

Hearing loss: The invisible enemy

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Abstract

A hearing impairment is frequently overlooked, but is more common than we choose to believe. Various factors can lead to congenital or acquired hearing loss, which include maternal rubella, birth asphyxia, meningitis, noise exposure, trauma and aging. Nurses play an important part in the appropriate and timely referral of individuals for a hearing assessment. Very often, caretakers will notice a hearing impairment before that person even knows it themselves. People with a hearing disability have difficulty following conversations, especially in noisy places, struggle to follow complex instructions and often have tinnitus. A knowledge of hearing loss and hearing devices may give substantial social support to improve an individual's experience in this process and with hearing devices. An audiologist assesses hearing abilities by using a battery of tests to determine the degree and configuration of hearing loss, to determine the appropriate treatment plan for auditory rehabilitation. The fitting of hearing devices prevents auditory deprivation. Auditory deprivation is described as a substantial decrease in hearing ability and one's ability to process speech. The early identification and treatment of these individuals will greatly improve their quality of life.

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Introduction

Hearing loss is more common than most medical professionals believe. Sub-Saharan African individuals, over the age of 65, have one of the highest occurrences of hearing loss in the world, as stated by the World Health Organization (WHO) in 2015. Nurses work with all generations, from babies to the elderly, and the prevalence and symptoms of hearing loss is a valuable tool to improve referrals for hearing evaluations. Hearing loss is often overlooked and a referral to the appropriate specialist may have a large impact on the quality of life for a person with hearing impairment. A nurse can also give the appropriate social support, essential to the acceptance of hearing loss as well as the adjustment to hearing instruments.

Our aim at Kind2Hearing is to give nurses across the country detailed information on the causes and symptoms of hearing impairment, as well as the identification and management of this disability. Kind2Hearing aims at supporting the role that medical professionals play in the referral process to an audiologist.

Causes of hearing loss

Hearing loss has multiple causes and can be either congenital, or acquired.

Congenital hearing loss

Congenital hearing loss is defined as a hearing impairment present from birth and is due to factors present prenatally or in the early days after birth. These factors or causes include maternal rubella (during pregnancy), an extended stay in the Neonatal Intensive Care Unit (> 3 days), birth asphyxia and the inappropriate use of certain medications during pregnancy.¹³ A foetus already starts developing its sense of hearing in the sixth week of pregnancy (see Figure 1).

This means that by the time the baby is born, they have already had 32 weeks of exposure to sound.⁶ If they have a congenital hearing impairment, they are already behind in the development of language and the auditory cortex in the brain. Early detection of hearing loss is critical to the successful outcome of intervention. Infant hearing screening programmes are suggested for every baby born, even if they are not considered at risk.^{1,3}

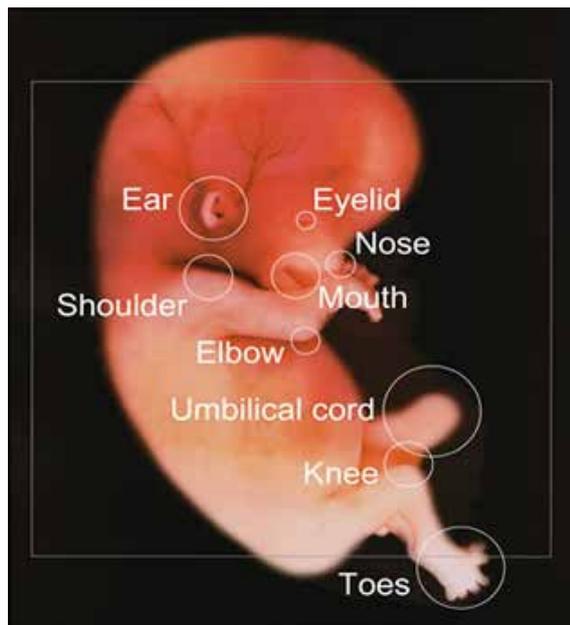


Figure 1. Foetus at six weeks

Acquired hearing loss

Acquired hearing loss is an impairment that occurs later in life. It can be brought on by meningitis, head or ear injuries, chronic ear infections, excessive exposure to noise, ototoxic medications as well as the ageing process.¹

