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## **SED – 14 INTRODUCTION TO SENSORY DISABILITIES**

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### **COURSE INTRODUCTION**

This Course consists of Five Units dealing with children with sensory disabilities viz., Hearing Impairment, Visual Impairment and Deaf blind. This course is designed to provide a basic understanding to the student teachers about the nature and needs of different types of sensory disabilities. It will also equip in undertaking screening, planning and instructing students with sensory disabilities.

**Block 1 & 2** deal with nature and impact of Hearing impairment. Block 1 explains on the single and dual sensory impairment, importance, process of hearing, definitions of hearing impairment and challenges due to hearing impairment. Block 2 deals with the impact of different degree of hearing impairment, need for early intervention, communication options, issues and measures in literacy development of hearing impaired and restoring and rehabilitation techniques.

**Block 3 & 4** describe the nature, assessment and educational implications of Visual Impairment. Block 3 deals with the process of seeing, blindness and low vision, importance of early intervention, assessment procedures for visually impaired. Block 4 deals with effects of blindness, educational placement and advanced assistive devices for visually impaired, core-curriculum and teaching principles for visually impaired.

**Block 5** explains the concept of deaf-blindness, its effect on daily living and education, assessment procedure of deaf-blindness, fostering early communication development and addressing the orientation, mobility and educational needs of children with deaf-blindness.

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**BLOCK 1 HEARING IMPAIRMENT: NATURE AND CLASSIFICATION**

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## **INTRODUCTION**

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A person is said having hearing loss, if he is unable to hear as of someone with normal hearing. Over 5% (466 million people) of the World's population has disabled hearing loss. It is estimated that by 2050 over 900 million people or one in every ten people will have disabling hearing loss. Many children develop hearing impairment during early childhood. As a teacher you must have knowledge to identify the children with hearing problems and refer to medical intervention. In this block you are going to learn about the meaning of sensory impairments, importance of hearing, and process of hearing, causes and types of hearing loss, challenges due to hearing loss.

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## **OBJECTIVES**

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After completion of this Block, you will

- Understand the importance of hearing.
- Explain the types of sensory impairment.
- Describe the process of hearing and types of hearing loss.
- Define the hearing loss and associated terminologies.
- Elaborate the challenges arising due to hearing loss.

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## **UNIT 1 TYPES OF SENSORY IMPAIREMNTS**

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We have five senses viz. Eyes, Ears, Tongue, Skin, and Nose through which we receive/ grasp the content. Non-functioning of these senses leads non-attainment of the concept fully. To be simple, Sensory impairment indicates the impairment in the senses.

After completion of this Unit you will be able to

- Describe the genesis of special education
- Explain the types of sensory impairments

### **1.1 Special Education**

Before knowing about the types of sensory impairments, it is essential to know about Special Education

Special education can be said as the education which meets the needs of those children who are deviant from average children either mentally, physically and or socially. Those children may suffer from deafness, dumbness, blindness, mental retardation, emotional disturbance and any

other ailments which hamper the intellectual growth of the individual. Hence, the teaching methods in special education schools also differ from standard or general schools and the methods are more individual oriented to adapt according to the individual's needs. Depending upon the condition of the individual, education policies and educational laws may or may not be admitted in a standard academic school. There are separate schools or separate classrooms for students with special needs but some students with mild impairments are allowed in a regular school or classrooms for a limited or full period of time. As the students require more care and attention, special education is also referred as '**Special Needs Education**' or '**Exceptional Children Education**'. Just like a general school, special school teachers receive specialised education training from educational institutes skilled in this area. Special education schools have certain norms and infrastructure which facilitates the development of children with special needs.

### **1.1.1 Developments in Special Education**

Earlier, disabled children were treated with hostility and were neglected. They were considered as 'Curse of God' and burden to the parents. They were often killed by their parents.

Later, the disabled children were kept in protection and wardship. Mankind was subjected to understand that "the disabled are useless, incapable of doing anything on their own, a species to be pitied and looked after as long as they are alive." Thus, no attempt was made for their education, training, habilitation, and rehabilitation.

In the next phase, an attempt was made for their education. But disabled children were considered distinct from their peers. They were considered to be incapable of receiving education in general schools. Thus, for the first time special schools and institutions were established in different countries for the education and training of such children. They were educated in special schools being separated from their parents and their non-disabled children.

In the second half of the twentieth century, new thinking and new realization have opened new directions for education of disabled children. It is now realised that a disabled child is not a different kind of person. He is the child with special needs. Like all other members of the

society, the disabled must have the same rights to education, work and full participation in the society. It is also recognised that the disabled, particularly those with mild to moderate degree of disability and the orthopedically handicapped, can be educated along with their non-disabled peers in general schools with provision of additional support. Moreover, education of disabled children along with non-disabled children in general schools have been found to be an economically viable. These realisations, made the educationists, planners and teachers have led to the conceptualisation of integrated education for the disabled children.

The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act 1995 is the main legal instrument for persons with disabilities. This Act includes seven categories of disabilities such as blindness, low vision, leprosy-cured, hearing impaired, locomotor disability, mental retardation, and mental illness. Some more disabilities like learning disability, Autism, multiple disabilities etc., also exist.

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## **1.2 Classification of sensory impairments**

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Meaning of Sensory Disabilities:

Sensory Impairment is the impairment in the senses viz., sight, hearing, smell, touch, taste and spatial awareness.

**Types:**

**A. Single Sensory Impairment:**

Single Sensory Impairment indicates the impairment in a single or one sense.

**Hearing Impairment:**A person is said to have hearing impairment if he/she cannot hear at all, or can hear only loud sounds, shouted words, or only if the speaker was sitting in front, or would usually ask to repeat the words spoken to him/her.

The Persons with Disabilities Act (1995) have adopted the definition that a person shall be deemed to be deaf if he/she has loss of 60 decibels more in the better ear in the conventional range of frequencies.

**Visual Impairment:** According to Persons with Disabilities Act (1995) blindness refers to a condition where a person suffers from any of the following conditions, namely:

- i. Total absence of sight or
- ii. Visual acuity not exceeding 6/60 or 20/200 (snellen) in the better eye with correcting lenses or
- iii. Limitations of the field of vision subtending an angle of 20 degree or worse.

**B. Dual Sensory Impairment**

Dual sensory impairment is the combination of impairment in both the senses i.e, hearing and sight impairment. Those with a less severe degree of both sight and hearing impairment may also be referred to as having a dual sensory impairment or loss. The words dual sensory impaired and deaf-blind are generally accepted as inter-changeable words. When a person has difficulties seeing and hearing then the person can be termed deaf-blind.

The special education explains about the education of the children with special needs. With many changes over time, the field is at present in inclusion the children with special needs in the normal main stream. The sensory impairments indicate the impairment in the senses.

**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

1. What is Special Education?  
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2. What is the difference between single and dual sensory impairments?  
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## UNIT 2 IMPORTANCE OF HEARING

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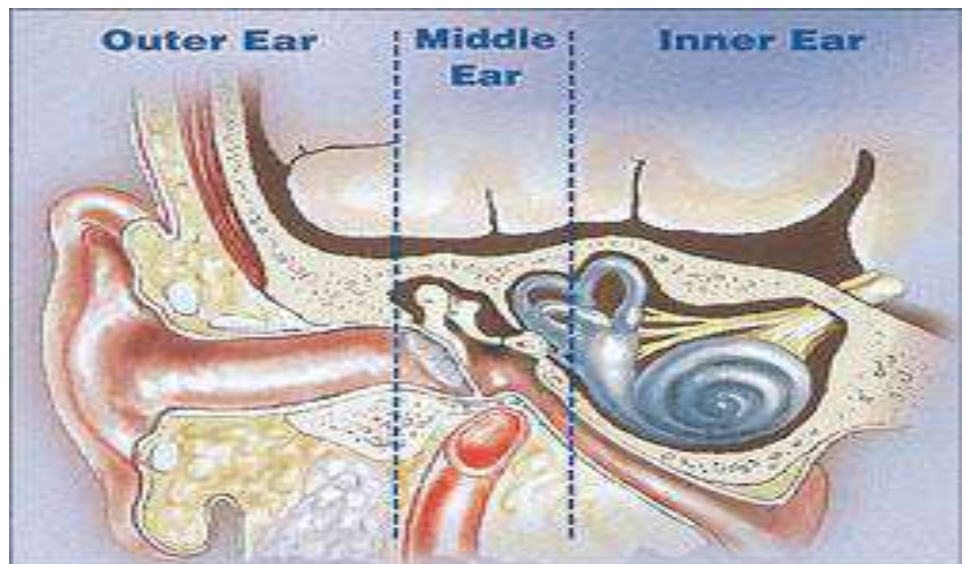
Hearing is mandatory to all. Hearing or Auditory perception is the sense of detecting sound i.e., receiving information about the environment from vibratory movement which is communicated through a medium such as air, water or ground.

After completion of this unit, you will be able to

- Describe the importance of hearing
- Draw the parts of ear with process of hearing
- Narrate the procedure of measuring the hearing

### 2.1 Parts in Hearing Mechanism

The human ear is a fully developed part of our bodies at birth and responds to sounds that are very faint as well as sounds that are loud. Knowledge on the main components of human ear is important in the process of hearing. The three parts that are leading up to the brain are outer ear, middle ear and the inner ear.



### 2.2 Importance of Hearing

The basic knowledge is learned through the 5 senses.

Seeing – 83%

Hearing – 11%

Touching – 3½ %

Smelling – 1 ½%

Tasting – 1%

### **People generally remember**

10% of what they read

20% of what they hear

30% of what they see

50% of what they hear and see

70% of what they say as they talk

80-90% of what they hear see and do.

Hearing empowers us and helps us lead our everyday lives without limitations. It enables us to socialize, work and communicate. It also helps us stay connected to the outside world and it keeps us safe by warning us of potential danger.



### **2.3 Measuring Hearing**

We measure the ability to hear (**auditory acuity**) and hearing loss using two dimensions: that include intensity and frequency. People hear sounds at specific levels of loudness (intensity). **Loudness** is expressed in decibels (db) the greater the decibel level, the louder the sound. A decibel level of 125 or louder is painful to the average person. Decibel levels of 0 to 120 are used to test hearing at various frequencies. **Frequency** (or pitch) is measured in hertz (hz), which indicates cycles per second. The frequency range for conversational speech is 500 to 2,000 hz. Both loudness and frequency can be measured with an audiometer.

Though hearing is an important sense, we, humans can't hear some sounds, whereas dogs, some marine mammals can hear sounds that humans can't hear. What sounds we, or a marine animal can hear depends on the frequency of the sound and the intensity of the sound.

