction

The human ear is a highly complex instrument that is comprised of three main sections: the outer ear, the middle ear, and the inner ear. While many surgical remedies exist for the treatment of hearing loss stemming from dysfunction of the outer and middle ear, few effective remedies have been developed for the treatment of hearing impairment resulting from inner ear disorders. The inner ear is comprised of two main components, the auditory system which receives the amplified mechanical vibrations transmitted from the middle ear and the vestibular system which is responsible for maintaining balance. The auditory system of the inner ear consists of the cochlea which contains three fluid filled spaces, the scala vestibule, scala media, and scala tympani. Mechanical vibrations from the middle ear are propagated through these spaces and are detected by the organ of corti which is located on the basilar membrane of the scala media. The organ of corti is a complex structure containing hair cells and supporting pillar and Deiters cells. Hair cells located in the organ of corti generate action potentials in response to perturbations which are transmitted to the auditory cortex via the cochlear nerve. Hearing loss can be brought about by various different circumstances. Some of them can be effectively treated, for the most part by surgery, depending upon the individual's infection cycle. In any case, the therapy of chronic sensor neural hearing with harmed cochlear designs typically needs hearing rehabilitation through specialized intensification. During the most recent years huge upgrades in portable hearing assistant innovation prompted a more excellent of the hearing rehabilitation process. For instance, because of sophisticated signal processing acoustic input could be diminished and henceforth open fitting options are accessible in any event, for additional subjects with higher levels of hearing loss. Specifically for high-frequency hearing loss, the utilization of open fitting is a choice. Both the clients' acknowledgment and the apparent sound quality were significantly expanded by opened components.

About Hearing Loss in Children

About 1 in 500 babies in the United States are born D/HH. Hearing loss can affect a child's ability to develop speech, language, and social skills. The earlier a child who is D/HH starts getting services, the more likely the child's speech, language, and social skills will reach Detection and Intervention (EHDI) their full potential.

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Every state has an Early Hearing program that works to ensure that babies who are D/HH are diagnosed early and receive the services they need on time.

Hearing Loss in Children

Hearing loss can affect a child’s ability to develop speech,

language, and social skills. The earlier children with hearing loss start getting services, the more likely they are to reach their full potential. If you think that a child might have hearing loss, ask the child’s doctor for a hearing screening as soon as possible.

