

Non-Communicable Diseases Watch

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衛生防護中心
Centre for Health Protection



衛生署
Department of Health

Keep Your Ears Safe

Key Messages

- ※ Hearing is a precious faculty. Once hearing is damaged, very often it cannot be restored. At any age, hearing impairment can have impact on interpersonal communication, psychological wellbeing and quality of life.
- ※ Globally, the estimated numbers of people with disabling hearing impairment in 2011 was 360 million, including 32 million children younger than 15 years old. In Hong Kong, an estimated 155 200 people (or 2.2% of total population) had hearing difficulty in 2013.
- ※ In general, prolonged exposure to noise levels at or above 85 dB can cause gradual hearing impairment. More importantly, effect of noise on hearing can accumulate over time.
- ※ Many causes of hearing impairment can be prevented. For noise-induced hearing impairment, it is preventable by obliging to safe listening practices. A rule of thumb is to avoid noises that are too loud, too close, or last too long.
- ※ Consult a family doctor if signs of hearing impairment emerge, such as difficulty in hearing high-pitched sounds (such as doorbells and telephones), difficulty in understanding speech, following conversations or ringing in the ear.

Keep Your Ears Safe

Hearing is a precious faculty.¹ According to the World Health Organization (WHO)'s definition, a person who is not able to hear as well as someone with normal hearing, i.e. hearing thresholds of 25 decibels (dB) or better in both ears, is said to have hearing impairment (or loss).² Hearing impairment comes in many forms. It can range from a mild impairment in which a person misses certain high-pitched sounds (such as the voices of children or doorbells), to a total loss of hearing (deafness) of one ear or both ears.¹ The causes can be present

Hearing impairment is a global problem

Globally, the estimated numbers of people with disabling hearing impairment (i.e. hearing loss >40 dB in the better hearing ear for adults and >30 dB in the better hearing ear for children) increased from 42 million (0.9% of the world's population) in 1985 to 120 million (2.1% of the world's population) in 1995.³ In 2011, the numbers further increased to 360 million (over 5% of the

Loud noise is a major hearing hazard

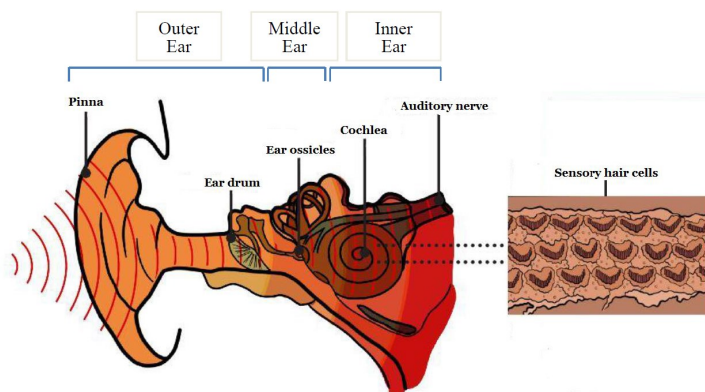
Noise-induced hearing impairment occurs when the delicate sensory hair cells in inner ear and other structures are damaged by sudden blasts of noise (such as explosion) or exposure to loud noise over an extended period.^{4, 5} As shown in Figure 1, the ear has three parts (outer ear, middle ear and inner ear) and each of which has a role in hearing. The outer ear gathers sound waves and transmits them to the eardrum. The sound waves cause the eardrum to vibrate. The vibrations are then passed to the ear ossicles (three small bones) of the middle ear, which amplify and conduct the vibrations to the cochlea (inner ear). The sensory hair cells within the cochlea convert the vibrations into electrical nerve signals. Travelling along the auditory nerve, electrical signals reach the brain for interpretation as sounds.⁴ It is noteworthy that we are all born with a fixed number of cochlear

at or acquired soon after birth, including congenital or hereditary hearing defect, infections during pregnancy (such as maternal rubella and syphilis), low birth weight and birth asphyxia (i.e. a lack of oxygen at the time of birth). When hearing impairment is acquired later, causes can include exposure to loud noise, certain diseases (such as measles, mumps, meningitis and ear infections), injuries to ear or head, medications (such as certain antibiotics and antimalarial medicines), and ageing.²

world's population), including 32 million children younger than 15 years.^{2, 3} The upward trend in the global prevalence of hearing impairment could be attributed to increasing prevalence of age-related hearing impairment; improvement in hearing impairment detection and diagnosis; and rapid urbanisation coupled with a lack of enforceable regulations on environmental and occupational noise.³

hair cells (about 16,000 on average) and they do not regenerate. Once damaged by noise exposure, they would be lost forever. Hence it is critical to protect our hearing from noise-induced damage.^{6, 7}

