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Rehabilitation for hearing impaired children: Challenging task before the society

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Abstract
Hearing impairment is caused by a disturbance of the conduction of sound to the inner ear, the perception of sound by the sensory cells of the cochlea, or the processing of sound in the cochlear nerves, the auditory pathway, or the cortical auditory centers. It is distinct from other hearing disturbances such as hyperacusis (oversensitivity to sound), fluctuating hearing, and tinnitus. According to the World Health Organization, hearing loss is one of the six leading contributors to the global burden of disease. It is becoming an ever more important problem in society at large, not just because the population is aging, but also because young people increasingly spend their leisure time in activities that expose them to excessive noise. On the other hand, the treatment of hearing loss is improving, as the result of technical developments in ontological surgery, hearing aids, and cochlear implants. For nearly every type of hearing loss, there is now some type of rehabilitative treatment. Hearing impairment may delink the child not only from the society but also from the family. The prevalence of deafness/ hearing impairment in India is fairly significant. It is the second most common cause of disability. Approximately 63 million people (6.3%) in India suffer from significant auditory loss. Rehabilitation of hearing impaired children in India remains a challenging task. Early detection and intervention is the mainstay of this initiative. We discuss here the resources and options available in India for the education of deaf/ hearing impaired children and the role of the Government bodies in rehabilitation. Awareness about education and rehabilitation of hearing handicapped is low among the general public and even among the medical fraternity.

Keywords: hearing impairment, educational provisions and rehabilitation

Introduction
The term "Hearing Impairment" refers to a lessening of hearing ability in the widest possible sense, ranging from subjectively barely appreciable impairments to total deafness.
The most common type of hearing impairment in childhood is transient conductive hearing loss due to a tympanic effusion. 10% to 30% of children suffer from this problem before their third birthday, with a prevalence as high as 8%. Congenital, permanent, bilateral hearing loss is much rarer, with a prevalence of 1.2 per 1000 children. In adulthood, the most common type of hearing impairment is the sensorineural hearing loss of old age (presbycusis), which affects 40% of all persons aged 65 or older. The next most common types are permanent conductive or combined hearing loss due to chronic otitis media (prevalence 1.5%) and hearing impairment due to acoustic trauma (prevalence 0.05%).
The degree of hearing impairment can vary widely from person to person. Some people have partial hearing loss, meaning that the ear can pick up some sounds; others have complete hearing loss, meaning that the ear cannot hear at all (people with complete hearing loss are considered deaf). In some types of hearing loss, a person can have much more trouble when there is background noise. One or both ears may be affected, and the impairment may be worse in one ear than in the other. The timing of the hearing loss can vary, too. Congenital hearing loss is present at birth. Acquired hearing loss happens later in life - during childhood, the teen years, or in adulthood - and it can be sudden or progressive (happening slowly over time).

What Causes Hearing Impairment?
The most common cause of conductive hearing loss in kids and teens is otitis (pronounced: o-tie-tus) media, which is the medical term for an ear infection that affects the middle ear. Ear infections cause a buildup of fluid or pus behind the eardrum, which can block the transmission of sound. Even after the infection gets better, fluid might stay in the middle ear for weeks or even months, causing difficulty hearing. But this fluid is usually temporary, and whether it goes away on its own (which is usually the case) or with the help of medications, once it's gone a person's hearing typically returns to normal. Blockages in the ear, such as a foreign object, impacted earwax or dirt, or fluid due to colds and allergies, can also cause conductive hearing loss. People also get conductive hearing loss when key parts of the ear - the eardrum, ear canal, or ossicles - are damaged. For example, a tear or hole in the eardrum can interfere with its ability to vibrate properly. Causes of this damage may include inserting an object such as a cotton swab too far into the ear, a sudden explosion or other loud noise, a sudden change in air pressure, a head injury, or repeated ear infections.
Sensorineural hearing impairment results from problems with or damage to the inner ear or the auditory nerve. Its causes include:

- Genetic disorders: Some genetic (inherited) disorders interfere with the proper development of the inner ear and/or the auditory nerve.
- Injuries to the ear or head: Injuries such as a skull fracture can cause hearing loss.

