Primary Ear and Hearing Care Training Resource

TRAINER'S MANUAL

Intermediate Level

WORLD HEALTH ORGANIZATION
Prevention of Blindness and Deafness
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FOREWORD

The World Health Organization estimated that in 2001 there were 250 million people in the world with disabling hearing impairment (moderate or worse hearing loss in the better ear). At least two-thirds of these are in developing countries. Many more have mild hearing loss and many kinds of ear diseases. These problems can cause life-long and sometimes life-threatening difficulties to people with them; they may have a profound effect on the ability of individuals to communicate with others, on their education, on their ability to obtain and keep employment, in social relationships and through stigmatization. These problems also produce surprisingly large economic burdens on society as a whole.

In developing countries there are few programmes to prevent and treat ear diseases and help people with hearing impairment, and, in many of these countries, few or no trained health workers to implement them.

Some of the most effective and cost-effective interventions against ear and hearing disorders can be implemented at the primary level by trained primary ear and hearing care (PEHC) workers or primary health care (PHC) workers or their equivalent. If these interventions are used on a large scale they will have a major impact on the burden of ear disease and hearing loss. However most developing countries do not have PEHC workers and the topic is hardly addressed in the training of PHC workers. Workers in Community-based rehabilitation (CBR) programmes rarely deal with this field.
The WHO Primary Ear and Hearing Care Training Resource is intended to address this urgent need. It consists of manuals and other materials for interactive and culturally appropriate training of village health workers, PEHC, PHC and CBR workers, and also more experienced personnel working at primary level. It comprises basic, intermediate and advanced level components.

The resource focuses on community involvement and raising awareness, and covers basic measures for prevention and management. A section on hearing aids is included for communities where there are no other trained personnel to help people use them effectively. The resource has been developed by a wide process of consultation in many developing countries, and has been field tested in Africa and Asia. It will be made freely available to projects and programmes that wish to conduct training in this field.

It is hoped that the resource will stimulate and enable greater priority to be given by developing countries to addressing ear and hearing disorders, and hence start to make a substantial reduction in their burden in the developing world.

PREFACE

FOR THE INTERMEDIATE LEVEL

This level of the training resource is an educational tool for the training of primary ear and hearing care workers in developing countries. The primary ear and hearing care worker can use it in their work with people suffering from common ear diseases and/or having a hearing impairment. He/she will also be able to work with members of the patient's families and the broader community.

Prevention, diagnosis and treatment of common ear diseases and hearing impairment are discussed. The training resource emphasises basic information that will enable primary ear and hearing workers to help parents, care givers, teachers and employers and community members to relate to a person who is hard of hearing.

Diagrams and photographs are used to clarify the structure, abnormalities and common disorders of the ear and hearing and to explain the equipment needed for treatment and management of hearing loss.

The trainer's manual contains the necessary knowledge and skills needed by the primary ear and hearing care worker. It also recommends interactive training and shows the trainer when to use the teaching aids provided.

The student's workbook contains the necessary knowledge and skills the student needs to understand and apply as a primary ear and hearing care worker. Each student is required to complete the interactive exercises throughout his or her training. By doing so each will show their understanding of primary ear and hearing care.

The intermediate level of the training resource consists of:

- A trainer's manual
- A student's workbook
- Teaching aids

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PURPOSE OF TRAINING RESOURCE

The purpose of this training resource is to assist with the training of primary ear and hearing care workers in developing countries.

Recent WHO (World Health Organisation) estimates for Global Burden of Disease (2001) show that 250 million people worldwide are estimated to have disabling hearing impairment. Two-thirds of these people live in developing countries. Approximately 50% of these cases are preventable. The role of the primary ear care worker is vitally important for the prevention, diagnoses and treatment of ear and hearing disorders.

An important role for the trained primary ear and hearing care worker will be to help the patient, family and community to understand common ear disease and hearing loss. The PEHC worker will be taught when to refer for further treatment and support. This training resource emphasises the need for prevention, diagnosis and treatment of common ear disease and hearing loss. It also shows that with understanding and the necessary support, people with hearing loss can play productive roles in the household, school or in the work place.

The training resource consists of three parts:

- A trainer's manual
- A student's workbook
- Teaching aids

The trainer's manual will guide the trainers through the course that is linked to the student's workbook and give support to the trainer in the following ways:

- Advises the trainer which teaching aids are needed for each module
- Contains the relevant knowledge and skills content
- Prompts the trainer to ask relevant questions and lead discussions
- Ensures that students participate in their learning
- Explains the process of how we hear sounds
- Explains prevention, diagnosis and treatment of common ear and hearing disorders
- Explains reasons for hearing impairment
- Explains the management and possible solutions available for the hard of hearing

The student's workbook is an interactive manual that comprises eight modules and supports the student's studies in the following ways:

- Describes the knowledge and skills required
- Requires the student to complete activities related to common ear disease and hearing impairment
- Encourages students to discuss issues relating to common ear disease and hearing impairment
- Explains the process of how we hear sounds
- Explains prevention, diagnosis and treatment of common ear and hearing disorders
- Explains reasons for hearing impairment
- Explains the management and possible solutions available for the hard of hearing

The teaching aids are relevant to each module and are clear and simple to understand. The students are encouraged to use the teaching aids to enhance their understanding of common ear diseases and hearing impairment. The posters will have separate labels to identify specific sections or functions.
The training resource will contain a list of recommended equipment.

CRITICAL OUTCOMES

- Become a competent Primary Ear and Hearing Care worker and work effectively as a member of a team for the effective treatment of the patient
- Identify and find the best possible solutions/answers for raising awareness about ear disease and/or hearing problems, and dealing with their prevention and management
- Organise and manage oneself and one's activities responsibly and effectively
- Collect, analyse, organise and critically evaluate information regarding ear disease and/or hearing problems
- Communicate effectively using visual and/or language skills in the modes of oral and/or written persuasion to assist the patients
- Use appropriate technology effectively and critically, showing responsibility towards the health of the patient
- Be culturally sensitive across a range of social contexts

EAR CARE EQUIPMENT

- Cotton applicators, 14cm, serrated
- Head light (spare bulbs)
- Head mirror
- Ear syringe (metal) 50ml
- Kidney bowls
- Otoscope (spare bulbs)
- Disposable specula – 2.5mm and 4mm
- Syringes – plastic, various sizes
- Equipment for doing simple maintenance on hearing aids and ear moulds

MODULE 1

Structure and Function of the ear

By the end of this module the Health Care Worker should be able to:

- Explain why hearing is important
- Recognise and name the parts of the ear
- Explain the function of the ear
- Explain the path sound travels through the ear
- Explain how people hear

Instructions for the pre test and post test

The aim of this activity is to assess whether or not the trainees improve their knowledge by completing the module.The pre test and post-test questions are the same.
Before starting the module the students answer the pre test questions. The questions are not marked at this stage.At the end of the module the students answer the post-test questions. Work through the questions with them and they mark their answers for both tests. Write down their marks and compare the two.
If the pre test marks were high then the trainees had good knowledge of the subject before they started but they should still have improved.

PRE TEST

Questions	True	False	Don't know
The pinna is made up of cartilage covered by skin and can bend.	✓		
The tragus makes wax to fill up the ear canal.		✓	
The normal ear canal is a straight tube with a wet lining like the lining inside your mouth.		✓	
The eardrum is at the end of the ear canal.	✓		
The ossicles conduct sound vibrations from the eardrum to the cochlea (hearing organ).	✓		
The Eustachian tube connects the middle ear space to the back of the nose.	✓		
The middle ear space is full of mucus to help us hear properly.		✓	
The cochlea (hearing organ) contains hair cells to convert sound vibrations into nerve signals.	✓		
The balance organ is called the vestibular system.	✓		
Infection in the ear can cause a lame face (facial palsy).	✓		
Score			

Preparation

- Read and understand both the trainers manual and the trainees workbook
- Study and understand the specific outcomes of each module
- Study and understand the list of terminology
- Copy sufficient copies of the students workbook
- Copy sufficient number of pre-test and post test questions
- Understand the purpose and the instructions for the pre and post test
- Blank paper, pencils and erasers for trainees
- Required posters and labels for each section
- Blackboard and chalk/whiteboard and pens

Symbols

☺ Discussion in groups or with the trainer ¢

Write in your answers or ideas ø Take part in an activity

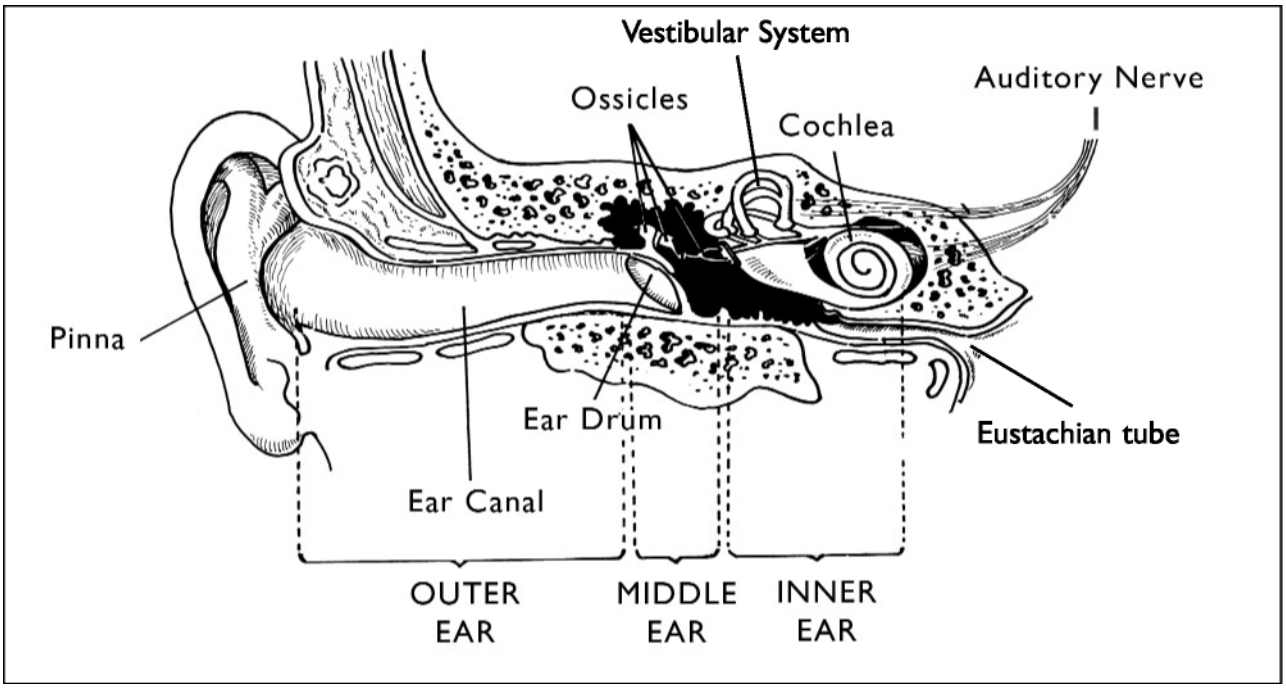
m Put up the poster
(the posters should be displayed when a particular part of the ear is being discussed. Students should be encouraged to place labels in the correct position on the posters)

Terminology

Outer ear	Middle ear	Inner ear	Others
Pinna	Ear drum (Tympanic Membrane)	Cochlea (hearing organ)	Facial nerve
Tragus	Middle ear space	Vestibular system (balance organ)	Disabling hearing impairment
Earlobe	Ossicles – malleus		Hearing impairment
Ear canal	Incus	Hair cells	
Sound vibrations	Stapes	Auditory nerve (Hearing and balance nerves)	
Wax	Eustachian tube	Nerve signals	
Self cleaning	Mastoid bone		
	Mastoid air cells		
	mucus		

Structure:

m Put up the poster and discuss the parts of the ear



Function:

Discuss what the ear does

Use the following words: talking, communicating, hearing, listening, sounds, voices, speaking, learning, school, work

1. COMMUNICATION

1.1 Different types and levels of sound

Activity 1

¢ Ask students to complete the worksheet of the different types of sounds people can hear as well as the different levels of sound (very loud to very soft) they hear.

☺ Discuss this activity with the students

Some expected answers:

TYPES OF SOUNDS		LEVELS OF SOUNDS	
Low	**High**	**Soft**	**Loud**
Cow mooing	Dentist's drill	whispering	Car horn
Truck engine	Childs screaming	Water boiling	Dish crashing on floor
Ship hooting	Whistle blowing	Rubbing hands together	Aeroplane flying
Water flowing	Telephone ringing		Maximum volume music

1.2 Why is hearing important?

Activity 2 encourages the students to discuss and begin to understand what hearing impaired people feel.This should help them understand the importance of ear and hearing care.

Activity 2

¢ Ask the students to tick which emotions they think they would feel if they could not hear well

☺ Discuss this activity with the students

Some expected answers:

Left out	Useless	Withdrawn	Ignores
Frustrated	Unloved	Alone	Quiet
Different	Stupid	Angry	An outcast

Other mentioned by students:

_____

Speech and hearing play a vital part in every person's life from the time they are born. Unless both speech and hearing develops the person will not be able to communicate easily with family, friends, at school, people in the workplace etc.
Communication enables us to learn as well as be involved in everyday life. Our speech and language skills develop as we grow.The earlier ear and hearing problems are picked up, the earlier they can be treated and managed.
The World Health Organisation estimates that about 250 million people worldwide have disabling hearing impairment.About two thirds of these people live in developing countries.About 125 million cases of disabling hearing impairment could be prevented.

1.3 Hearing impairment

The words "hearing impairment" are used in this statement. Hearing impairment is the inability to hear as well as someone with normal hearing. Hearing impaired people can be Hard of Hearing (HOH) or deaf.

- Having difficulty hearing conversational speech (slight impairment)
- Having difficulty hearing loud speech (moderate impairment)
- Can only hear some words if they are shouted into the ear and having to rely on lip reading or hearing aids to help understand speech (severe impairment)
- Cannot even hear shouted words and having to rely on lip reading or sign language for communication (profound impairment)

Disabling hearing impairment in adults means they are only able to hear loud speech or even fewer sounds.
Children have disabling hearing impairment when they have difficulty hearing conversational speech or identifying most sounds. Children need good hearing to develop proper speech and to hear as they learn.
What words do the trainees use when someone cannot hear well? Words such as "Hearing Impairment" should be used when a person cannot as well as people with normal hearing. If a person cannot hear at all then they have "Deafness" or they are "Deaf".

1.4 The impact of hearing impairment and ear disease

Discuss the following statements about some of the effects of hearing impairment and ear disease with the trainees and include points such as:

- cost to the health departments for treatment of ear disease
- low levels of education if they cannot be offered education
- loss of income if these people cannot find work
- cost of support to the families
- how prevention can solve some of the above problems
- how early diagnosis and treatment will prevent serious ear disease and hearing impairment from occurring

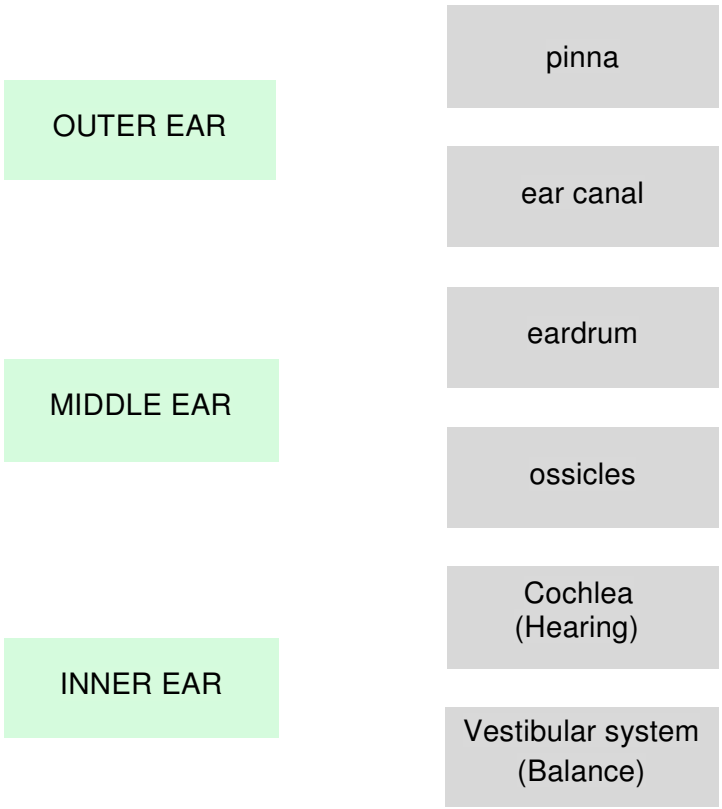
About half of all hearing impairment and deafness could be prevented if common causes were dealt with in Primary Health Care.

- It is important to be able to hear well. In order to hear we need healthy ears that function properly
- Ear and Hearing Care workers play an important role in preventing and treating the common things that cause hearing impairment and deafness.
- Ear and Hearing Care workers need to understand the normal structure and function of the ear to help identify the common abnormalities and diseases of the ear.

2. STRUCTURE AND FUNCTION OF THE EAR

The ear consists of three parts:

m Put up the poster **Flowchart of the three sections of the ear.**
Briefly explain the three sections and that each part plays a vital role in enabling the person to hear well. Students should be encouraged to come back to this flowchart throughout the training



m Put up the poster **Line diagram of the ear – indicating the three sections of the ear**
Have the corresponding cards, identifying the three sections of the ear, available for the students to place in the correct place on the poster.
Relate this line diagram to the flowchart above.

Activity 3

¢ Students write in the correct names of each part of the ear on the diagram provided

☺ Discuss this activity with the students

Refer to the: **Line diagram of the ear – indicating the three sections of the ear** (see above). Discuss the path sound travels through the ear.

3. THE OUTER EAR

m Put up the poster **Line diagram of the outer ear**
Have the corresponding cards, identifying the parts of the ear, available for the students to place on the poster.

The outer ear has two parts – the pinna and the ear canal.

3.1 What is the structure of the pinna?

The pinna is made out of cartilage covered by normal skin. Cartilage can be bent.The ear lobe is soft and this is where holes are usually made so that earrings or traditional jewellery can be worn.The pinna leads into the ear canal. In front of the opening of the ear canal is a bump called the tragus.

3.2 What is the function of the pinna?

The pinna picks up sound vibrations and directs them into the ear canal.
Hard of hearing people sometimes put their hand behind the pinna to help pick up more sound.
If a person has deformed ears they might have difficulty hearing. Some deformed ears have no opening into the ear canal so that sounds cannot get through which will make the hearing problem much worse.

3.3 What is the structure of the ear canal?

The ear canal is an open tube with a skin lining.At the entrance there are hairs to try and stop things getting into the ear canal. Just beyond the hairs are glands that produce wax that spreads to cover the skin in the ear canal and helps to keep it healthy. **The ear canal normally cleans itself and clears the wax out by itself.**

This is an important message to give to trainees and an important message for them to give to their

patients.Why? Because a lot of the problems that occur in the ear canal are caused by people trying to clean their ears out.
There is a small bend in the ear canal and in the deep part the skin is thin and sensitive to pain and can easily be injured.At the end of the ear canal is the eardrum.

Activity 4

¢ Ask the students to look at both ears of their partner.They must tick each question as they examine the ear

	LEFT EAR		RIGHT EAR	
	Yes	No	Yes	No
Can you see the pinna?				
Can you see the tragus?				
Can you see the entrance to the ear canal?				
Is it open?				
Can you see any hairs in the entrance to the ear canal?				

Do not put things in the ear canal – you may hurt it

3.4 What is the function of the ear canal?

The sound vibrations picked up by the pinna travel down the ear canal to the eardrum and make the eardrum vibrate.
If the ear canal is blocked the sound vibrations cannot reach the eardrum. When this happens the person is not able to hear sounds clearly. The commonest cause of a blocked ear canal is wax.
Some people produce more wax than normal and some ears do not clear the wax out properly. Many people try to get wax out of their ears by poking things into the ear canal. This can do damage and cause infection. Later in the course they will learn that the way to get wax out is to syringe it out.

Activity 5

Ask the students to discuss what they would think a patient would complain about if there was wax blocking the ear canal.