Figure 1: Mechanism of hearing



(Modified from Krug et al 2015, page 2)

Apart from noise-induced hearing impairment in workplace, exposure to unsafe levels of sound in recreational settings (such as nightclubs, pubs, concerts, personal music players and video game consoles) recently emerges as a public health concern, especially among the younger population as they are more prone to unsafe listening practices.⁴ Surveys from different countries consistently found that many young people regularly used personal

music systems, often at levels and for durations that were hazardous to hearing.⁸⁻¹¹ As the WHO reports, nearly one in two teenagers and young adults (aged 12 to 35 years) in middle- and high-income countries are exposed to unsafe sound levels from the use of personal audio devices. Globally, 1.1 billion young people could be at risk of hearing impairment due to unsafe listening practices.⁴

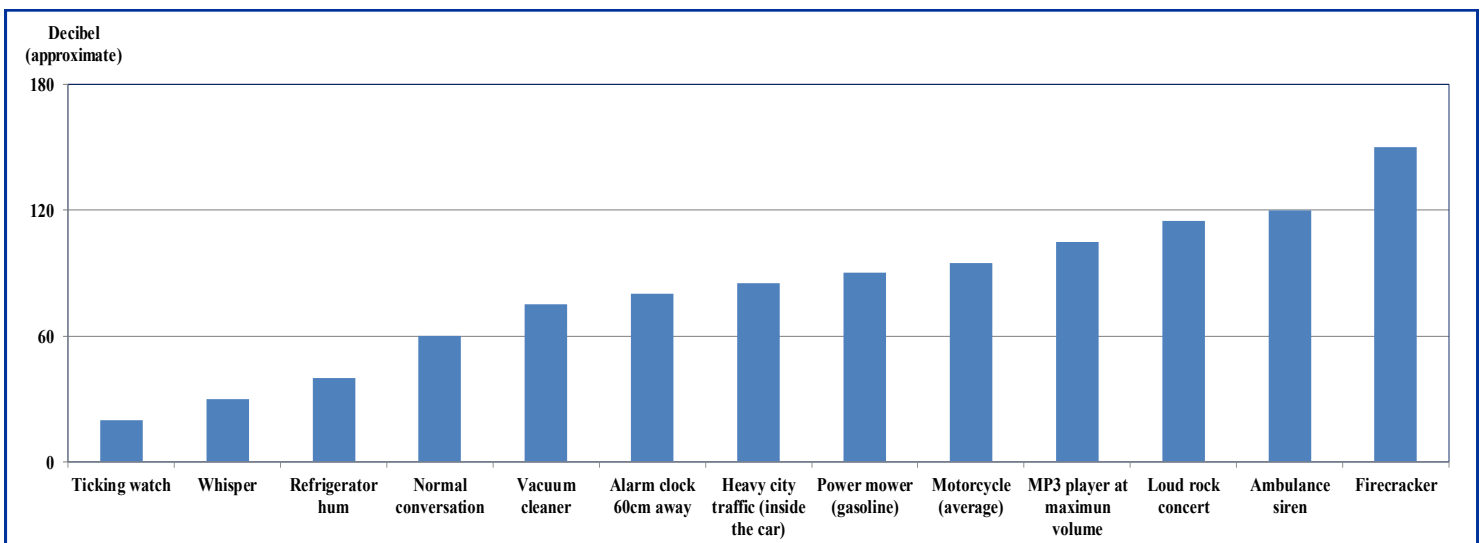
Effect of noise on hearing can accumulate over time

The impact of noise on hearing depends on three main factors: intensity (loudness), duration (length of time) and frequency (how often) of exposure.¹ Exposure to loud noise for any length of time causes fatigue of the ear’s hair cells, resulting in temporary hearing impairment or tinnitus (a ringing sensation in the ear) that may last for hours or even days dependent on the level of loudness and the amount of time exposed to the loud noise. Regular or prolonged noise exposure can cause gradual, irreversible damage to the hair cells, leading to a permanent hearing impairment.⁴

During daily life, we are exposed to various sounds and noises. Normally, sound levels below 75 dB (such as normal conversation, Figure 2) are unlikely

to cause hearing impairment no matter how long we listen. However, long or repeated exposure to any noise levels at or above 85 dB can cause gradual hearing impairment; regular exposure to noise levels of 110 dB or above for periods longer than one minute could risk permanent hearing impairment.^{4, 12, 13} More importantly, effect of noise on hearing can accumulate over time. While the short term effects of noise may not be obvious in audiometric examinations, up to 30% to 50% of sensory hair cells can be damaged before any measurable level of hearing impairment is detected.⁶ Eventually, the accumulated effects of harmful episodes of noise exposure would lead to significant hearing impairment.^{6,7}

Figure 2: Intensities (dB) of some common sounds



Source: U.S. National Institute on Deafness and Other Communication Disorders, 2014.