Symptoms of a hearing impairment

Kind2Hearing believes that there are multiple symptoms that could give an indication that a person has hearing loss and these can be used as referral criteria. Often, symptoms go unnoticed, especially if the hearing loss is gradual. It can occur bilaterally (both ears) or unilaterally (one ear) and can affect an individual's quality of life and daily activities.^{1,2,3} More symptoms of hearing impairment include difficulty taking part in conversations, understanding people in background noise, and tinnitus (ringing, buzzing or whistling in one's ears).⁷ Individuals may listen to music or the television at a much louder level than normal and these individuals are frequently tired and stressed from the increased concentration required when engaging in conversation. In some cases, other people (such as family members or healthcare providers, especially nurses) will recognise hearing loss, before the person knows it themselves.¹¹

Hearing loss in children

Children are very dependent on us to be vigilant of their abilities to hear, because they can't tell us when they have difficulty hearing especially when they are still very young. We at Kind2Hearing recommend that you refer an infant or a toddler for a hearing test if they show the following signs: the child isn't startled by loud noises, he/she doesn't turn towards a sound source (0 to 4 months old), delayed speech development (not using single words at the age of one year) and doesn't respond to their name being called. Signs in



Figure 2. Child not responding to speech

older children may include: unclear speech, inappropriate responses to questions, they may talk very loudly and they watch other people to copy instructions because they didn't hear the directive.¹¹

Children are often mistaken for being inattentive and poorly behaved, especially in the classroom. Before diagnosing a child with a learning disability, it is important to have their hearing tested. Hearing loss is often under-diagnosed because of ignorance. Research suggests that one in every 1 000 children at the age of eight years has a hearing impairment. Fourteen percent of children aged 6–19 years, have hearing loss in one or both ears. If left untreated, hearing loss can negatively affect a child's communication, speech and language development, as well as their learning. This is because, whether the impairment is bilateral or unilateral, the children do not get adequate information from their environment to learn efficiently during the critical developmental years.⁵ We at Kind2Hearing believe that the earlier intervention occurs, the better.

Presbycusis

As we age, the small hair cells (cilia) in our inner ear, integral to our hearing abilities, start to deteriorate (See Figure 3). Subsequently, as the number of cilia decrease, so does our hearing.

Unfortunately, damage to our inner ear results in permanent hearing loss, because our inner hair cells cannot be restored once damaged. This type of hearing loss is gradual and may go unnoticed for some time. For the most part, presbycusis is caused by age, but other factors can increase the chance of presbycusis like smoking, loud noise exposure, genetics and certain medical conditions like diabetes.⁷ Exclusion from social interaction may lead to feelings of loneliness, embarrassment, frustration and ultimately depression.^{1,3} Hearing impairment can also lead to work-related stress and even limit career choices.³ Evidence suggests that dementia is almost twice as likely in individuals with hearing loss.⁸

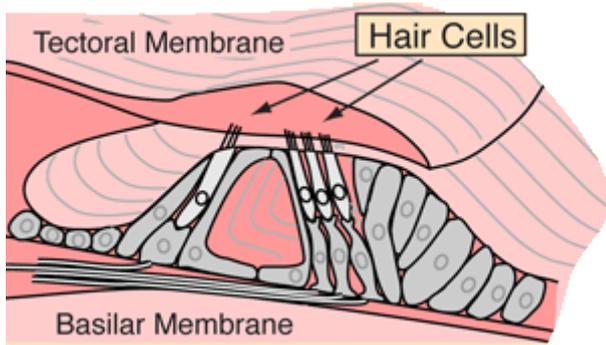


Figure 3. Inner ear cilia

Audiology as profession

The Kind2Hearing audiologists are passionate professionals, with a four-year university degree, that deals with auditory disabilities and their effect on communication. The Kind2Hearing audiologists are involved in the identification, assessment, diagnosis, evaluation, treatment and management of auditory disabilities like hearing loss, vestibular disorders, excessive cerumen and tinnitus.