☺ Discuss this with the students and include points such as:

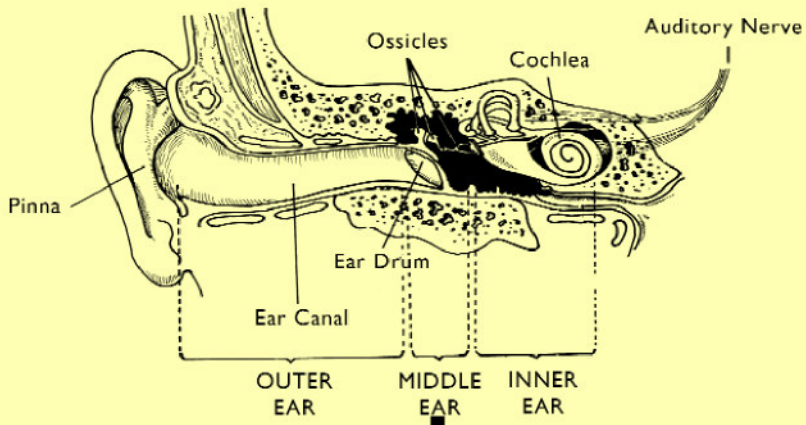
- the ear may be uncomfortable or itchy
- the ear may feel sore
- they may have difficulty hearing clearly in the blocked ear
- an infection may develop if objects are put into the ear canal

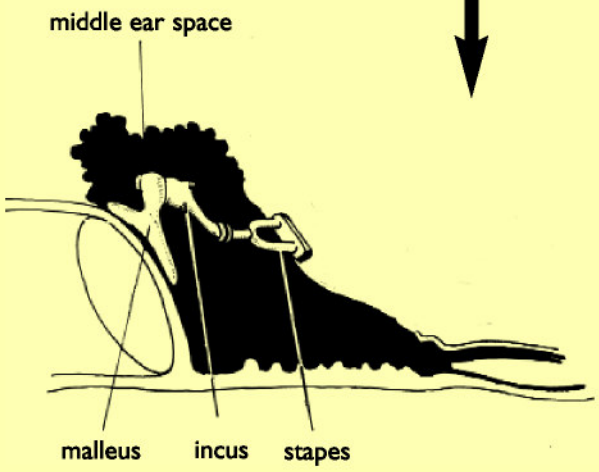
If you feel something in the ear canal – get it checked at your clinic
A healthy ear canal is important for hearing.

4. THE MIDDLE EAR

m Put up the poster: **Line diagram of the middle ear**
Have the corresponding cards, identifying the parts of the ear, available for the students to place on the poster.

Activity 6





¢ Ask the students to write in the labels the correct name for each part of the middle ear on the diagram.

☺ **Discuss this activity**

4.1 What is the structure of the middle ear?

The ear canal leads to the eardrum. The eardrum is a thin membrane that separates the outer ear from the middle ear. The middle ear is a space that is filled with air. The air gets into the middle ear through the Eustachian tube. The Eustachian tube goes from the back of the nose to the middle ear.

Activity 7

ø Ask the students to pinch their nose closed and try to blow gently through their nose.They should feel their ears 'pop' open as air passes through the Eustachian tube into their middle ear.

☺ Discuss this activity with the students

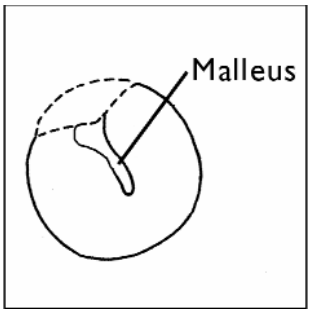
There are three tiny bones in the middle ear called the ossicles

Ossicles = malleus + incus + stapes

Or they can be named after their shapes

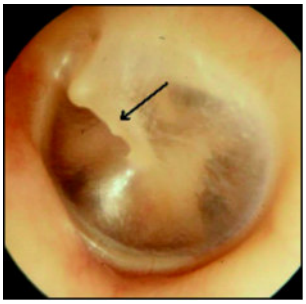
Ossicles = hammer + anvil + stirrup

The malleus forms part of the eardrum – see diagram and picture.



The malleus is connected to the incus.The incus is connected to the stapes. The stapes fits into a tiny oval window that opens into the inner ear.

The middle ear has a lining that usually secretes a tiny amount of mucus. This mucus is drained away through the Eustachian tube. If the lining produces too much mucus this blocks up the Eustachian tube and air cannot get into the middle ear and the mucus cannot drain away properly. The middle ear space will fill up with mucus and then the eardrum and the ossicles will not be able to vibrate properly to transmit sound.The patient may not hear well and have some pain.



Bacteria can get through the Eustachian tube into the middle ear and cause infection.

4.2 What is the function of the middle ear?

The eardrum picks up the sound vibrations that travel down the ear canal.The eardrum vibrates and makes the ossicles vibrate.The ossicles vibrate and conduct these vibrations across the middle ear space.The stapes vibrate and make the fluid in the inner ear vibrate.

The sound vibrations can only be conducted across the middle ear if the space is filled with air.

Activity 8

¢ Ask the students to write down what they think would happen if the ossicles could not vibrate.

☺ Discuss this activity with the student and include points such as:

- only loud sounds would pass through to the inner ear
- they would hear muffled sounds
- the ear may feel blocked

4.3 The mastoid air cell system

The mastoid bone is situated behind the middle ear and is filled with air.
The mastoid is a bony system of cells that contain air and is linked to the middle ear. Both these areas are filled with air and the mastoid air cell system works as an air tank that helps balance the air pressure changes in the middle ear.

5. THE INNER EAR

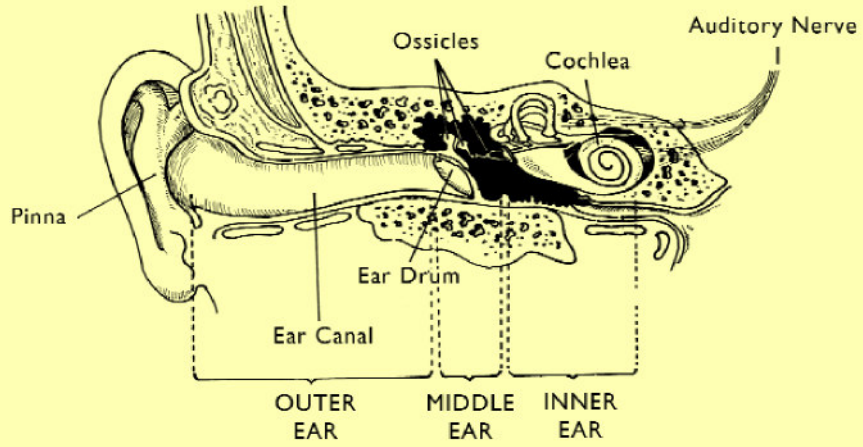
The inner ear has two parts.

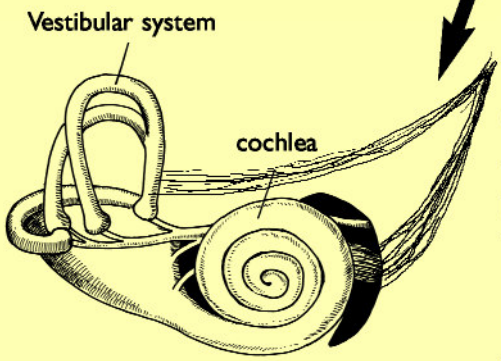
- The **cochlea** deals with sound vibrations and is responsible for **hearing**
- The **vestibular system** is responsible for **balance**

5.1 Hearing: What happens in the cochlea?

The cochlea is filled with fluid and contains a delicate membrane lined with tiny hair cells.The hair cells are all connected to the hearing nerve.Vibrations of the ossicles make the fluid vibrate.The vibrations are picked up by the hair cells.The hair cells change the sound vibrations into tiny nerve signals.These nerve signals then travel along the auditory nerve to the brain. In the brain there is a special area where these nerve signals are interpreted as the sounds we hear. Damage to the cochlea or hearing nerve causes hearing impairment or deafness.

Activity 9





Ask the trainees to write in the labels the correct names of each part of the inner ear on the diagram:

Discuss this activity with the students

What path does sound travel from outside the ear until we can hear it?

m Put up the poster : **flowchart of how sound travels**

☺ Discuss the flowchart of how sound travels

Sound vibrations are picked up by the pinna

The pinna directs these sound vibrations into the ear canal

The sound vibrations reach the membrane of the eardrum and make it vibrate

The vibration of the eardrum causes the ossicles to vibrate

The ossicles vibrate and cause the fluid in the inner ear to vibrate

These vibrations are picked up by the hair cells in the cochlea

These hair cells change the vibrations into nerve signals

These nerve signals travel along the hearing nerve to the brain

In the brain the nerve signals are interpreted into the sounds we hear

5.2 Balance:The vestibular system:

The vestibular system is also filled with fluid. Movements of our head cause the fluid to move.There are different hair cells in the vestibular system that are all connected to the balance nerve.These hair cells pick up any movement in the fluid and convert it into nerve signals.These nerve signals pass along the balance nerve into the brain.The brain has a special area where the nerve signals are interpreted as the movements we feel.

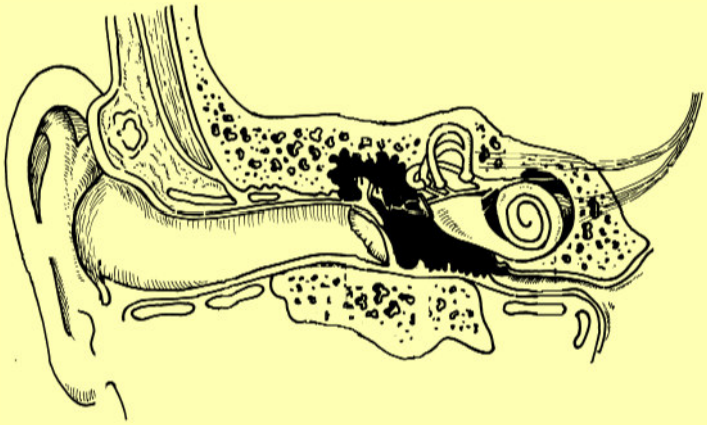
Normal function on both sides is needed for us to keep our balance and so that we can keep our eyes focused on what we are looking at as we move our head around.
If there is infection in one ear that spreads into the inner ear, the function of the vestibular system on that side will be upset and the patient will feel dizzy. If there is inflammation of the balance nerve on one side the same thing will happen.When a patient is dizzy and feels as if everything is moving round and round we say that they have vertigo.

Activity 10

¢ Ask students to complete the diagram of how sound travels through the ear.

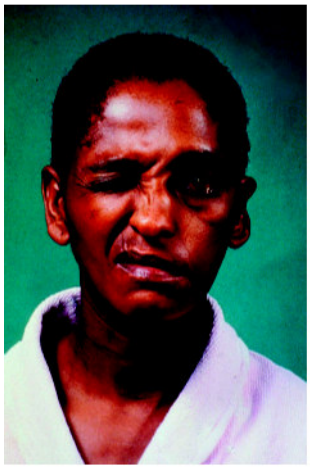
☺ Discuss this with the students and include points such as the need to:

- understand what parts make up the ear
- understand that each part has to work properly in order for the person to hear well
- recognise and name the different parts of the ear in a diagram
- be able to explain and show patients the parts of the ear on a diagram in order to explain problems and treatment more clearly



Refer to both of the Diagrams/Posters from Activities 3 and 4

6. FACIAL NERVE



You need to make sure that the trainees know something about nerves and muscles. Some nerves make muscles work. In the face there is only one nerve on each side that makes all the muscles on that side of the face work. It is called the facial nerve. Infection in the middle ear can cause facial palsy (also called lameface).

The facial nerve goes through the ear inside a bony tunnel on the wall between the middle ear and the inner ear.

If ANY part of the ear becomes damaged because of infection or injury the person may become temporarily or permanently hearing impaired

POST TEST

Questions	True	False	Don 't know
The pinna is made up of cartilage covered by skin and can bend.	✓		
The tragus makes wax to fill up the ear canal.		✓	
The normal ear canal is a straight tube with a wet lining like the lining inside your mouth.		✓	
The eardrum is at the end of the ear canal.	✓		
The ossicles conduct sound vibrations from the eardrum to the cochlea (hearing organ).	✓		
The Eustachian tube connects the middle ear space to the back of the nose.	✓		
The middle ear space is full of mucus to help us hear properly.		✓	
The cochlea (hearing organ) contains hair cells to convert sound vibrations into nerve signals.	✓		
The balance organ is called the vestibular system.	✓		
Infection in the ear can cause a lame face (facial palsy).	✓		
Score			

MODULE 2
Hearing Impairment and Deafness: Causes and Prevention

By the end of this module the Health Care Worker should be able to:

- Identify and explain common causes of hearing impairment
- Describe the risk factors for hearing impairment
- Explain hearing impairment preventive measures
- Explain the different types of hearing impairment
- Explain the different levels of Hearing Impairment

Instructions for the pre test and post test

The aim of this activity is to assess whether or not the trainees improve their knowledge by completing the module. The pre test and post test questions are the same.
Before starting the module the students answer the pre test questions. The questions are not marked at this stage. At the end of the module the students answer the post test questions. Work through the questions with them and they mark their answers for both tests. Write down their marks and compare the two.
If the pre test marks were high then the trainees had good knowledge of the subject before they started but they should still have improved.

PRE TEST

Questions	True	False	Don't know
Hearing impairment always means that a person is deaf.		✓	
Deafness cannot be inherited.		✓	
A child who is born deaf may not learn to speak properly.	✓		
All deaf people can hear normally if they wear a hearing aid.		✓	
There are different levels of hearing impairment.	✓		
Moderate hearing impairment means that a person cannot hear speech even if it is shouted close to their ear.		✓	
Neglected ear infections can cause hearing impairment.	✓		
Damage by loud noise to the hair cells in the cochlea (hearing organ) always recovers.		✓	
Some drugs when used over a period of time can cause hearing impairment	✓		
Vaccination against measles, mumps and rubella can prevent hearing impairment.	✓		
Score			

Preparation

- Read and understand both the trainers manual and the trainees workbook
- Study and understand the list of terminology
- Study and understand the aims of each module
- Copy sufficient number of pre-test and post test questions
- Copy sufficient copies of the students workbook
- Blank paper, pencils and erasers for students
- Required posters and labels for each section
- Blackboard and chalk/whiteboard and pens

Symbols

Discussion with students or in groups

m Put up the poster

¢ Students to complete by writing in answers or ideas

ø Students to take part in an activity

Terminology

Hearing impairment

Disabling hearing impairment

Normal hearing – no impairment

Slight hearing impairment

Moderate hearing impairment

Severe hearing impairment

Profound hearing impairment

Deafness – deaf

Lip reading

Sign language

Genetic (hereditary causes)

Causes during pregnancy – viral infection, rubella (German measles), syphilis, drugs that damage hearing

Causes at birth – prematurity, difficult birth, jaundice

Childhood diseases – measles, mumps, meningitis

Ear infections

Loud noise

Ototoxic drugs

Head injury

Old age

Hearing aids

Genetic counselling

Immunisation/vaccination

Preventative measures

Consanguineous marriage

Speech: whispered speech – conversational speech – loud speech

1. HEARING IMPAIRMENT

1.1 What do we mean by hearing impairment?

This is when a person is not able to hear as well as someone with normal hearing.
There are several different levels of hearing impairment:

- A person has difficulty hearing conversational speech
- A person has difficulty hearing loud sounds
- A person can only hear some words if they are shouted into the ear
- A person cannot even hear shouted words

A person who cannot even hear shouted words has deafness or is said to be deaf

1.2 What do we mean by disabling hearing impairment?

This is when people can only hear loud speech or shouted words.
Children have disabling hearing impairment when they have difficulty hearing conversational speech. Disabling hearing impairment in children is set lower than in adults because children need good hearing to develop proper speech and to hear as they learn.

1.3 What are the different types of hearing impairment?

1. Conductive hearing impairment

This term is used when the problem causing the hearing impairment is in the ear canal or in the middle ear.
It is then difficult for sound to be "conducted" through to the inner ear.
The problem can often be corrected by treatment or if it cannot the patient can be helped by wearing a hearing aid.

2. Sensorineural hearing impairment

This term is used when the problem causing the hearing impairment is in the cochlea or in the hearing nerve or sometimes both.
The "sensori-" part comes from the cochlea which is a "sense organ" and the "neural" part comes from the hearing nerve.
Hearing aids can sometimes be used to help hearing.

2. CAUSES OF HEARING IMPAIRMENT

2.1 Causes before and during birth:

Genetic (hereditary) causes – Congenital causes mean those causes that are already present when the baby is born.The first group of congenital causes are genetic causes. Genes are the structures on the chromosomes in either the sperm (from fathers) or the ovum (from mothers) that determine what we inherit from our parents.

- Hearing impairment could run in the family

Problems during pregnancy – things that happen during pregnancy that interfere with the growth and development of the baby.

- Diseases during pregnancy – Rubella (German measles), other viral infections
- Sexually transmitted diseases – syphilis
- Drugs that can damage hearing taken during pregnancy

Difficulties at birth – events that happen during birth or soon after birth that cause harm or damage to the baby.

- Premature birth
- Difficult birth when the baby suffers from lack of oxygen
- Jaundice after birth

Activity 1

Ask the students to tick off and write down some things that they think could cause hearing impairment

Some correct answers:

- Old age
- Bad ear infections
- Meningitis
- Head injury
- Working in a noisy environment
- Hearing impairment in the family
- Treatment of TB

😊 Discuss this activity with the students

Risk factors and some preventative measures:

- If parents were born deaf then there is a risk that their children will be born deaf. Counselling may be needed if such parents are thinking of having children.
- Rubella during pregnancy is a risk because it can damage the development of the hearing organ in the inner ear.They can prevent it by making sure that a comprehensive Rubella vaccination programme is applied in their community.
- Pregnant women should be screened for syphilis and treatment given if necessary.
- Drugs that can damage hearing should not be given or used during pregnancy unless prescribed by a doctor.These drugs are known as ototoxic drugs.
- Good antenatal care should be provided and births should be supervised.
- Jaundiced babies should be referred for diagnosis and possible treatment.

2.2 Other causes of hearing impairment:

Childhood diseases
- Measles, Mumps, Meningitis

Ear infections
- Infection can cause problems in the ear canal, the middle ear or the inner ear

Drugs that can damage hearing (ototoxic drugs)
- Antibiotics such as Streptomycin and Gentamycin
- Antimalarials such as Quinine and Chloroquine

Noise
- Working with noisy machinery, loud music, explosions

Accidents
- Head injury or injury to the ear can cause hearing impairment

Old age
- As people get older they usually develop some hearing impairment

Wax
- Wax blocking the ear canal can cause hearing impairment at any age

Glue ear
- Glue ear is a common cause of hearing impairment in children

Less common causes risk factors and some preventative measures:

- Neonatal jaundice can damage the hearing nerve.They can prevent hearing impairment by referring these babies for treatment.
- Childhood infections can be prevented by applying the Expanded Programme of Immunisation (EPI) in their community.
- Early treatment of ear infections can prevent damage to the middle ear.
- Drugs that can damage hearing should only be given on prescription by a doctor.
- They need to educate their community about the harmful effects of loud noise.
- They should encourage cyclists and motorcyclists to always wear protective helmets

3. HOW WELL CAN WE HEAR?

3.1 No hearing impairment:

People with normal hearing can hear whispered speech.

3.2 Slight hearing impairment:

People with slight hearing impairment can hear normal (conversational) speech only if the speaker is close (1 metre).
Hearing aids may be needed for this level of impairment to amplify sound.

3.3 Moderate hearing impairment:

People with moderate impairment can hear loud speech only if the speaker is close (1 metre).
They may lip read to help understand speech.
They have difficulty listening to the radio or television unless the volume is turned up.
Children have difficulty hearing the teacher at school.
Hearing aids are recommended for this level of impairment to amplify sound.

3.4 Severe hearing impairment:

People with severe hearing impairment can hear speech only when the words are shouted into the ear.
Hearing aids are needed for this level of impairment.
Lip reading and sign language are needed to understand speech when hearing aids are not available.

3.5 Profound hearing impairment (Deafness):

People with profound impairment (deafness) cannot even hear shouted speech.
Hearing aids may help some deaf people understand words.
People born deaf may never learn to speak unless given special assistance.
Lip reading and sign language are essential for communication.

Discuss what level of hearing they think this boy has.

- It is not normal since he is wearing a hearing aid.
- It is probably not slight hearing impairment since people with this level of hearing do not usually need a hearing aid.
- It could be moderate hearing impairment because people with moderate hearing impairment hear much better if they use a hearing aid.
- It could be severe hearing impairment because people with severe deafness hear much better if they use a hearing aid.
- It is probably not profound hearing impairment/deafness because people with profound deafness do not usually find that they can hear even when they use a hearing aid.

4.WHAT IS IT LIKE TO HAVE HEARING IMPAIRMENT?

Activity 2

Each trainee must choose a partner.
One trainee turns their back to their partner and closes off both ears while their partner asks a question.The results are ticked in their workbook.
Make sure that they know how to press the tragus cartilage hard enough to completely close off the ear canal.

Discuss this activity with the trainees

Explain to them that when they close off their ears like this they are imitating slight or even moderate hearing impairment.They can experience what a patient with this problem can or cannot hear and they may be able to see that lip reading can help understand words

Activity 3

Each trainee writes down what they think are some of the difficulties that a person with hearing impairment will have in their daily life.