For humans, the sounds we hear best are those used in conversation. Hearing loss can be difficult to diagnose in infants and babies because they haven't yet developed communication skills. All babies are



screened before they leave the hospital to see if they have hearing loss. Sometimes parents may begin to notice that the baby doesn't respond to loud noises or to the sound of voices, or has a delay in speech.

A hearing test provides an evaluation of the sensitivity of a person's sense of hearing and is most often performed by an audiologist, who is a health professional who specializes in diagnosing and treating hearing problems. The audiologist will do various hearing tests that can help detect where the problem might be by using an audiometer. An audiologist will conduct a hearing test at different frequencies and intensities by making the person to respond when they hear a tone (behavioural hearing test), electro-physiological responses of the auditory system for those who cannot respond through behavioural hearing test (Oto-acoustic Emission test or OAE). The audiologist measures the hearing loss and plots a graph called an audiogram, showing how much that person can hear. The audiologist uses this information and conducts some other tests to understand the degree of hearing impairment and type of hearing impairment to suggest hearing aids or cochlear implantation.

Hearing is an easy and mandatory for normal people. Occasionally they may miss a few words, but in general effortlessly they move around in everyday life without paying it. But things are not as easy with hearing loss persons. It (hearing loss) make them (persons) to experience all sorts of emotions from worry to sadness and loneliness, feel tired and irritable from having to concentrate just to hear what people are saying.

### **Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

3. Why hearing is important?

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4. How hearing can be measured?

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## **UNIT 3      PROCESS OF HEARING AND TYPES OF HEARING LOSS**

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By hearing only the human beings develop spoken language within the first few years of life. Language is learned through exposure to sounds. Children pick up words they hear in their environment. Hence the ability to hear is central to this learning process. The literacy generally depends on understanding the speech. So hearing is important for learning to read the written word.

After completion of this Unit, you will be able to

- Narrate the physiology of hearing mechanism
- Explain the role of external, middle, inner ear, and auditory pathway
- Describe the causes for hearing loss, and types of hearing loss

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### **3.1      Physiology of Hearing Mechanism**

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Physiology indicates the way in which a living organism or bodily part functions. Regarding the hearing physiology, it is a sound wave that is transmitted through four separate mediums in the human ear along the auditory system before a sound is perceived: 1. in the outer/external ear – air, 2. in the middle ear-mechanical, 3. in the inner ear – liquid and 4. to the brain- neural. Let us discuss in detail.

#### **3.1.1      Role of the External Ear**

- The pinna “collects” the sound waves from all directions and direct them into the ear canal.
- It also makes the higher frequency sounds (i.e. 5000 Hz to 7000 Hz) a little louder by “resonating” it.
- The ear canal helps in smooth transmission of sound waves from the pinna to the eardrum. It also amplifies and makes certain frequencies (around 2000 Hz) sound louder by its natural resonance.
- Because of its ‘S’ shape, the ear canal protects the eardrum from direct injuries from sharp objects.
- The hair and the wax present in the ear canal protects the eardrum and other delicate structures in the middle ear by preventing the entry of any foreign body such as insects, worms, dusts, etc.

### **3.1.2 Role of the Middle Ear**

The sound waves transmitted from the ear canal fall on the tympanic membrane and set it to vibration. This vibration in tympanic membrane in turn vibrates the ossicular chain. The sound is passing through the ossicular chain, then the footplate on the vibration pass to the inner ear. Thus, middle ear plays a very important role in the process of transmission of sound from the outer ear to the inner ear.

- The middle ear conducts the sound from outer ear to the inner ear.
- It acts as a “Transformer” whereby it conserves and enhances the sound energy so that not much energy is lost due to impedance mismatch while transmitting the sound from air medium of middle ear to fluid medium of inner (i.e. to the perilymph to Scala Vestibule). The transformer action of the middle ear enhances the sound energy approximately up to 27 dB.
- It protects the inner ear by two ways: (a) it gives the cushioning effect to the inner ear and (b) the contraction of the stapedius and tensor tympani muscles protects the structures in the inner ear from damage due to very loud sounds.
- The Eustachian tube helps to maintain the air pressure in the middle ear with that of the surrounding atmospheric pressure. This helps in the effective conduction of sound from the outer ear to the middle ear. Eustachian tube also helps to drain out any secretion produced in the middle ear into the Nasopharynx.

### **3.1.3 Role of the Inner Ear**

The vibrations in the tympanic membrane set the ossicular chain in motion as a result the footplate of the stapes starts moving or “rocking”. This disturbs the fluid in the Scala Vestibuli. This results in propagation of a sound wave toward the apex of the cochlea. The sound vibrations that are introduced into the Scala Vestibuli in turn displace the Reissner’s membrane, which separates the Scala Vestibuli from Scala Media. This displacement of the Reissner’s membrane sets the endolymph to vibrate. These vibrations in endolymph displace the basilar membrane similarly like the Reissner’s membrane. Since the Organ of Corti is located/situated on the basilar membrane as a result these vibrations are readily transmitted to it. The up and down movement of the basilar membrane in response to fluid displacement activates the hair cells in the Organ of the Corti. Hair cell activation triggers the nerve impulses in the 8<sup>th</sup> nerve. These impulses are electrical in nature and are conducted along the auditory pathway. However sound

may reach the inner ear by other routes also such sound can directly travels across the middle ear and stimulate the round window. It can also be transmitted through the bony structures of the skull. Thus inner ear has the following functions.

- It acts as a transformer whereby it converts the mechanical energy (sound vibrations) into electrical impulses by the functions of the hair cells. This process is called as the Transduction Process.
- Cochlea has “Tonotopic Organization” or Frequency Tuning” function i.e at the cochlear level itself the analysis of the frequency of sound takes place.
- In addition to hearing information (function), the inner ear also converts information regarding the body’s position and movement into a bioelectrical code and sends the same information to the brain via the auditory nerve.

#### **3.1.4 Role of the Auditory Pathway**

Sounds converted by the hair cells into electrical impulses are referred to as Action Potentials. These electrical impulses are then transmitted to the brainstem through the frequency, intensity and time of the sound very systematically till they reach the auditory cortex. Majority of these impulses from the right side cross over to the left side and vice-versa. Once the impulses reach the various parts of the auditory cortex then the sound will be perceived and heard. Thus in the mechanism or process of human hearing, the auditory pathway functions as a RELAY and CONTROL Center. Thus the auditory nerve and the auditory pathway play an important role in recording and processing of information reaching to the auditory cortex.

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### **3.2 Causes of Hearing Loss**

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During knowing the importance of hearing, it is necessary to know the causes for the hearing impairment. Causes of hearing loss are classified into three broad categories namely prenatal, perinatal and post natal causes.

#### **3.2.1 Prenatal Causes**

Many times, congenital deafness is strongly co-related to the damage to the embryo in uterus. Thus, when the mother incurs certain diseases early in the pregnancy especially during the first three months of

pregnancy (when vital organs like brain and organs related to the auditory system are developing), can result in hearing impairment in child. The causes include:

1. Age of mother below 18yrs and above 35yrs increases the chances of Hearing impairment in child.
2. Increase the dose or duration of ototoxic drugs (usually aminoglycoside group) during pregnancy lead to hearing loss. Oral contraceptives and other gynaecological drugs also cause progressive hearing loss.
3. Exposure to Radiation / chemicals especially during 1<sup>st</sup> trimester increases the chances of impairment.
4. Physical / Physiological trauma during pregnancy leads to miscarriage/ hearing loss.

The first trimester is important as the development of vital organs takes place during that time. During this period Infections can have impact on developing embryo and thus can cause hearing loss. Infections could be Viral or Bacterial.

#### **Viral Infections**

1. Rubella commonly known as German measles is common in pregnant females and leads to multiple disabilities and syndromes.
2. Measles-Highly contagious and may cause
  - Moderately severe to severe hearing loss
  - Sloping configuration-hearing loss.
3. Mumps may cause
  - Unilateral severe to profound SNHL
  - Causes infertility.
4. Other infections
  - Whooping cough
  - Pertusis
  - Diphtheria
  - Tetanus

#### **Bacterial Infections**

1. Tuberculosis – can cause multiple perforations in the TM. Ototoxic drugs used to treat TB can lead to hearing loss and may also affect the vestibular system.
2. Syphilis – Sexually Transmitted Diseases (STD) causes severe to profound hearing loss and directly attacks the cochlea.
3. Meningitis may cause Mental Retardation, Blindness, Hearing loss.

4. Encephalitis may cause death / atrophy of brain tissue and may cause hearing loss.

The other known etiological factors causing hearing loss are maternal alcoholism and drug addiction. The conditions such as maternal irradiation, toxemia, diabetes and severe systemic maternal illnesses also have been documented as causes of hearing loss. Maternal malnutrition and maternal use of certain drugs like quinine and derivatives (drugs used to relieve pain) may affect the fetus and lead to hearing loss.

### 3.2.2 Perinatal Causes

Any complications occurring during the process/at the time of birth or immediately after birth may be responsible for causing hearing losses in children.

The perinatal causes make the children at double risk to develop or to acquire hearing impairment in later stage of life. These conditions are grouped in a category known as “High Risk Criteria” or “High Risk Register”. The conditions that are associated with the high-risk group are as follows:

1. **Birth Asphyxia:** It indicates that the child does not breathe or has difficulty in breathing, immediately after birth. This results in delayed birth cry. This occurs due to lack of oxygen supply to the brain resulting in permanent damage to the brain. If this damage occurs in “auditory area” in the brain and it results in “hearing impairment” in the child.
2. **Low Birth Weight:** Weight of the baby at birth is considered as low if it is less than 1500 gms.
3. **Consanguinity:** Marriage of parents between close relatives e.g. first cousins.
4. **Birth Defects of Ear, Nose and Throat:** The child is born with congenital defects of ear like atresia, microtia etc, and with cleft lip and palate, etc.
5. **Hyperbilirubinemia (Excessive Billrubin):** The child develops severe jaundice, immediately after birth, which requires treatment like phototherapy, blood transfusion depending upon the severity of jaundice.
6. **Family History of Hearing Loss (Hereditary Hearing Loss):** There is one or more hearing impaired persons in the family.

7. **Prematurity:** Birth of a child before completion of normal pregnancy period (i.e. nine months or 36 weeks).
8. **RH Incompatibility:** Mother and baby (fetus) having opposite or different blood groups (i.e. Rh + ve and Rh – ve) as a result “severe jaundice” in baby (fetus).
9. **Severe Infections:** Severe infections in the early weeks after birth e.g. meningitis, mumps, measles etc.
10. **Birth Defects of Head, Face and Neck:** The child may have small head (microcephaly) or abnormally large head (megacephaly).

### **Torches Infections**

These are severe infections associated with prenatal and natal period and are known to cause hearing impairment in baby / child. These are as follows:

- Toxoplasmosis
- Other infections like Bacterial Meningitis
- Rubella
- Cytomegalo Virus (CMV)
- Herpes Simplex
- Excessive bilirubin (Hyperbilirubinemia)
- Syphilis

The above stated conditions (i.e. High Risk Criteria and TORCHES Infections) are closely associated with hearing loss. However, hearing loss is only one of the disabilities associated with the above group.

