

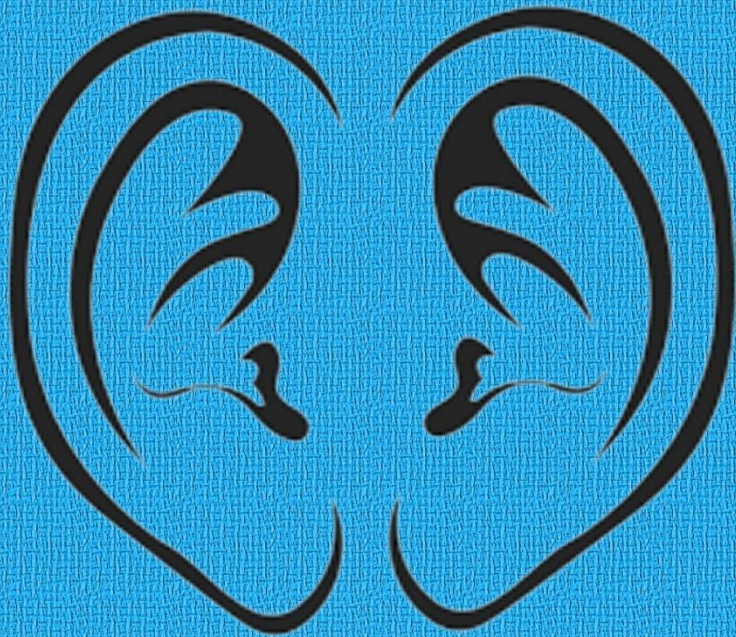


Federal Ministry of Health of Ethiopia
Ear and Hearing care Guideline



Federal Ministry of Health

Ear & Hearing Care Guideline



JULY 2019

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FOREWORD

The World report on disability of 2011 estimated that more than one billion people in the world live with some form of disability ,of whom nearly 200 million will experience considerable difficulties in functions.

93 million of people with disability are children. Eighty percent (80%) of persons with disability live in low and middle income countries. World health organization estimates that 360 million persons suffer from disabling hearing impairment.

In Ethiopia, taking WHO's estimate for Sub-Saharan Countries, 5.3 million (5.3%) people are believed to live with disabling hearing impairment. Hearing impairment affects language acquisition and school performance of children. In Adults, hearing impairment has a negative impact on their social interaction and their productivity. It is also associated with significant social stigma.

Most of the causes of hearing impairment can easily be prevented by simple interventions like: immunization, maternal and newborn care, protection of ears from noise and ototoxic drugs and early recognition and management. Implementing neonatal screening services of paramount importance. Currently, hearing services in Ethiopia are almost non-existent. This document will be highly instrumental to efficiently deliver ear and hearing care services to all Ethiopians.

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ABBREVIATIONS

ABR	Auditory Brainstem Response
AAU	Addis Ababa University
CBR	Community Based Rehabilitation
CSOM	Chronic Suppurative Otitis Media
EHC	Ear and Hearing Care
ENT	Ear Nose and Throat
ENT COs	Ear, Nose & Throat Clinical Officers
MOH	Ministry of Health
OAE	Otoacoustic Emissions
OME	Otitis Media with Effusion
SLT	Speech and Language Therapist
SPHMMC	St Paul's Hospital Millennium---
URTIs	Upper respiratory Tract Infections
VNG	Videonystagmography
WHO	World Health Organization

A. GUIDELINES FOR ESTABLISHMENT AND MANAGEMENT OF EAR AND HEARING CARE UNITS

This section highlights the Equipment, Consumables Physical Infrastructure and Human resources' required to setup an Ear Nose and Throat (ENT), Audiology and Speech and Language Therapy (SLT) Units in a health facility depending on the level (level I to level IV) of the facility.

Levels: Depending on the health care tier system of the country, the levels are classified as follows.

1. Primary health care(Health post,Health centers and Primary Hospitals)
2. General/Zonal hospitals
3. Tertiary /Specialized hospitals delivering comprehensive ENT services
4. ENT centers of excellence