Discuss the comments with your trainees

Some expected answers:

- Conversation becomes difficult to follow
- They become embarrassed to join in conversations
- Learning can be difficult – cannot follow what teacher is saying
- Sounds and direction of sounds, are not easy to identify

People with hearing impairment have difficulty in conversations as they cannot hear speech properly.
Most hearing impaired people benefit from wearing a hearing aid. Hearing aids amplify sounds so that people can hear better.

5. HOW DOES HEARING IMPAIRMENT AFFECT SPEECH?

We develop speech by listening to other people talking and then try to imitate what they are saying.

Children learn to talk by saying the words they hear around them. If they have hearing impairment they will not hear the words properly and they will pronounce the words incorrectly.

Children born with deafness or who become deaf before they learn to speak cannot hear words and cannot develop speech without special training.They need to use sign language to communicate.

Adults who become hearing impaired start to pronounce words incorrectly because they cannot hear their own voice properly.

6. HOW CAN WE PREVENT HEARING IMPAIRMENT AND DEAFNESS?

6.1 Genetic counselling

Hearing impairment can be inherited. Ask patients or parents if they know of any hearing impairment in the family.
Inherited hearing impairment can be of any level from slight to profound. It can be present from birth or can develop later in life.
There could be high risk when one or both parents are deaf.These parents should be referred to your doctor for investigation and counselling.
In genetic counselling the families of parents of a deaf child are studied to advise them if there is a risk of inherited deafness being passed on if they have children more.

Activity 4

Each student writes down some of the things that they think might prevent hearing impairment and deafness.

☺ Discuss the comments with your trainees

Some expected answers:

- Keep dirty water out of their ears
- Take children to the clinic as soon as they complain of sore ears
- Avoid loud noise
- Do not put anything in the ears
- Ensure children are vaccinated against childhood diseases
- Drugs that can damage hearing should only be given on prescription by a doctor

6.2 Prevention of ear infections

Ear infections are common in young children especially when there is overcrowding in the home, when people smoke at home, when there is poor hygiene, when these children are in close contact with people with runny noses, coughs and colds and when children attend day care centres.You can advise parents about these things.

Breast-feeding helps a baby resist infections.You can encourage mother to continue breastfeading.

Neglected ear infections can cause hearing impairment.You must educate your community to seek help for ear infections. Early intervention in ear infection helps prevent hearing impairment.

6.3 Ear Hygiene

Important points to remember:

- Do not try to clean the ear canal – it will clean itself
- Do not put things in the ear canal – you may harm it
- If you feel something in the ear canal – get it checked at your clinic

6.4 Vaccinations

Vaccination against Haemophilus and Pneumococcus bacterial infections helps prevent ear infections in children. If these vaccinations are available, advise parents to have their children vaccinated.

Diseases such as measles, mumps and rubella can cause hearing impairment.
Meningitis can cause hearing impairment.

Tuberculosis meningitis can cause hearing impairment.

How to help prevent hearing impairment:

- Refer babies with neonatal jaundice for treatment.
- Apply the Expanded Programme of Immunisation (EPI) in your community.
- Treat ear infections early to prevent damage to the middle ear.
- Ensure that drugs that can damage hearing are only given on prescription by a doctor.
- Educate your community about the harmful effects of loud noise.
- Encourage cyclists and motorcyclists to always wear protective helmets

All children in the community should be vaccinated against these diseases according to the recommendations of your Health Authority vaccination programme.

6.5 Ototoxic drugs

PLEASE NOTE:
Ototoxic drugs are drugs that can damage hearing.
Drugs that can damage hearing should be prescribed by doctors only!
Common ototoxic drugs are antibiotics such as gentamicin and streptomycin and the antimalarials such as quinine and chloroquine.
There are other drugs that can damage hearing.

6.6 Protection of ears from noise

If the ear is exposed to loud noise the hairs of the hair cells in the cochlea break and do not repair themselves so that the hearing impairment is permanent. Hearing protectors should always be worn when working in a noisy environment.

Excessive noise is one of the major causes of hearing impairment in industry

- Advise all workers exposed to loud noise to wear hearing protectors.
- Screen workers in a noisy environment for hearing impairment.
- Encourage the enforcement of noise legislation.

Activity 5

Each student writes down any very loud noises and where they are found

Discuss the comments with your trainees

Some expected answers:

- Factories where there are machines for cutting wood/metal
- Working in mines or quarries
- Textile factories
- Home industries where there is a lot of hammering
- Loud music – in a nightclub
- Repairing roads

PREVENTION IS BETTER THAN CURE!

POST TEST

Questions	True	False	Don't know
Hearing impairment always means that a person is deaf.		✓	
Deafness cannot be inherited.		✓	
A child who is born deaf may not learn to speak properly.	✓		
All deaf people can hear normally if they wear a hearing aid.		✓	
There are different levels of hearing impairment.	✓		
Moderate hearing impairment means that a person cannot hear speech even if it is shouted close to their ear.		✓	
Neglected ear infections can cause hearing impairment.	✓		
Damage by loud noise to the hair cells in the cochlea (hearing organ) always recovers.		✓	
Some drugs when used over a period of time can cause hearing impairment	✓		
Vaccination against measles, mumps and rubella can prevent hearing impairment.	✓		
Score			

MODULE 3

The outer ear: examine, treat, refer

By the end of this module the Health Care Worker should be able to:

- Demonstrate examination of the pinna
- Describe or demonstrate use of an otoscope
- Describe or demonstrate examination of the ear canal
- Describe problems of the outer ear
- Describe the treatment or referral of problems of the outer ear

Instructions for the pre test and post test

The aim of this activity is to assess whether or not the trainees improve their knowledge by completing the module. The pre test and post test questions are the same.
Before starting the module the students answer the pre test questions. The questions are not marked at this stage. At the end of the module the students answer the post test questions. Work through the questions with them and they mark their answers for both tests. Write down their marks and compare the two.
If the pre test marks were high then the trainees had good knowledge of the subject before they started but they should still have improved.

PRE TEST

Questions	True	False	Don't know
Some people have a tiny" hole" in front of their pinna which can become infected	✓		
An otoscope is an instrument used to examine the pinna		✓	
You need to pull the pinna forwards to see into the ear canal		✓	
Children with sores on their body can spread the infection to the skin of their pinna	✓		
Swimming in dirty water can cause otitis externa	✓		
Wax does not come out of the ear canal by itself and always has to be removed		✓	
Foreign bodies in the ear canal need to be removed	✓		
Hard wax dissolves in water	✓		
Otitis externa is treated with antibiotics		✓	
You should always test the hearing when a patient has a deformed ear	✓		
Score			

Preparation

- Read and understand both the trainers manual and the trainees workbook
- Study and understand the list of terminology
- Study and understand the aims of each module
- Copy sufficient number of pre-test and post test questions
- Copy sufficient copies of the students workbook
- Blank paper, pencils and erasers for students
- Required posters and labels for each section
- Blackboard and chalk/whiteboard and pens
- Obtain working otoscopes with different sizes of speculum and spare batteries
- Bowl of water, antiseptic or liquid soap, towel.

Symbols

☺ Discussion with partner or in groups

m Put up the poster

¢ Students to complete by writing in answers or ideas

ø Students to take part in an activity

Terminology

The Pinna	Normal pinna	Normal ear canal	Eardrops
Skin infection	Ear Canal	Otoscope	Incision and drainage
Infection of the pinna	Wax	Speculum	Syringing
Pre-auricular sinus	Fungas body	Batteries	Refer
Deformity of pinna	Otitis externa	Bulb	Ear hygiene
Unknown abnormality of pinna	Unknown abnormality of ear canal	Antiseptic cream	Diabetic
		Antibiotics	

1. EXAMINATION OF THE EAR

Activity 1

¢ Each trainee writes down why they think the ear needs to be examined

☺ Discuss your ideas with your group and with your trainer

Some expected answers:

- To make sure the ear is normal
- To make sure there is no infection
- To check whether all parts of the ear that can be seen are normal
- Is it a disease or abnormality that the trainee can recognise and treat
- To see if any part is swollen and red
- To look for any abnormalities
- If any part is not normal then to work out what is wrong with that part
- Is it something that will need to be referred to a doctor.

1.1 Examination of the pinna

Activity 2

What can the trainees see when they examine the pinna? They should choose a partner and examine the pinna and the area around it. Make sure that they do this in a good light.

The trainees work through the following questions while they examine each ear:

Examination of the pinna	**Left ear** yes	no	**Right ear**	no
Is there any infection of the skin around the ear or in the pinna?				
Is the pinna swollen and inflamed?				
Is there any injury to the pinna?				
Is there a tiny "hole" in front of the pinna?				
Is this infected?				
Is the pinna deformed?				
Is there an abcess on the pinna?				
Is there anything else abnormal that you do not know what it is?				
Is the pinna normal?				
Is the pinna absent?				

The trainees need to learn a method to use each time they examine an ear.The same method will be used for each part of the ear but with different questions for each part.

They need to be able to look at each part and decide whether that part is normal or not. Until they have gained experience they need to go through the questions one by one. If their answer to each question is "No" then their answer to the last question "Is it normal" should be "Yes".

If their answer to any question is "Yes" then they need to look more closely and try to decide what is the disease or the abnormality that they are seeing.They then need to decide whether this is something that they can recognise and treat or is it something they need to refer to their doctor.

By practising this they will gain the experience they need for Primary Ear Care in their work.

2. PROBLEMS OF THE PINNA

2.1 Skin infections

Skin infections are common when children and adults do not practice good personal hygiene. If they scratch their ear with a dirty finger nail or after they have been touching other sores on their body they can start up infection in the skin around the ear or in the pinna. Playing or washing with stagnating water can cause infection of the pinna.

2.2 Infection of the pinna

When the pinna itself – not just the skin but also the cartilage underneath the skin – is infected the whole pinna becomes inflamed and swollen.This is a serious infection especially in a person with diabetes.The pinna can be deformed by such infection.

2.3 Injury to the pinna

Injury can damage the pinna and cause deformity. Injury to the entrance to the ear canal can cause it to close up completely.

2.4 Pre-auricular sinus – a tiny "hole" in front of the pinna

These are common in some areas.
They can become infected and cause an abscess.

2.5 Deformities

Deformities are not common but there may be hearing impairment, especially if there is no opening into the ear canal. Patients with a deformity should have their hearing assessed.
Deformities can be present at birth – congenital deformities – such as absences the pinna
Deformaties can happen later from injury or infection – acquired deformities.

2.6 Other problems whose cause is not known to the examiner

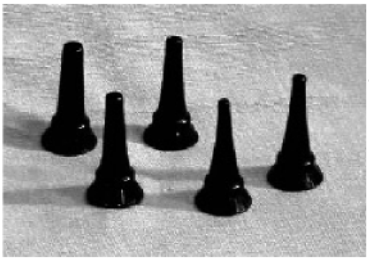
Any problem that is not known to the examiner should be referred.

When examining the pinna, if there is any problem write and/or draw your findings in the patient's record card.

3. EXAMINATION OF THE EAR CANAL

To examine the ear canal you need to use an instrument called an otoscope.An otoscope is a special torch with speculums of different sizes to look into the ear canal. Ensure there is a working otoscope with several different sizes of speculums to use. Several working otoscopes it will make teaching much easier. Make sure there are some spare batteries and a spare bulb in case they are needed.

A bowl with water and some antiseptic or liquid soap will be needed to wash the speculums after use and a towel to dry them.



If you cannot get an otoscope you can use this picture to show the trainees what an otoscope looks like.

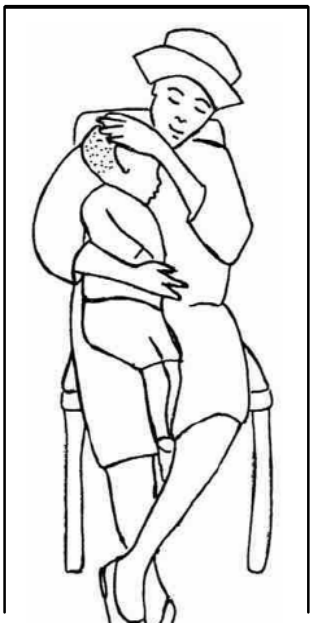
An otoscope Different size speculum

Demonstrate use of the otoscope

- Switch on the otoscope – does the bulb shine brightly?
- Make sure each speculum is clean
- Choose the biggest speculum that fits comfortably in the patients ear canal.
- Can you see through the otoscope and the speculum?

Batteries for the otoscope

- Batteries go flat very quickly
- Make sure you switch the otoscope off when you have finished examining the patient
- Batteries can leak and cause damage if they are left in the otoscope – take them out at the end of the clinic



Show them how to hold the otoscope

- Hold the otoscope like a pencil in your hand – then rest your hand against the patient's head to avoid hurting the patient if they make a sudden movement.
- When they examine a patient's ear it is important to make sure the patient does not move his/her head. Children and babies should be held firmly to prevent them from moving. Sometimes children need to be wrapped up to keep them still (see diagram).
- With the other hand gently pull the pinna away from the head to straighten the ear canal: Adults – pull pinna back and up
  Children – pull pinna back and down
- First shine the light into the opening to inspect the entrance to the ear canal.
- Then look through the otoscope and gently put the speculum into the ear canal
- DO NOT go into the deep part of the ear canal as it is very sensitive to touch

Safety!

The tip of the speculum should only go into the ear canal far enough to see past the hairs. If it is pushed in any further they will touch the very sensitive skin deeper in the ear canal and hurt the patient. It may also scratch the skin of the ear canal and cause bleeding. After examining the patient they should check that there is no damage to the ear canal skin.

- Examine the ear canal. Is it normal. Can you see the eardrum.
- Make a drawing on the patient's card of what you see

ALWAYS … change or wash the speculum after examining the ear.This prevents the spread of infection from one ear to the other. Try to examine the good ear first.

Activity 3 – when otoscopes are not available

¢ If otoscopes are not available then this activity is done through discussion.What should they look for when they examine the ear canal?

Some expected answers:

- To see what the patient is complaining about
- To see if there is any wax in the ear canal
- To see if there is any infection in the ear canal
- To see if there is anything in the ear canal
- To see if the eardrum can be seen

Activity 4 – when otoscopes are available

Trainees choose a partner and then use an otoscope to examine both ear canals of their partner. They work through the questions in the chart below as they examine each ear.

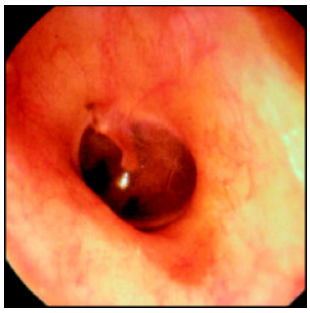
Examination of the pinna	**Left ear** yes	no	**Right ear** yes	no
Is there any wax in the ear canal?				
Is the wax blocking up the ear canal?				
Is there a foreign body in the ear canal?				
Is there any discharge in the ear canal?				
Is the skin lining of the ear canal inflamed and/or swollen?				
Is there anything else abnormal that you do not know what it is?				
Is the ear canal normal?				

If the answer to each question is "No" then the answer to the last question "Is it normal" should be "Yes".
If their answer to any question is "Yes" then they need to look more closely and try to decide what is the disease or the abnormality that they are seeing.They then need to decide whether this is something that they can recognise and treat or is it something they need to refer to their doctor.

r Discuss what they have seen and any difficulties that they have had.

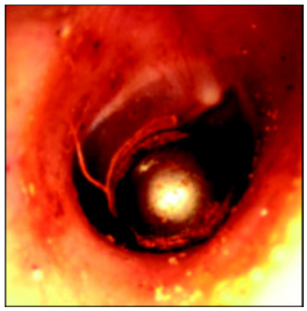
What could be seen if they were using an otoscope?

Normal ear canal



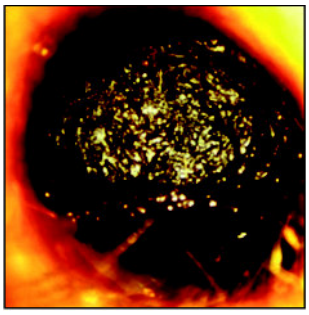
Foreign body

Children often put things into their ears. Insects can crawl into the ear canal.
This is a picture of a bead in an ear canal.



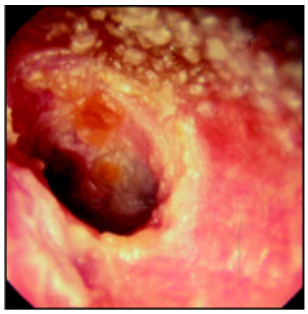
Wax

Some people either produce too much wax or do not clear it out of their ear canal. Wax can block the ear canal and be uncomfortable or cause hearing impairment.



Otitis externa

Infection of the skin lining of the ear canal is called otitis externa. It can be just a small abscess in the hairy area at the entrance to the ear canal or it may be infection of the skin deeper in the canal.The infection can be either fungal or bacterial. In some areas otitis externa is a common cause for discharge from the ear. In some areas fungal infections are common due to using/bathing in dirty water
This picture shows infection of the skin lining of the ear canal.



If there is any problem in the ear canal write and/or draw your findings on the patient's record card.

Summarise what the trainees have learned. Use the chart below and work through it with them.

What they might see when they examine the outer ear?

Normal pinna	Look at the front and back of the pinna - no abnormality seen
Normal ear canal	Use an otoscope – no abnormalities seen.The eardrum can be seen
Problem of the pinna	The skin could be infected
	The pinna could be infected
	There could be a tiny "hole" in front of the pinna which could be infected
	The pinna could be injured
	The pinna could be deformed
	There could be some other problem
	There could be absence of pinna
Problem	The ear canal could be blocked by wax
in the ear canal	There could be a foreign body in the ear canal
	The ear canal could be full of discharge
	There could be a fungal infection
	The skin lining of the ear canal could be infected

Activity 5

ø Each student chooses a partner. One is the 'Health Care worker' and one is the 'Patient'. The patient chooses one of the problems from the list below and describes the problem and uses their imagination to make themselves sound like a real patient.
The health care worker asks more questions about the problem and then uses their knowledge to fill in the details on the Patient Health Chart below.
You will need to show them how to do this by circling each detail on the chart.

Some suggested patient problems:

- Patient has a sore on the leg. Now has sores in the ears.
- Patient fell off bicycle and injured ear.
- Patient is a child who has an abscess in front of the ear.
- Patient is a new baby. Baby has one deformed ear.
- Mother thinks child has put something into the ear.
- Patient has been swimming in dirty water. Ear now discharging.
- Patient has a sore ear after trying to clean it.

NOTE:
Before they start this activity go through this example with the group:
A patient has a deformity of the pinna of the right ear after an injury but the ear canal is normal. The patient also has wax blocking the ear canal in the left ear.
After completing their examination they will fill in the chart they and start with the right ear and with the Pinna.The Pinna is not normal so they will draw a ring around "Abnormal". They then have to choose one of the abnormalities and in this case they draw a ring around "Deformity of the Pinna" and also around "Happened later" and around "Injury". The ear canal is normal so for Ear Canal they draw a ring around "Normal".
Check both ears. For the left ear they would start with the Pinna which is normal and draw a ring around "Normal" then examine the Ear Canal and draw rings around "Abnormal", "Wax" and "Blocking the canal".
Using a chart like this is a way of making sure that they do a complete examination and do not miss anything.
When they have completed their case they can present it to the group. Discuss treatment of the different ear problems with the group.

PATIENT HEALTH CARD

Date Sex Age Name
What is the patient's problem? Address

LEFT EAR Pinna

Normal / Abnormal
Skin infection
Infection of the pinna
Pre- auricular sinus Infected / Not infected
Injury to pinna Minor / Serious
Deformity of the pinna From birth / Happened later (Injury / Infection)
Some other problem

Ear Canal

Normal / Abnormal
Wax - Blocking the canal / Not blocking the canal
Foreign body
Otitis externa
Fungas
Some other problem
Skin infection
Infection of the pinna
Pre- auricular sinus Infected / Not infected

RIGHT EAR

Pinna

Normal / Abnormal
Injury to pinna Minor / Serious
Deformity of the pinna From birth / Happened later (Injury / Infection)
Some other problem

Ear Canal

Normal / Abnormal
Wax - Blocking the canal / Not blocking the canal
Foreign body
Otitis externa
Fungas
Some other problem

The next section of the Health Chart needs to be completed showing treatment of their patient after working through the next section of the Module. Discuss what they need to do to treat the patient. Use the chart below and work through it with the group.