Another perinatal cause is “haemorrhage” occurring during the process of birth and shortly after birth. Numerous causes for haemorrhage include trauma from prolonged or rapid delivery, caesarean section, breech presentation, other abnormal birth conditions and an inappropriate obstetric practice i.e. deliveries are conducted at unhealthy places and by untrained personnel.

The bacterial and viral infections occurring during the birth and immediately after birth can destroy cochlear hair cells thus leading to permanent hearing loss. The diseases that may cause sensorineural hearing impairment include measles, mumps, scarlet fever, diphtheria, whooping cough and any of the unknown viral / bacterial infections.

### **3.2.3 Post Natal causes**

Anything that completely blocks the ear canal can cause hearing loss. Blockage with earwax is common. However, they sometimes can cause

external ear infections. Many other problems can also block the ear canal and lead to hearing loss. Such as

- Foreign bodies in the ear
- An injury
- A growth in the ear canal

Any of these, including blockage by wax, may result in *conductive hearing loss*. A doctor can cure this easily by removing the wax either with specially designed instruments or flushing with water.

Problems that can affect the middle ear and lead to hearing loss include:

- Ear infection
- Fluid in the ear
- Otosclerosis
- Tumors

**Ear infections:** Temporary hearing loss is commonly caused by ear infections. Middle ear infections cause swelling of the lining in the middle ear and often an accumulation of fluid (such as pus). When there is fluid behind the eardrum and surrounding the ossicles (the three small bones in the ear), these structures cannot work properly, and hearing loss results.

**Glue ear:** Ear fluid not caused by infection accumulates commonly in children, and sometimes in adults. This condition is known as *glue ear*, or chronic Otitis Media with Effusion (OME). Fluid in the ear usually is due to malfunction of the Eustachian tube, which connects the ear with the back of the throat. The job of the eustachian tube is to keep the pressure in the middle ear approximately the same as that in the ear canal and outside world. The presence of fluid causes hearing loss, and sometimes frequently recurring *middle ear infections* (acute otitis media).

**Otosclerosis:** Otosclerosis is a common hereditary disease in which new bone is deposited around one of the tiny bones in the middle ear, specifically around the footplate of the stapes (or 'stirrup') bone. This prevents normal bone transmission of sound from the eardrum to the inner ear and consequently, conductive hearing loss results. This hereditary condition is present in females than males and it causes significant hearing loss in about one percent. It occurs less commonly in black and Asian people. Otosclerosis generally becomes apparent during early adult life, and the severity of hearing loss can be accelerated by pregnancy.



**Tumors:** Tumors of the middle ear may be responsible for hearing loss. They may be cancerous (malignant) or noncancerous (benign).

These are many conditions that cause the delicate inner portion of the ear to function abnormally. They include:

**Otosclerosis:** Otosclerosis (the hereditary disease in which bone deposits collect around the small bone in the middle ear known as the stirrup) can also affect the cochlea (the coiled tube in the inner ear), and cause hearing loss in some people.

**Fistula:** A fistula (opening) is an abnormal connection between the inner ear and middle ear. The inner ear is filled with fluid, and the middle ear is filled with air. If a fluid leak occurs from the inner ear, hearing loss and dizziness commonly result. This kind of hearing loss often is cured by surgically repairing the fistula. Such leaks are usually caused by trauma. The trauma may be direct, such as a blow to the ear or a head injury in a car accident. However, it may also be the result of air pressure changes in an airplane trip, a forceful sneeze, or lifting a heavy object.

**Head injury:** Direct head trauma, particularly trauma severe enough to cause unconsciousness, can cause inner ear concussions and hearing loss.

**Meniere's syndrome:** Meniere's syndrome is a condition characterized by fluctuating hearing loss (usually more prominent in the lower frequencies where we hear speech), dizziness, fluctuating ear pressure, and tinnitus (a noise sensation heard in one or both ears). It is due to a swelling and fluid overload of the middle compartment of the inner ear (a condition known as endolymphatic hydrops).

**Noise:** Due to the progress of civilization, the noise has now become the part and parcel of the human environment. The noise is called as "slow poison" as it has adverse effects on human physiology. It produces permanent adverse changes in many human bio-systems including ear. Noise is an important cause of hearing loss. An estimated 7 to 10 million people in American industry have noise-induced hearing loss, virtually all of which was preventable. In addition to industrial noise, recreational noise can damage hearing. Such noise is encountered commonly from gunfire, power tools, snow blowers, motorcycles, loud music (especially with earphones) and other causes.

In some cases, the playing of musical instruments can damage hearing. This has been reported not only with loud, electrical rock and roll instruments, but also with classical music performance such as violin playing and flute playing. One can minimize such problems by using ear

protection whenever practical, such as during selected practice sessions.

**Neural problems:** Neural (nerve-related) problems may also produce hearing loss. Among the more common are:

- Acoustic neuroma, a common tumor of the acoustic nerve
- Multiple sclerosis
- Autoimmune sensorineural hearing loss, in which the body attacks its own ear.

**Ototoxicity:** There is a group of certain drugs that are known to cause cochlear and in certain cases vascular damage leading to hearing loss. Such drugs are termed as “Ototoxic drugs”. Drugs which are particularly toxic to the ear are certain antibiotics (especially “Mycin” group drugs), Salicylates and Quinine (Aminoglycosides as they are called biochemically) Streptomycin, which is prescribed for treatment of tuberculosis, is both a vestibulotoxic and ototoxic drug.

**Aging:** Degenerative changes of aging also lead to sensorineural hearing loss. This condition is commonly known as “ Presbycusis” or “ Old Age Deafness”. It is the most common cause of sensorineural hearing loss in the adult population. Because of advancement or invention in science has now increased. Recent survey and statistics have shown that the hearing impairment can occur in as many as 25% of those in the age group for 65 to 70 years.

### 3.3 Types of Hearing Loss

There are five basic factors on the basis of which hearing loss are mainly classified. These factors include: 1. Age of onset, 2. Site of lesion, 3. Causal factor, 4. Nature of hearing loss and 5. Degree of hearing loss.

#### 3.3.1 Age of onset

On the basis of age of onset (factor of time), organic hearing loss can be classified as: Congenital Hearing loss, Hereditary hearing loss and Acquired Hearing loss.

- a. Congenital Hearing Loss:** It refers to any hearing loss occurring prior to birth or at the time of birth. It may be hereditary or may develop during prenatal or natal period.
- b. Hereditary Hearing Loss:** Hereditary hearing loss may be defined as the hearing loss caused by factors present in the

genetic makeup of the fertilized ovum. Hereditary hearing loss may transmit as a dominant or recessive characteristic.

- c. **Acquired Hearing Loss:** The term indicates that the hearing mechanism was normal or developed at a later stage due to some reasons like severe illnesses (such as meningitis, encephalitis, etc.), accidents, etc.

### 3.3.2 Site of lesion

On the basis of site of lesion, hearing loss can be classified as: Conductive Hearing Impairment, Sensorineural Hearing Impairment, and Mixed Hearing Impairment.

- a. **Conductive Hearing Impairment:** Any dysfunction of the outer or middle ear in the presence of a normal inner ear is termed as a conductive hearing impairment. In conductive hearing impairment, the difficulty is not with the perception of a sound but with the conduction of sound to the analyzing system. Conductive hearing impairment is reversible one i.e. temporary one i.e. can be correctable with medicine or surgery. The conductive hearing impairment can be congenital or acquired. Acquired hearing losses in children are more likely to be of the conductive type.
- b. **Sensori-neural Hearing Impairment:** When the loss of hearing function is occur due to defect or pathology in the inner ear or along the auditory nerve pathway from the inner ear to the brainstem then the loss is referred as sensori-neural hearing impairment. In a pure sensorineural hearing impairment, the sound conducting mechanism i.e. the outer and the middle ears are normal both structurally and functionally. Thus in other words, sound is conducted properly to the fluid of inner ear but it cannot be analyzed or perceived normally. This involves both loss of sensitivity as well as loss of understanding of speech poor or of speech discrimination. Sensori-neural hearing impairment can be congenital i.e. present at birth or can be developed in the late stage of life. This loss is irreversible or permanent and the only remedy is a suitable hearing aid.
- c. **Mixed Hearing Impairment:** In mixed hearing impairment, there is a damage or defect or defect or pathology in both outer and middle ear as well as in inner ear. A patient with mixed hearing loss exhibits symptoms of both conductive and sensori-neural hearing impairment. Also a patient with

mixed hearing impairment usually shows some hearing loss by bone conduction but a greater hearing loss by air conduction. An elderly patient may sometimes show mixed hearing loss where conductive hearing loss occur because of middle ear defect while sensori-neural hearing impairment develop because of inner ear or auditory nerve defect due to aging. The treatment of mixed hearing impairment can vary from patient to patient and depend upon the conductive involvement. An otologist (ENT Specialist) usually decides the treatment of the mixed hearing impairment. The treatment of could be medical, surgical or use of hearing aid.

### **3.3.3 Nature of Hearing Impairment**

On the basis of nature, hearing impairment can be classified as: Gradual Hearing impairment and Sudden Hearing Impairment

- a. Gradual Hearing Impairment:** Gradual hearing impairment is also termed as “progressive hearing loss”. This refers to a slow deterioration of hearing sensitivity with time. This may be due to infection or hereditary disorders or aging. Conductive or mixed or sensori-neural hearing impairment can be gradual or progressive in nature.
- b. Sudden Hearing Impairment:** In Sudden hearing impairment, the patient overnight may suffer partial or complete hearing loss in either one or both ears. This hearing loss results due to onetime insult to the auditory system. Usually the damage to the auditory system results in a permanent hearing loss. Sudden hearing impairment is usually always of sensori-neural type.

### **3.3.4 Degree of Hearing Impairment**

An important consideration of any hearing loss is the degree of impairment. The classification is done on the basis of the ‘Pure Tone Average’ i.e. the average of the hearing thresholds at 3 frequencies namely 500Hz, 1000Hz and 2000Hz.

On the basis of degree, hearing impairment can be classified as follows:

**Table: Degree of Hearing Impairment**

<b>Average threshold level (dB HL)</b>	<b>Degree of hearing loss</b>
-10 to 25	Normal hearing sensitivity
26 to 40	Mild
41 to 55	Moderate
56 to 70	Moderately – severe
71 to 90	Severe
91 and above	profound

The classification in the table was given by Goodman (1965).

### **3.3.5 Causative factor**

Based on the cause, hearing loss be classified as Exogenous Hearing Impairment, Endogenous Hearing Impairment and Idiopathic Hearing Impairment.