- Complications during pregnancy or birth: Some babies are born with hearing impairment due to infections or illnesses that the mother had while she was pregnant, which can interfere with the development of the inner ear. Premature babies are also at higher risk for hearing impairment.
- Infections or illnesses: Certain conditions, such as repeated ear infections, mumps, measles, chickenpox, and brain tumors, can damage the structures of the inner ear.
- Medications: Certain medications, such as some antibiotics and chemotherapy drugs, can cause hearing loss.
- Loud noise: A sudden loud noise or exposure to high noise levels (such as loud music) over time can cause permanent damage to the tiny hair cells in the cochlea, which then can't transmit sounds as effectively as they did before.

Treatments for People with a Hearing Impairment

There is help for patients with all types of hearing loss. Treatment depends on why the deafness exists and how severe it is. Sensor neural hearing loss is incurable. When the hair cells in the cochlea are damaged, they cannot be repaired. However, various treatments and strategies can help improve the patient's quality of life.

Hearing Aids

These are devices that help in hearing. There are several types of hearing aids; they come in a range of sizes, circuitries, and levels of power. They do not cure deafness, but amplify the sound that enters the ear so that the listener can hear things more clearly. Hearing aids consist of a battery, loudspeaker, amplifier, and microphone. Today, they are very small, discreet, and can be fitted inside the ear. Many of the modern versions can distinguish background noise from foreground sounds, such as speech. For a person with profound deafness, a hearing aid is not suitable. The audiologist takes an impression of the patient's ear to make sure the device fits well. It will be adjusted to the patient's auditory requirements.

Examples of Hearing Aids

Behind-the-ear (BTE) hearing aids - these consist of a dome (earmold) and a case, with a connection from one to the other. The case is behind the pinna (outer ear, the part that sticks out); the connection to the dome comes down the front of the ear. The sound from the device is routed to the ear either electrically or acoustically.

BTE hearing aids tend to last longer than other devices because the electrical components are located outside the ear (less moisture and earwax damage). These devices are more popular with children who need a sturdy and easy-to-use device.

In-the-canal (ITC) hearing aids - these fill the outer part of the ear canal and can be seen, but only just. Soft ear inserts, usually made of silicone, are used to position the loudspeaker inside the ear. These devices fit most patients straight away, and have better sound quality.

Completely-in-the canal (CIC) hearing aids - these are tiny devices, but are not recommended for people with severe hearing loss.

Bone conduction hearing aids - for patients with conductive hearing loss, as well as those unable to wear conventional type hearing aids. The vibrating part of the device is held against the mastoid with a headband. The vibrations go through the mastoid bone, to the cochlea. These devices can be painful or uncomfortable if worn for too long.

Cochlear Implants

Inserted to help patients whose hearing impairment is caused by hair cell damage in the cochlea. The implants usually help most people understand speech better. The latest cochlear implants have new technology which helps patients enjoy music, understand speech better even with background noise, and use their processors while they are swimming.

Sign Language and Lip-Reading

Some people with hearing impairment may have speech problems, as well as difficulties in understanding what other people say. A high percentage of people with hearing impairment can learn other ways of communicating. Lip reading and sign language can replace or complement oral communication.

Lip reading: Also known as speech reading, lip reading is a method for understanding spoken language by watching the speaker's lip, facial and tongue movements, as well as extrapolating from the data provided by the context and any residual hearing the patient might have. People who became hearing impaired after they learned to speak can pick up lip reading rapidly; this is not the case for those who are born hearing-impaired.

Sign language: This is a language that uses signs made with the hands, facial expressions, and body postures, but no sounds - it is used mainly by those who are deaf. There are several different types of sign languages. British Sign Language (BSL) is very different from American Sign Language (ASL). For instance, BSL uses a two-handed alphabet, whereas American Sign Language uses a one-handed alphabet.