Equipment

	EAR NOSE AND THROAT (ENT)	AUDIOLOGY AND SPEECH AND LANGUAGE (SLT) THERAPY	CONSUMABLES
Level I	<ol style="list-style-type: none"> 1. Head light (spare bulbs) 2. Head mirror 3. Otoscope (spare bulbs) 4. Otoscope speculums 5. Syringe Ear (metal) 6. Fork Tuning – 512 Hz 7. Specula Nasal (thudicum's) No. 5/set 8. Apron – Tarpaulin (0.75G, 2 metres& tailoring) 9. Forceps Tilley's 10. Forceps Crocodile 11. Probes Aural (jobson's) 12. FB hook 13. Hook Cerumen 14. Dishes Kidney 10" 15. Bowls (L) 16. Tray ss 18"x12" 17. Sterilizer 12" 18. Tweezer College 6" 19. Pot Gully (Large and small) 20. Scissor Surgical 21. Suction machine and suction nozzles 22. Laryngeal mirror 		<ol style="list-style-type: none"> 1. Glycerine Pure Medicinal (atl. Wicks ZIPP) 100ml 2. Sticks Orange (applicator sticks) No. 500/pack 3. Masks Face Surgical No. 50/pack 4. Depressor Tongue Wooden 100/pack 5. Hydrogen Peroxide Antiseptics 200ml 6. Cotton Wool Roll 7. Spirit Surgical 5lt 8. Liquid paraffin 9. Swabs Gauze N-S 7.5cm 100pcs/pack 10. Blades Surgical 11. Gloves Exam N-S

			ambidex 100/pack 12. Plaster Adhesive (ZOP) 13. Savlon 14. Syringes Needles
Level II	1. Head light (spare bulbs) 2. Head mirror 3. Otoscope (spare bulbs) 4. Otoscope speculums 5. Syringe Ear (metal) 6. Fork Tuning – 512 Hz 7. Specula Nasal (thudicum’s) No. 5/set 8. Apron – Tarpaulin (0.75G, 2 metres& tailoring) 9. Forceps Tilley’s 10. Forceps Crocodile 11. Probes Aural (jobson’s) 12. FB hook 13. Hook Cerumen 14. Dishes Kidney 10” 15. Bowls (L) 16. Tray ss 18”x12” 17. Sterilizer 12” 18. Tweezer College 6” 19. Pot Gully (Large and small) 20. Scissor Surgical 21. Suction machine and suction nozzles 22. Laryngeal mirror 23. -Siegle’s pneumatic bulb 24. Minor surgical set 25. Cricothyrotomy/Tracheotomy set 26. Posteriorrhinoscopy mirror 27. Nasal foreign body hook 28. Quinsy forceps	Screening Audiometer Screening otoacoustic emission	1. Glycerine Pure Medicinal (atl. Wicks ZIPP) 100ml 2. Sticks Orange (applicator sticks) No. 500/pack 3. Masks Face Surgical No. 50/pack 4. Depressor Tongue Wooden 100/pack 5. Hydrogen Peroxide Antiseptics 200ml 6. Cotton Wool Roll 7. Spirit Surgical 5lt 8. Liquid paraffin 9. Swabs Gauze N-S 7.5cm 100pcs/pack 10. Blades Surgical 11. Gloves Exam N-S ambidex 100/pack 12. Plaster

			Adhesive (ZOP) 13. Savalon 14. Syringes Needles 15. Syringes Needles 16. tracheostomy tube/plastic/ 17. portextrachy tube
LEVE L III	All in Level II equipment Plus 1. Adenotonsillectomy set 2. Operating microscope 3. Mastoidectomy set 4. Rhinoplasty set 5. Bronchoscopy set 6. Larngoscopy/ Oesophagoscopy set 7. Headlight, Light Cable, Light source 8. Rigid & Flexible Nasal Endoscope 9. Otological drill 10. ENT examination table 11. Tymanoplasty/ossiculoplasty set 12. Stapedectomy set 13. Facial fracture set 14. Coablator unit 15. Co2 laser unit 16. TELE CAM one-chip Endoscopic camera	All in Level II equipment Plus 1. Diagnostic Audiometer 2. Tympanometer 3. Otoacoustic Emmissions Machine (OAES) 4. Earmould Laboratorytools 5. Hearing Aids 6. Hearing Aid Tools 7. Paediatric Behavioral Assessment tools:- paediatric audiometer, Chime bar- C & G, sound level meter, high frequency rattle 8. BERA (Brainstem evoked response Audiometry)	All in Level II consumables Plus 1. Gelfoam 2. Nasal packs 3. Haemolock 4. Ear impression materials 5. Earmould materials 6. Ear impression syringe 7. Penlight 8. Stationeries- thermal roll, 9. Audiogram forms 10. Spray Xylocain (10% lignocain) 11. Hearing Aids batteries 12. TORP 13. PORP 14. Stapes Prosthesis 15. Bone Wax
LEVE L IV	All in Level III Equipment Plus 1. Facial Nerve monitor 2. Stroboscopy 3. Micro Laryngeal set 4. ENT examination Unit	All in Level III Equipment Plus 1. Visual Reinforced Audiometry equipment 2. Speech Audiometry	All in Level III Consumables Plus 1. Insert foam tips 2. Gel