In Hong Kong, many people have hearing difficulty

In Hong Kong, the Census and Statistics Department conducted periodic territory-wide surveys on persons with disabilities and chronic diseases, including hearing difficulty. In the surveys, ‘persons with hearing difficulty’ were defined as those who had perceived themselves as having long-term difficulty in hearing or using specialised hearing aids or tools at the time of enumeration. Results showed that the number of people with hearing difficulty increased from 92 200 (or 1.3% of total

population) in 2007 to 155 200 (or 2.2% of total population) in 2013.^{14, 15} As shown in Table 1, the prevalence of hearing difficulty was higher among males (2.3% of total population) and people aged 70 and above (14.2% of total population). While over two-thirds (67.5%) of persons with hearing difficulty claimed that they did not require a hearing aid, old age (64.0%) was the most common cause of hearing difficulty.¹⁵

Table 1: Number and percentage of persons with hearing difficulty by sex, age group, degree of severity and main cause, 2013

	No. of persons (‘000)	Percentage	Rate
Sex			
Male	74.9	48.3%	2.3*
Female	80.3	51.7%	2.1*
Age group (years)			
Less than 15	1.3	0.9%	0.2*
15-29	2.8	1.8%	0.2*
30-39	1.9	1.3%	0.2*
40-49	5.2	3.4%	0.4*
50-59	15.0	9.6%	1.2*
60-64	11.4	7.3%	2.6*
65-69	14.8	9.6%	5.0*
70 and above	102.7	66.2%	14.2*
Degree of severity			
Unable to hear at all	4.3	2.8%	0.1#
Required a hearing aid ^a in order to be able to hear sound ^{b, c}	46.1	29.7%	0.6#
Not required a hearing aid ^{a, c}	104.7	67.5%	1.5#
Main cause			
Old age	99.3	64.0%	-
Disease	25.6	16.5%	-
Congenital/Hereditary	8.1	5.2%	-
Working environment	7.8	5.0%	-
Accident	6.8	4.4%	-
Others	7.5	4.9%	-
Overall	155.2	100.0%	2.2#

Notes: * As a percentage of total population in the respective of sex or age group

As a percentage of total population

^a Excluding cochlear implant

^b Including those persons with hearing difficulty who indicated that no improvement could be made even with a hearing aid

^c Referring to the situation of the better ear

Source: Special Topics Report No. 62, Census and Statistics Department.

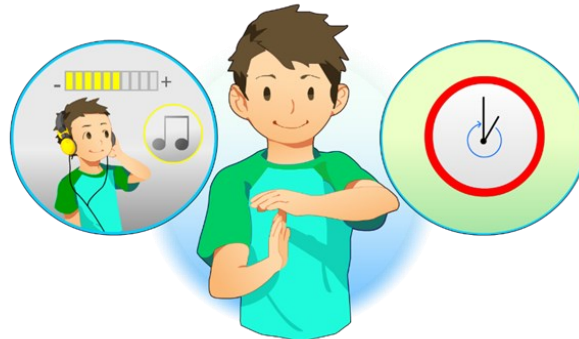
Hearing loss can be prevented

At any age, hearing impairment can impact on interpersonal communication, psychological well-being and quality of life. Nevertheless, half of all global causes of hearing impairment can be prevented through primary prevention.² For noise-induced hearing impairment, it is virtually 100% preventable

by obliging to safe listening practices.⁴ A rule of thumb is to avoid noises that are too loud, too close, or last too long (Box 1), along with taking appropriate measures to protect the ears from infections, injuries, and drugs or chemicals which are toxic to ears.