The Following Measures May Help Protect Your Hearing

- TV, radio, music players, and toys - do not set the volume too high. Children especially are very sensitive to the damaging effects of loud music. Researchers found that noisy toys put children's hearing at risk.
- Headphones - focus on isolating what you want to hear; block out all outside noise as much as possible, instead of drowning it out with high volume.
- The workplace - if you work in a noisy environment, wear earplugs or ear muffs. Even in discos, nightclubs, and pubs - earplugs are discreet and hardly noticeable.
- Leisure venues - if you go to pop concerts, motor racing, drag racing, and other noisy events, wear earplugs.
- Cotton swabs - do not prod them into your or your children's ears. The same applies for cotton or tissues.

Hearing is the ability to perceive sound. A person suffering from hearing impairment has difficulty in perceiving or identifying sound clearly due to auditory problems. The impairment may be unilateral or bilateral. The Rehabilitation Council of India Act, 1992, has defined "hearing

handicapped" as hearing impairment of 70 decibels and above, in better ear or total loss of hearing in both ears. The legal definition of "hearing disability" in India as per the Persons with Disability Act (PWD), 1995 is "a hearing disabled person is one who has the hearing loss of 60 decibels or more in the better ear for conversational range of frequencies". The latter definition is at variance with the former. There exists a need to clarify which of the two is a valid definition. The term 'deaf' is being replaced by the term 'hearing impaired'. 'Hearing challenged' is an alternate appropriate term. An individual who is hard of hearing since birth was earlier termed 'deaf and dumb'. In today's age of political correctness, these individuals have been redesignated as "congenitally deaf". The term 'deaf' is being replaced by the term 'hearing impaired'. 'Hearing challenged' is an alternate appropriate term. An individual who is hard of hearing since birth was earlier termed 'deaf and dumb'. In today's age of political correctness, these individuals have been redesignated as "congenitally deaf". The word 'deaf,' when spelt with a small'd' refers to hearing loss and when spelt with a capital 'D', refers to the Deaf Community. The Deaf Community is an invisible minority community worldwide, as deaf persons can only be identified after personal interaction with them. Habilitation is a process by which persons born with impairments learn life skills. Rehabilitation refers to a process by which persons readapt to society after acquiring impairment.

The impact of hearing impairment on the child is determined by a variety of factors. Generally speaking, early treatment and training can help to minimize the developmental problems caused by hearing impairment. If the impairment is incurable, the child may need to use a hearing aid or receive a cochlear implant, depending on the nature of the lesion. With the help of appropriate auditory and speech training, even children with severe hearing impairment could gradually show improvement in response to sound.

Early Diagnosis and Intervention for Rehabilitation of Deaf/Hearing Impaired Children

Early identification & timely intervention with appropriate support from the family and community is the key to management. Early diagnosis and suitable amplification is mandatory for speech training. Shortly after birth, every neonate should be screened by OAE (otoacoustic emission) testing. All cases detected by OAE testing should be tested further by BERA (Brainstem Evoked Response Audiometry) testing. Speech training should be initiated as early as two years of age with an amplification device such as bone conduction hearing aid. Surgery, where indicated should be performed after careful assessment of each case. Cochlear implant surgery has evolved in recent years and many centres in India are conducting this operation with fairly good outcomes. However, the cost of the implant being prohibitive, not many can afford to avail of this facility.

Initiatives by the Government of India

The last decade has seen the passing of many legislation on disability by the Government of India.

- The Rehabilitation Council of India Act (1992): A Rehabilitation Council of India was set up to promote and regulate training of rehabilitation professionals in the country Persons with Disability Act (1995)3
- The Persons with Disabilities Act, 1995: includes hearing impairment in the list of disabilities covered and defines hearing impairment (vide supra). The Act endeavors to promote the integration of learners with disabilities in mainstream schools. It includes a section dealing with reduced syllabus for disabled people and issuing a concession of a single language for the hearing impaired student. It has set up the Ali Yavar Jung National Institute of Hearing Handicapped (NIHH).