	<p>5. Video Display Unit 6. Fully Equipped Temporal Bone Lab 7. VOXEL-MAN ENT Surgical Simulator (2) 8. 3D Printer for Ear Molds & Hearing Aid Laboratory</p>	<p>equipment 3. Auditory Brainstem Response (ABR) machine 4. Videonystagmography machine (VNG)</p>	<p>3. Scrub Gel 4. BAHA 5. Cochlear Implant 6. Titanium Micro Plate 7. BallonSinuplasty Set 8. Airway Balloon Dilator 9. Voice Prosthesis 10. Laryngectomy tube</p>
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INFRASTRUCTURE

	ENT	AUDIOLOGY AND SPEECH AND LANGUAGE (SLT) THERAPY
LEVEL I	1. ENT consultation room	
LEVEL II	ENT consultation room ENT procedure room	Audiology Consultation Room
LEVEL III	<p>Level II Infrastructure Plus</p> <ol style="list-style-type: none"> Fully fledged ENT Department ENT Filter consulting rooms ENT Consultant rooms ENT Wards Minor OR ENT 2-Operating Theatre Temporal dissection lab 	<p>Level II Infrastructure Plus</p> <ol style="list-style-type: none"> Soundproofed rooms/ booths SLT Consultation room Ear mould Laboratory room
LEVEL IV	<p>All in Level III Infrastructure plus:</p> <ul style="list-style-type: none"> -Equipment for laser surgery -Separate ENT block -Separate 4-OR Theatre 	<p>All in Level III Infrastructure plus-</p> <ul style="list-style-type: none"> -VNG examination room

HUMAN RESOURCE

	Profession	Number of Professionals
<i>Otology National Center of Excellence</i>	<i>Otologist-Neurotologists</i>	6
	<i>ENT surgeons</i>	10
	<i>ENT nurses /Mid level ENT professionals</i>	20
	<i>Audiology technologists and audiology technicians</i>	3
	<i>Speech and language therapists</i>	4
	<i>Ear mould technicians</i>	3
	<i>Audiologist</i>	6
LEVEL III	♦ <i>ENT Surgeon</i>	4
	<i>Otologist-Neurotologists-2</i> <i>Pediatrics ENT surgeons-2</i>	
	♦ <i>Head and Neck surgeons-2</i> <i>FEES –Skull base surgeons-2</i> <i>Laryngologist -2</i>	
	♦ <i>ENT Nurse/ Mid level ENT professionals</i>	25
	♦ <i>Audiologist</i>	2
	♦ <i>Audiology Technologist and Audiology Technician</i>	3
	♦ <i>Speech and Language Therapist</i>	2
	♦ <i>Ear mould Technician</i>	2
LEVEL II	♦ <i>ENT Surgeon</i>	2
	♦ <i>ENT Nurse/Mid level ENT professionals</i>	4
	♦ <i>Audiology Technologist and Audiology Technician</i>	2
	♦ <i>Speech and Language Therapist (Optional)</i>	1
Level I	<i>ENT Nurse/Mid level ENT professionals</i>	2
	♦ <i>Primary Ear and Hearing Care worker (PEHC)</i>	8
	♦ <i>Community Health worker</i>	

B. PROTOCOLS FOR EAR AND HEARING CARE

MAIN OBJECTIVES

At the end of these Guidelines, the Ear and Hearing care worker should:

1. Become a competent Ear and Hearing Care worker.
2. Identify the best possible solutions for ear disease and hearing problems, their prevention and management.
3. Evaluate information regarding ear disease and/or hearing problems
4. Use appropriate technology to enhance ear and hearing care.
5. Be culturally sensitive across a range of social contexts.

CHAPTER 1: HEARING IMPAIRMENT AND DEAFNESS

1.1 OBJECTIVES:

At the end of this chapter, the ear and hearing care worker should be able to:

1. Identify and explain common causes of hearing impairment
2. Describe the risk factors for hearing impairment
3. Understand hearing impairment preventive measures
4. Understand the different types of hearing impairment
5. Understand the different levels of hearing impairment

1.2 CAUSES OF HEARING IMPAIRMENT

- ◆ Genetic (hereditary) causes
- ◆ Problems during pregnancy
- ◆ Difficulties during or just after birth
- ◆ Childhood diseases
- ◆ Ear infections
- ◆ Drugs that can damage hearing (ototoxic drugs)
- ◆ Noise
- ◆ Accidents
- ◆ Old age
- ◆ Wax
- ◆ Middle ear fluid (glue ear)
- ◆ Foreign bodies
- ◆ Consanguineous marriage

◆ Systemic Diseases

1.3 LEVELS OF HEARING IMPAIRMENT

- ◆ No hearing impairment
- ◆ Slight hearing impairment
- ◆ Moderate hearing impairment
- ◆ Severe hearing impairment
- ◆ Profound hearing impairment (Deafness)

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

1.4 THE EFFECTS OF HEARING IMPAIRMENT ON SPEECH AND LANGUAGE

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 develop speech and language without intervention.