- a. Exogenous Hearing Impairment:** This retest to hearing loss caused by all factors other than heredity. These factors include: Prenatal causes (causes before birth), Natal causes (causes at the time of birth) and Postnatal causes (causes after birth)
- b. Endogenous Hearing Impairment:** This included only “heredity” as the causative factor for hearing loss. Hereditary hearing loss may be transmitted as a dominant or recessive characteristic.
- c. Idiopathic Hearing Impairment:** This refers to hearing loss of an unknown pathology or cause i.e. the causes of hearing loss is unknown.

In the process of hearing, the sound wave transmitted from outer ear to brain neural through middle and inner ear. Any damage or blockage in this procedure leads to hearing impairment. The causes for hearing impairment is classified as prenatal (before birth), natal (during birth), and post natal (after birth); and the types of hearing loss is categorized based on the basic factors such as age on set,

site of lesion, causal factors, nature of hearing loss and degree of hearing loss.

**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

5. What are the parts involved in hearing mechanism?

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6. Mention the classification of hearing impairment based on site of lesion.

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**UNIT 4      DEFINITION OF HEARING LOSS AND ASSOCIATED TERMINOLOGIES**

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The description of a person’s hearing loss is often based on their level of hearing at different frequencies as measured by an audiologist. Hearing loss levels are often broadly described as Mild, Moderate, Severe and Profound. Generalizations based on these single word descriptors often do not accurately predict an individual’s skills across a variety of tasks such as speech, language, listening, communication mode, etc. The terminology “deaf” and “hard of hearing” used to describe individuals with hearing loss is based on a medical model and definition of hearing loss levels. How an individual views him/herself, however, can depend on self-identity and cultural values related to or separate from the status of their hearing. For example, a person who has a level of hearing that may be medically described as hard of hearing (a person diagnosed with a “moderate” or “severe” hearing loss) may actually identify him/herself as Deaf based on their preferred communication mode, cultural values, and self-identity. Regardless of

definition, many deaf and hard of hearing people do not support the use of negative descriptors such as hearing loss, impairment, or disability. A basic description that attempts to address both medical and cultural perspectives of the differences between deaf and hard of hearing will be provided.

After completion of this unit, you will be able to

- Define the various terminologies associated with hearing loss
- Understand the concept of hearing loss based on the definitions

**Deafness:** This term indicates a hearing loss so severe that processing of linguistic information through hearing alone, with or without hearing aids, is severely limited. Students with cochlear implants are considered physically deaf even though they may function as hard of hearing. Deafness is not solely dependent on ability to speak or need to use sign language.

**Hard of Hearing:** This term describes a degree of hearing loss that allows the student to process acoustic information necessary for auditory-verbal communication, with the assistance of hearing aids or assistive listening devices (ALD) when needed. Yet the amount of hearing loss is not an accurate predictor of how one function auditorally. The audiologic evaluation does not reliably predict the student's ability to hear with comprehension. Some hard of hearing students function very well with hearing aids and ALDs while some may require sign language to understand classroom instruction or conversation, especially in noisy situations.

Professionals in the field of special education are using different terms such as impairment, disability and handicap. These terms are used to represent children with defect who needs special assistance or rehabilitation. However, these terms have different philosophical meaning and imply different applications. The following is the WHO (1980) definition of disability, impairment and handicap.

### **Impairment**

It is defined as any damage or weakening of physiological and anatomical function of structure. Here impairment concerns with abnormality of the body, structures and appearance with organ or system functions, resulting from any cause. In principle impairment represents disturbance at the level of organ it indicates the extent of damage to the organ or limb. In case of hearing, impairment means the type and extent of damage to the hearing with the degree of loss. This can be measured clinically.

### **Disability**

Disability is any restriction or lack of ability resulting from impairment to perform an activity in the manner or within the range considered normal for a human being. Disability is reflecting the consequences of

impairment in terms of functional performance and activity by individual. Disability, thus represents disturbance at the level of person. Disability relates only to the organ.

### **Handicap**

Handicap is a disadvantage for a given individual, resulting from impairment or a disability that limits or prevents the fulfilment of a role that is normal depending on age, sex and social and cultural factors for that individual. The WHO defines that handicap is concerned with the disadvantageous experiences of disabilities. Handicap, thus reflects interaction with adoption to the human surround. Handicap is the social aspect of disability.

**WHO International Classification – 1998** puts forth,

Impairment refers to limitation in organ level functions.

Disability refers to personal level limitations

Handicap refers to limitation in social ability or relation between individual and the society.

Definitions given by the RPwD Act, 2016

As per the Rights of Persons with Disabilities, 2016 the definitions of “deaf”, “hard of hearing” and “speech and language disability” are as follows:

“deaf” means persons having 70DB hearing loss in speech frequencies in both ears, “hard of hearing” means person having 60DB to 70 DB hearing loss in speech frequencies in both ears “speech and language disability” means a permanent disability arising out of conditions such as laryngectomy or aphasia affecting one or more components of speech and language due to organic or neurological causes.

Missing the hearing ability is called the hearing impairment. There is difference among the terminologies commonly used for this state of hearing capacity viz. Deafness, hard of hearing, impairment, disability, and handicap and so.



**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

7. Define Hearing Impairment.

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8. Compare Impairment, Disability, and Handicap.

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**UNIT 5 CHALLENGES ARISING DUE TO HEARING LOSS**

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Hearing losing has indirect consequences on the development of language, academic performance and psycho-social interactions. Children with hearing loss face potential life-long communication barriers. Congenital hearing loss is a hearing loss present at birth. It can include hereditary hearing loss or hearing loss due to other factors present either in utero (prenatal) or at the time of birth.

**5.1 Common Educational Needs of children with Hearing impairment are,**

- Need of attitudinal change of others towards disability and education.
- Need for non-discrimination in the services, resources, facilities etc.
- Need for appropriate educational set-up based on the degree / onset / type of hearing loss.
- Need for least restrictive environment for learning.
- Need for preserving and utilizing the residual hearing.
- Need for developing language skills for communication
- Need for adaptation of curriculum
- Need for ancillary services like speech training, hearing aid repairs, ear mould making, therapy, counseling etc.

- Need for vocational training

## 5.2 Problems faced by students with hearing impaired

- **Language Challenges:** Children with hearing impairment, especially the children with congenital hearing impairment start receiving linguistically retarded speech even before they were born. There is also a possibility of children to lose their hearing before they could learn to speak. These two types of children are called 'children with pre-lingual hearing impairment'. These children could see many things but they do not understand the full picture of the events as they cannot hear.
- **Behavioural Challenges:** Hearing impairment is a hidden disability. The family members, including the mother and others who frequently handle the child do not suspect hearing impairment, as the child looks absolutely normal, smiling and playing like any other child. By the time the child reaches the age of three or four years old, the child gains a substantial level of learning through the visual inputs but lags behind in language and speech. So, the child cannot understand what people say and is not able to communicate his needs and ideas. This lack of communication by the child results in parents and people misunderstanding the child's behaviour. The child is usually then labelled as 'hyperactive' or 'disobedient'. This, in fact, builds frustration in the child and he starts throwing temper tantrums at every possible situation. This forms the foundation for behaviour problems in children with hearing impairment.
- **Self confidence and self esteem challenges:** There are several factors among children with hearing impairment like degree/ type of hearing loss, intelligence level, age of intervention, type and use of amplification device, education support etc. which have a very strong impact on their achievement level. Except the children with mild or moderate hearing impairment, all others do not develop language and speech skills without special support. Since these children do not develop oral language skills, they are not able to communicate orally with the hearing community. They are often not able to get integrated even with their own parents

and siblings. This adversely affects their self-confidence and self-esteem.

- **Intervention Challenges:** Children with hearing issues get enrolled into schools either because the school is nearest to their hometown or because the parents are not aware of any other institutions. The choice is never made depending on the potentials in the children. Therefore, it is common to find children of different hearing loss, intelligence, abilities, additional disabilities etc. in a single classroom. As the children are of mixed category, they do not get the maximum educational support that is required.
- **Emotional and social development Challenges:** Due to the non-availability of special schools in every part of the country, quite a good number of children are forced to enrol in residential schools for children with hearing impairment. These children visit their home only during vacations which in most cases, once in a year. This can have an adverse effect on the children's emotional and social development.

Due to hidden nature, hearing impairment often go unnoticed resulting in ignorance of the society towards educational needs and social participation of children with hearing impairment. Society viewed disability as a manifestation of mysterious or ruthless fate or displeasure of God. The indifferent attitude kept children with hearing impairment away from education. But the necessity of education of any individual holds true for children with hearing impairment also.

**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

9. Mention any two common Educational needs of children with hearing impairment.

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10. Mention any three problems faced by the students with hearing impairment.

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## LET US SUM UP

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It is now universally accepted that it is advantageous to detect sensory handicap as early in life as possible. It is because the children with hearing impairment often fall behind in speech and language development, cognitive skills and social skills while comparing with their peers. The earlier we can identify hearing loss the sooner we can begin to treat the problem and have better outcomes for that individual. In this unit we learnt about the physiology, importance of hearing, causes, types and challenges of hearing impairment.

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## GLOSSARIES

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- age on set - specific age when the problem accrued
- Audition - sense of hearing
- Auditory acuity - ability to hear
- Cochlea - whorled structure that contains receptors for transduction of ht mechanical wave into an electrical signal
- Consanguinity - blood relation
- Idiopathic - unknown
- Inner ear - innermost part of the ear: consists of the cochlea and the vestibular system
- Lesion - damage caused to a part of the body due to injury or illness
- Middle ear - part of the hearing apparatus that functions to transfer energy from the tympanum to the oval window of the inner ear
- natal - birth
- Outer ear - part of the ear that consists of pinna, ear canal, and tympanum and which conducts sound waves into the middle ear
- Special Education - Branch of education focusing on education of children with special needs
- Toxoplasmosis - is a disease results from infection with the toxoplasma gondii parasite

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## ANSWERS TO CHECK YOUR PROGRESS

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1. Special education is the education which meets the needs of the children with disabilities.
2. Single sensory impairment indicates the person having the impairment of one sense, whereas the dual sensory impairment indicates the two impairments of a person.
3. Hearing is important to grasp the sound or receiving information about the environment.
4. Based on intensity and frequency the hearing ability or hearing loss can be measured.
5. Outer ear, middle ear and inner ear consisting pinna, external auditory canal, ear drum, ossicles, cochlea and auditory nerve to brain.
6. On the basis of site of lesion, hearing loss can be classified as Conductive Hearing Impairment, Sensorineural Hearing Impairment, and Mixed Hearing Impairment.
7. Impairment is defined as any damage or weakening of physiological and anatomical function of structure. Hearing impairment means the type and extent of damage to the hearing with the degree of loss.
8. Impairment refers to limitation in organ level functions, Disability refers to personal level limitations, and Handicap refers to limitation in social ability or relation between individual and the society.
9. Need of attitudinal change of others towards disability and education, Need for appropriate educational set-up based on the degree / onset / type of hearing loss.
10. The main problems faced by students with hearing impairment are on Language, Intervention, and emotional development.