Kind2Hearing audiologists perform a full diagnostic hearing assessment that takes approximately 60–90 minutes, wherein the outer, middle, inner ear as well as neural pathways that carry auditory information and signals to the brain are assessed. Hereafter, an appropriate treatment and management plan is discussed and developed. The audiologist will make recommendations on the appropriate type and style of hearing instrument by factoring in the hearing loss, the patient's needs, lifestyle, medical aid benefit and finances.⁴

At Kind2Hearing, a hearing test consists of the following: the audiologist obtains a full case history of the patient, including the chronic medication the patient may use and previous surgeries. The first examination that takes place is an otoscopic examination where the audiologist inspects the ear canal for abnormalities. Immittance is used to assess the functioning of the middle ear components. These results will indicate if a middle ear, or neural pathology is present which needs to be treated by a doctor or, in more serious cases, an ear-, nose and throat specialist. Pure tone audiometry is used

to evaluate an individual's hearing sensitivity at different frequencies (pitches), from which an audiogram (graph) is compiled. Speech audiometry is then performed where the patient is required to repeat words the audiologist reads at predetermined intensities. This test evaluates the brain's ability to process speech.⁴

Based on the above-mentioned results, the Kind2Hearing audiologist will then determine the type and degree of the hearing impairment. Most medical aids cover all or part of the diagnostic hearing test as well as the hearing instruments.

Types of hearing loss

1. Conductive hearing loss is caused by an obstruction in the middle or outer ear, which blocks sound from travelling into the inner ear, e.g. a foreign object, cerumen build-up, and otitis media. Conductive hearing loss can usually be reversed by means of medication or surgery.
2. Sensorineural hearing loss is caused by damage to the inner ear (cochlea) or its associated neural pathways that carry auditory information to the brain. A sensorineural hearing loss is permanent in nature and can occur because of age, genetics, ototoxic medications such as the antibiotic gentamycin, etc. Hearing devices can help those affected to hear better.
3. Mixed hearing loss is the simultaneous occurrence of a conductive and a sensorineural hearing loss. As with sensorineural hearing loss, mixed hearing loss cannot be reversed entirely, but hearing aids can help many individuals to regain some auditory function.

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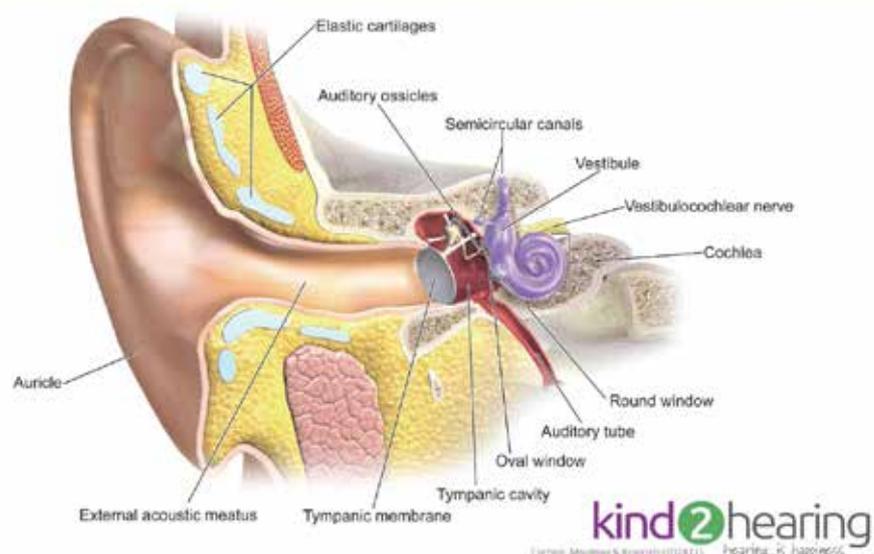


Figure 4. Anatomy of the ear

Hearing devices

After the treatment plan is finalised, the patient is fitted with a hearing device that is customised to the patient's hearing impairment. At Kind2Hearing we include three free follow-up sessions to ensure that the patient is satisfied with the technology and that adequate amplification is provided. Hearing instruments provide auditory stimulation which prevent auditory deprivation. They also can improve speech understanding in noisy situations and in general, speech sounds are enhanced.¹

Modern hearing instruments have multiple functions and more technology can be fitted into a smaller device (see Figure 5), however, they are still sensitive to dirt and moisture.