Amplification of sound by use of hearing aids or cochlear implants helps to improve hearing and enhance the development of speech and language. Sign Language is one of the interventions provided for children and adults with profound deafness.

1.5 WHY IDENTIFYING HEARING IMPAIRMENT IS IMPORTANT IN CHILDREN

- ◆ Good hearing is important for speech and language development.
- ◆ Good speech and hearing are important for communication and socialization.
- ◆ 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

1.6 PREVENTION OF HEARING IMPAIRMENT AND DEAFNESS?

- ◆ Genetic counseling
- ◆ Prevention of ear infections
- ◆ Ear Hygiene
- ◆ Vaccinations
- ◆ Ototoxic drugs
- ◆ Protection of ears from noise

CHAPTER 2: EXTERNAL EAR EXAMINATION AND TREATMENT

2.1 OBJECTIVES

At the end of this chapter, the ear and hearing care worker should be able to:

1. Examine the pinna
2. Use an otoscope
3. Examine the ear canal
4. Diagnose problems of the outer ear
5. Manage and or make appropriate referral of conditions of the outer ear

2.2 EXAMINATION OF THE PINNA

- ◆ Check for malformations of the pinna for example an absent pinna
- ◆ Check for infection of the skin around the ear or the pinna
- ◆ Check if the pinna is swollen or inflamed
- ◆ Check for any injury to the pinna
- ◆ Check for any abscess on the pinna
- ◆ Check for any pre auricular sinus (tiny hole) in front of the pinna
- ◆ Check if the pre auricular sinus is infected.
- ◆ Check for any post auricular swelling, tenderness or discharge.

2.3 EXAMINATION OF THE EAR CANAL

This examination will be done using an otoscope or a headlight

- ◆ Check for impacted wax in the ear canal
- ◆ Check for any foreign body in the ear canal
- ◆ Check for any discharge in the ear canal
- ◆ Check the skin lining of the ear canal for inflammation and/or swelling.
- ◆ Check for any abnormalities of the ear canal for example stenosis or narrowing.

ALWAYS ... CHANGE OR WASH THE SPECULUM AFTER EXAMINING THE EAR. THIS PREVENTS SPREAD OF INFECTION FROM ONE EAR TO THE OTHER. EXAMINE THE GOOD EAR FIRST.

2.4 CONDITIONS OF THE EXTERNAL EAR AND THEIR MANAGEMENT

2.4.1 PINNA

i) Superficial skin infections Treatment

- Treat by cleaning the affected area with iodine solution. Some patients may need antibiotics such as Amoxicillin/ Cloxacillin
- If there is no improvement after 5 days refer to the next level for further management.

ii) Deep Infection with Swelling of the Pinna

a) Cellulitis

- ◆ Analgesics
- ◆ Oral Antibiotics: Amoxicillin/Cloxacillin

b) Auricular Abscess.

- ◆ Refer to the Secondary Level for Incision and Drainage of the abscess

iii) Injury to the pinna

a) Haematoma

- ◆ Needle aspiration OR Refer to the Secondary Level for Incision and drainage of the haematoma.

b) Lacerations/cuts

- ◆ Stitch under L/A using mono filament synthetic suture preferably
- ◆ Have pressure dressing
- ◆ Remove stitch on 10 day
- ◆ Give Oral antibiotics and analgesics
- ◆ Inject Tetanus Toxoid vaccine
- ◆ Refer if massive and complete avulsion in <4hrs at 4 centigrade

c) Human/Animal bites

- ◆ Clean and perform daily dressing of the wound
- ◆ Give oral antibiotics and analgesics
- ◆ Inject Tetanus Toxoid vaccine
- ◆ Refer if massive

iv) Pre-auricular sinus (tiny "hole" in front of the

pinna) Treatment

Congenital malformation affecting 5% of population only
needing treatment if they become symptomatic

If not infected then no treatment is needed.