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## SUGGESTED READINGS

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## **BLOCK 2    IMPACT OF HEARING LOSS**

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### **Structure**

Introduction

Objectives

Unit 6    Characteristics and impact of hearing impairment

        6.1    Symptoms of Hearing Impairment

        6.2    Impact of Hearing Impairment

Unit 7    Need for Early Intervention

        7.1    Language and communication issues attributable to hearing loss

        7.2    Importance of Early Intervention

Unit 8    Communication options of individuals with hearing loss

        8.1    Meaning of Communication

        8.2    Communication Approaches

                8.2.1 Oral methods

                8.2.2 Manual methods

Unit 9    Literacy development and scholastic achievements of children with hearing loss

Unit 10    Techniques and technological support

Let us sum up

Glossaries

Answers to check your progress

Suggested readings

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## **INTRODUCTION**

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Special children have special educational needs which require serious attention. Therefore while setting the goals of special education, the educators need to address and fulfil the special needs. Based on the special needs of the children the teacher preparation, transaction of content, new innovations in the field of special education should be conducted. In this block we will discuss about the characteristics and impact of hearing impairment, need for early intervention, communication options of individuals with hearing loss, literacy development of children with hearing impairment etc.

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## **OBJECTIVES**

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After completion of this block, you will

- Understand the symptoms and impact of hearing impairment.
- Explain the need for early intervention.
- Describe the communication options of individuals with hearing loss.
- Explain the literacy development of children with hearing loss
- Discuss on the techniques and technological support for the individuals with hearing loss.

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## **UNIT 6 CHARACTERISTICS AND IMPACT OF HEARING IMPAIRMENT**

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A Rose is a Rose though a petal is lost. So, though the hearing impairment exists, they are the human beings. Due to this impairment, they face physical, psychological isolation to some extent. In this connection, let us understand the characteristics and impact of hearing impairment.

After completion of this unit, you will able to

- Describe and classify the symptoms of hearing impairment
- Analyse the impact of hearing impairment on the individual development

### **6.1 Symptoms of Hearing Impairment**

Hearing impairment is a latent disability. Hearing loss can manifest in many different ways. Depending on the degree or severity of the hearing loss, symptoms can range from occasional difficulty understanding words to inability to communicate with others and socialisation.

- The child experiences difficulties following oral presentation and directions.
- Watches lips of teachers/ speaker very closely.
- Often asking people to repeat.
- Turns head and leans towards speaker.
- Child cannot localize sound (tell where sound is coming from).
- Use limited vocabulary.
- Uses speech sounds poorly.
- Child does not startle when loud sound is present.



- Often does not respond when called from behind.
- Shows delayed speech and language development.
- Generally inattentive during oral presentations and the perception those others are mumbling.
- Constantly turns volume up on radio or television or has discharge.
- Complains of earaches, frequent colds or ear infections.
- A learning disability diagnosis, poor performance in school.

## **6.2 Impact of Hearing Impairment**

The human ear perceives simple tones in the range of 20 to 20,000 Hz. Consequences of hearing impairment will depend on the ear/ ears involved the degree and the type of hearing loss and the age of onset. Hearing impairment leads to loss of normal verbal communication. Due to distortion of sounds, it is difficult to differentiate the environmental sounds, including the speech. Making sounds louder does not improve the clarity or quality of sound. Similarly, abnormal growth of loudness, a characteristic of damage the inner ear, makes it difficult to tolerate loud sounds.

For children with hearing impairment, congenital or acquired before the development of speech and language, normal speech development is interfered.

With unilateral hearing impairment also, there is difficulty in localising the sound. Reduced speech discrimination, lower speech and language development in children has significant effect on their educational, linguistic and auditory perceptual development. The hearing impaired persons have common difficulty in hearing, spoken and other sounds. They also depend on what they see which they supplement to what they hear.

Hearing loss can have a range of consequences that depends on the individual and their unique type of hearing loss. The most common experience is a reduced ability to understand other people, particularly in noisy situations. Exchange of information with others, an important aspect of everyday life, can be seriously impaired in individuals with hearing loss. These difficulties with communication could lead to a perceived reduction in quality of life. If the hearing loss is untreated, it has the following effects:

- Irritability, negativism and anger.
- Fatigue, tension, stress and depression
- Avoidance or withdrawal from social situations
- Social rejection and loneliness
- Reduced alertness and increased risk to personal safety
- Impaired memory and ability to learn new tasks
- Reduced job performance and earning power
- Diminished psychological and overall health.

Hearing impairment is a hidden disability, and the symptoms can be classified based on the severity of the hearing loss. Due to hearing loss, not only the normal verbal communication, but also psychological feelings also affect.

**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

1. Mention any two symptoms of hearing loss?

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2. Mention any three effects of hearing impairment.

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**UNIT 7    NEED FOR EARLY INTERVENTION**

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Children with a mild or moderate hearing loss can have difficulties in learning and developing the necessary speech and language skills that help them to foster self-esteem and the ability to succeed at school and gain employment. If not detected early, a hearing loss can change the way children speak, learn and interact with others. Soon after born, through neonatal hearing screening, the child's hearing abilities should be assessed. This gives enough time to the hearing health professionals to manage a young child's hearing loss with effective habilitation. Once a hearing loss is detected and appropriate measures put in place, a child

can usually continue down the pathway of speech and language development.

After completion of this unit, you will be able to

- Discuss the importance of early intervention
- Predict the early intervention based on early identification

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### **7.1 Language & communication issues attributable to hearing loss**

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Language is a conventional system by means of which ideas are deliberately communicated. It has a structure and a vocabulary, governed by certain rules which are followed by those who use language. Different languages have different rules. In order for a deaf child to learn language he/she needs to be taught language. The earlier a child is identified, accurately assessed and provided with an early intervention programme including the fitting of an appropriate hearing aid, the provision of ear moulds, a good supply of batteries etc., the better.

The method of communication will depend on a variety of factors including:

- Age of onset of the hearing loss
- Type of hearing loss
- Degree of hearing loss and use of residual hearing
- Language skills
- Lip reading skills
- Personality
- Intelligence
- Educational background
- Family environment
- When an early intervention programme introduced
- The communication method adopted at home
- The presence of additional disability etc.

Language is learned through communication. Children acquire language comfortably and easily in a social setting and in an unconscious manner.

According to this it is important to preschool teachers of deaf children to provide a variety of experiences that are accompanied by appropriate language input. Communication is the key to language learning and this should be related to activities, which are real and meaningful to children and provide opportunities for them to communicate with the teacher with whom they are familiar.

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## 7.2 Importance of Early Intervention

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The early intervention service provides the following:

- **Assistive technology devices and services** - equipment and services that are used to improve or maintain the abilities of a child to participate in such activities as playing, communication, eating or moving.
- **Audiology** - identifying and providing services for children with hearing loss and prevention of hearing loss.
- **Family training** - services provided by qualified personnel to assist the family in understanding the special needs of the child and in promoting the child's development.
- **Medical services** - only for diagnostic or evaluation purposes.
- **Mental health counselling** for children, parents, and families.
- **Nursing services** - assessment of health status of the child for the purpose of providing nursing care, and provision of nursing care to prevent health problems, restore and improve functioning, and promote optimal health and development. This may include administering medications, treatments, and other procedures prescribed by licensed physician.
- **Nutrition services** - services that help address the nutritional needs of children that include identifying feeding skills, feeding problems, food habits, and food preferences.
- **Occupational therapy** - services that relate to self-help skills, adaptive behavior and play, and sensory, motor, and postural development.
- **Parent training** and parenting education be facilitated.
- **Physiotherapy** - services to prevent or lessen movement's difficulties and related functional problems.

- **Psychological services** - administering and interpreting psychological tests and information about a child's behaviour and child and family conditions related to learning, mental health and development as well as planning services including counselling, consultation, parent training and education programs.
- **Service coordination** - someone who works in partnership with the family by providing assistance and services that help the family to coordinate and obtain their rights under the early intervention program.
- **Social work services** - preparing an assessment of the social and emotional strengths and needs of a child and family, and providing individual or group services such as counselling or family training.
- **Special instruction** - includes designing learning environments and activities that promote the child's development, providing families with information, skills, and support to enhance the child's development.
- **Speech-language pathology** - services for children with delay in communication skills or with motor skills such as weakness of muscles around the mouth or swallowing.
- Therapeutic early childhood classrooms, providing developmentally **appropriate learning environments** and staffed by trained early interventionists.
- **Vision services** - identification of children with visual disorders or delays and providing services and training to those children.

Intervention is a process through which the positive outcome will be tried out. So, early intervention of the hearing impairment provides a chance to get language and communication and be normal in all the aspects on par with normal children.

**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

3. Why hearing loss is to be detected early?

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4. What is meant by Assistive technology devices and services?

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**UNIT 8 COMMUNICATION OPTIONS OF INDIVIDUALS  
WITH HEARING LOSS**

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Communication means exchange or transfer of information, ideas, feelings, opinions etc. Animals also communicate among themselves. But the level of this communication is primitive; moreover it is habitual, specific to situation. Also, there are only a few limited sounds or other types of signals – these are not symbolic.

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**8.1 Meaning of Communication**

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Language is a conventional system by means of which ideas are deliberately communicated. It has a structure and a vocabulary, governed by certain rules which are followed by those who use language. Communication is possible without language. It is possible to communicate through a touch, a look and a gesture.

Animals also communicate among themselves. But the level of this communication is primitive. Moreover it is habitual and specific to a situation. Also, there are only a few limited sounds or other types of signals and these are not symbolic; The difference between communication and language is communication is about passing a message, where as language is about passing a message in a conventional, systematic way to others who use the system.

Communication is of two types

1. Linguistic or Verbal

## 2. Non-linguistic or Non-verbal

**Verbal:** The system of language can be truly effective for exchange of ideas and information of any kind. The mode of verbal communication generally used by hearing people are listening, speaking, reading and writing. But a system using manual code representing spoken languages can also be considered as a mode of linguistic communication. The use of verbal language (oral/written communication) is one way of communication which is specific to human beings.

**Non-Verbal:** In communication a lot of information is conveyed by non-verbal means, such as gestures, which involve not only hand movements but also facial expressions and body movements and postures. But exclusive use of such means is not only difficult but also inefficient and ineffective.

Hearing and Deaf children babble and learn to communicate long before they are able to use language. Communication through signs and gestures are present long before spoken language in both hearing and deaf children.