4. PROBLEM,TREATMENT AND REFERAL

Problem	Treatment and referral
The Pinna	
Superficial skin infections – sores	Treat by cleaning the sores and applying an antiseptic cream. Some patients may need an antibiotic.
Earpiercing	Treat with cleaning and appropriate medicines. Ask patient to return for a check up. PLEASE NOTE: Chronic cases should be referred.
Deep infection with swelling of the pinna	PLEASE NOTE: This is a serious infection. These patients should be referred urgently. If there will be a delay then start an antibiotic. Some of these patients may be diabetic so the urine should be checked.
Injury to the pinna	If minor then treat injury with appropriate cleaning and dressings. Ask patient to return daily for a check up. PLEASE NOTE: Refer serious injuries such as like swelling and bruising, cuts right through the cartilage, cuts into the ear canal, severe burns to your hospital for treatment.
Pre-auricular sinus (tiny "hole" in front of the pinna)	If not infected then no treatment is needed. If infected then: • Start an antibiotic and refer • Incise and drain if there is an abscess Ask patient to return daily for a check up. PLEASE NOTE: Refer to your doctor when the infection has healed or if the infection will not heal.
Deformities of the pinna	• Check for and refer. • Check for Hearing Impairment and refer.

Problem	Treatment and referral
The Ear Canal	
Foreign body	Most foreign bodies will come out with syringing. Try to syringe it out. Vegetable seeds that do not come out must be referred urgently as the seeds swell. Insects that do not come out with syringing should be drowned by filling the ear canal with olive oil drops or clean cooking oil. PLEASE NOTE: Refer if the foreign body cannot be safely removed. Refer if the foreign body cannot be removed. Hooks and other instruments should **never** be used.
Wax	Wax does not need to be removed if not blocking the ear canal – only if blocking the ear canal, then try to syringe it out. Soften the wax by putting water into the ear for 10 minutes as often as possible for two days and then try syringing. **Water softens wax.** PLEASE NOTE: Refer if the wax cannot be safely removed. Refer if the wax cannot be removed.
Otitis externa	Clean ear canal by dry mopping and/or syringing before treatment. **Treat with appropriate eardrops** Patients should be checked every 2 days and if the ear canal is full of pus it must be cleaned again. PLEASE NOTE: Refer if otitis externa does not heal with adequate treatment. If there is inflammation around the ear then refer the patient. Sometimes eardrops do not work well and these patients should be referred if the infection has not healed after one week of treatment.

Who could the patient be referred to?

Patients who cannot be treated or patients who have a problem but they do not know what it is should be referred to someone with more experience – a more highly trained nurse, a clinical assistant, a nurse or clinical practitioner or a doctor. If someone with more experience is not available or if the case is urgent then they should refer the patient to their local hospital.

Ensure that trainees know what is meant by referral.

Find out from them what the situation is at their clinic?

- Do they have a clinical assistant, a nurse or clinical practitioner or a doctor working in the clinic?
- Do they have a doctor who comes once a day, once a week or once a month?
- Do they never have a doctor visit?
- Do they have a local hospital with a doctor to whom they can refer patients?

They need to work out a system for referral and for urgent referral that can work for their situation.

Activity 6

Trainees work with their partner from Activity 5 and complete the Patient Health Card for their patient from Activity 5

PATIENT HEALTH CARD

What is the name of the problem?

What is the name of the problem?

😉 Discuss what they are going to call the problem and the treatment that is needed.

Always check both ears!

EAR HYGIENE

DO only use medication in your ears that has been prescribed for you

DO use clean towels to dry your ears

DO NOT put anything into your ear

DO NOT try to clean your ears with hairpins, tooth picks or anything else!

DO NOT let dirty water go into your ears

DO NOT leave cotton wool in your ears

REINFORCE THAT THESE ARE MESSAGES THAT NEED TO BE TAKEN TO THEIR COMMUNITY

POST TEST

Questions	True	False	Don't know
Some people have a tiny" hole" in front of their pinna which can become infected	✓		
An otoscope is an instrument used to examine the pinna		✓	
You need to pull the pinna forwards to see into the ear canal		✓	
Children with sores on their body can spread the infection to the skin of their pinna	✓		
Swimming in dirty water can cause otitis externa	✓		
Wax does not come out of the ear canal by itself and always has to be removed		✓	
Foreign bodies in the ear canal need to be removed	✓		
Hard wax dissolves in water	✓		
Otitis externa is treated with antibiotics		✓	
You should always test the hearing when a patient has a deformed ear	✓		
Score			

MODULE 4

The ear canal: examine, diagnose and clean

By the end of this module the Health Care Worker should be able to:

- Make and use a dry mop safely to clean the ear canal
- Make and use a wick to clean the ear canal
- Demonstrate the use of a syringe to remove wax and/or foreign bodies
- Describe putting in eardrops

Preparation

- Read and understand both the trainers manual and the trainees workbook
- Study and understand the specific outcomes of each module
- Study and understand the list of terminology
- Copy sufficient copies of the students workbook
- Copy sufficient number of pre-test and post test questions
- Understand the purpose and the instructions for the pre and post test
- Blank paper, pencils and erasers for trainees
- Required posters and labels for each section
- Blackboard and chalk/whiteboard and pens
- Obtain thin wooden stick applicators and cotton wool
- Obtain absorbent paper (paper hand towel not tissue paper) and/or pieces of cotton cloth
- Obtain ear syringes or 20 ml syringes and suitable plastic tips (eg. IV cannula)
- Obtain and prepare 2 ml syringes by sealing the tips and removing the plungers
- Obtain suitable foreign bodies of different types (eg. small stones, pencil rubbers, small insects)
- Obtain containers for hot and cold water
- Obtain containers for syringing water and for catching water (eg. plastic cups)

Symbols

☺ Discussion with students or in groups

¢ Students complete by writing in answers or ideas ø Students take part in an activity

m Put up the poster

Terminology

Dry mopping	Head mirror / headlamp
Wicking	Eardrops
Syringing	Ear hygiene
Otoscope	

Instructions for the pre test and post test

The aim of this activity is to assess whether or not the trainees improve their knowledge by completing the module.The pre test and post-test questions are the same.
Before starting the module the students answer the pre test questions. The questions are not marked at this stage.At the end of the module the students answer the post-test questions. Work through the questions with them and they mark their answers for both tests. Write down their marks and compare the two.
If the pre test marks were high then the trainees had good knowledge of the subject before they started but they should still have improved.

PRE TEST

Questions	True	False	Don't know
People should clean their ears regularly by making and using a dry mop made from a thin stick and cotton wool		✓	
It does not matter if the end of the stick goes right through the cotton wool as this helps to clean out any wax		✓	
Wicking and dry mopping can be used to clean the ear canal	✓		
Children should be held facing you with their heads free to move so you can clean their ears		✓	
You can gently syringe an ear if it is discharging pus	✓		
When you syringe an ear the water must be cold		✓	
If a vegetable seed is put into the ear it can sometimes swell up inside the ear canal	✓		
Don't put anything into the ear if you see a perforation in the eardrum after syringing an ear		✓	
Patients must "pump" the tragus after putting eardrops into their ear	✓		
Patients should put cotton wool in their ears after putting in eardrops		✓	
Score			

1. DRY MOPPING AND WICKING

Activity 1– Why do trainees need to learn how to clean the ear canal?

Discuss how they could clean the ear canal

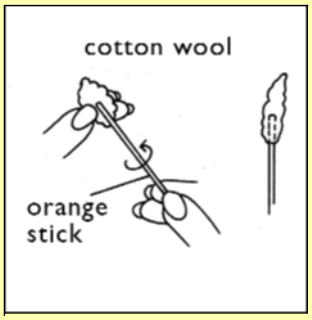
How can you clean the ear canal?

- Dry mopping is used to clean ears that are discharging.
- Wicking is a way to clean ears that are discharging when the materials needed for dry mopping are not available.
- Syringing can be used to remove wax, a foreign body or any discharge.

Activity 2

Divide the trainees into two groups – Group A makes dry mops, group B makes wicks.
Change groups.
Each trainee to make several dry mops and wicks until you are sure they are confident.

Discuss the dry mops/wicks, their use and safety with the trainees



CHECK each dry mop to make sure the trainees have made them correctly and the right size:

- there is a good fluffy tip covering the stick and projecting well beyond the end of the stick
- the cotton wool does not come off easily
- the tip will fit into an ear canal easily

Materials:
– 1 thin wooden stick applicator
– cotton wool

A

- Wash your hands with soap and water – air dry.
- Pull off a small piece of cotton wool.
- Gently pull it out into an oval shape.
- Put the tip of the stick into the centre of the cotton wool.
- Twist the stick round and round with one hand whilst holding half of the cotton wool tightly against the stick with the thumb and index of your other hand.
- Half of the cotton wool should extend from the end of the stick and form a fluffy, soft tip.
- The rolled up piece of cotton wool should be long enough so that when the soft tip is deep in the ear canal and next to the eardrum there is still some cotton wool sticking out of the ear canal.This is so that you can hold onto the cotton wool and ensure that the cotton wool comes out of the ear canal.
- After completing dry mopping, wash your hands again.

Remember – make the dry mop the correct size for the patient's ear canal

NOTE: Patients should be taught:

- Only clean their ears with a dry mop when the ear is discharging.
- When the ear is dry it must not be cleaned with a dry mop as it will push anything in the ear canal deeper into the canal and block up the ear canal.
- A dry mop is not the same as a "cotton bud".
- "Cotton buds" must never be used to clean ear canals.

B

Materials:
- A small piece of absorbent cotton cloth OR
- A piece of soft strong tissue paper – NOT flimsy toilet paper that can fall apart in the ear.

- Wash your hands with soap and water – air dry
- Make a wick by rolling the cloth or the tissue paper into a pointed shape.
- Gently pull the pinna away from the head.This helps straighten the ear canal.
- Place the wick into the ear canal. It will absorb any discharge or blood in the ear canal.
- Leave it in place until it is wet.
- Remove the wet wick and inspect it. Is there pus on the wick?
- Replace with a clean wick.
- Repeat until the wick stays dry.
- After completing wicking, wash your hands again.

Dry mopping is recommended to clean the ear canal in the clinic. Patients could be taught wicking to clean the ears at home because materials for dry mopping may not be available. Discuss dry mopping and wicking with the trainer

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- **Will the cotton wool come off the stick easily?**
  If it not rolled tightly on to the stick – remake the mop. If the stick is very smooth – wet the end of the stick or break a short piece off the end of the stick

- **What would happen if it came off?**
  If the mop is the right length there should still be some cotton wool sticking out of the ear canal. Catch this with a pair of forceps and remove the cotton wool. If the cotton wool can not be seen then check the ear canal with an otoscope and if it is still in the ear canal try to syringe it out. If it does not come out then refer the patient.

- **What would happen if the tip of the stick pushed through the cotton wool?**
  The tip of the stick could scratch the skin of the ear canal causing pain and sometimes bleeding.The tip of the stick could scratch the eardrum or go right through the eardrum.

- **Why should you use clean cotton wool or a clean piece of paper/cloth in each ear?**
  Infection can spread from one ear to the other ear.

Dry Mopping

An adult can sit sideways in front of you pointing the ear to the source of light.

How to hold a child to prevent them moving while you mop their ear

How to hold a child

Tell them that they should restrain children who move about by wrapping the child in a sheet to avoid hurting them if they move

Follow the steps listed below.

- Hold the mop between the thumb and first finger of your better hand DO NOT HOLD IT TIGHTLY.
- With your other hand gently pull the pinna away from the head
  Adults – pull the pinna back and up
  Children – pull the pinna back and down
  This helps straighten the ear canal
- Gently push the soft tip into the ear canal and turn the mop slowly round and round while you do this
- The soft tip will absorb any discharge or blood in the ear canal
- Take the mop out of the ear canal and inspect the tip
- Is there pus on the mop? Sometimes the pus will be bloodstained
- Use a clean mop each time
- Keep cleaning until the cotton wool comes out clean

- DO NOT carry on cleaning if the patient is in any pain
- TAKE THE MOP OUT of the ear canal if the patient moves or jerks
- When clean examine the ear canal with an otoscope
- Check both ears!

Keeping the patients records up to date is very important:
Write down what you see in the patient's ear canal on their patient record card.

Patients can be taught how to clean their own or their children's ears by making dry mops or wicks.

2. SYRINGING

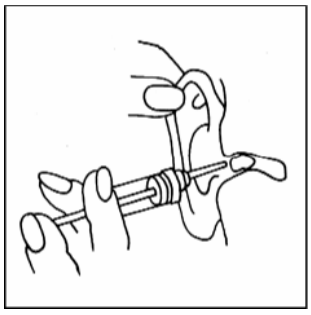
DO NOT SYRINGE IF THE EAR IS DRY AND IF YOU KNOW THERE IS A PERFORATION IN THE EARDRUM
Refer these patients

Water can go through the perforation into the middle ear and can start up an infection in the middle ear. If the middle ear is already infected and discharging pus they can syringe gently to remove the pus. The patient must sit with the ear facing the light and you must be able to see the entrance to the ear canal clearly.
Fill the syringe with boiled, cool water and squirt it hard a few times back into the water container to check that it works well and the tip does not come off.

Remember: the water used to syringe the ear MUST be exactly the same as body temperature – 37°C
Warm but comfortable on the hand

The balance organ in the inner ear is close to the ear canal and if it is gets too warm or too cold it makes the patient giddy.

- Gently pull the pinna away from the head.
- Place the tip of the syringe just inside the canal and squirt the water into the ear canal.
- Water should be directed around the foreign body.The water will then be behind the foreign body and should push it out.
- Catch the water that comes out in a bowl. Check to see what has come out of the ear canal.
- Examine the ear canal with an otoscope after every five syringes.
- Once the foreign body has come out of the ear canal you should be able to see the eardrum.
- Check both ears!



Children put all kinds of things in their ears.

NOTE:
Do NOT direct the water straight onto the foreign body! If you do the water will push the foreign body further into the ear canal.

Activity 3

¢ List some of the things that children put in their ears Some expected answers:

- Small stones
- Pieces of paper
- Pieces of sponge
- Pencil rubbers
- Beads
- Vegetable seeds

☺ Discuss their ideas

- Most foreign bodies will come out with syringing
- Hooks and other instruments should never be used as they can cause damage to the ear canal and eardrum
- Vegetable seeds that do not come out with syringing must be referred urgently as the seeds swel l
- Insects/ticks that do not come out with syringing should be drowned by filling the ear canal with olive oil drops or clean cooking oil and then try again
- Examine the ear canal with an otoscope after removal of the foreign body
- Check both ears!

REMEMBER: Blocked ears can cause temporary hearing impairment! After removal of the foreign body check that the hearing is normal.

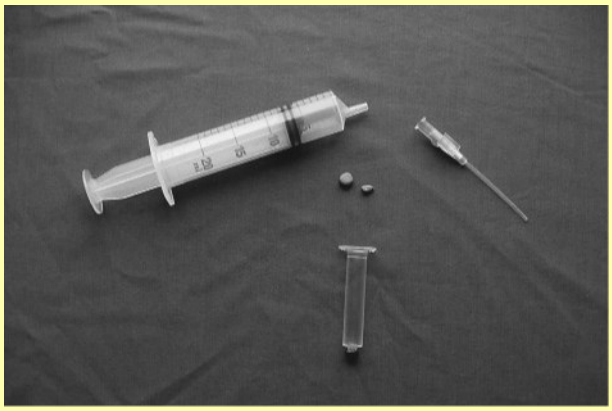
If you see any trauma to the ear canal after you have removed the foreign body fill the ear canal with eardrops, give the patient eardrops to take home and use four times each day. Check the ear again after two days.

Activity 4

¢ Trainees choose a partner – one is the patient; one is the health care worker.
The patient tells the health care worker that he/she thinks there is a foreign body in one ear. The health care worker must explain to the patient what he/she will do to get it out. The patient then holds the syringing model while the health care worker syringes the foreign body out of the syringing model.
Change and repeat so both partners practice explaining and syringing.
Make a syringing model so that the trainees can practice syringing:

Materials:

- 2 ml syringes – plug the tips and remove the plungers
- 20 ml syringes
- Plastic tips for the syringes – eg IV cannula
- Some foreign bodies – eg small stones
- Containers for water – hot and cold
- Containers to catch water



The patient puts a foreign body into the bottom of the 2ml syringe and then holds the 2ml syringe in one fist.
DO NOT PUT THE FOREIGN BODY IN YOUR EAR – PUT IT IN THE SYRINGE
The health care worker must mix water until it is body temperature, fill the 20 ml syringe and squirt it hard a few times to make sure the tip does not come off.
The health care worker then syringes out the foreign body.

Discuss any problems they may be having 😊

What will they do if they see a perforation in the eardrum after syringing a dry ear?

- Explain to the patient that water may have gone through the perforation into the middle ear and it may cause an infection to flare up in the middle ear
- To try and prevent this they should fill up the ear canal with eardrops and "pump" the tragus
- They should give the patient eardrops and tell them to use the drops four times a day for two days and then come back to the clinic to be checked
- If the ear is infected and discharging when the patient comes back they should treat the patient with an antibiotic, dry mopping and eardrops until the infection clears up

3. HEAD MIRRORS AND HEAD LAMPS

Headmirror

Headlamp and otoscope

Head mirrors or headlamps are sometimes used by doctors or other experienced health workers when they are trying to do something in a patient's ear.A headlamp or head mirror provides the light needed to examine the ear with an otoscope and leave both hands free.
Using a head mirror or a headlamp will make it easier to dry mop or syringe an ear. If there is one in your clinic ask your doctor to show you how to use it.

If there is one in the trainees' clinic they should ask their doctor to show them how to use it and then to use it for these procedures.

4. HOW TO PUT IN EARDROPS

When putting eardrops into the ear it is important to make sure that the eardrops reach the bottom of the ear canal.When using eardrops to treat middle ear infection it is important that the eardrops go through the perforation in the eardrum and into the middle ear. Sometimes the eardrops go all the way down the Eustachian tube and the patient can taste them.
Their local Health Authority will recommend the eardrops that they can use.

There are 3 different kinds of eardrops that are used for ear infections.

• Antiseptic eardrops are cheap and can be used for many infections.

The recipe of 10 ml of eardrops is: boracic acic 200 mg
spirit (96%) 5 ml
distilled or purified water 5 ml

- 2% acetic acid with 30% glycerine and 45% spirit in distillled water. (in my original recipe it says 50% spirit, but it is actually 48%)
  The recipe of 10 ml is: acetic acid (98%) 0.2ml
  glycerine 3 ml
  spirit (96%) 5 ml distilled
  or purified water 1.8 ml
- Antibiotic eardrops are more expensive eardrops and so are often only supplied by hospital clinics.They usually work better than the others.
- Fungal infections sometimes need to be treated with antifungal cream.This can be put into the ear canal with a small syringe.

Activity 5

¢ The trainees should discuss what they think the correct way would be to hold a child when they instil eardrops.

Some expected answers:

- Let the mother hold the child on their lap
- Make sure the child is held firmly and cannot move
- The child is frightened after having the ear cleaned
- The ear is sore
- Hold the patients head still while instilling ear drops
- If the patient is a baby, wrap him/her in a blanket to stop them moving
- Some eardrops sting (they could try a different eardrop)

☺ Ask them why they think a child might not keep still.
Discuss their answers with the students

Follow these steps when putting in eardrops:

Examine the ear canal and eardrum with an otoscope

Clean out the ear canal – dry mopping or syringing

Lie the patient on their side or tilt their head so that their ear is pointing upwards

There should be enough light to see the entrance to the ear canal

Gently pull the pinna back and up to straighten the ear canal

Drop 2 or 3 eardrops into the ear canal

Move the pinna to make sure the eardrops go to the bottom of the ear canal

Put in 2 or 3 more eardrops

"Pump" the tragus (repeatedy push it in and out) to spread the eardrops around inside the ear and through a perforation

Keep the patient on their side for 5 minutes

Wipe away any eardrops that run out of the ear when the patient sits up

Do not block earcanal with cottonwool

5. TEACHING THE PATIENT TO CARE FOR HIS/HER EARS

Patients should be taught to:

- put in eardrops at home
- clean their ears by dry mopping or wicking
- put the eardrops in regularly

Patients should return to the clinic regularly until the infection has cleared up.

Ear Hygiene

DO only use medication in your ears that has been prescribed for you

DO use clean towels to dry your ears

DO NOT put anything into your ear

DO NOT try to clean your ears with hair pins, tooth picks or anything else!