It is important to keep the device clean to prolong its lifespan



Figure 5. ReSound LiNX hearing device available at Kind2Hearing

and to keep it functioning correctly. Avoid dropping it on hard surfaces, protect it from high temperatures and keep it away from children and pets. Hearing devices work with zinc-air batteries which need to be changed regularly. There are different sized batteries, with a lifespan ranging between two days and one month. When replacing the batteries, ensure that it is with the flat side facing upwards and never force the battery door closed (see Figure 6).

Auditory deprivation

Our bodies function at their best when used. The human body works on a "use it or lose it" principle and the auditory system is not at all different. Auditory deprivation is defined by a substantial decrease in the brain's ability to process speech as well as a decrease in the overall hearing ability if not fitted with a hearing device. A growing amount of research suggests that individuals with hearing loss are helped more effectively when they are diagnosed and treated early. When the auditory cortex and the auditory nerve are deprived of sound, they tend to weaken over time.⁹ Auditory deprivation is more prevalent in adults than children, because when a child is diagnosed with hearing loss at a young age, they may still be in their optimal neural plasticity stage. It is well known that neural plasticity decreases with age, highlighting the importance of early identification once again (See Figure 7).⁹

The most important factor for the rehabilitation of people with hearing impairment is the use of proper amplification (hearing devices). The goal of a hearing device is to provide the individual with access to sound. The Kind2Hearing audiologists adjust the hearing devices according to each individual's degree and configuration of hearing loss; thereby creating audibility at frequencies that were difficult to hear before. Unfortunately, hearing the sound at the level of the ear doesn't ensure speech perception. Understanding