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## 8.2 Communication Approaches

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Some of the main communication approaches used in the education of children with hearing impairment are 1. Oral methods and 2. Manual methods. All need to have good early identification and an early intervention parent based programme and access to appropriate hearing aid and backup services.

### 1. Oral Methods:

- **Auditory-Verbal**

Children are taught to speak through listening.

- **Oral-Aural**

Children use hearing with lip reading and speech to communicate orally. The Maternal-Reflective method is based on this approach. In the MRM, the spoken word is seized from the child and reinforced on writing, class books made through the written form. There is strong emphasis and made for the children etc. in order that they can reflect on language learnt.

## 1. **Manual Methods include**

### • **Cued Speech**

The oral method with cues provided with hand shapes and positions. These are linked inseparably with speech to assist lip reading. As the many words in English language look the same, the cues cannot stand alone and are intended to assist early language and speech development.

### • **Sign language**

Deaf people preferred Sign Language method of communication, for the following reasons,

- Lip reading is tiring and confusing, many words look the same and people have different lip patterns
- Very few pre lingual profoundly deaf people learn to speak clearly
- Signs provide a visual reinforcement to the spoken word
- The emphasis is not only on the sign, but the location, classifier, hand shape, movement, orientation and facial expression
- Signs are the language of the eye

Sign language is gaining more and more recognition as an official language for the deaf community. Britain Sign Language (BSL), American Sign Language (ASL), Australian Sign Language (AUSLAN) and Indian Sign Language etc are the different types of sign languages.

### • **Finger Spelling**

It is using hand shapes to represent sounds (phonemes) or alphabet (letters) of speech. It can be said that instead of writing on paper one is writing in the air with hand shapes for letters. One should know the words and their spellings to be able to use finger spelling. In India two handed BSL is using by many deaf children and adults. It is easy to do finger-spelling than to reading and understanding it.

**Indian Manual Alphabet (IMA):** There are finger configurations used for some 50 speech sounds (vowels and consonants) and letters in Indo-Aryan and Dravidian languages. These hand



shapes representing these sounds/letters are called finger spelling and the system is termed as Indian Manual Alphabet.

- **Total Communication**

Total Communication, a term coined by Roy Holcomb in 1967, in essence is a Philosophy/ approach, and not a method. It accepts the child and his handicap and strives to meet the individual on his terms.

The total communication approach uses form of input available to present vocabulary, complete sentences and grammatical concepts to deaf children. It involves oral skills, signs, finger spelling, cueing, auditory training, reading, writing and any other form of communication which stimulates a child to develop conceptual thinking, acquire language and encourages him to express thoughts in correct language order.

The ultimate goal of an education program for the hearing impaired should be good communication, social skills and the development of an educational background that will allow the child to become independent and achieve his total potential.

Communication is the act to exchange the ideas, information. It may be verbal (linguistic, language oriented) or non-verbal (non-linguistic). The two communication approaches are oral methods, and manual methods. The total communication approach which consists the various communication approaches is very much useful for the children with hearing impairment.

**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

5. What is the difference between communication and language?

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6. Mention the communication approaches used in education of children with hearing impairment.

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## UNIT 9 LITERACY DEVELOPEMENT AND SCHOLASTIC

### ACHIEVMENT OF STUDETNS WITH HEARING LOSS

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Education of children with hearing impairment in India is more than a century old, the first special school, i.e., the Bombay School for the Deaf and Dumb started in 1882 (Hull, 1913). Today, with technology, and the movement of inclusive education, the quantity and quality of education are changing rapidly.

After completion of this unit, you will be able to

- Describe the literacy development of the children with hearing loss
- Narrate the scholastic achievement of the hearing impaired

Education of children with deafness is synonymous with rehabilitation and is influenced by multifaceted variable.

- The Census 2011 revealed that, in India 20% of the disabled persons are having disability in movement, 19% are with disability in seeing, and another 19% are with disability in hearing. 8% has multiple disabilities. The number of disabled persons is highest in the age group 10-19 years (46.2 lakhs), 17% of the disabled population is in the age group 10-19 years and 16% of them are in the age group 20-29 years.
- The Census, 2011 also revealed that more than half of the total disabled population in India are now literate. The literacy rate among the disabled has increased from 49.3 % in 2001 to 54.5 % in 2011. However, this is significantly lower than the overall literacy level of India which stands at 74 %per cent.
- Both rural and urban areas saw an increase of around four percentage points in literacy rate of the disabled. Among the urban disabled, 68 % are literate while the number stands at 49 % for disabled in the rural areas.
- The difference between literacy rate of males and females is wider in rural areas — 72 % of disabled males and 61 % of disabled females in urban areas are literate, a difference of nine percentage points. But in rural areas, the difference stands at 20% points, as 58 per cent of disabled males and only 38 per cent of disabled females are literate.
- It is to be noted that 45% of India's population is illiterate according to Census 2011, compared to 26% of all Indians. Of

persons with disability who are educated, 59% complete Class X, compared to 67% of the general population. Despite the promise of universal access to education through the Sarva Shiksha Abhiyan (Education for All Movement), which promotes free and compulsory education for all children between the ages of six and 14, children with special needs form the largest out-of-school group in India. Some 600,000 (28%) special-needs children between 6 and 13 years of age are out of school, according to the 2014 National Survey of out of School Children report, at a time when India has almost universal primary school enrolment.

- Among children with special needs, as many as 44% of children with more than one disability are out of school, and children with mental (36%) and speech (35%) disabilities are more likely to be out of school than those with other kinds of disability. A higher percentage of children with hearing disability, orthopaedic / locomotive disability and visual disability go to school, with only 20%-30% failing to do so, according to this 2014 United Nations Educational Scientific and Cultural Organization report.
- Children with hearing loss require intensive instructional intervention during their critical period of life and follow up thereafter for developing language and reading skills. Their parents also need to be empowered to develop natural language at home. If not, they fall behind in academics due to their inability to understand language and comprehend the text. There is a shortage of sign language interpreters and curricular adaptations including text books pose a challenge to the general education teachers who are already overburdened owing to the huge class size. Sarva Shiksha Abhiyan has the provisions of recruiting itinerant special educators, however most of these teachers are single disability trained and hence cannot address the differential needs of modes of communication and literacy issues of deaf children. This is bound to create mere physical inclusion of children with hearing loss in mainstream settings. Hence forth, the Rehabilitation Council of India (RCI) through the revised curriculum framework, 2015 focused on inculcation of teaching skills to the student teachers to teach the students at inclusive schools, their major disability schools and other disability schools.

- Most of the special schools in India offer primary education only. Due to this, the crunch is felt in other educational programmes like early childhood, secondary and college education.
- Parents play a key role in the successful educational rehabilitation of their children with hearing impairment. The non-availability of information to the parents regarding the importance and existence of these programmes further prevent the children with hearing impairment to get admitted in the suitable programmes.
- In a country like, India, illiteracy and financial constraints of parents also act as a barrier in availing the existing programmes for their children with hearing impairment.
- Most of the states in India follow its own particular language to run these programmes at their institutions. This restricts interstate flow of students for pursuing their desired programmes. As mentioned earlier, not every state does have all these programmes successfully running. So a hearing impaired student in one state should be satisfied with whatever programmes offered by that state institutions. For those who have already competed/presently enrolled for such courses, teaching/learning in regional languages will not help to meet the global challenges.
- Majority of the special schools in India particularly believe and follow Oral-Aural philosophy as a panacea for educating the children with hearing impairment. As this philosophy can be best suited for some percentage of children, it cannot be taken as the best blanket method for the education of the entire population of children with hearing impairment. On the other side, the success of this method is decided by the crucial factors like early identification of hearing loss, severity of loss, fitment of appropriate amplification devices, appropriate intervention and infrastructure etc.
- The recent trend is towards inclusion of children with hearing impairment. Whether deliberately or not, many of the children with hearing impairment are placed in regular schools without adequate preparation. The fact is that majority of these regular schools are not adequately equipped to meet the needs of these differently able children both in terms of infrastructure and trained staff. Especially in rural areas, many children are admitted in regular schools as there are no special schools available in the vicinity.

Technology providing the opportunities for the hearing impaired to develop their literacy and scholastic achievement. The government policies are more focussing on the holistic development of the hearing impaired through there are differences with regard to culture, language, and social aspects.

**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

7. What is the percentage of hearing impaired exist in India as per Census, 2011?

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8. What is the percentage of children with speech problems are at out of school?

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**UNIT 10    TECHNIQUES AND TECHNOLOGICAL SUPPORT**

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Education of the children with hearing impairment has a deep rooted history. In olden days, children with hearing impairment were considered as retarded. They were isolated from the society and were denied their rights. No special effort was taken to educate them.

After completion of this unit, you will be able to

- Demonstrate the technological support for the education of children with hearing impairment
- Explain the educational development of hearing impaired

It was only in 16<sup>th</sup> century that pioneers like Pedro Ponce De Leon of Spain made an attempt to educate the deaf. The first school had started in France during early 18<sup>th</sup> century. In India, the first special school Bombay Institute for Deaf and Mutes was established in 1884, followed by Calcutta Dead and Dumb School by Mr.E.D.Dutt, Mr.J.N.Benerjee in 1883 and the third school was established by Ms.FlorenceSwainson in Palayamkotai, Tamilnadu in 1897.

- During the initial years, age appropriate educational programmes were not made available to children with hearing impairment in the country. The advancement of science and technology developments in early identification and intervention of the knowledge of child development change in the attitude. This resulted in the development and implementation of age-appropriate educational programmes to meet the educational needs of every child with hearing impairment.
- Presently, Parent Infant Programme (PIP), pre-school programme, primary, secondary and college education are available either in integrated/segregated set-ups. The recent trend is towards 'inclusion' whereby accepting the disabled child in the mainstream as a child first and adapts the environment to suit their special educational needs.
- During earlier times, the classroom teaching methods were more of manual nature. However, with the establishment of the fact that deaf neither are nor dumb, the speech and development of spoken language in children with hearing impairment started receiving attention.
- Researches in aids and appliances have contributed greatly to the change in classroom practices. The recent auditory verbal therapy and auditory approach to improve the verbal communication skills of children with hearing impairment is possible today due to the extremely superior kind of hearing aids.
- Traditional methods like chalk and talk method has been replaced by project methods, individualized education, microteaching etc. the use of Information Communication Technology (ICT) in the education of children with hearing impairment has brought in more and more illustrious teaching-learning materials in the classroom.
- From the stage were the children with hearing impairment used their hands cupped behind the ears for better reception of sounds to the present use of programmable hearing aids, the amplification devices have come a long way. The speaking tubes, speaking horns and heavy cumbersome hearing aids gave away to much sophisticated light weight, cosmetically appealing and superior quality hearing aids.
- The science and technology has also made inroads in the field of devices for early detection of hearing impairment. Babies as

young as a week old also can now be screened for a hearing loss.