DO NOT let dirty water go into your ears

DO NOT leave cotton wool in your ears

POST TEST

Questions	True	False	Don't know
People should clean their ears regularly by making and using a dry mop made from a thin stick and cotton wool		✓	
It does not matter if the end of the stick goes right through the cotton wool as this helps to clean out any wax		✓	
Wicking and dry mopping can be used to clean the ear canal	✓		
Children should be held facing you with their heads free to move so you can clean their ears		✓	
You can gently syringe an ear if it is discharging pus	✓		
When you syringe an ear the water must be cold		✓	
If a vegetable seed is put into the ear it can sometimes swell up inside the ear canal	✓		
Don't put anything into the ear if you see a perforation in the eardrum after syringing an ear		✓	
Patients must "pump" the tragus after putting eardrops into their ear	✓		
Patients should put cotton wool in their ears after putting in eardrops		✓	
Score			

MODULE 5
The middle ear: examine, diagnose and treat

By the end of this module the Health Care Worker should be able to:

- Demonstrate / describe examination of the eardrum using an otoscope
- Describe the common middle ear problems
- Describe the eardrum appearances of the common middle ear problems
- Describe the complications of middle ear disease
- Describe treatment / referral of the common middle ear problems

Instructions for the pre test and post test

The aim of this activity is to assess whether or not the trainees improve their knowledge by completing the module.The pre test and posttest questions are the same.
Before you start the module the students answer the pre test questions.The questions are not marked at this stage.At the end of the module the students answer the posttest questions. Work through the questions with them and they mark their answers for both tests. Write down their marks and compare the two.
If the pre test marks were high then the trainees had good knowledge of the subject before they started but they should still have improved.

PRE TEST

Questions	True	False	Don't know
In Acute Otitis Media the eardrum never perforates (bursts)			
In Chronic Suppurative Otitis Media there is a perforation in the eardrum and a discharge for more than 2 weeks			
Sticky mucus causes Glue Ear			
Normal eardrums all look the same			
In Acute Otitis Media the eardrum looks inflamed			
The treatment of Acute Otitis Media is eardrops			
Infection can turn Inactive Chronic Suppurative Otitis Media into Active Chronic Otitis Media			
Mastoiditis can cause meningitis and a brain abscess			
The treatment of Dry Perforation is dry mopping and eardrops			
Dirty water can only cause infection in the ear canal. It cannot cause infection in the middle ear.			
Score			

Preparation

- Read and understand both the trainers manual and the trainees workbook
- Study and understand the specific outcomes of each module
- Study and understand the list of terminology
- Copy sufficient copies of the students workbook
- Copy sufficient number of pre-test and post test questions
- Understand the purpose and the instructions for the pre and post test
- Blank paper, pencils and erasers for trainees
- Required posters for each section
- Required labels for each poster
- Blackboard and chalk/whiteboard and pens
- Obtain working otoscopes with different sizes of speculum and spare batteries
- Bowl of water, antiseptic or liquid soap, towel.

Symbols

m Discussion with students or in groups

Put up the poster

¢ Students to complete by writing in answers or ideas

ø Students to take part in an activity

Terminology

Eardrum

Otoscope

Acute and Chronic infection

Otitis Media (OM)

Acute Otitis Media

Inflamed eardrum

Bulging eardrum

Perforation

Discharge

Chronic Suppurative Otitis Media (CSOM)

Dry perforation

Complications

Mastoiditis

Meningitis / Brain abscess

Facial palsy

Balance problems – vertigo, dizziness

Hearing impairment / deafness

Glue Ear

Otitis Media with Effusion (OME)

Middle Ear Effusion

Preventable Hearing Impairment

1. THE EARDRUM

Common middle ear problems can be treated when they are recognised. Middle ear problems are recognised by the appearance of the eardrum. Each problem has a particular appearance. Firstly the health care worker needs to be able to recognise what a normal eardrum looks like. Normal faces all look a little different and in the same way normal eardrums all look a little different but usually a normal eardrum has a smooth shiny surface with no perforation.

Normal healthy eardrum

Examining the ear with an otoscope

The eardrum is a thin membrane that separates the ear canal from the middle ear.
A normal healthy eardrum has a smooth, shiny surface and has no holes (perforations) in it.

Activity 1

¢ Ask the students to write down what they think the eardrum does and what things can damage the eardrum.

Discuss the answers with the students.

Some expected answers:

What it does:	**What causes damage:**
• Seperate the outer ear from the middle ear	• Poking things into the from ear to clean it
▪ Help sound get trough	• Being hit on the ear to the middle ear
▪ Keep water out of the middle ear	• Infection of the the middle ear

1.1 Examining the eardrum

Activity 2 – Examining the eardrum (When otoscopes are available)

Trainees to use otoscopes to examine 10 ears from their group

Before they start trainees should read "How to use an otoscope" in Module 3 to remind them what they have to do.

To remind you what it said:

- Hold the otoscope like a pencil in your hand – then rest your hand against the patient's head to avoid hurting the patient if they make a sudden movement.
- With the other hand gently pull the pinna away from the head to straighten the ear canal: Adults – out and up. Children – out and down
- First shine the light into the opening to inspect the entrance to the ear canal.
- Then look through the otoscope and gently put the speculum into the ear canal – DO NOT go into the deep part of the ear canal as it is very sensitive to touch and you may scratch the skin lining.
- Examine the ear canal. Is it normal? Can you see the eardrum?

Important points to remember:

- Use a speculum that is large enough to see through and is comfortable for the size of the ear canal.
- Move the tip of the speculum around gently until you can see the whole of the eardrum.

While they are examining the eardrum they should answer these questions:	Yes	No	Not sure
Can you see the ear drum?			
Does the eardrum look normal and healthy?			

r Discuss any problems that they are having in looking at the eardrum.

ALWAYS … change or wash the speculum after examining the ear.This prevents the spread of infection from one ear to the other. ALWAYS … try to examine the good ear first.

Activity 3 – Examining the eardrum (When otoscopes are not available)

Questions to discuss:

What would you do if you could not see the eardrum?

Clean the ear canal by dry mopping or syringing

What are you going to do if you are not sure if you can see the eardrum?

- clean the ear canal by dry mopping or syringing and if you are still not sure then show the ear to someone with more experience.

What would you do if the eardrum was not normal and healthy?

- Try to decide what the problem is and treat the patient.

What would you do of you were not sure if the eardrum is normal and healthy?

- Look at the eardrum again and work through the questions later on in the module. If you are then still not sure then show the ear to someone with more experience.

2. WHAT ARE THE COMMON MIDDLE EAR PROBLEMS?

2.1 Acute Otitis Media.

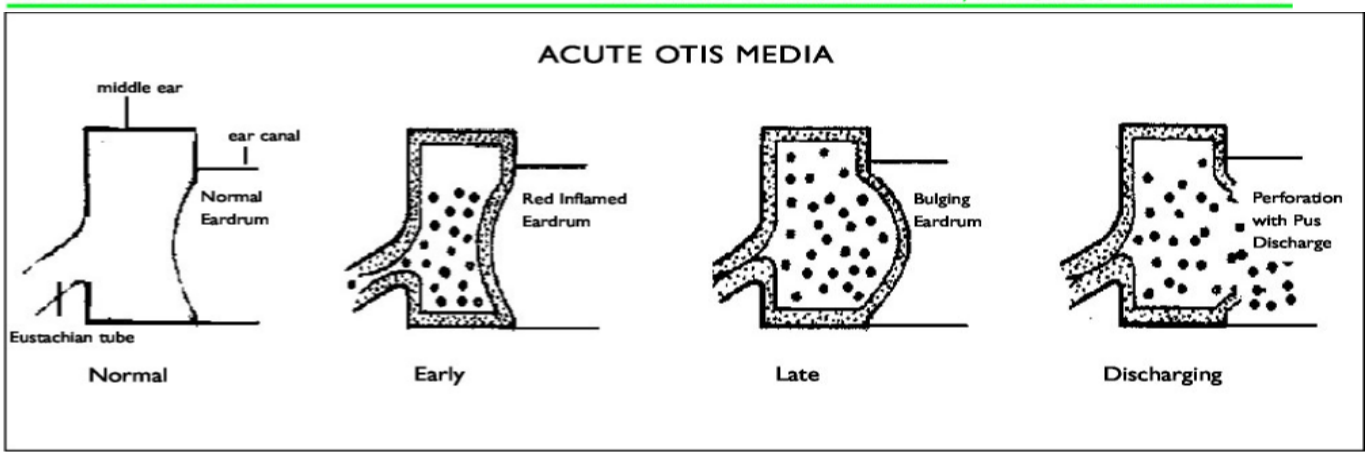
Infection in the middle ear for less than 2 weeks is called **Acute Otitis Media.**

Who can get acute otitis media?

It is very common in babies and young children, less common in older children and much less common in adults.
It is common in HIV positive babies and in malnourished children.
It is common when babies are not breastfed, when there is overcrowding, when there is smoking in the home, when children are in contact with other children who have runny noses and coughs.

What happens?

It often starts with a cold or a sore throat. It can be caused by measles.
Infection spreads up the Eustachian tube from the nose or the throat.
The lining of the middle ear becomes infected and this causes fever and pain and the eardrum is inflamed (red).
Pus forms and fills the middle ear space.
Pressure builds up and the eardrum bulges.
If the infection is not treated the eardrum may burst (a perforation) and pus will start to discharge from the ear.



What will be seen? **Questions to ask the patient**

Red, inflamed eardrum

- Has there been a recent cold and/or sore throat?
- Has the patient had a fever/temperature?
- Is the ear painful?

Examination

Use an otoscope to look at the eardrum

- The eardrum will be inflamed and there could be a bulging eardrum or a perforated eardrum with pus discharge.
- Check both ears
- Check behind both ears for swelling (mastoiditis)

Bulging eardrum

Treatment

- Antibiotic must be prescribed for 5 days
- Painkiller needs to be prescribed if the ear is painful or if the patient has a fever
- Review after 2 days
- Review again after 1 week
- Test the hearing when infection has cleared

Perforated eardrum with pus

Refer if:

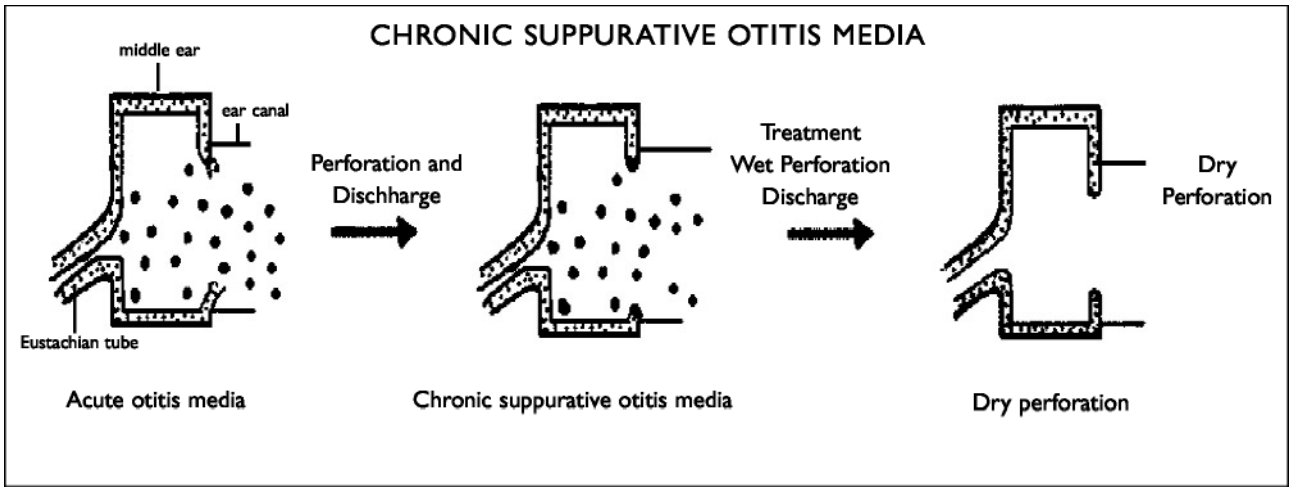
- Headache • Vomiting
- Drowsiness • Neck stiffness
- Swelling behind the ear • Still painful after 2 days of antibiotic
- Eardrum is still inflamed after 5 days of antibiotic
- Hearing impairment after infection has cleared

If there is **no history of pain** and of **fever** and the ear is discharging then it is probably dry perforation (inactive otitis media) that has become active and is now called Chronic Suppurative Otitis Media

REMEMBER: Acute – problem for less than 2 weeks
Chronic – problem for 2 weeks or more

2.2 Chronic Suppurative Otitis Media C S O M (also called active chronic otitis media)

Chronic Suppurative Otitis Media means infection in the middle ear (the middle ear is active) causing a **discharge for more than 2 weeks.** This is a disease in which there is a perforation in the eardrum that does not heal. Sometimes these ears are dry and sometimes they are discharging (infected).



What happens?

Chronic Suppurative Otitis Media first starts as otitis media that is not properly treated and so the eardrum perforates (bursts) and the ear discharges pus.The discharging ear is neglected and discharges pus for 2 weeks or more through the perforation.After the first infection the next infections start from dry perforation (inactive chronic otitis media) – see below.

What will be seen?

Perforation in the eardrum with pus discharge

Questions to ask the patient

- Has the ear been discharging for more than 2 weeks
- Is there any pain or fever?
- Is there any hearing impairment

REMEMBER: There should be no pain

Examination

Use an otoscope to look in the ear canal

- Clean the discharge out of the ear canal by dry mopping or syringing

Use an otoscope to look at the eardrum
- The eardrum will have a perforation
- Check both ears
- Check behind both ears for swelling (mastoiditis)

Treatment
- An Antibiotic must be prescribed for 5 days (Use an antibiotic that is recommended for this condition by your health programme)
- Teach patient how to dry mop ears and how to put in eardrops
- Patient should dry mop and put in eardrops 3 times a day
- See patient as often as possible to repeat dry mopping or syringing and putting in eardrops – daily or weekly - and repeat examination of the ear and behind the ear each time
- Test the hearing in both ears when the infection has cleared

Refer if:
- Pain in ears
- Swelling behind the ears
- Balance problems
- Facial palsy
- No improvement after 1 month of treatment
- Hearing impairment when infection has cleared

When the infection is treated the pus discharge stops but the perforation does not always heal.

REMEMBER AND EDUCATE THE COMMUNITY:
Discharge from the ear means Infection

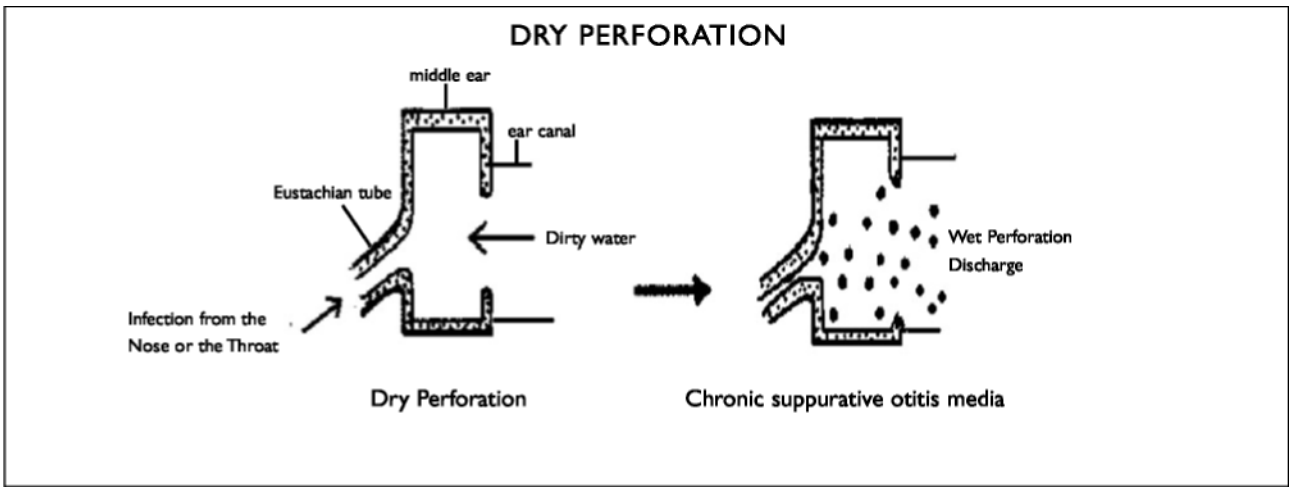
2.3 Dry Perforation (also called Inactive Chronic Otitis Media)

Dry perforation means that there is no infection (the middle ear is inactive) but there is still a dry perforation (hole in eardrum) in the eardrum.This is a disease in which there is a perforation in the eardrum that does not heal. Sometimes these ears are dry and sometimes they are discharging (infected).

Dry perforation in the eardrum

What will be seen?

NOTE:
Infection can turn dry perforation back into Chronic Suppurative Otitis Media.
Infection gets up the Eustachian tube from a cold or sore throat or it gets in through the perforation from dirty water.



Questions to ask the patient

When dry:
- Has the ear discharged in the past?
- Has there been or is there any problem with hearing?

When infected:
- Has there been a recent cold and/or sore throat?
- Has water got into the ear?

REMEMBER: There should be no pain

Examination

See Chronic Suppurative Otitis Media

When infected:
- Use an otoscope to look at the eardrum

When dry:
- Test the hearing in both ears

Treatment

- See Chronic Suppurative Otitis Media

When infected:
- No treatment needed
- Keep water out of the ear

When dry:

Refer

- See Chronic Suppurative Otitis Media
- If there is hearing impairment
- If the ear often becomes infected

When infected

When dry:

Remember: A perforation can cause hearing impairment

In developing countries ear infection often turns into serious disease because of poor resistance to infection from malnutrition and chronic disease, from neglect of the ear problem and from inadequate treatment. Some of these complications can cause death – such as meningitis and brain abscesses. Other complications can cause permanent damage to the inner ear and cause deafness and / or balance problems. Some complications can cause permanent deformity – facial palsy. Health Care workers need to have a basic knowledge of the complications of ear disease so that they can recognise when the ear disease has turned serious and needs urgent referral.

3. COMPLICATIONS OF EAR INFECTIONS

- Acute Otitis Media and Chronic Suppurative Otitis Media can spread into the mastoid air cells in the mastoid bone behind the ear to cause **Mastoiditis.**
- A swelling forms behind the ear and the patient becomes ill.
- Mastoiditis is a serious disease.
- Acute and Chronic Suppurative Otitis Media can cause **meningitis.**
- Infection in the mastoid can spread to the brain to cause **meningitis and/or brain abscess.**
- Acute Otitis Media and Chronic Suppurative Otitis Media can affect the facial nerve and cause **Facial Palsy**.The facial nerve goes through a bony tunnel on the wall between the middle ear and the inner ear.This nerve is responsible for the movements of all the muscles on that side of the face.When the nerve is affected all the muscles go lame – this is known as facial palsy.
- Acute Otitis Media and Chronic Suppurative Otitis Media can spread into the inner ear to cause **Balance problems**.The words vertigo and dizziness are sometimes used.
- Acute Otitis Media and Chronic Suppurative Otitis Media can spread into the inner ear to cause **Deafness.**

In some developing countries mastoiditis is a common complication of ear infection and needs to be taught to Health Care workers so that they can recognise it and know that these patients have to be urgently referred for treatment.The treatment is by surgery to clear the infection out of the mastoid air cells.

4. MASTOIDITIS

What does it look like? Questions to ask the patient

- Does the patient have an ear infection or has the patient had an ear infection recently – pain, fever, discharge?
- Is the patient unwell?
- Is it sore or swollen behind the ear?

Early stage – inflammation behind the ear

Late stage – an abscess/ swelling behind the ear

Examination

Use an otoscope to look in the ear canal and at the eardrum

- There may be discharge
- The ear canal may be very swollen
- The eardrum may be inflamed, bulging, perforated

Check behind the ear – There will be inflammation and/or swelling over the mastoid bone pushing the pinna forwards?

- Is this swelling an abscess? Check both ears

Treatment

Refer urgently to your hospital. If there will be a delay:

- Start an intravenous antibiotic if possible. (Use an antibiotic that is recommended for this condition by your health programme)
- Incise and drain any abscess

Refer if:

- Inflammation and/or swelling over the mastoid bone
- Patient unwell with a high temperature
- Drowsiness
- Headache
- Vomiting
- Neck stiffness

5. GLUE EAR (ALSO CALLED OTITIS MEDIA WITH EFFUSION – OME)

In this disease the middle ear fills up with sticky mucus that looks like glue when it is sucked out of the middle ear. Most people know what glue is which is why it is a useful word to use in explanation. An effusion is fluid in a space in the body eg. pleural effusion. In this case the space is the middle ear space.

Who gets glue ear?

Glue ear is common in young children. It is less common in older children. It sometimes occurs in adults.

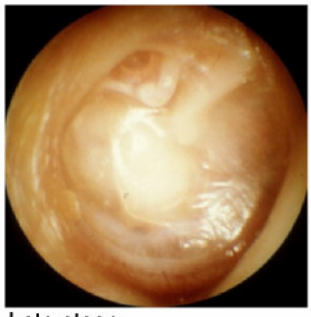
What happens?

