CHILDHOOD HEARING LOSS

Strategies for prevention and care

World Health Organization

Contributors

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The interaction between a person and his or her surrounding environment is mediated through sensory experiences. The sense of hearing, in particular, fundamentally facilitates communication and fosters social interaction. Hearing is the key to learning spoken language and is important for the cognitive development of children. Without suitable interventions, hearing loss is a barrier to both education and social integration (1-10). Some 360 million people (approximately 5% of the world's population) live with disabling hearing loss[1] and nearly 32 million of them are children (12). It is estimated that over 60% of such hearing loss could be avoided through preventive measures. In addition, children who have hearing loss can benefit greatly from early identification and appropriate interventions. Action is required to ensure that the preventable causes of hearing loss are avoided and that everyone with unavoidable hearing loss can reach their full potential through rehabilitation, education and empowerment.

This document outlines the prevalence and impact of childhood hearing loss. It highlights that the majority of causes responsible for hearing loss in children can be prevented and offers strategies for action.

1. The impact of unaddressed hearing loss

While the most obvious effect of childhood hearing loss is on language development, it also has an impact on literacy, self-esteem and social skills (1-4). Untreated hearing loss is often associated with academic underachievement, which can lead to reduced employment opportunities later in life (5, 6). Communication difficulties can have lasting emotional and psychological consequences that can lead to feelings of isolation, loneliness and depression (7-10). The impact on the family is equally profound. Parents of children who are deaf or hard of hearing must deal with specific challenges, are often at greater risk of stress, have higher out-of-pocket expenses and lose more work days than other parents (13).The stress can be further exacerbated by communication difficulties with their children and increased need for support and financial resources (14-17). Untreated hearing loss also affects social and economic development in communities and countries (18).

The severity of the impact of hearing loss for a child depends on a number of factors (19-23).

[1] Disabling hearing loss in children is defined as hearing loss greater than 30 dB in the better-hearing ear.

- *Age of onset.* Children develop language in the early years of life. The impact of hearing loss on the development of spoken language is greatest in those who are born with hearing loss or develop it soon after birth (1, 24).
- *Degree of hearing loss.* Hearing loss may range from mild to profound. The greater the severity, the greater the impact (25-27). Table 1 summarizes the different degrees of hearing loss.

Table 1. Definition and characteristics of the different levels of hearing loss

Degree of hearing loss	Hearing loss in decibels (dB)	Functional characteristics
Slight/mild	26–40	The person has trouble hearing and understanding soft speech, speech from a distance or speech in a background of noise.
Moderate	Children: 31–60 Adults: 41–60	The person has difficulty hearing regular speech, even at close distances. This may affect language development, interaction with peers and self-esteem.
Severe	61–80	The person may hear only very loud speech or loud environmental sounds, such as a siren or a door slamming. Most conversational speech is not heard.
Profound	Over 81	The person may perceive loud sounds as vibrations. Speech and language may deteriorate.

- *Age of identification and intervention.* The sooner a child is identified as having hearing loss and the earlier he or she receives support, the greater the possibility of the child learning spoken language and the lower the likely adverse impact of the hearing loss (1). The Joint Committee on Infant Hearing recommends that all children with hearing loss should receive intervention by six months of age at the latest (28).

- *Environment.* The overall living environment, including access to services, significantly influences the development of a child with hearing loss. Children with access to hearing technology, special education and sign language may be able to participate at school and in social activities on an equal basis with their peers with normal hearing (in the absence of other impairments) (29).

Recent advances in newborn hearing screening, hearing technology (such as digital hearing aids and cochlear implants) and therapies that teach a child to develop spoken language through listening have greatly changed the situation for children with hearing loss. Early identification and intervention can significantly reduce the educational costs associated with hearing loss, and may improve earning capacity in later life (30-36). However, there are still millions of children who face the negative impact of untreated hearing loss in all aspects of their life (5).

> "Hard of hearing" is used to describe people with hearing loss ranging from mild to severe. At times, sounds (such as speech) are heard but not clearly understood. Such people usually communicate through spoken language and may benefit from hearing amplification with hearing aids and cochlear implants (11).
>
> Deaf children are those with severe or profound hearing loss, which implies very little or no hearing. Hearing devices, such as cochlear implants, may help them to hear and learn speech. In learning to communicate, such children may benefit from visual reinforcement, such as signs, cued speech and lipreading (11).

2. What causes hearing loss in children?

Hearing loss has many causes, and it may not always be possible to determine the exact cause. Some possible causes are listed below.

- Genetic factors. These are responsible for nearly 40% of childhood hearing loss. Hearing loss is much more frequent in children born of a consanguineous marriage (5, 37-39).
- Infections (5, 37-40).
    - Children may be born with hearing loss because the mother had an infection during pregnancy, for example, with rubella or cytomegalovirus.

- Childhood infections, such as meningitis, mumps and measles, can also cause hearing loss.
- Ear infections – often manifest as discharging or running ears, e.g. chronic suppurative otitis media (CSOM) (5, 37, 39, 43) – occur frequently in low- and middle-income countries (44). In addition to hearing loss, such ear infections can also lead to life-threatening problems, such as meningitis and brain abscesses (44).

- Conditions at the time of birth can also lead to hearing loss. Prematurity, low birthweight, lack of oxygen at the time of birth (birth asphyxia[2]), neonatal jaundice, congenital malformations of the ear and the auditory nerve (5, 39-42).
- Diseases of the ear.
  - Too much earwax (impacted cerumen), which is very common, especially in many low-resource countries (39, 45, 46);
  - Glue ear (nonsuppurative otitis media or otitis media with effusion (OME)), caused by accumulation of fluid inside the ear; this is a common childhood problem and can lead to mild to moderate hearing loss (37, 39).
- Noise (5, 37, 39, 40, 47). Exposure to loud sounds, including from personal audio systems,[3] for prolonged periods can lead to hearing loss. Even short, high intensity sounds, such as fireworks and shooting, may cause permanent hearing loss. The noisy machinery in a neonatal intensive care unit can also contribute to hearing loss.
- Medicines. Medicines, such as those used in the treatment of neonatal infections, malaria, drug-resistant tuberculosis and cancers, can lead to permanent hearing loss (ototoxic medicines). In many parts of the world, especially where their use is either unregulated or under-regulated, ototoxic antibiotics are commonly given to children