- The surgical implant of cochlea is another progressive step to help the children with hearing impairment to improve the perception of speech and communication skills.
- The classroom amplification devices have been of great assistance to the teachers of children with hearing impairment. The currently available loop induction system and frequency modulated hearing aids have drastically eased out the mobility of teachers and students and are making the educational process an enjoyable experience.
- Education of children with hearing impairment is influenced by the quality and quantity of teachers. Establishment of Rehabilitation Council of India (RCI) in 1986 was another landmark in the history of manpower development. RCI was passed in 1992 with the objective of recognizing the educational qualification of professionals and to regulate the standards of institution offering teacher training programme.
- In India, different educational programmes for children with hearing impairment are designed and practiced in formal as well as non-formal set-ups. Some of these programmes are segregated in nature and some integrated and are confined to urban areas. Intensive efforts are going on to extend these programmes in rural areas in order to achieve the goal of universalisation of education.

The technology supporting the hearing impaired to be the part in the mainstream. Science and Technology through Aids and appliances bringing the children with hearing impairment from the state of isolation to inclusion.

### **Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

9. When was the first deaf school established?

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10. What is the contribution of Science and Technology in empower the

hearing impaired? ----- -----
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**LET US SUM UP**

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Educating the children with hearing impairment is an ever growing and challenging job for the special teachers. During the past few decades, the education of children with hearing impairment has undergone a significant, positive, transformation. There has been so many milestones achieved particularly in the areas of identification and intervention. A more focused, balanced and team oriented effort of all concerned in the field is the need of the hour in order to surmount the present and future problems areas/constraints in the field of education of children with hearing impairment.

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**GLOSSARIES**

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- Attributable – probably caused by the thing mentioned
- Communication – the act of sharing or exchanging information, ideas and feelings
- Congenital – by birth
- Inclusion – an act of taking in as part of a whole
- Intervention – an act of interfering with an intent of modifying the outcome
- Irritability – a feeling of agitation
- Occupational therapy – treatment method to regain independence in physical, sensory, or cognitive problems
- Physiotherapy - treatment method to address the physical issue and to restore, maintain the physical function and motion
- Self-esteem – feeling good about oneself
- Symptom – a change in your body that is a sign of illness

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**ANSWERS TO CHECK YOUR PROGRESS**

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1. The child experiences difficulties following oral presentation and directions, Shows delayed speech and language development.
2. Avoidance or withdrawal from social situations, difficulties in learning and Irritability, negativism and anger.



3. If the hearing loss is not detected early, a hearing loss can change the way children speak, learn and interact with others.
4. Assistive technology devices and services indicates the equipment and services that are used to improve or maintain the abilities of a child to participate in such activities as playing, communication, eating or moving.
5. The difference between communication and language is communication is about passing a message, where as language is about passing a message in a conventional, systematic way to others who use the system.
6. The main communication approaches used in the education of children with hearing impairment are 1. Oral methods and 2. Manual methods.
7. 19%
8. 35%
9. The first special school Bombay Institute for Deaf and Mutes was established in 1884.
10. Science and Technology invented new devices for early detection of hearing impairment.

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## SUGGESTED READINGS

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- Davis, H. & Silverman, S. R. (1970). Hearing and Deafness - Part I. Holt, London: Rinehart & Winston.
- <https://scroll.in/article/833784/why-12-1-million-45-indians-with-special-needs-are-illiterate>
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## **BLOCK 3 VISUAL IMPAIREMENT: NATURE AND ASSESSMENT**

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### **Structure**

Introduction

Objectives

Unit 11 Process of seeing and common eye disorders

- 11.1 Structure of eye
- 11.2 Process of seeing
- 11.3 Causes of visual impairment and common eye diseases
  - 11.3.1 Common eye diseases
  - 11.3.2 Other eye disorders
  - 11.3.3 Loss in the visual field
  - 11.3.4 Genetic causes
- 11.4 Eye care

Unit 12 Blindness and Low Vision

- 12.1 Symptoms of visually impaired
- 12.2 Concepts of Blindness and Low vision
  - 12.2.1 Blindness
  - 12.2.2 Low vision

Unit 13 Demographic information

- 13.1 Prevalence and Incidence
- 13.2 Disabled population by type of disability
- 13.3 Disabled population in the respective age groups
- 13.4 Disabled population by social groups

Unit 14 Early Identification and Intervention

- 14.1 Early Intervention
- 14.2 Importance of Early Intervention
- 14.3 Types of Early intervention
  - 14.3.1 Home visit
  - 14.3.2 Combination of home visit and child intervention
  - 14.3.3 Community interventions
  - 14.3.4 Multiple interventions
  - 14.3.5 ECE and childcare
  - 14.3.6 Parenting education and training programmes

Unit 15 Functional Assessment procedures

- 15.1 Developmental milestones
- 15.2 Assessment of visual impairment

Let us sum up

Glossaries

Answers to check your progress

Suggested readings

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## **INTRODUCTION**

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Eye is the predominant sense organ of human being. It is very sensitive organ in our body to be taken care of properly. Around 85% of the information is received through our eyes. The eye collects information about size, shape and colour and transmits those to brain where these are interpreted. The process by which the brain interprets information received from the eye is called vision. As we know, vision loss would retard our daily activities. In this block, you will learn about eye and eye care, assessment, and early intervention programmes for visually impaired.

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## **OBJECTIVES**

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After completion of this block, you will

- Understand the process of seeing and common eye disorders.
- Describe the characteristics of blindness and low vision.
- Explain the demographic information as per the recent statistical analysis.
- Recognize and narrate the importance of early identification and intervention.
- Discuss on the functional assessment procedures of visual impairment.

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## **UNIT 11    PROCESS OF SEEING AND COMMON EYE DISORDERS**

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Eyes are the important one among all senses. Without eyes and vision, we are unable to get the information on size, shape and colour. In this Unit, you will learn about the structure of eye, process of seeing, causes of visual impairment and the process of eye care.

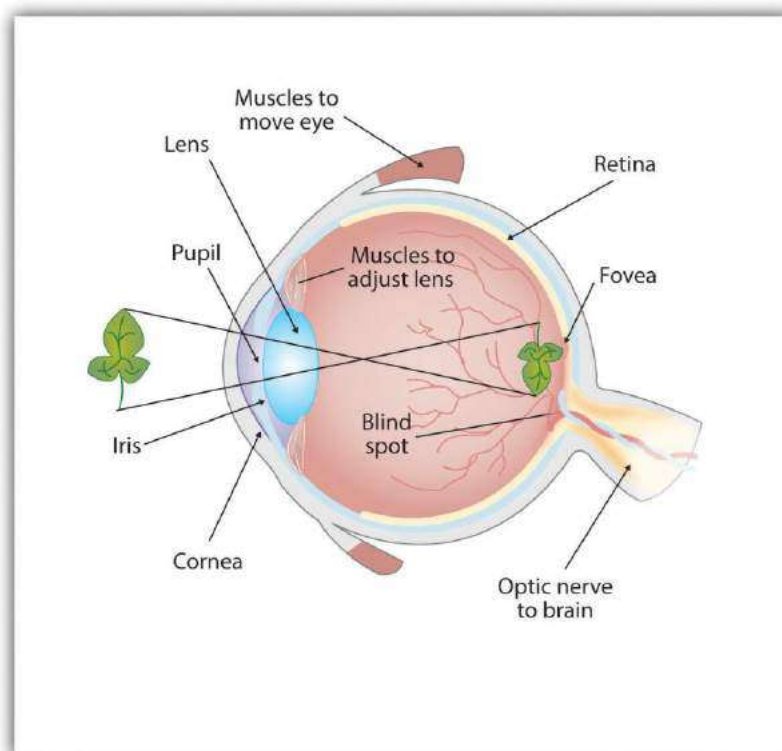
After this Unit, you will be able to

- Label the parts in the structure of eye

- Describe the process of seeing
- Analyse the causes of visual impairment
- Explain the importance of eye care

### 11.1 Structure of Eye

Eye is protected in sockets within the bones of the skull known as the orbits. It is surrounded by fat, fibrous tissue and muscles which protect form damage. In addition the upper and lower lids prevent flying particles from entering the eye by reflex closure. Tears keep the eye ball moist and clean. They also help in combating infection.



The eyeball is 23-24 mm in length. It has three coats namely outer coat (Sclera), middle vascular coat (Uveal tract) and inner nervous coat (Retina) which are explained below:

#### a. Outer coat

Sclera is the outer coat of the eye. The white portion of the eye which one sees from the front is a part of Sclera. It forms 5/6<sup>th</sup> portion of the

outer coat of the eye ball. The remaining 1/6<sup>th</sup> portion in front of the sclera is the Cornea. It is transparent and sits over the sclera like a watch glass. The cornea is continuous with the sclera at the sclera-corneal margin called the *limbus*. The anterior part of the sclera is covered by a mucous membrane called Conjunctiva which is reflected over the lids. Inner surface of the sclera is brown and lies in contact with the choroid underneath.

#### **b. Middle vascular coat**

It is also called as the Uveal tract. It consists of iris, ciliary body and choroid.

- Anterior part called iris which rests on the lens. In the centre of the iris there is a hole called pupil which regulates the entrance of light into the eye.
- Middle part called the ciliary body which has ciliary muscles and ciliary processes. Ciliary muscles are responsible for accommodation and ciliary processes are responsible for secreting aqueous humour.
- Posterior part called the choroid which lies on the inner side of sclera. The function of the choroid is to supply nutrition to the retina.

#### **c. Inner nervous coat**

Inner nervous coat is called Retina. It acts like the film of a camera. The retina contains millions of pigment cells. These cells are known as *rods* and *cones* which are light-receiving cells (photoreceptors). The nerve fibres arising from the eye ball converge posterior to form the optic nerve.

#### **d. Chambers**

The iris sits between the anterior chamber and the posterior chamber in the front part of the eye. These chambers contain a watery liquid known as aqueous humour, which is constantly being produced (by the ciliary body) and drained away. Aqueous humour is important for nourishing the lens and cornea.

## **11.2 Process of Seeing**

The physical components of the visual system include the eye, the brain (visual centre) and the optic nerve which connects the eye to the visual centre. Vision is possible only if light is present. Light rays reflected received by the eye are converted into electrical impulses and interpreted in brain. The light rays passing from the environment to the eye through the cornea. The cornea is the external covering of the eye and in the presence of light it reflects visual stimuli. These reflected light rays pass through the pupil which is an opening in the iris. The pupil regulates the amount of light entering eye. The lens focuses the light rays by changing their direction so that they strike the retina directly. As in a camera lens, the lens of the eye reverses the image. The retina consists of light sensitive cells namely rods and cones that transmit the image to the brain through optic nerves. Images from the retina upside down until they are flipped over the visual centre of the brain. The brain interprets the images. This is the process of seeing.