The lining in the middle ear is similar to the lining in the nose and produces sticky mucus (glue) that drains away down the Eustachian tube. In the beginning stage the fluid is very thin.
If too much mucus is produced it blocks the Eustachian tube and air cannot get into the middle ear. The middle ear space fills up with sticky mucus and the eardrum and the ossicles cannot vibrate properly causing **hearing impairment.**
In children if the eardrum does not look normal but does not look like any of the other problems that have been discussed then they should think of Glue Ear and test the hearing. If the hearing is not normal then the child may have Glue Ear. In children the hearing impairment causes speech problems – delayed speech development, words are not spoken properly / clearly.
Parents often do not notice that their child cannot hear properly but they usually notice when their child is not developing speech like other children or when their child is not pronouncing words properly or clearly. Health Care workers should always think of hearing impairment when a child has speech problems.

What will be seen? Questions to ask the patient

In children:
- Is the hearing normal?
- Is the speech clear?
- Is the ear sometimes painful? In adults:
- Does the ear feel blocked?


Glue ear with air bubble


Late stage – eardrum '' sucked in"

Examination

Use an otoscope to look at the eardrum
- The eardrum will not look normal – it could be dull, it could be "sucked in"
- Check both ears Test the hearing – There will be slight/moderate hearing impairment

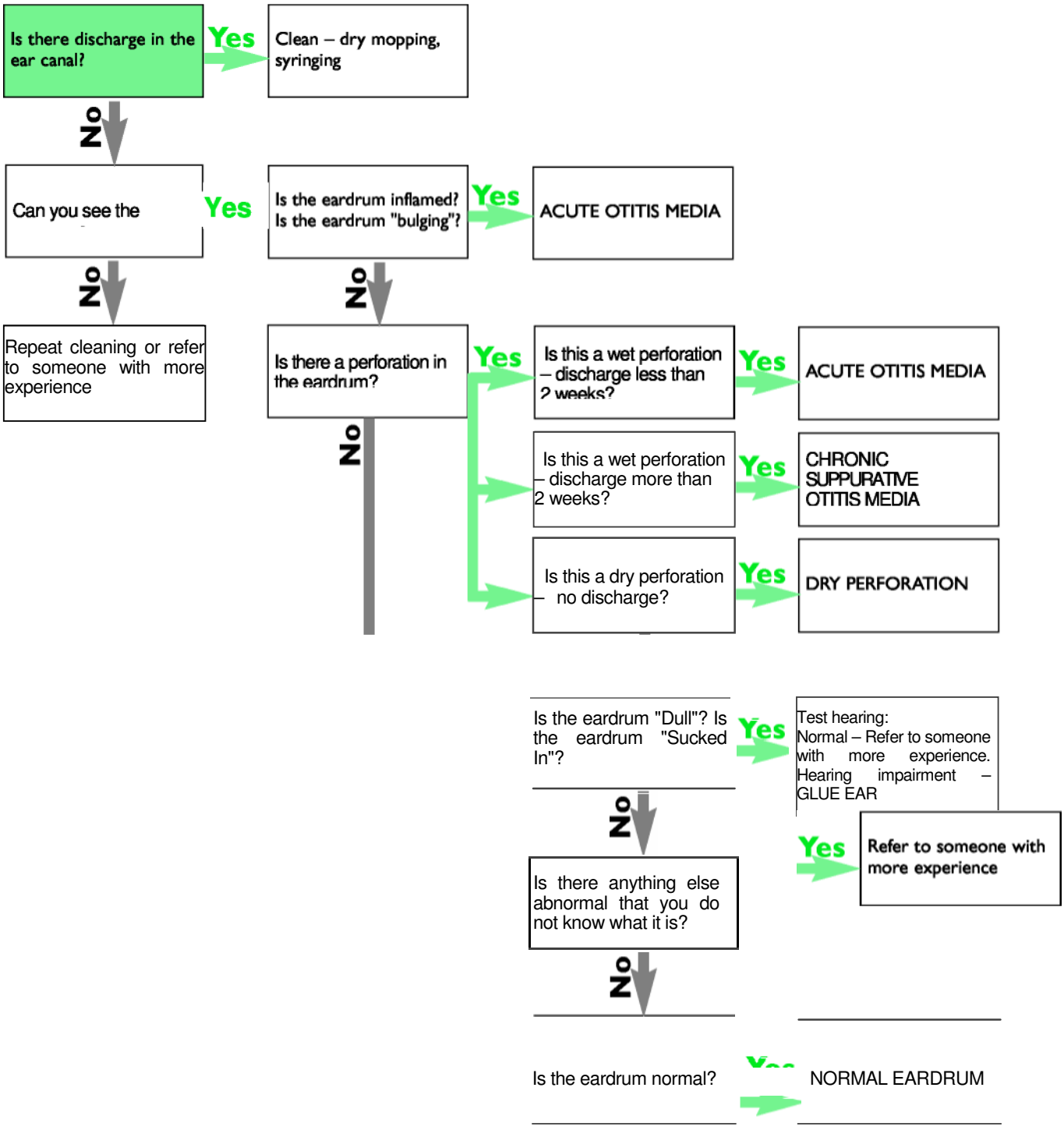
Treatment

- Treat any Respiratory Tract Infection – upper and/or lower
- Treat any ear infection.
- See patient again after 1 month and repeat examination and hearing test

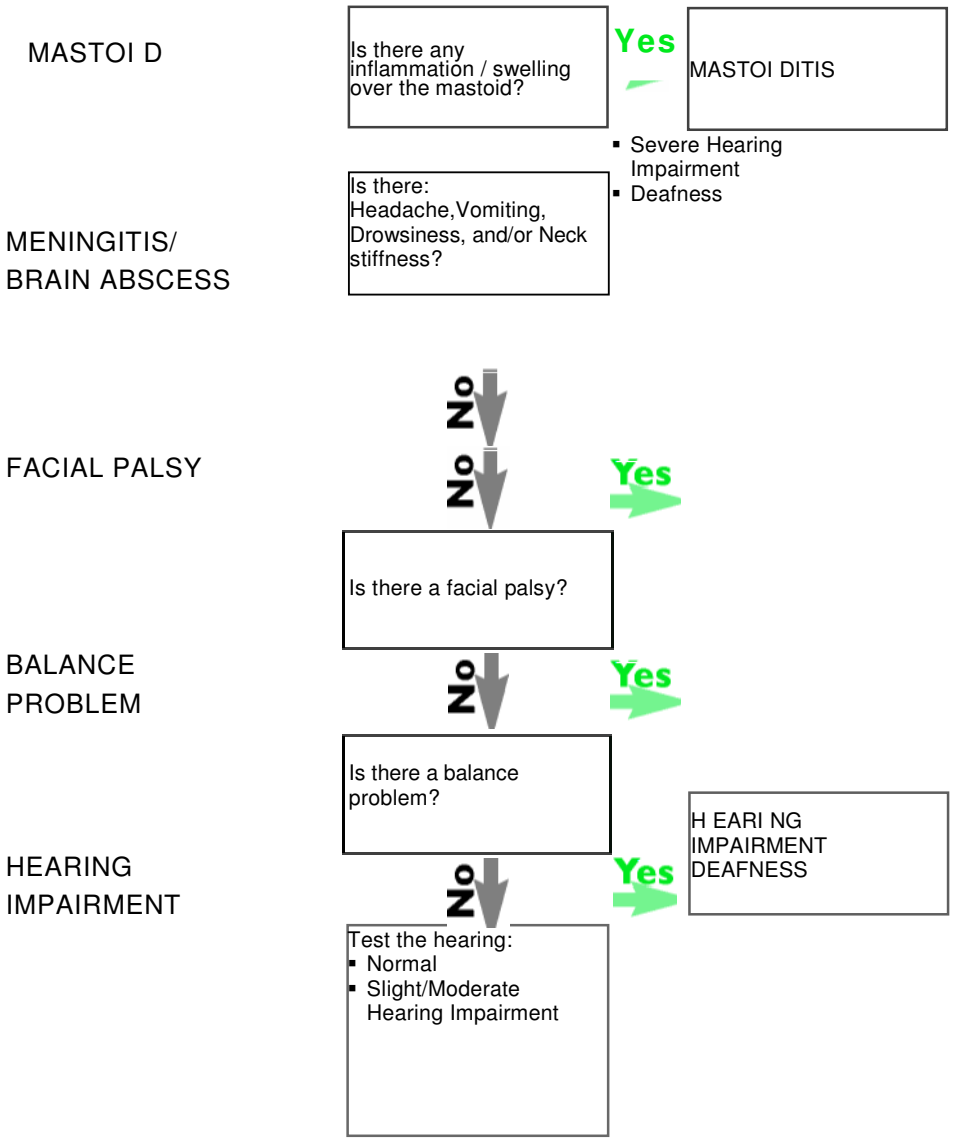
Refer if:

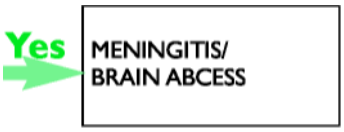
- There is still hearing impairment at the repeat visit

6. HOW TO EXAMINE THE EARDRUM



To complete the examination of the ear





FACIAL PALSY

BALANCE PROBLEM

Activity 4

ø The students choose a partner. One is the 'Health Care worker' and one is the 'Patient'. The patient chooses one of the problems from the list below and describes the problem and uses thei r imagination to make them sound like a real patient.The health care worker asks more questions about the problem and then uses their knowledge to fill in the details on the Patient Health Chart below. Show them how to do this by circling each detail on the chart.

Some suggested patient problems:

- Patient has a child who was crying all night with a sore ear.
- Patient has had a discharge from the ear for a long time. No pain.
- Patient had a discharge from the ear last year. Now cannot hear well.
- Patient has a child who had a sore ear last week and now has a discharge from the same ear.
- Patient has had a sore ear for several days. Now feels ill and the pain is now behind the ear.
- Patient found semi-conscious. Discharge from the ear.
- Patient has a child who is not speaking clearly.
- Patient has been swimming in the river/dam and now has a discharge from the ear. No pain.

When they have completed their case they can present it to the group and you can discuss treatment of the different ear problems with the group to reinforce what you have already taught.

An example to discuss with the students:

A patient who has otitis media with an inflamed, bulging eardrum in the right ear and who also has mastoiditis and has been vomiting because of meningitis .The patient has a normal left ear. After completing their examination they will fill in the chart they and start with the eardrum. Because it is not normal they would draw a ring around "Abnormal".Then they would choose one of the abnormal appearances – in this case "Inflamed" and "Bulging" and draw rings around these. They then move on to Mastoid and draw a ring around "Yes". They then move on to Meningitis/Brain Abscess and draw rings around "Vomiting" and "Neck stiffness".

Reminder:

They must check both ears so for the left ear that is normal they would start with the eardrum and draw a ring around "Normal" – Because it is normal they cannot draw rings around any of the abnormal problems.
Using a chart like this is a way of making sure that they do a complete examination and do not miss anything out.

PATIENT HEALTH CARD

Normal • Headache • Vomiting • Drowsiness • Neck stiffness

Date Name
Sex Address
Age
What is the patient's problem?

LEFT EAR

Eardrum

Normal / Abnormal
Inflamed / Bulging
Perforation:Wet / Dry
"Dull" / "Sucked In" Something else but you do not know what it is

Mastoid

Normal / Inflammation or swelling over the mastoid

RIGHT EAR

Eardrum

Normal / Abnormal
Inflamed / Bulging
Perforation:Wet / Dry
"Dull" / "Sucked In" Something else but you do not know what it is

Mastoid

Normal / Inflammation or swelling over the mastoid

Mengitis/Brain Abscess

Facial Nerve	**Facial Nerve**
Normal / Facial palsy	Normal / Facial palsy
Balance problem	
Normal / Balance problem	
Hearing Impairment	
Baby questions – Normal / Hearing impairment	
Voice test:	**Voice test:**
• Normal hearing	• Normal hearing
• Slight impairment	• Slight impairment
• Moderate impairment	• Moderate impairment
• Severe impairment	• Severe impairment
• Deafness	• Deafness
What is the name of the problem? How are you going to treat the problem?	

Discuss with the students

7. INFECTIONS OF THE MIDDLE EAR

- Acute and chronic otitis media are common, particularly in children.
- They cause a lot of ill health and can have serious and even fatal complications.
- They are an important preventable cause of hearing impairment.
- It is vitally important that parents and the community are made aware of the importance of early intervention and should be encouraged to bring patients for treatment as soon as there is any sign of ear infection.
- Early intervention with proper treatment can lead to full recovery and avoid further infection and possible hearing impairment.
- Ear hygiene needs to be taught at clinics, hospitals, schools and included in any other community health programmes.

Stress the importance of early intervention.

Ear Hygiene

D O only use medication in your ears that has been prescribed for you D O

use clean towels to dry your ears

D O N O T put anything into your ear

D O N OT try to clean your ears with hairpins, tooth picks or anything else!

DO N OT let dirty water go into your ears DO NOT leave cotton wool in your ears

POST TEST

Questions	True	False	Don't know
In Acute Otitis Media the eardrum never perforates (bursts)			
In Chronic Suppurative Otitis Media there is a perforation in the eardrum and a discharge for more than 2 weeks			
Sticky mucus causes Glue Ear			
Normal eardrums all look the same			
In Acute Otitis Media the eardrum looks inflamed			
The treatment of Acute Otitis Media is eardrops			
Infection can turn Inactive Chronic Suppurative Otitis Media into Active Chronic Otitis Media			
Mastoiditis can cause meningitis and a brain abscess			
The treatment of Dry Perforation is dry mopping and eardrops			
Dirty water can only cause infection in the ear canal. It cannot cause infection in the middle ear.			
Score			

MODULE 6

Assessing hearing and counselling

By the end of this module the Health Care Worker should be able to:

- Describe screening hearing assessment in babies
- Describe screening hearing assessment in children aged 3 – 6 years
- Undertake screening hearing assessment in adults and older children
- Explain the results of screening hearing assessment
- Describe counselling of patients with hearing impairment and their families
- Describe community awareness activities

Instructions for the pre test and post test

The aim of this activity is to assess whether or not the trainees improve their knowledge by completing the module.The pre test and post test questions are the same.
Before starting the module the students answer the pre test questions. The questions are not marked at this stage.At the end of the module the students answer the post test questions. Work through the questions with them and they mark their answers for both tests. Write down their marks and compare the two.
If the pre test marks were high then the trainees had good knowledge of the subject before they started but they should still have improved.

PRE TEST

Questions	True	False	Don 't know
Testing hearing is the same as screening hearing		✓	
Parents do not usually know if their children have hearing impairment		✓	
Questions can be used to assess hearing in babies	✓		
Young children usually repeat words when asked to do this		✓	
You can use your voice to assess hearing in older children	✓		
People with normal hearing can hear you when you whisper	✓		
Lip reading helps people with hearing impairment to understand words	✓		
Deaf children cannot go to school		✓	
Communities usually know that deafness is a disability		✓	
Health workers should teach teachers to assess hearing in schoolchildren	✓		
Score			

Preparation

- Read and understand both the trainers manual and the trainees workbook
- Study and understand the list of terminology
- Study and understand the aims of each module
- Copy sufficient number of pre-test and post test questions
- Copy sufficient copies of the students workbook
- Blank paper, pencils and erasers for students
- Required posters and labels for each section
- Blackboard and chalk/whiteboard and pens

Symbols

☺ Discussion with students or in groups

m Put up the poster

¢ Students to complete by writing in answers or ideas

ø Students to take part in an activity

Terminology

Testing hearing

Screening hearing

Audiometer

Decibels

Voice Test

Whispered voice

Conversational voice

Loud voice

Shouted voice

Hearing and speech development in babies

Assessing hearing in babies

Noisemakers

Special education – "Deaf School"

Lip reading

Sign language

Advice and support

Raising awareness

1.WHAT IS HEARING IMPAIRMENT?

When a person is not able to hear as well as someone with normal hearing then they have hearing impairment.There are several different levels of hearing impairment:

- Not able to hear whispered voice - slight
- Not able to hear conversational voice - moderate
- Not able to hear loud voice - severe
- Not able to hear shouted voice - profound

2.WHAT IS DEAFNESS?

Profound hearing impairment is called deafness or we say that a person with profound hearing impairment is deaf.
Most people born without hearing (Deaf) never hear speech or learn to speak. Doctors sometimes call this problem "Deaf-mute" or "Deaf and dumb" but to many people these words mean the same as "deaf and stupid". Because of this, these words can hurt people who are deaf and should be discouraged. Deaf people can use sign language to communicate.
If a deaf person heard speech and learned to speak before going deaf they can sometimes lip read.

3.WHY IS IDENTIFYING HEARING IMPAIRMENT IMPORTANT IN CHILDREN?

- Good hearing is important for speech and language development.
- Good speech and hearing are important for communication.
- Good communication is important for learning in the home and at school.
- Learning is important if a child is to develop to their full potential.
- Identification of hearing impairment helps us to improve the quality of residual hearing.

Because of this it is important that babies and children have their hearing assessed regularly.A good place to do this is at "immunisation" clinics and "well baby" clinics.Teachers should be encouraged to assess the hearing of all children when they start school.Teachers can be taught the same simple hearing test that will be taught in this module.

Activity 1

Trainees write down the things they might notice in a child who has difficulty hearing.

☺ Discuss the ideas with the students

Some expected answers:

- He/she does not respond when he/she has their back to the speaker
- He/she cannot hear when called from a different room
- The child gives the incorrect reply to many questions
- They do not understand simple instructions

3.1 Signs to look for if you think a child has a hearing problem

- he/she cannot follow simple instructions
- he/she gives the wrong answers to questions
- he/she does not respond when you call
- he/she cannot dance/sing in time to music
- he/she cannot identify different sounds

Hearing testing is the most accurate way of assessing hearing.Testing is done with special equipment that requires special training to use.The equipment used is called an audiometer and there are many different types of audiometer that test hearing in different ways.This equipment is usually expensive and not found in Primary Care clinics. Because it is important to assess hearing in patients methods have been developed to "screen" hearing in Primary Care. Screening means finding out whether or not a person has normal hearing. If a person has hearing impairment, screening helps to find out what level of hearing impairment they have. It is not as accurate as testing with an audiometer but is very useful to do when testing is not available.

4. HOW CAN HEARING BE ASSESSED

The World Health Organisation chart below shows levels of hearing impairment measured in two ways:

- With an audiometer which is a machine for testing hearing
- With a "voice test" which is a less accurate way of assessing hearing

The voice test is a Screening test that means it is a way of finding out whether people have normal hearing or not.To do this whispered voice is used.
When people do not have normal hearing the voice test can also be used to find out what level of hearing impairment they have by using other levels of voice – conversational voice, loud voice or shouted voice.

Grade of impairment	Level tested with an Audiometer	Level tested with the Voice Test	Recommendations
Normal hearing	25 dB or better	Able to hear whispers.	—
Slight impairment	26 - 40 dB	Able to hear and repeat words spoken in conversational voice at 1metre.	Counselling. Hearing aids may be needed.
Moderate impairment	41 - 60 dB	Able to hear and repeat words using loud voice at 1 metre.	Hearing aids usually recommended.
Severe impairment	61 - 80 dB	Able to hear some words when shouted into the ear.	Hearing aids needed. If no hearing aids available, lip-reading and signing should be taught.
Profound impairment (Deafness)	81 dB or greater	Unable to hear and understand even a shouted voice.	Hearing aids may help understanding words. Additional rehabilitation needed. Lipreading and sometimes signing essential.

Adapted from: Report of the Informal Working Group on Prevention of Deafness and Hearing Impairment Programme Planning WHO, Geneva, 1991

4. 1 The Audiometer

Some of the trainees may work in clinics or hospitals where hearing tests are done with a machine called an audiometer. This machine measures the sound levels that people can hear in units called decibels (dB).
People with normal hearing may be able to hear a sound at a level of 1 decibel.A person with hearing impairment may only be able to hear a sound at a level of 50 decibels which is in the range for moderate hearing impairment. Another way of saying this is that person has a hearing impairment of 50 decibels.

4.2 The "Voice Test"?

Most Primary Care clinics do not have equipment for testing hearing.At these clinics hearing can be screened using the voice.The voice is used at the different levels in the chart to say words that the patient repeats back if they have heard them clearly.

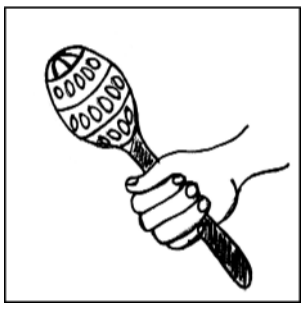
4.3 Assessing hearing in babies

It is very difficult to test hearing in babies because they cannot tell the tester whether or not they can hear the sound.The best person to know whether a baby can hear or not, is the mother or care giver. We can find out whether the baby can hear properly or not by asking questions about the baby's hearing and about the baby's speech development. Babies do different things at different ages so first you need to work through this chart with the trainees of what a baby with normal hearing should do at different ages.