Box 1: Some tips which can help reducing the risk of noise-induced hearing impairment

- Be aware about safe listening levels (75 dB or below), and daily permissible noise level exposure. In general, the highest permissible exposure level is considered to be 85 dB for up to a maximum of 8 hours, whereas the safe duration of exposure to sound level of 100 dB is only 15 minutes a day.⁴
- Adopt 60-60 Rule: Keep the volume no more than 60% of maximum. Limit the listening time to less than 60 minutes per day and take regular breaks. Adjust the output to a lower volume setting for music / game / film that include impulse and fluctuating sound, or do so when you are using deep-in-the-ear earphones.¹⁶ Impulse sound (noise level rise and fall suddenly, e.g. shooting, hammer, and firecracker) and fluctuating sound (noise level change drastically over time, e.g. road traffic noise, rock music) are more damaging than continuous noise with the same sound level. In-the-ear earphones produce louder sound at a certain volume setting than other types of headphones at the same volume setting.¹⁷



- Use audio entertainment devices wisely. Use noise-cancelling / noise attenuating earphones or headphones if listening devices are used frequently in noisy environments.⁴ Use the built-in 'smart volume' feature which help to regulate the volume and cap the possible maximum output in the products, if available.
- Move away from loud sounds. People should stay as far away as possible from the sound sources such as loudspeakers at a noisy venue. Have short listening breaks and reduce the overall time spent in noisy environments or activities, e.g. nightclubs, bars.
- Block out noise by wearing appropriate hearing protection device (such as ear plugs and ear muffs), even for short exposures.
- Observe occupational health and safety practices on noise control. Take necessary precautions when working in noisy environment.

Screening for hearing can prevent further damage through early detection

Screening could identify people with hearing impairment before symptoms occur and prevent further damage with early interventions. In Hong Kong, the Hospital Authority neonatal units have been providing universal newborn hearing screening to newborns prior to hospital discharge. The Maternal and Child Health Centres of the Family Health Service, Department of Health (<http://www.fhs.gov.hk/>) also offers hearing screening to newborn babies who have not received the screening test in their birthing hospitals. Likewise, the Student Health Service (<http://www.studenthealth.gov.hk/>) provides periodic hearing screening as part of the comprehensive health screening for primary and secondary students who attend the Service for annual health assessment. If indicated, those suspected to have hearing impairment will be referred to specialist clinic for further clinical evaluation or intervention.

Hearing impairment may develop later in life. As the progress of hearing impairment is usually insidious, many people may not realise their hearing impairment. Thus, parents and carers should pay attention to young children's hearing behaviours (a checklist of some general signs to look for in baby's first year is available at http://www.fhs.gov.hk/english/health_info/child/15662.html). For children and adolescents, parents and carers should also be vigilant in identifying the signs of hearing impairment (Box 2). Workers in certain 'high-risk' occupations (such as quarry, construction, metalwork, carpentry, plastic and textile) are recommended to have regular hearing tests to detect hearing impairment early.¹⁸ Older adults should consult their family doctor if signs of hearing impairment emerge such as difficulty in hearing high-pitched sounds (such as doorbells and telephones), difficulty in understanding speech, following conversations, ringing in the ear, or if their family think that they may have hearing impairment.¹⁹

Remember, hearing is one of the most important senses. Once hearing is damaged, very often it cannot be restored. Thus, we should keep our ears safe and hearing sharp.

Box 2: Heed the warning signs of hearing impairment

- Delayed response to soft sounds
- Show poor understanding of what other people are saying
- Tend to lean forward or pay extra attention to the speaker's face while listening
- Often complain that other people are not speaking clearly
- Turn head to one side constantly while listening
- Show difficulty locating the sound source
- Often requests for repetition by saying 'Pardon?' or 'Say that again' during a conversation
- Have unclear speech
- Often give irrelevant answers or misinterprets instructions
- Have earache or ear discharge
- Ringing in the ears
- Understand speech much poorer than others in a noisy environment
- Confuse words with similar sounds e.g. 'sin' and 'tin'

For more details, please refer to the Student Health Service's Health Information on Ears/ Hearing/ Speech: http://www.studenthealth.gov.hk/english/health/health_ehs/health_ehs_dychn.html.

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World Hearing Day : 3 March



World Hearing Day is an annual advocacy event held on 3 March. It aims to raise awareness and promote ear and hearing care across the world.

The date '3 March' was selected because of the similarity of the figures '3.3' with the shape of our ears.

Each year, this day addresses a specific theme. For 2016, the theme is '**Childhood hearing loss: act now, here is how!**'. This aims to draw attention to the fact that the majority of causes which lead to hearing loss in children can be prevented through public health measures.

For more information about the World Hearing Day and past activities, please visit <http://www.who.int/pbd/deafness/news/WHD2016/en/>.

Non-Communicable Diseases (NCD) WATCH is dedicated to promote public's awareness of and disseminate health information about non-communicable diseases and related issues, and the importance of their prevention and control. It is also an indication of our commitments in responsive risk communication and to address the growing non-communicable disease threats to the health of our community. The Editorial Board welcomes your views and comments. Please send all comments and/or questions to so_dp3@dh.gov.hk.

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