If infected then:

- ◆ Start an antibiotic and if recurrent ,refer to secondary level
- ◆ For an abscess, refer for incision and drainage at the secondary level

v) Deformities of the pinna

- ◆ Refer to tertiary level

2.4.2 THE EAR CANAL

A) FOREIGN BODY

- ◆ Inanimate- vegetable seeds and non-vegetable
- ◆ Animate- such as insects

Treatment

1) Removal

- Inanimate- removal with either forceps, loop, hook or syringing. Do not syringe plant seeds e.g. maize.
- Animate- removal with either forceps or syringing. If insect is alive, drown it by instilling Liquid Paraffin or if animate and has hook/firmly attach it self with skin preferably install 2ml-3ml 4%/2% lidocaine before removal.
- Don't attempt if child is not cooperative and don't attempt more than 2 times.

2) If unsuccessful, refer to secondary level for removal.

B) WAX

Treatment

1) Wax Removal

- ◆ Wax does not need to be removed if not blocking more than 80% the ear canal as cause of conductive hearing loss or if it occlude examination of tympanic membrane.

- ◆ impacted wax: Soften the wax with 2/3% hydrogen peroxide ear drops instilled four times a day for two days /if it is dry and impacted wax in bony canal , use olive oil (paraffin) for 3-5day and then perform syringing.

2) Referral

- ◆ Where the wax cannot be safely removed refer to secondary level.
- ◆ Where patient gives a history of ear discharge or perforation refer to secondary level.

C) OTITIS EXTERNA

i) Treatment

- Aural toilet

Antibiotic/Steroid ear drops

-Alcohol/acid (acetic or boric) mixtures

Or neomycin/polymyxin/hydrocortisone

Ciprofloxacin

Teracortear drop

- Analgesics
- Oral Antibiotics- combination of amoxicillin/ cloxacillin

Patients with severe or spreading infection (cellulitis,lymphadenitis) require added oral - ciprofloxacin or levofloxacin/in pediaetrics-cephalexin/

***ACUTE LOCALIZED OTITIS EXTERNA (FURUNCULOSIS OF THE EAR CANAL**

Should be oral therapy with Cephalexin/Clindamycin, dicloxacillin, TMP/SMX

ii) Referral

- Otitis Externa in a known diabetic should be referred to the secondary level.
- Otitis externa which does not heal after one week of adequate treatment should be referred to secondary level.

CHAPTER 3: THE MIDDLE EAR EXAMINATION AND TREATMENT

3.1 OBJECTIVES:

At the end of this chapter, the ear and hearing care worker should be able to:

1. Examine the eardrum using an otoscope
2. Identify common middle ear problems
3. Identify the complications of middle ear disease
4. Treat and or refer common middle ear problems

3.2 EXAMINATION OF THE EARDRUM

- Check for perforation, ear discharge, colour, bulging, inflammation, retraction, aural polyps, fluid levels and bubbles
- In case of traumatic ear perforation start on analgesics, advice to keep the ear dry and refer to the next level. Don't put ear drops (it's a sterile perforation)

3.3 CONDITIONS OF THE MIDDLE EAR AND MANAGEMENT

3.3.1 ACUTE OTITIS MEDIA

History

- Ear pain
- Fever
- Irritability
- Hearing loss

Examination

- ◆ Inflamed/bulging tympanic membrane
- ◆ Ear discharge +/-
- ◆ Perforation +/-

Treatment

Antibiotic – Amoxicillin high dose(80mg/kg), or high-dose amox/clav for a 5-7 days or 2nd line Ceftriaxone (Rocephin) IM one injection daily (or every day) x3day

- ◆ Analgesics
- ◆ Review again after 1 week
- ◆ Keep ear dry in case there is perforation and ear discharge

Refer if there is:

- ◆ Vomiting ,vertigo
- ◆ Drowsiness
- ◆ Neck stiffness
- ◆ Swelling behind the ear
- ◆ If there is still fever or ear pain after 5 days of antibiotic treatment
- ◆ Hearing impairment after infection has cleared

3.3.2 CHRONIC SUPPURATIVE OTITIS MEDIA (CSOM)

History

- ◆ Discharge from the ear for more than 2 weeks
- ◆ No fever
- ◆ No pain

Examination

- ◆ Perforation
- ◆ Ear discharge +/-

Treatment

- ◆ Aural Toilet-Dry mopping or ear suction

Topical antibiotic ear drops- Ciprofloxacin ear drops for a 2 weeks or 2nd line -Povidone-iodine (Betadine),Boric acid/iodine powder

- ◆ Avoid water getting into the ear e.g. plug ear canal with vaselinecotton wool when bathing and remove thereafter
- ◆ Follow-up after one month and test for hearing
- ◆ If perforation persists for 1 month and there is recurrent ear discharge, the child should be referred to the next level
- ◆ Refer to secondary level health facility for tympanoplasty

Refer if there is :