Age of baby	How they should respond
A few weeks old (up to 6 month)	Should show some sign of hearing sounds – open eyes, blink, look alert (like they are listening to the sound)
About 6 months	Should respond by trying to see where the sound is coming from by turning their eyes or head in the direction of the sound
About 9 months	Should be listening to loud and very soft sounds and making all sorts of sounds themselves
About 1 year	Should respond to their own name and to other words they know and starting to say "baby" words
About 18 months	Should be able to point to familiar things when asked to do so and be using simple words

These are the questions to use in assessing hearing in babies

Age of baby	Questions	Yes	No
A few weeks old	Does your baby open his/her eyes or blink when there is a noise?		
	Does your baby appear to be listening to you when you talk or sing?		
About 6 months	Does your baby try to see where the noise is coming from by turning their eyes or head towards the sound?		
	Does your baby enjoy you talking to him/her?		
About 9 months	Does your baby appear to respond to even very soft sounds?		
	Does your baby enjoy babbling and making other sounds?		
About 1 year	Does your baby respond when you say his/her name and the name of things they play with?		
	Is your baby starting to say baby words?		
About 18 months	Does your baby pick up or point to things around the house when you ask them to do this?		
	Is your baby starting to use simple words?		
2 years old	Do you think your baby can hear normally even when you speak to them in a very soft voice?		
	Is your baby putting words together and trying to talk to you?		



If the answer to any of the questions is 'No' then you should begin to think that the baby may have hearing impairment.
Some of these babies may have delayed development and this could be the reason they are not responding properly to sounds. A full developmental assessment needs to be done if this seems to be the reason.
Try to refer babies who you think may have hearing impairment to a clinic or hospital where the hearing can be tested with special testing equipment.
What can be done if the baby cannot be referred for special testing? If this is not possible you can try testing babies from about nine months of age with a simple "Noisemaker". Stand behind the baby so he/she cannot see the movement of the noisemaker.The noisemaker should make a sound about as loud as a whispered voice.A few grains of salt, sand or sugar moved around (NOT shaken) on a plastic container is a good high frequency sound. If you do not have a noisemaker, try rubbing your fingers together behind the babies ear.The baby should respond by turning in the direction of the sound.

Never ignore possible hearing impairment in a baby or a child

4.4 How will you test the hearing?

- Find a quiet room and someone to help you.
- It needs two people to test the hearing – one to stand 1 metre behind and to one side of the baby and make a noise with the noise maker and the other sit in front of the baby and watch to see whether the baby turns to look to see where the sound is coming from.
- Ask the mother to hold her baby sitting up on her lap and facing in front while the test is being done.
- The person in front gets the baby's attention by showing a toy or something else.
- The person testing makes a noise with the noisemaker.
- Does the baby look to see where the sound is coming from?

Activity 2

Trainees should work in groups of four and think up and write down what kinds of noisemakers they could make and use. They should then present their ideas to the whole group, discuss them and decide which would be the best to use.

☺ Discuss the ideas with the students

Some expected answers:
- Put sugar in a plastic bottle - shake
- Run their finger along the edge of a comb
- Rub wooden stick along side of plastic bottle with sugar in it

- If the baby responds then the person standing behind moves to the other side and the test is repeated.

If the baby responds then the hearing is normal.The test should be repeated after three months to see if the hearing is normal.

If the baby does not respond and there is an ear problem the problem should be treated and the test repeated when it has healed.

If the baby does not respond and there is no ear problem then the parents should be given advice about the things they should do at home to help the baby - see below in the section " Advice to parents with a hearing impaired baby or child".The test should be repeated every three months until both the Health Care Worker and the parents are sure that there is hearing impairment.The child should then be referred to a "Deaf School" to be assessed to find out whether Special Education is needed.

REMEMBER:
The hearing problem may affect a child's speech and language development

4.5 Testing children 3 to 7 years old

The voice test can be used to assess hearing at this age but children this age are often too shy to repeat words. Instead ask them to do things such as:

- 'Touch your nose'
- 'Point to your mouth'
- 'Put your hand on your tummy'

Or you could put things on a table in front of them and ask them to point to each one as you say its name. Choose things that they know such as:

Cup/mug Book/paper

Pencil/toy Apple/sweet

If testing children in your clinic frequently, a chart with pictures could be made up to use.
Give the instruction or say the word from in front until they know what to do.
Then stand behind the child and start with a whispered voice. Repeat two or three times until you are sure that the child is hearing what you are saying clearly.

- Correct response – **normal hearing.**
- No response – repeat in conversational voice.

- Correct response – **slight hearing impairment.**
- No response – repeat in loud voice.

- Correct response – **moderate hearing impairment.**
- No response – repeat by shouting into the ear

- Correct response – **severe hearing impairment.**
- No response – **Deafness.**

Trainees should try to refer children who they think may have hearing impairment to a clinic or hospital where the hearing can be tested with special testing equipment.

4.6 What can be done if the child cannot be referred for special testing?

If the parents think the child has a hearing problem but the voice test showed the hearing is normal:

- The test should be repeated every three months until both the Health Care Worker and the parents are sure that the hearing is normal.

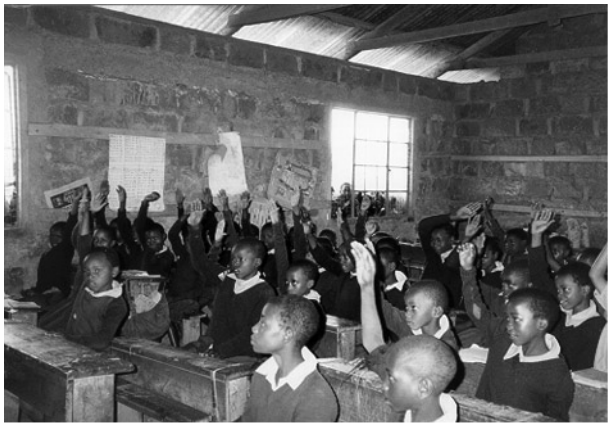
If the child has a hearing problem and there is an ear problem as well:

- The ear problem should be treated and the test repeated when it has healed.

If the child has a hearing problem and there is no ear problem:

- The parents should be given advice about the things they should do at home to help the child – see below in the section " Advice to parents with a hearing impaired baby or child".The test should be repeated every three months until both the Health Care Worker and the parents are sure that there is hearing impairment.
  The child should then be referred to a local hearing centre, a teacher at a local school, local deaf groups or a "Deaf School" to be assessed to find out whether Special Education is needed.

It is important that children with hearing impairment get proper support and training. If the child has hearing impairment or deafness the ideal treatment is a hearing aid with special training and education directed towards communication and development of skills.This is what a "Deaf School' does for these children.



If the child is deaf and a "Deaf School" is not available, encourage the parents to start non-verbal communication.They will have to make up signs for food, members of the family and important objects.They should try to make contact with other members of the community who use sign language.

If the child has some hearing then using signs as well as words helps the child to learn lip-reading. Often these children can hear low frequency sounds but not high frequency sounds and this means that many words will not be heard properly and using signs and lip reading helps them to understand what has been said.

5.TESTING ADULTS AND OLDER CHILDREN.

Adults and older children can be assessed using the voice test. Most patients need each ear to be tested separately.
Stand behind and to one side and reach around and "close off" the other ear by pressing on the tragus until the ear canal is blocked.
When this has been demonstrated ask all trainees to close off one ear by pressing on their tragus to feel how hard they have to press to do this.Then do it to their other ear.
Patients with very poor hearing have to be tested with both ears open.
Demonstrate the voice test. Close off one ear and stand on the other side and say some words that should be repeated back to you.Then stand in front of the trainee and say some words loud enough for the trainee to hear and get them to repeat the words until you are sure the trainee knows what to do.

Suggested list of words that could be used for testing:

Post office	Fish	Factory
Sky	Bicycle	Mat
Fi re	Garden	Aeroplane
Number	Taxi	Ladder

Practice is needed to get the voice levels right for the test.

- For whispered voice breathe out and then whisper the words.
- Conversational voice is the quiet conversational voice you would use if speaking to someone sitting next to you.
- Loud voice is the level you would use to speak to someone across the other side of the room when there is other conversation in the room.
- Shouted voice is the level you would use to speak to someone on the other side of the road when there is traffic noise.

5.1 How to assess hearing using the voice test

Stand about an arms length away behind and to one side of the patient

↓

Reach around and close off the other ear by pressing on the tragus

↓

Whisper a word in a soft whispered voice. Use several different words.

↓

If patient repeats what you have said and you are sure the patient can hear you clearly then the patient has normal hearing in this ear.

↓

Change sides and test the other ear

↓

If patient cannot repeat the words you have said repeat the test using a conversational (normal) voice. Use several different words.

↓

If they can now hear the words clearly and repeat them they have slight hearing impairment

↓

Change sides and test the other ear

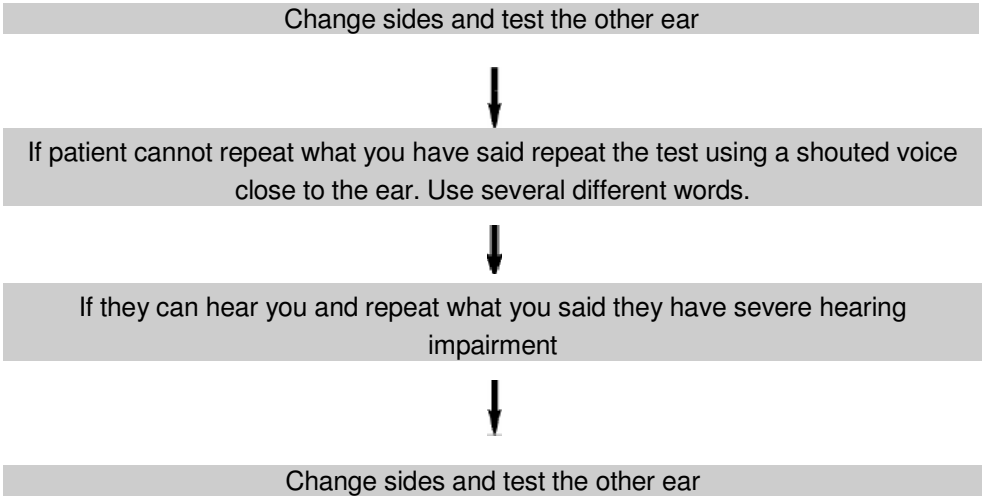
↓

If patient cannot repeat the words you have said repeat the test using a loud voice. Use several different words.

↓

If they can now hear the words clearly and repeat them they have moderate hearing impairment

↓



If the patient cannot hear even your shouted voice they have profound hearing impairment or deafness

Activity 3

ø Trainees choose a partner and follow the steps on the flowchart to test their partner's hearing.They must tick the responses and test at all four levels even if their partner has normal hearing. Listen to the levels of voice that they are using and try to correct them to the right level for each test.

☺ Discuss the results with the students

5.2 What to do when the hearing has been assessed.

For older children:

If the parents think the child has a hearing problem but the voice test showed the hearing is normal:

- The test should be repeated every three months until both the Health Care Worker and the parents are sure that the hearing is normal.

If the child has a hearing problem and there is an ear problem as well:

- The ear problem should be treated and the test repeated when it has healed.

If the child has a hearing problem and there is no ear problem:

- The parents should be given advice about the things they should do at home to help the child – see below in the section " Advice to parents with a hearing impaired baby or child".The test should be repeated every three months until both the Health Care Worker and the parents are sure that there is hearing impairment.The child should then be referred to a local deaf centre, a teacher at the local school, local groups of deaf people or "Deaf School" to be assessed to find out whether Special Education is needed.

For adults:

If the hearing is normal no treatment is needed.
If there is a hearing problem and there is an ear problem as well:

- The ear problem should be treated and the test repeated when it has healed.

If there is a hearing problem and there is no ear problem:

- Try to refer the patient for hearing testing at a hospital or clinic where this can be done.

6. WHO NEEDS ADVICE AND SUPPORT WHEN THERE IS SOMEONE IN THE FAMILY WITH HEARING IMPAIRMENT?

6.1 The patient

It is sometimes difficult for a person – even a child – to understand why they are hearing impaired. They are sometimes seen as 'different' or 'stupid' and so they can become withdrawn.
If their family does not understand and support them it is very difficult for them to learn to communicate, develop language and learn about the world around them.
If the patient is a child they should be referred for special education.Their parents and family should be encouraged to communicate with them using pictures and signs as well as by pointing to things. If they have to go to a normal school the teachers should be told that they have a hearing problem and be asked to give them special attention.
If the patient is an adult they should find out if there are any other hearing impaired or deaf people in the community and form a support group.
An older person with hearing impairment due to old age may only need the family to speak a bit more slowly and clearly and face them while they are speaking.
The patient should have their ears checked and tested regularly to make sure they are clean, healthy and that the hearing has not deteriorated.
People with hearing impairment should be encouraged to use hearing aids where possible and affordable.

6.2 Parents and family members

Parents and family members play an important role in the life of a person with hearing impairment or deafness. The hearing impaired person needs to learn to communicate first in the home. Family members can develop a simple sign language to support their speech when talking to a hearing impaired or deaf person.

Activity 4

ø Trainees choose a partner and each think up signs for things and activities around the home.They make these signs to their partner who has to try and guess what the sign means.

They should include the hearing impaired or deaf person in all activities in and around the home. Parents and family members should educate themselves and learn how to communicate with the hearing impaired or deaf person.With support, people with hearing impairment can be educated and enter into the job market. Parents should ensure that their children receive the best possible education and training so that they may become self-sufficient.
Parents could join, or form, support groups in their own community and so offer support to each other.

7. ADVICE TO PARENTS WITH A HEARING IMPAIRED BABY OR CHILD

- Let the child see your face when you speak to them
- Make sure there is good light for the child to see your face
- Get the child's attention before you speak to them
- Decrease other distractions – especially loud noises
- Encourage Hard of hearing children to listen and discriminate different sounds especially if they are using a hearing aid.
- Stand close to the child when you speak
- Speak clearly and more slowly
- Don't shout and exaggerate movements
- Repeat words and instructions many times
- Use gestures, drawings, paintings – point at things
- Encourage lip-reading
- Don't eat or chew while talking to the child
- Do not over protect the child
- If the child has a hearing aid he/she must use it
- Be patient – it takes time to learn to communicate

Activity 5

ø Choose a partner

Each of you in turn thinks of a word and "mouths" this word to your partner without saying the word.Your partner has to try and guess what the word is.

8. METHODS TO USE TO HELP HEARING-IMPAIRED PEOPLE LIP-READ

- Face the person when speaking
- Get their attention before you speak to them
- Do not cover your mouth with your hand or newspaper
- Make sure there is good light for them to see your face. Do not turn off the lights – they will not be able to see your lips!
- Decrease other distractions – especially loud noises.Turn off the radio or TV
- Speak clearly and more slowly
- Repeat words and instructions many times

9. RAISING AWARENESS IN THE COMMUNITY AND IN SCHOOLS

One of the main problems in some societies is that Hard of hearing and deaf people are not seen and they are shut away in the home because they are believed to be 'stupid' and so cannot do anything. When this happens community awareness of the problem of hearing impairment is low. Communities need to be made aware of the problem of hearing impairment and the communication problems that it causes and be made aware of how to help people with hearing impairment.

Another problem is that families sometimes do not realise that a family member who they think is "stupid" is in fact Hard of hearing and so do not take them to have their ears examined and tested.

Public awareness campaigns could create a better understanding of hearing impairment and the disability that it causes:

- Local clinics should display posters about hearing impairment and ear care to raise awareness amongst patients.
- Communities should be encouraged to have "Healthy ear" days to raise awareness in the community.
- Communities should be encouraged to have fund raising activities to help equip their local clinics for testing hearing and supplying hearing aids.
- Health workers should visit schools and talk to teachers and learners about hearing impairment and its problems and encourage activities such as designing posters to raise awareness and playing "What can you hear?" games to identify children with hearing impairment.
- Children should be introduced to first language only
- Encourage deaf adults to teach sign language classes and talk about deafness.

10. WHAT COULD HEALTH CARE WORKERS DO?

- Teach teachers about hearing impairment and encourage them to include this in their teaching programme
- Train teachers to recognise signs for in learners with hearing impairment and teach them how to do the simple voice test and refer children with hearing impairment for treatment
- Promote awareness campaigns in the community and encourage people with hearing impairment to have their ears checked and their hearing tested
- Raise awareness in the community by speaking to social, religious and other groups in the community about hearing impairment. Promote the use of sign language with sign language interpreters in their meetings to assist people with deafness.
- Promote the need to include hearing impaired people in the world of work, in education and in society
- Encourage the formation of support groups for the hearing impaired and their families
- Recruit educated deaf adults to assist to deaf awareness campaigns and help deaf children in school and the community.

POST TEST

Questions	True	False	Don't know
Testing hearing is the same as screening hearing		✓	
Parents do not usually know if their children have hearing impairment		✓	
Questions can be used to assess hearing in babies	✓		
Young children usually repeat words when asked to do this		✓	
You can use your voice to assess hearing in older children	✓		
People with normal hearing can hear you when you whisper	✓		
Lip reading helps people with hearing impairment to understand words	✓		
Deaf children cannot go to school		✓	
Communities usually know that deafness is a disability		✓	
Health workers should teach teachers to assess hearing in schoolchildren	✓		
Score			

MODULE 7
Hearing aids

By the end of this module the Health Care Workers should be able to:

- explain the basic concepts of hearing aids
- discuss the function of Body Worn and Behind the ear hearing aids
- insert and check batteries for BW and BTE hearing aids
- explain the importance of ear moulds and how they fit into the ear
- carry out basic care and maintenance on BW and BTE hearing aids
- identify simple faults for BW and BTE hearing aids and propose a solution

Instructions for the pre test and post test

The aim of this activity is to assess whether or not the trainees improve their knowledge by completing the module.The pre test and post-test questions are the same.
Before starting the module the students answer the pre test questions. The questions are not marked at this stage.At the end of the module the students answer the post-test questions. Work through the questions with them and they mark their answers for both tests. Write down their marks and compare the two.
If the pre test marks were high then the trainees had good knowledge of the subject before they started but they should still have improved.

PRE TEST

Questions	True	False	Don't know
People should clean their ear moulds regularly	✓		
It does not matter if the water gets into the hearing aid		✓	
If the battery drawer is not closed properly there is weak or no sound heard	✓		
Children should be encouraged to wear their hearing aids	✓		
Sound comes and goes if the cord is not plugged in correctly	✓		
Condensation cannot block the ear mould		✓	
Sound is distorted if the volume is too high	✓		
Do not replace the battery if is running down		✓	
Patients must be taught how to care for their hearing aid	✓		
Speech and language development in Hard of hearing children cannot be improved by wearing hearing aids		✓	
Score			

Preparation

- Read and understand both the trainers manual and the trainees workbook
- Study and understand the specific outcomes of each module
- Study and understand the list of terminology
- Copy sufficient copies of the students workbook
- Copy sufficient number of pre-test and post test questions
- Understand the purpose and the instructions for the pre and post test
- Blank paper, pencils and erasers for trainees
- Required posters and labels for each section
- Blackboard and chalk/whiteboard and pens
- Obtain a body worn hearing aid and behind the ear hearing aid
- Obtain the correct batteries for the hearing aids
- Obtain plastic tubes, ear moulds for the hearing aids

Symbols

☺ Discussion with students or in groups

m Put up the poster

¢ Students to complete by writing in answers or ideas

ø Students to take part in an activity

Terminology

hearing aid

onset of hearing impairment

ear mould

body worn (BW) hearing aid

behind the ear (BTE) hearing aid

microphone

amplifier

receiver

background noise

volume control

plastic tubing

zinc air battery

alkaline battery

acoustic feedback

acrylic material

condensation

1. WHAT ARE H EARI NG AI DS?

Spectacles can often help people with poor vision. Walking sticks or wheelchairs can often help people who cannot walk

What can help people with a hearing impairment? – Hearing aids.

Everyone knows what spectacles or walking sticks look like.They are every day items used by many people all over the world. Hearing aids are not as well known in some places.

What is a hearing aid? – An electrical device worn on the ear.

What do hearing aids do? – They allow hearing impaired people to hear sounds better and hearing aids make sounds louder

2.WHO CAN USE HEARING AIDS?

Behind the ear hearing aid (BTH)

Body worn hearing aid (BW)

Almost everyone, young and old, who has a hearing impairment can be helped with hearing aids.
The successful use of hearing aids depends on many things:

- at what age the hearing impairment occurred
- whether the hearing impaired person has already developed spoken language
- how soon hearing aids are fitted after a hearing impairment is discovered
- the degree of hearing impairment - slight, moderate, severe, profound
- the type of hearing impairment - conductive, sensorineural
- how motivated the hearing aid wearer is towards using hearing aids
- how well hearing aids are fitted and maintained
- the quality of the hearing aid and ear mould
- the help and support available to learn to use hearing aids – especially for young children
- where hearing aids are used - quiet or noisy surroundings
- if the wearer has been given instructions on how to listen/use the hearing aid

In general, people with a hearing impairment in only one ear do not need to use a hearing aid, because they receive enough information in their good ear.