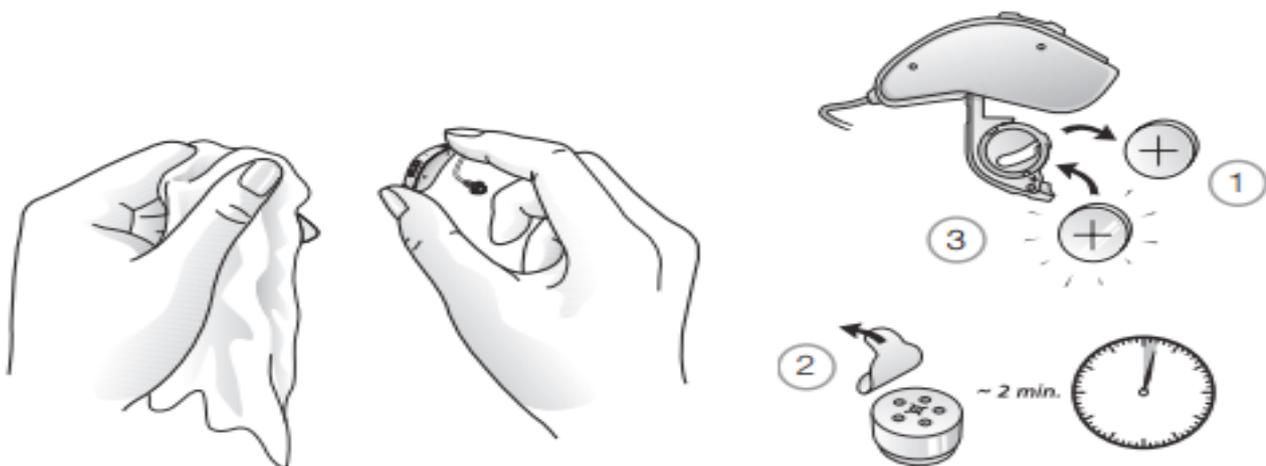


Figure 6. Cleaning of hearing devices and how to insert a battery

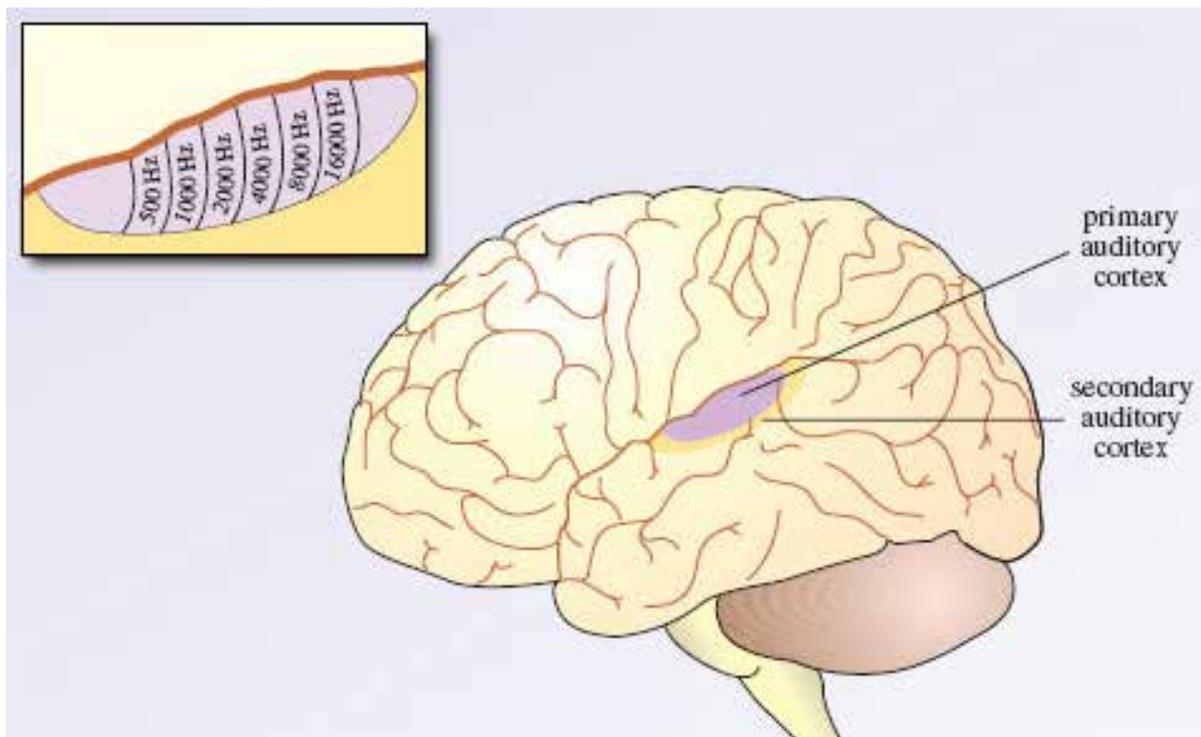


Figure 7. The auditory cortex

the incoming signal depends on the integrity of the sound as well as the ability of the brain to decode and combine numerous input signals or cues (which is changed by auditory deprivation).^{9,10}

Conclusion

Hearing impairment is very often overlooked, but it is more common than most people might believe. Congenital hearing losses are caused by factors like maternal rubella and an extended stay in the NICU. Acquired hearing losses are usually caused by presbycusis, diabetes, prolonged exposure to loud noise and ototoxic medication. Kind2Hearing's top tips to identify individuals with hearing loss: People having difficulty communicating in background noise, tinnitus, asking for repetition, and social isolation, to name just a few. Kind2Hearing believes that early identification and treatment of individuals with hearing loss is crucial. Our audiologists do a variety of tests to determine the degree and configuration of hearing loss, whereafter an appropriate treatment and management plan is executed. Hearing instruments are delicate and need to be handled with care, but when used correctly can prevent auditory deprivation. The sooner an individual is referred to a Kind2Hearing audiologist, the better. Our treatment plan will have a big impact on that person's ease of communication and quality of life.

For any further information, please contact Kind2Hearing at 0800 200 100 or visit www.kind2hearing.co.za

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