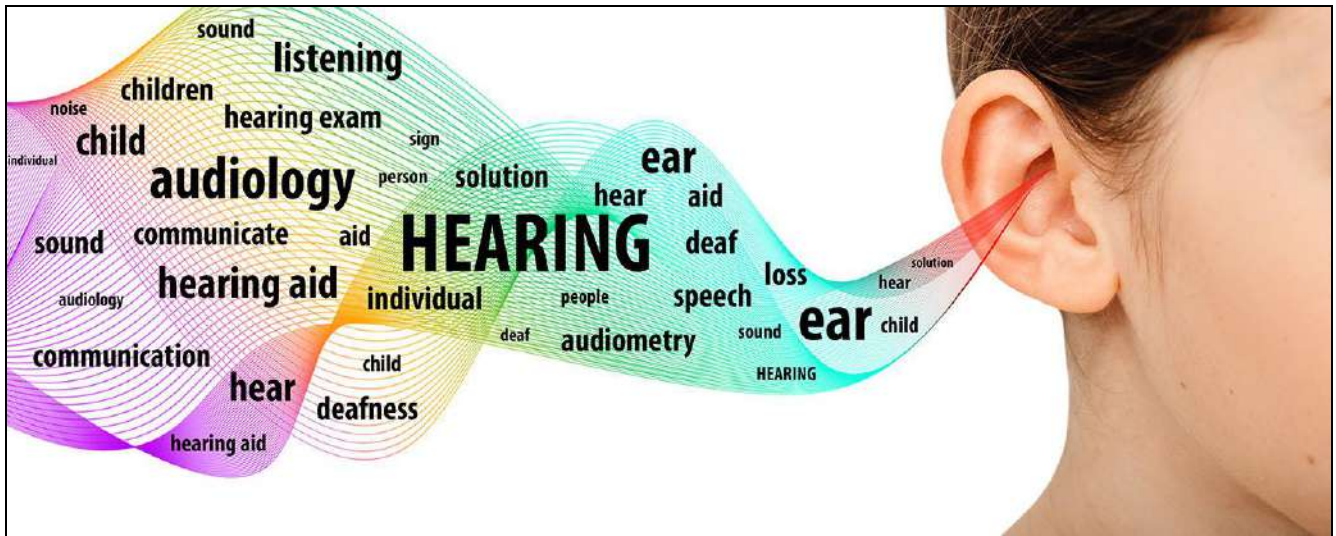


Figure of Hearing loss and deafness

Hearing loss and deafness

A person who is not able to hear as well as someone with normal hearing – hearing thresholds of 20 dB or better in both ears – is said to have hearing loss. Hearing loss may be mild, moderate, severe, or profound. It can affect one ear or both ears, and leads to difficulty in hearing conversational speech or loud sounds. 'Hard of hearing' refers to people with hearing loss ranging from mild to severe. People who are hard of hearing usually communicate through spoken language and can benefit from hearing aids, cochlear implants, and other assistive devices as well as captioning. 'Deaf' people mostly have profound hearing loss, which implies very little or no hearing. They often use sign language for communication.

Causes of hearing loss and deafness

Although these factors can be encountered at different periods across the life span, individuals are most susceptible to their effects during critical periods in life.

Prenatal Period

- Genetic factors - Include hereditary and non-hereditary hearing loss
- Intrauterine infections – such as rubella and infection

Perinatal period

- Birth asphyxia (a lack of oxygen at the time of birth)
- Low-birth weight
- Other perinatal morbidities and their management

Childhood and adolescence

- Chronic ear infections
- Collection of fluid in the ear
- Meningitis and other infections

Factors across the life span

- impaction ear wax

- Trauma to the ear or head
- Loud noise/loud sounds
- Ototoxic medicines
- Work related ototoxic chemicals
- Nutritional deficiencies
- Viral infections and other ear conditions
- Delayed onset or progressive genetic hearing loss

The impact of unaddressed hearing loss

Hearing loss impacts many aspects of life at individual level

- Communication and speech
- Cognition
- Education and Employment
- Social isolation,
- Loneliness and stigma
- Impact on society and economy

WHO estimates that unaddressed hearing loss poses an annual global cost of US\$ 980 billion. This includes health sector costs (excluding the cost of hearing devices), costs of educational support, loss of productivity, and societal costs. 57% of these costs are attributed to low- and middle-income countries.

Prevention and Treatment

Many of the causes that lead to hearing loss can be avoided through public health strategies and clinical interventions implemented across the life course.

Prevention of hearing loss is essential throughout the life course – from prenatal and perinatal periods to older age. In children, nearly 60% of hearing loss is due to avoidable causes that can be prevented through implementation of public health measures. Likewise, in adults, most common causes of hearing loss, such as exposure to loud sounds and ototoxic medicines, are preventable.

Effective strategies for reducing hearing loss at different stages of the life course include

- Immunization;
- Good maternal and childcare practices;
- Genetic counselling;
- Identification and management of common ear conditions;
- Occupational hearing conservation programmes for noise and chemical exposure;
- Safe listening strategies for the reduction of exposure to loud sounds in recreational settings; and
- Rational use of medicines to prevent ototoxic hearing loss.

Treatments and Intervention Services

No single treatment or intervention is the answer for every person or family. Good treatment plans will include close monitoring, follow-ups and any changes needed along the way. There are many different types of communication options for children with hearing loss and for their families. Some of these options include:

- Learning other ways to communicate, such as sign language
- Technology to help with communication, such as hearing aids and cochlear implants
- Medicine and surgery to correct some types of hearing loss
- Family support services

Importance of Hearing

Hearing is essential for maintaining relationships and connections with friends and family, fully participating in team and community activities, and experiencing life events. Hearing makes it possible to engage, listen, laugh, and enjoy many of the things that help shape your quality of life. Most importantly, hearing connects us to people enabling us to communicate in a way that none of our other senses can achieve. As the famed 20th-century activist and educator, Helen Keller, once said, "Blindness cuts us off from things, but deafness cuts us off from people".

Conclusion

Animal models of human HI remain essential for investigating potential future therapies that leverage on an improved understanding of the molecular pathways that differentiation, and structure in the inner ear. To cure Hearing impairment due to dysfunction of the inner ear, therapies that induce functional restoration of the highly complex cochlea cytoarchitecture must be developed. Future combinational therapies involving various permutations of progenitor cell transplantation, cochlear implants, targeted gene therapy, and drugs may provide interesting therapeutic results and lead the development of effective therapies for a wider range of (HI) hearing impairment patients. Researchers notice that the recently made hair cells actually would need to assume control over the capacities at the characterized area of the basal membrane and that this is an incredible test. Therefore, the gene therapy just portrays potential outcomes and examines research projects. All things considered, the advancement of helpful methodologies that may be applied defensively for noise exposition or backing cochlear implantation, seems to be more plausible than the likelihood to totally replace the

damaged designs of the inner ear.

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