3.WHY ARE HEARING AIDS NEEDED?

Hearing impaired people need hearing aids to help them communicate. Hearing aids can help people hear and understand speech and other sounds around them.The ability to hear all these sounds not only improves the quality of life of hearing impaired people, but can also significantly improve their ability to learn at home, at school or in the workplace. Hearing aids can help hearing impaired people become active members of their families and community instead of being isolated and alone.

4.WHEN SHOULD HEARING AIDS BE FITTED?

Hearing aids should be fitted as soon as a hearing impairment has been discovered.This is especially true for babies and young children. It is important that young children can hear well in order to develop speech and language. Important language learning can be missed when young hearing impaired children are not fitted with hearing aids

Early identification of hearing impairment in babies and children is very important for successful use of hearing aids

5.WHERE CAN HEARING AIDS BE OBTAINED FROM?

Hearing aids are not ornaments or pieces of jewellery that can be bought "off the shelf" in a shop. Hearing aids need to be fitted following an accurate hearing test. Hearing aids (including the ear moulds) then need to be properly fitted into the ear.At the same time new wearers must be given instructions and help on how to use hearing aids and look after them. Follow up visits are needed to give further assistance to the wearers and their carers. Therefore, hearing aids should only be obtained from a person who has received appropriate training and is experienced enough to carry out all these tasks.

Activity 1

Ask the trainees if hearing impaired people in their local area / community have hearing aids and if so, where they get them from

☺ Discuss with the students

Remember – hearing aids are not a miracle cure for hearing impairment, they are an "aid" that helps hearing impaired people to hear sounds better.

6.TYPES OF HEARING AIDS AND HOW THEY WORK

6.1 How do hearing aids work?

Microphone – the sound is picked up through the microphone and changed from a sound signal to an electronic signal.

Amplifier – The electronic signal from the microphone is made larger by the amplifier.

Receiver – The receiver works like a loud speaker and changes the amplified electronic signal back to a sound signal.

On-off switch on a hearing aid is usually labelled 'O T M' O = Off position
T = Telecoil used with specially adapted equipment to cut out background noise
M = On position (M stands for microphone)
Sometimes the on-off switch is part of the battery drawer. In this case the hearing aid is switched off by slightly opening the battery drawer.

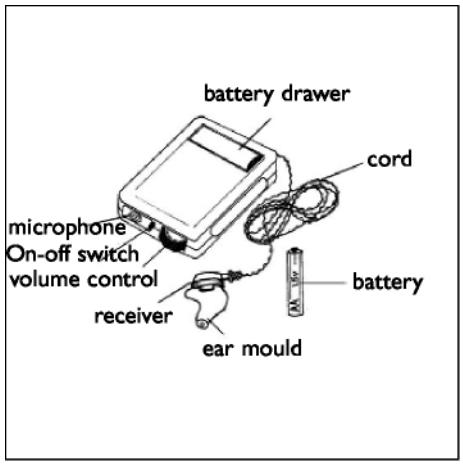


Diagram of BW hearing aid

Volume control alters the loudness of the sound going into the ear from the receiver.The volume can be adjusted by the hearing aid wearer.

Battery drawer is where the battery is kept and is usually positioned at the bottom of the hearing aid

Battery is the power supply for the hearing aid.

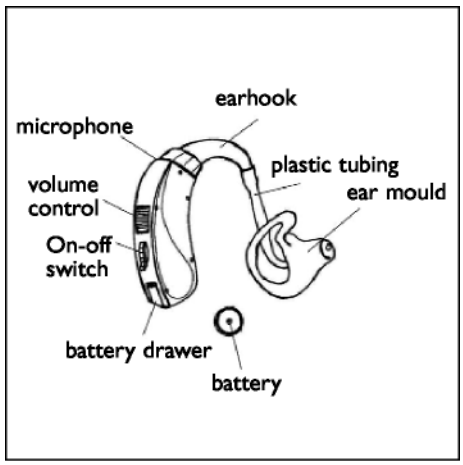


Diagram of BTE hearing aid

Ear hook (BTE hearing aids only) – this rigid plastic hook fits over the top of the ear to hold the hearing aid in position. It is also connected to the plastic tubing of the earmould.

Cord – (BW hearing aids only) – the receiver is attached to the main part of the hearing aid by a cord.This cord can be single (for one receiver), or double (for two receivers).

Receiver is the speaker or ear phone that transmits the amplified sounds to the ear.

Activity 2

¢ Trainees to label the diagrams of a BW and BTE hearing aid in their workbooks.

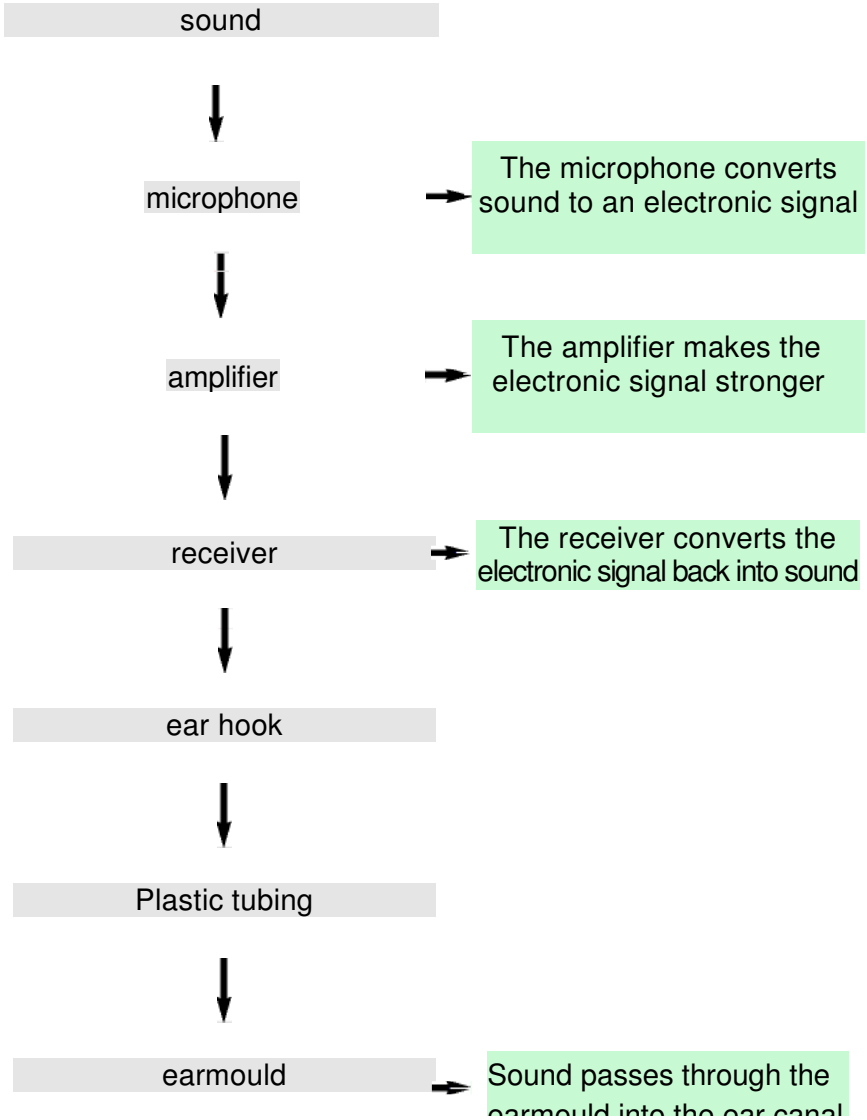
☺ Ask trainees to identify and explain the function of one part of a hearing aid.

6.2 How does sound travel through hearing aids?

m Put up the poster: Flow diagram of how sound travels through the hearing aid
Explain how the sound travels through a BTE and BW hearing aid

The hearing aid picks up sound through the microphone on the top of the hearing aid. The microphone converts the sound to an electronic signal that is then made stronger by the amplifier. This is then passed on to the receiver where it is converted back to sound again. In a BW hearing aid the receiver is outside the main part of the hearing aid and is connected by a cord.The sound enters the ear through the ear mould that is clipped onto the receiver. In a BTE hearing aid the sound travels down the ear hook from the receiver and then through the plastic tubing in the ear mould into the ear canal.

Flow diagram of how sound travels through a BTE hearing aid



Activity 3

¢ Trainees to draw arrows on the diagrams in their workbooks to show how the sound travels through hearing aids.

☺ Trainees explain the route of sound through a hearing aid

6.3 Types of hearing aids

Body-worn (BW) hearing aids

BW hearing aids are a small box worn on the front of the body with a cord leading to the receiver that is clipped into an ear mould in the ear.They are usually used for severe and profound hearing impairment.

Behind-the-ear (BTE) hearing aids

BTE hearing aids are worn behind the ear and are connected by a short length of plastic tubing to an ear mould in the ear.They can be used for all levels of hearing impairment.

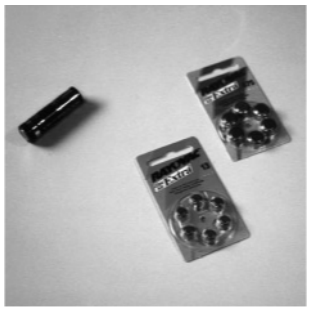
Solar rechargeable hearing aids

A few solar rechargeable BW hearing aids have been designed specifically for people in developing countries.They include a solar panel built into the housing which, when exposed to direct sunlight, charges a rechargeable battery. Solar rechargeable BTE hearing aids are also currently being developed.

7. TYPES OF BATTERY

(PASS AROUND SAMPLES OF THE BATTERIES OUTLINED BELOW)

The correct batteries must be used or the hearing aid will not work properly. For BW hearing aids any standard AA size 1.5 V battery can be used, but long life alkaline batteries are advised (these are more expensive but will last much longer). For BTE hearing aids special hearing aid batteries must be used.The battery life depends on how often the hearing aid is used, at what volume and the power of the hearing aid itself. Batteries may last from just a few days to almost a month.



Remember – the circular LR44 watch/camera batteries should not be used as they will damage a BTE hearing aid

7.1 Fitting a new battery into a hearing aid

Demonstrate how to fit a battery into a BW and BTE hearing aid.

For BW hearing aids place the battery in the battery drawer matching the positive signs together For BTE hearing aids remove the paper from the battery and place it in the battery drawer (not inside the hearing aid) matching the positive signs together. Gently close the battery drawer – do not force it shut. Do not touch the face of the battery as it can clog the aircells that are used in a zinc battery.
Note: the paper cannot be replaced and the battery cannot be put back in the packet to be used later.

7.2 Checking the battery

Demonstrate how to check the battery in a BW and BTE hearing aid.This procedure can be used to check if the battery is working:

- Remove the hearing aid from the ear and take off the ear mould.
- Switch the hearing aid on and turn the volume control to the highest setting
- Place the hearing aid in the palm of your hand. For a BW hearing aid place the receiver next to the microphone.
- If there is a continuous whistling sound the battery is working
- If there is no whistling sound the battery is used. Replace the battery
- If there is still no whistling sound with a new battery then there is a problem with the hearing aid

Activity 4

ø Each trainee to correctly fit a battery into a hearing aid.

Divide the students into groups and give each group a small selection of new and used batteries and a hearing aid. The trainees must then find out which batteries are working and which are used

8. Ear moulds

The ear mould is an <u>essential</u> part of any BTE or BW hearing aid.

8.1 What are earmoulds and why are they needed?

Solid ear moulds

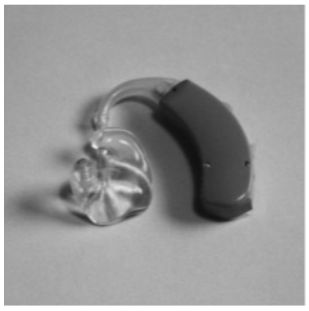
Shell earmoulds

Ear moulds connect the hearing aid itself to the ear.They are made individually for each person so that they fit exactly into the ear. If an ear mould is the wrong size or has been put in the ear incorrectly there is a loud whistling sound. An ear mould that does not fit properly will be uncomfortable and may even be painful. Ear moulds need to be replaced every one to two years. Children, whose ears grow very quickly, will need new ear moulds every few months.

Solid Ear moulds are used with BW hearing aids and are connected to the receiver by a small plastic or metal ring.

Solid or shell Ear moulds are used with BTE hearing aids and are connected to the hearing aid by a short length of flexible plastic tubing

The left ear mould is a mirror image of the right ear mould. Hold the ear mould with the canal part at the bottom and the helix at the top.With the concha (crescent shape) at the back, the direction of the ear canal indicates the ear into which the ear mould is to be fitted.



Earmould fitted right way to BTE hearing aid

Earmould fitted wrong way to BTE hearing aid

Earmould tubing too long

8.2 Fitting the ear mould onto the hearing aid

For a BW hearing aid the ear mould simply clips on to the receiver and can then be fitted into the ear.
For a BTE hearing aid the plastic tubing needs to be cut to the right length. If it is too long the hearing aid will not stay behind the ear properly. If it is too short then the ear hook of the hearing aid will be pulled down on the top of the ear and be uncomfortable.

Remember – the tubing must not get twisted as this will block the pathway of the sound

8.3 Fitting the ear mould into the ear

Demonstrate (using his own ear and ear mould or one of the students) how to correctly fit an ear mould into the ear.
Fitting an ear mould into the ear correctly is not easy and can take some practise:

- Hold the ear mould between the thumb and middle finger.Your first finger helps support the hearing aid.
- Fit the canal part of the mould into the ear canal first.
- Now press the mould into the ear so that it fits into the shape of your ear.

9. HEARING AID CARE AND MAINTENANCE

9.1 Looking after hearing aids

- Do not to drop them – hearing aids are delicate.
- Do not leave hearing aids in direct sunlight or on top of a heater.
- Do not wear hearing aids if you have any ear discharge from an infection without medical advice
- Do not use a pin, paper-clip or any sharp object to remove dirt from hearing aids or ear moulds
- Store hearing aids in their box, in a cool, dry place out of the reach of other children and animals. Don't just put them in a pocket

Activity 5

Trainees suggest ways in which hearing aids may get broken or go wrong

☺ Discuss how these things could be prevented

Some expected answers:
- dropping hearing aids on the floor
- getting hearing aids wet
- handle hearing aids with care
- remove hearing aids forwashing or swimming

- Only use the on-off switch and the volume control – all other controls should only be changed by a trained person
- Remove hearing aids before putting on perfume or hair spray
- Never try to repair hearing aids yourself – if they break return to the place where they were fitted
- Keep cords of BW hearing aids free of knots and do not wind them tightly around the hearing-aids
- Do not get hearing aids wet, remove them for washing and swimming. If hearing aids do get wet, do not put them in the oven or the sun to dry out. Remove the batteries, leave the battery drawers open and put them somewhere safe for a day or two and they may dry out.
- Keep hearing aids in a "staydry" or plastic bag/box containing rice or silica gel crystals to absorb moisture.

9.2 Looking after batteries

- Batteries should be stored in a cool, dry place, away from small children and animals that may swallow them. If a battery is accidentally swallowed seek medical help immediately. In very hot, humid climates batteries can be stored in a refrigerator. Used batteries must be disposed of carefully and not thrown in the fire or left where small children or animals can reach them.
- When the hearing aid is not being used it should be switched off to save the batteries. In hot, humid climates or if the hearing aid is not going to be worn for a long time the battery should be removed from the hearing aid altogether
- Batteries for BW hearing aids can be bought at local shops. Batteries for BTE hearing aids can usually be bought at hearing centres. Batteries should always be bought well within their expiry date.
- For zinc air batteries do not remove the tab on the top of the battery until it is going to be inserted into the battery drawer. Removing the tab causes the battery to discharge.

9.3 Looking after ear moulds

It is very important to keep ear moulds clean so they need to be washed every two or three days:

- Detach the ear moulds from the hearing aids
- Wash the ear moulds in warm soapy water. Do not use strong detergent or spirit.
- Any wax still stuck in the hole through the ear moulds can be carefully removed using a toothpick/thin stick. Be careful not to push the wax further down the tube.
- Rinse the ear moulds in clean water and blow through the tubing to remove any drops of water.
- Dry the ear moulds with a soft cloth or tissue and replace them the correct way around on the hearing aids.

Condensation (small drops of water) sometimes forms in the plastic tubing and can block the ear mould. If this happens, remove the ear mould and tubing from the hearing aid and blow through the tubing.

Note: do not blow into the hearing aid itself

10. HEARING AID FAULT-FINDING

Problem	Problem identified	Solution
Weak or no sound	Hearing aid switched off	Switch hearing aid on
	Volume too low	Increase volume
	Battery running down or used	Replace battery
	Battery not inserted correctly	Insert battery correctly Close
	Battery drawer not closed properly	battery drawer Clean ear
	Ear mould tubing blocked with wax or moisture	mould and tubing
	Ear mould tubing twisted	Replace ear mould tubing
	Cord broken Other	Replace cord
Sound comes and goes	Dirty battery contacts	Send hearing aid for repair
	On-off switch or volume control faulty	_____
	Cord not plugged in correctly Cord faulty	Send hearing aid for repair Send hearing aid for repair
Distorted sound	Volume too high	Push in cord plugs
	Battery running down	Replace cord
	Clothing noise	Decrease volume
	Cord faulty	Replace battery
	Other	Wear hearing aid outside clothing Replace cord Send hearing aid for repair

Hearing aids are expensive and delicate so all wearers must be shown how to look

after the hearing aid. Lost or broken heraing aids are no help for anyone.

POST TEST

Questions	True	False	Don't know
People should clean their ear moulds regularly	✓		
It does not matter if the water gets into the hearing aid		✓	
If the battery drawer is not closed properly there is weak or no sound heard	✓		
Children should be encouraged to wear their hearing aids	✓		
Sound comes and goes if the cord is not plugged in correctly	✓		
Condensation cannot block the ear mould		✓	
Sound is distorted if the volume is too high	✓		
Do not replace the battery if is running down		✓	
Patients must be taught how to care for their hearing aid	✓		
Speech and language development in Hard of hearing children cannot be improved by wearing hearing aids		✓	
Score			

PRIMARY EAR CARE EQUIPMENT

- Cotton applicators, 14cm, serrated
- Head light (spare bulbs)
- Head mirror
- Kidney bowls
- Otoscope (spare bulbs)
- Disposable specula – 2.5mm and 4mm
- Syringes – disposable, various sizes 5,10, 20 ml
- Simple equipment for maintenance of hearing aids and ear moulds

PRIMARY EAR CARE MEDICINES

Oral antibiotics for Acute Otitis Media (Module 5):

- Amoxicillin syrup and tablets
  Usage: 5-10 days. Dosage in children 15 mg/kg 3 times a day.
- Cotrimoxazole syrup and tablets
  Usage: 5-10 days. Dosage in children trimethoprim 4 mg/kg/sulfamethoxozole 20 mg/kg twice a day.

Antiseptics for skin infections of the pinna and ear canal (Module 3 and 4):

- Silversulfadiazine cream
- Clotrimazol cream
- Povidone Iodine topical solution
  Usage: apply twice daily on the affected area.

Eardrops:

Earwax softener (Module 3and 4):

- Sodium bicarbonate 5% ear drops
  Formulation per litre:

sodium bicarbonate	50 g
glycerine	300 ml
purified water	add to 1000 ml

  Usage: fill the ear canal with the solution and syringe after 20 minutes. Repeat if necessary.

- Alternative: soapy water

Acidifying eardrops for mild otitis externa (with closed ear drum) (Module 3 and 4):

- Acetic acid 2%/glycerine 30%/spirit 50% ear drops
  Formulation per litre:

acetic acid (98%)	20 ml
glycerine	300 ml
spirit (96%)	500 ml
purified water	add to 1000 ml

  Usage: 3 times a day 4 drops; refer to ENT if no improvement.

- Alternative: 1 part vinegar and 2 parts purified water

Antibiotic eardrops for Chronic Suppurative Otitis Media (Module 5):

- Ciprofloxacin 0.3% or Ofloxacin 0.3% eardrops
  Usage: 2 times a day 3 drops, but not longer than 2 weeks. Refer to ENT if the ear is still discharging.

Intravenous antibiotics for mastoid abscess (Module 5).

Refer to the hospital immediately. In case of delay, incise and drain the abscess and start parenteral antibiotics. Give chloramphenicol (25 mg/kg every 8 hours IM or IV) and benzylpenicillin (50 000 units/kg every 6 hours) until the child improves; then continue oral chloramphenicol every 8 hours for a total course of 10 days.