Among the Several Facilities at This Institute, the Following Are Noteworthy

1. Training of Personnel at NIHH It was only as late as 2001, when a proposal for starting ISL classes and an interpreter training programme at NIHH was initiated. In March 2001, the first national workshop on sign language in India, sponsored by the Rehabilitation Council of India was held. An ISL Cell was established at NIHH, in May 2001 and subsequently, sign language training commenced in formal manner on an ongoing basis.
2. Facility of Hearing aid sale at the Institute has been provided.
3. A Directory of Rehabilitation Resources for persons with hearing impairment in India consisting of details of Schools for the Deaf, Acts, Concessions, Schemes of the Government of India, is available at the Institute.

National Programme for Prevention and Control of Deafness/ hearing impairment (2006)

National Programme for Prevention and Control of Deafness was launched with the long term objective to prevent and control major causes of hearing impairment and deafness, so as to reduce the total disease burden by 25% of the existing burden by the end of eleventh five year plan. The pilot project was completed in 2008.As per NSSO survey; currently there are 291 persons per one lakh population who are suffering from severe to profound hearing loss (NSSO, 2001). A large percentage of these, are children aged from 0 to 14 years. These hearing impaired young Indians, contribute to a loss of national productivity. Rehabilitation programmes reaching all over the country, particularly the rural areas is the need of the hour.

Persons with Disabilities (Equal Opportunities, Protection of Rights & Full Participation) Act, 1995

The most landmark legislation in the history of special education in India is the Persons with Disabilities (Equal opportunities, protection of rights & full participation) Act, 1995. This comprehensive Act covers seven disabilities namely blindness, low vision, hearing impaired, loco motor impaired, mental retardation, leprosy cured and mental illness. Chapter V (Section 26) of the Act, which deals with education, mentions that the appropriate Governments and the local authorities.

Persons with Disabilities Act, 2011 - All persons with disabilities have a right to be provided aids and appliances of recognized quality at an affordable cost along with the requisite training to utilize it. Every person with disability has

the right to be informed of the various rehabilitation options and make the final decision on the course of rehabilitation. There shall be constituted for the purposes of this Act, a Fund to be called the National Fund for Persons with Disabilities

District Primary Education Programme (DPEP): The success of PIED led to the inclusion of the component of Integrated Education of the Disabled (IED) in DPEP, a scheme launched in 1994 by the Government of India for the development of elementary education. At present, IED in DPEP is going on in 242 districts of 18 states. In these states, approximately 6.21 lakh children with special needs have been enrolled in regular schools with adequate support services.

Conclusion

According to the World Health Organization (WHO), hearing loss is one of the six leading contributors to the burden of disease in industrialized countries: Along with ischemic heart disease, depression, and Alzheimer's disease, it is one of the conditions that most severely impair the quality of life of those who suffer from them. According to the National Institute on Deafness and Other Communication Disorders, about 37.5 million American people aged 18 and over are deaf or hearing impaired. That's about 15 out of every 100 people. Another 26 million are exposed to hazardous noise levels on a regular basis. Hearing loss is also the most common birth anomaly.

The government has enacted legislation and set up bodies like Rehabilitation Council of India and institutes like NIHH for training personnel for the education and rehabilitation of deaf children. These measures focus on inclusive schooling as a means of integration of deaf children in the community. However, the advantages of special schools for deaf children cannot be ignored. The task of educating and rehabilitating deaf children is a formidable one. The decision whether to opt for special school or mainstream schooling should be left to the parents of the deaf child. Suitable counselling centres should be set up to advice parents to take an informed decision regarding the same. More special schools as well as training institutes for educators of the deaf are the need of the hour. Public awareness campaigns should be initiated by voluntary organizations so that facilities provided by the government are broadcast and thereby availed by all in need.

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