- ◆ Recurrent discharge
- ◆ Pain in ears
- ◆ Severe Headache
- ◆ Swelling behind the ears
- ◆ Balance problems
- ◆ Facial palsy
- ◆ Impaired level of consciousness
- ◆ No improvement after 1 month of treatment or if the discharge is decreased but it still foul smelling.
- ◆ Hearing impairment when infection has cleared

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

History

- ◆ History of hearing loss
- ◆ Delayed speech and language development +/-
- ◆ Ear fullness or blockage
- ◆ Usually no ear pain or fever

Examination

- ◆ Bulging and dull tympanic membrane
- ◆ Fluid levels or bubbles behind the ear drum and conductive HL

Treatment

- ◆ Usually resolves spontaneously
- ◆ Treat any underlying Respiratory Tract Infection (especially-adenoiditis in children)
- ◆ Treat with oral Antibiotics – Amoxicillin in case of ear pain or fever /in children < 3years with HL >40Db OR in unvaccinated children ;amoxacillin/calv
- ◆ See patient again after 1 month for review and hearing test
- ◆ refer OME if it persist for 3 month

Referral

- ◆ If there is hearing loss, refer to secondary health facility for further management.

3.4 COMPLICATIONS OF EAR INFECTIONS

- ◆ Mastoiditis
- ◆ Meningitis
- ◆ Petrositis
- ◆ Labyrinthitis
- ◆ Otitic Hydrocephalus
- ◆ Brain Abscess
- ◆ Lateral Sinus Thrombosis
- ◆ Facial Nerve Palsy
- ◆ Balance problems

CHAPTER 4: ASSESSING HEARING AND COUNSELLING

4.0 OBJECTIVES:

At the end of this chapter, the ear and hearing care worker should be able to:

- ◆ Describe hearing screening in babies.
- ◆ Describe hearing assessment in young children.
- ◆ Describe hearing assessment in adults and older children
- ◆ Explain the results of hearing screening assessment
- ◆ Conduct counseling of patients with hearing impairment and their families
- ◆ Conduct community awareness activities

4.1 CHECK LIST FOR HEARING AND SPEECH AND LANGUAGE DEVELOPMENT

4.1.1 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 identify different sounds
- ◆ he/she cannot dance/sing in time to music

REMEMBER:

- ◆ Babies who cannot hear properly will grow up with problems in communication and will not be able to learn properly. The hearing problem can affect their speech and language development
- ◆ Never ignore possible hearing impairment in a baby or a child

4.1.2 Signs to look for if you think a child has a hearing and language problem

New-born:	Startles to a loud sound
0–3 months:	Soothed by moderately loud voice or music
3–4 months:	Turns towards the source of a sound
6–8 months:	Turns and locates the source of a quiet sound Babble sounds appear e.g. Dada
12 months:	Increased babble and the first word is heard Understands one or two simple instructions e.g. “clap hands”
18 months:	Says at least six words
2 years:	Joins two words together
3 years:	Talking in sentences. Speech mainly clear.

4.1.3 HEARING LOSS QUESTIONNAIRE

1. Can the child hear a loud noise e.g. door banging?
2. Does the child respond when his name is called?
3. Do people have to shout for the child to hear?
4. Can the child hear the dog barking?

5. Does the child ask people to repeat what they have said?
6. Does the child speak as well as other children of the same age?
7. Does the child hear quiet sounds?
8. Do you have to raise your voice to get the child's attention?

REMEMBER:

Never ignore possible hearing impairment in a baby or a child.

Refer the child for hearing assessment.

4.2 METHODS OF HEARING ASSESSMENT

1. By "Voice Test"
2. Distraction test
3. Visual Reinforced Audiometry
4. Conditioned Play Audiometry
5. Audiometry testing.
6. Objective tests- Otoacoustic Emissions and Auditory Brainstem Response Audiometry

4.2.1 THE VOICE TEST: How to assess hearing using the voice test

- ◆ Stand about an arm's length away behind and to one side of the patient
- ◆ Reach around and close off the other ear by pressing on the tragus

- ◆ Speak words 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
- ◆ Change sides and test the other ear
- ◆ If patient cannot repeat what you have said repeat the test using a shouted voice close to the ear. Use several different words.
- ◆ If they cannot hear you and repeat what you said they have severe hearing impairment
- ◆ Change sides and test the other ear

4.2.2 DISTRACTION TEST

This is a behavioural test used to assess hearing in children between the ages of 7 months and 18 months. Two testers are involved in performing this test. One tester holds the child's attention from the front while the other presents a sound to the child from a position which is outside of the child's visual field. The sound stimulus is introduced at a low intensity of 30 dB(A) and then gradually increased until the child responds by making a head turn to locate the sound. The sound stimulus is presented separately at high, mid and low frequencies.

4.2.3 VISUAL REINFORCED AUDIOMETRY

This test is suitable for assessing hearing in children between the ages of 7 months and 30 months. The equipment needed for this test is a sound source and a visual reinforcer. The visual reinforcer is in the form of a moving toy or a flashing light. The child is conditioned (trained) to turn his/her head to the visual reinforcer when he/she hears a sound. The sound is presented through insert phones, headphones or loudspeakers at the following test frequencies: 0.5, 1, 2 and 4 KHz.

Two testers are involved in performing this test. One tester presents the sounds and visual reinforcement and the other one trains the child to turn to the sound. The sound is presented first and the visual reinforcer is only introduced after the infant has turned to locate the sound. In this way sounds of different frequencies can be presented.

The screening level chosen is usually 30/35 db when using loud-speakers.

4.2.4 CONDITIONED PLAY AUDIOMETRY

This test is suitable for children from 2.5 years up to 5years. The child is conditioned (trained) to make a response to sound stimuli by placing an object in a box upon hearing the sound that has been presented. The sounds can be presented through either headphones, insert phones, loudspeakers or hand held warblers. The frequencies tested are 0.5, 1, 2,4 kHz and the results recorded on an audiogram form.

4.2.5 AUDIOMETRY TEST

This can either be a screening or diagnostic audiometry test. Sound stimuli is introduced to the ears through headphones and testing carried out by air conduction at frequencies 0.25, 0.5 1, 2,4 and 8 kHz. The World Health Organization (W.H.O) grading of hearing loss is: Mild (26-40 dB), Moderate (Children 31-60 dB; Adults 41-60 dB), Severe (61-80 dB), Profound(81 dB or more).

Screening Audiometry provides information on the level of hearing. Diagnostic audiometry provides information on the level of hearing and characterizes the hearing loss into three categories namely: conductive, sensorineural or Mixed Hearing loss.

4.2.6 OBJECTIVE HEARING TESTS

4.2.6.1 Otoacoustic Emissions.

Otoacoustic Emissions (OAEs) are low intensity sounds that are generated by the cochlear in response to a sound stimulus presented to the ear. The OAEs used can either be Transient Otoacoustic Emissions (TOAEs) or Distortion Product Otoacoustic Emissions (DPOAEs). This test is commonly used in newborn and infant hearing screening programmes. It can be done at all levels of healthcare.

The OAE hearing screening test is conducted by placing a probe into the ear canal. The test is simple, quick and non-invasive. The results obtained can be either a pass or refer.

- ◆ **A pass result indicates that hearing is within normal range.**
- ◆ **If the results indicate a “refer”, then diagnostic ABR hearing testing is recommended.**

4.2.6.2 Auditory Brainstem Response (ABR) Audiometry

The Auditory brainstem response (ABR) audiometry is an electrophysiologic measurement of hearing. The ABR test is conducted by placing three electrodes on the child’s scalp and presenting sound to the ear using insert earphones. ABR is used for either screening or diagnostic hearing assessment. The automated version of ABR (A-ABR) is designed for newborn hearing screening.

The results obtained from an A-ABR screening test can either be a pass or refer.

- ◆ **A pass result indicates that hearing is within the normal range.**
- ◆ **If the results of the A-ABR test indicate a “refer”, then a diagnostic ABR is recommended.**

4.3 COUNSELLING

Advice and support when there is someone in the family with hearing impairment should be given to the following persons:

- ◆ The patient or guardian
- ◆ Parents and family members

4.3.1 Advice to parents with a hearing impaired 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

4.3.2 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

CHAPTER 5: RE/HABILITATION OF HEARING IMPAIRMENT AND DEAFNESS

5.1 OBJECTIVES:

At the end of this chapter, the ear and hearing care worker should be able to;-

1. Know what a hearing aid is
2. Know the function and the different types of hearing aids.
3. Advice on basic maintenance and care of a hearing aid

5.2 WHAT IS A HEARING AID AND WHO REQUIRES HEARING AIDS?

A hearing aid is an electrical device worn on the ear to enable hearing impaired persons to hear better and louder.

Almost everyone, young and old, who has hearing impairment can be helped to hear better by wearing 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 the hearing impairment is identified

- ◆ the degree of hearing impairment , slight, moderate, severe, profound
- ◆ how motivated the hearing aid wearers are to wear and use hearing aids
- ◆ how well hearing aids are fitted and maintained.
- ◆ the help and support available to learn to use hearing aids.

5.3 THE FUNCTION OF A HEARING AID AND THE TYPES OF HEARING AIDS

5.3.1 The function of a hearing aid is to amplify sound for the individual with hearing impairment.

Hearing aids help the person with hearing loss to hear and understand speech better. Hearing aids should be fitted as soon as hearing impairment is identified, especially for babies and young children. Young children need to hear well in order to develop speech and language

5.3.2 Hearing Aids can either be Digital or Analogue. The types of hearing aids are as follows:

1. Behind the ear
2. Custom Hearing Aids such as in the ear, completely in the canal hearing aids
3. Receiver-in-the Canal
4. Body worn

5.3.3 Types of implantable hearing devices are as follows:

1. Cochlear Implants
2. Bone Anchored Hearing aid (BAHA)

5.4 HEARING AID CARE AND MAINTENANCE

Hearing aids are expensive and delicate so all wearers must be shown how to look after the hearing aid.

5.4.1 Looking after hearing aids

DO:

- ◆ Use a soft dry cloth to clean the hearing aids
- ◆ Use a small brush or tooth pick to remove dirt or wax from the earmould
- ◆ Remove hearing aids before putting on perfume or hair spray
- ◆ Store hearing aids in a cool, dry place preferably in a box with silica gel crystals or rice to help absorb moisture.

DO NOT:

- ◆ Drop them – hearing aids are delicate.
- ◆ Get hearing aids wet - remove them when bathing or swimming
- ◆ Leave hearing aids in direct sunlight or on top of a heater.
- ◆ Wear hearing aids if you have any ear discharge from an infection
- ◆ Use a pin, paper-clip or any sharp object to remove dirt from hearing aids or ear molds
- ◆ Try to repair hearing aids yourself - if they break return them to the place where they were fitted.

CHAPTER 6.0: BASIC EAR CARE PROCEDURES

6.1 OBJECTIVES

At the end of this chapter, the ear and hearing care worker should be able to:

Do the following basic ear procedures:

6.2 DRY MOPPING AND WICKING

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
- ◆ 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!

6.3 SYRINGING

Do not syringe if you suspect perforation in the eardrum

Refer these patients

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

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.

REMEMBER: Blocked ears can cause temporary hearing impairment!

After removal of the foreign body check that the hearing is normal.

6.3 HOW TO PUT IN EARDROPS

Follow these steps when instilling eardrops:

- ◆ Examine the ear canal and eardrum with an otoscope
- ◆ Clean out the ear canal – dry mopping
- ◆ 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
- ◆ Instill 2 or 3 eardrops into the ear canal

- ◆ Move the pinna to make sure the eardrops go to the bottom of the ear canal
- ◆ Instill 2 or 3 more eardrops
- ◆ "Pump" the tragus (repeatedly 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 ear canal with cotton wool

CHAPTER 7: PROMOTION OF EAR AND HEARING CARE & PREVENTION OF HEARING LOSS

7.1 Pre-natal: Promotion and Prevention

DISORDER	PROMOTION AND PREVENTION		
	Primary Prevention	Secondary Prevention	Tertiary Prevention
Rubella	Immunization	Early Detection by screening all or high risk groups and treatment if available	Hearing Aids Special Education Habilitation
Syphilis, Toxoplasmosis	Health Education and Treatment of Mother		
Iodine Deficiency	Nutrition and Supplementation		
Ototoxicity	Avoidance, Rational Use		
Genetic Causes	Health Education, Counselling, Identification of Carriers		

7.2 Peri natal/ Neonatal: Promotion and Prevention

DISORDER	PROMOTION AND PREVENTION		
	Primary	Secondary	Tertiary
Low Birth Weight	Nutrition, Antenatal Care	Early Detection by screening all or High risk groups and treatment if available	Hearing Aids Special Education Habilitation
Birth Trauma, Hypoxia	Improved Birth Practice		
Herpes Simplex	Caesarian Section		
Cytomegalovirus	Personal Hygiene, Health Education		
Jaundice	Detection of at risk groups		
Ototoxicity	Avoidance, Rational use of drugs		

7.3 Promotion and Prevention in Childhood

DISORDER	PROMOTION AND PREVENTION		
	Primary	Secondary	Tertiary
Impacted Wax, Otitis Externa, Foreign Bodies	Personal Hygiene Health Education	Health Education and screening for early recognition of disease and hearing loss and prompt treatment of disease and/or complications Case	Surgery, Hearing Aids, Special Education, Re/Habilitation, Social Integration as appropriate
Acute and Chronic Otitis Media	Personal Hygiene, Better Living Conditions, Proper management of URTIs better nutrition, breastfeeding		
Measles, Mumps	Immunization		
Cerebral Malaria	Vector reduction and prophylaxis		
Meningitis	Prophylaxis and immunization		
Ototoxicity	Avoidance, Rational use of drugs		

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