## **11.3 Causes of Visual Impairment and common Eye Diseases**

Both acquired and congenital causes are making persons to get visual impairments. Untreated eyes lead to blindness very often. Due care has to be taken for avoiding blindness. Many eye diseases are to be corrected surgically. The following are some of the important eye diseases which cause blindness or low vision among children.

### **i) Common Eye Diseases**

The common causes of visual impairment (WHO, 2002) are cataract, glaucoma, age-related macular degeneration, corneal ulcer, diabetic retinopathy, childhood blindness, xerophthalmia, conjunctivitis and onchocerciasis which are explained below:

- **Cataract**

In spite of the progress made in surgical techniques in many countries during the last ten years, cataract (47.9%) remains the leading cause of visual impairment in all areas of the world, except for developed countries. Cataract is a common eye disease in the developing countries. This is a defect due to the aging process and is called "over 45 defect". In India, cataract accounts for 50-80% of avoidable blindness. In cataract, the lens which is transparent in nature becomes opaque and the light rays are not absorbed. A person can restore sight with the corrective devices after the removal

of the defective lens. It is not the development of a layer over the lens but the opacity of the entire lens itself. Even though this is a common eye disease usually found in grown up persons, children too are sometimes found with this defect which is called congenital cataract. Pregnant mothers affected by German measles or rubella during the first trimester of the pregnancy consequently give birth to children with congenital cataract.

- **Glaucoma**

The number of persons estimated to be blind as result of primary glaucoma is 4.5 million, accounting for slightly more than twelve percent of all global blindness. As per the Independent Commission on Health in India (1997), Glaucoma accounts for 2% of adults (aged 40 years and above) with visual impairment and 0.5% of the total population of blind person. Glaucoma refers to a group of eye conditions that lead to damage to the optic nerve which carries visual information to the brain. In most cases, damage to the optic nerve is due to increased pressure in the eye, also known as intraocular pressure. Intra ocular pressure is a function of the ratio between the formation of aqueous in the eye and the resistance to outflow of aqueous from the eye. The degree of interference by glaucoma in vision varies from slight blurring to complete blindness. Congenital glaucoma is seen in babies which is hereditary in nature. Secondary glaucoma is caused by drugs (corticosteroids) and eye diseases (uveitis).

- **Age-Related Macular Degeneration**

Age-related macular degeneration (AMD) is a deterioration or breakdown of the eye's macula. The macula is a small area in the retina which is the light sensitive tissue lining the back of the eye. The macula is the part of the retina that is responsible for central vision, allowing seeing fine details clearly. One symptom of macular degeneration is dark areas in the central vision. Causes of macular degeneration include the formation of deposits called drusen under the retina and in some cases, the growth of abnormal blood vessels under the retina. When macular degeneration does lead to loss of vision, it usually begins in just one eye, though it may affect the other eye later.

- **Corneal Ulcer**

A foreign body is the cause for most common corneal disorders, and ulcers frequently occur as complications of corneal abrasions or



foreign body. When the foreign body stays in the cornea, it may lead to ulcer which in turn reduces the vision from mere blurring to total blindness. In order to avoid this, the eyes should be washed with clean water when the foreign body stays in the eye and on any account the eye should not be rubbed. Corneal ulcers are developed in the eyes due to bacteria, virus infection, fungus, hyper sensitivity reactions, vitamin deficiency etc.

- **Diabetic Retinopathy**

Diabetic retinopathy is the most common diabetic eye disease. It is caused by changes in the blood vessels of the retina. In some people with diabetic retinopathy, blood vessels may swell and leak fluid. In other people, abnormal new blood vessels grow on the surface of the retina. If a person has diabetic retinopathy, at first he/she may not notice changes to his/her vision. But over time, diabetic retinopathy can get worse and cause vision loss. It usually affects both eyes.

- **Childhood Blindness**

Childhood blindness refers to a group of diseases and conditions occurring in childhood or early adolescence, which, if left untreated, result in blindness or severe visual impairment that are likely to be untreatable later in life. The major causes of blindness in children are Vitamin A deficiency, corneal scarring from measles, and conjunctivitis in the newborn, congenital cataract and retinopathy of prematurity (ROP). ROP is an established problem in developed countries because of the ever-increasing survival rate of low and very low-birth-weight infants. For the same reason, it is also emerging as a problem in economically-developing parts of the world, especially in urban settings. About 40% of the causes of childhood blindness are preventable or treatable.

- **Xerophthalmia**

Xerophthalmia is a general term applied to the Vitamin A deficiency disease. Night blindness is the earliest symptom of this disease. At the onset, the conjunctiva and cornea lose their normal lustre and become dry and thickened. Kertomalacia is the severe form of Xerophthalmia. Early diagnosis and treatment will be the best way in checking this defect. Uncared condition may lead to scarring in the cornea and ulceration which in turn make the eye totally visionless. Blindness due to vitamin A deficiency has been controlled to a large extent in India.

- **Conjunctivitis**

Conjunctivitis is the commonest eye disease caused due to bacteria, virus infection, allergic conditions etc. Inflammation in the eye is the earliest symptom. This defect is usually cleared within a short period with the help of anti-bacterial agents. In addition to these diseases, diabetes and hypertension can also cause serious damage to the eye.

- **Onchocerciasis**

Onchocerciasis is the infectious cause of blindness. It is often called river blindness because of its most extreme manifestation and the black-flies that transmit the disease around in riverside areas, where they breed in fast-flowing waters. In Africa, it constitutes a serious obstacle to socio-economic development. 78 million people are estimated to be at risk. 3,00,000 people are blind.

## ii) **Other Eye Disorders**

Visual impairment may also result due to other eye disorders. Some of the possible eye disorders are listed as follows:

- **Retinal Detachment**

Retinal detachment is a separation of the light-sensitive membrane in the back of the eye (the retina) from its supporting layers. No physiological symptoms are evident for retinal detachment. Secondary effects such as diabetics and myopia may also cause retinal detachment. A serious blow to the head may also sometimes cause detachment of the retina from its position.

- **Albinism**

Albinism is a defect of melanin production that results in little or no colour pigment in the skin, hair and eyes. Due to the absence of pigment in the iris, skin and hair, affected children report poor visual acuity, and often the defect is accompanied by refractive errors. The albino children are very sensitive to light. Dark sunglasses are suggested for these children to control the intensity of light.

- **Astigmatism**

This is a type of visual defect in which the refractive error prevents the light rays from coming to a single focus on the retina because of different degrees of refraction in the various meridians of the eye. Astigmatism is a natural and commonly occurring cause of blurred or

distorted vision. The exact cause is not known. However, it is easily corrected by eyeglasses, contact lenses or surgery.

- **Nystagmus**

Nystagmus is a term to describe fast, uncontrollable movements of the eyes that may be side to side (horizontal nystagmus), up and down (vertical nystagmus), or rotary (torsional nystagmus). Depending on the cause, these movements may be in both eyes or in just one eye. The involuntary eye movements of nystagmus are caused by abnormal function in the areas of the brain that control eye movements.

- **Optic Atrophy**

Optic atrophy is a condition that affects the optic nerve, which carries impulses from the eye to the brain. Optic atrophy is not a disease, but rather a sign of a potentially more serious condition. Optic atrophy results from damage to the optic nerve from many different kinds of pathologies. The condition can cause problems with vision, including blindness.

- **Retinitis Pigmentosa (RP)**

This is a defect due to the hereditary degeneration and atrophy of the retina. It is characterized by progressive peripheral vision loss and night vision difficulties (nyctalopia) that can lead to central vision loss.

- **Trachoma**

Trachoma is the result of infection of the eye with a specific virus (*Chlamydia trachomatis*). Infection spreads from person to person. If left untreated, the infection eventually causes severe scarring of the eyelids and cornea. This ultimately leads to irreversible blindness, typically between 30 and 40 years of age.

### iii) **Loss in the Visual Field**

In addition to the eye diseases, there are some defects caused due to the loss in the field vision, these defects are the blind areas or suppressed areas anywhere in the field of vision. Those with marked visual loss move cautiously in unfamiliar places.

- **Defect in the Visual Field**

Visual field is defined as the entire area one can see without shifting the gaze. In field defect, the individual does not see in a particular

portion of the eye. In visually impaired individuals, a reduction in the field of vision can be considered a handicapping condition.

- **Loss of Peripheral Vision**

In this condition, the central vision of the individual is intact, but it is surrounded by totally suppressed peripheral retina. Due to the suppressed retina, a blind area is formed around the central visual field. The individual affected by this loss vision travel poorly, especially in poor illumination. Tubular vision is a condition of the loss of peripheral vision.

#### **iv) Genetic Causes**

Nearly half of all human diseases could have a genetic basis. These include 20% of heart failures, 25% of miscarriages, 50% of abortions and 67% cases of mental retardation. The advances in the field of medical genetics have helped identify nearly 4,000 diseases, which are inheritable. It is understood that at least 35% conceptions contain harmful chromosomal abnormalities, which account for 20% of spontaneous abortions, 11% cases of male sterility and 6% of the mentally defective human beings. For most of the chromosomal abnormalities there is no cure. Research reveals that marriages arranged between close relatives also cause impairment in the child. Sometimes the impairment is in cognitive functions leading to mental retardation and learning disabilities. In some cases the impairment may be sensory in nature. Therefore, it is always better to avoid close blood relationship in marriage to reduce the risk of getting a child with visual impairment.

Besides the above causes, some systematic causes are also responsible for blindness. There is a hypothesis that the blindness in the future may be due to metabolic causes such as diabetics and hypertension. Though these are not the primary causes, proper care of these secondary causes might prevent possible blindness among the adults.

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## **11.4 Eye Care**

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Eye care needs to be given priority in our health perspective. Due to unawareness of eye health and hygiene, people are susceptible to get eye diseases which leads to loss of vision. Children are more prone to

get eye diseases. They are physically hampered by impaired vision. They are not able to perform daily activities. Some are barely able to see or have lost their vision entirely. They also faced emotional stress. Children with severe eye problems face many issues that can lead to solitude and depression. This strain also affects friends and families. They are not able to enjoy everyday moments or special events. Eye problems can also be very costly to individuals. The need for eye wear, eye surgeries, and other needs can greatly affect a person or a family's income. There are several steps everyone can take to help prevent eye diseases and the problems related to them. It starts with knowledge of keeping the eye healthy and following good guidelines for maintaining good eye health.

Many eye diseases are preventable. Progression of eye diseases can be slowed down with proper precautions and healthy eating. Eating a lot of Vitamins A, E, C and some Zinc and Selenium can help prevent many diseases including those that affect the eyes. Certain diseases might be caused by other factors such as obesity, diabetes, exposure to ultraviolet light, smoking, certain medications such as steroids, and many other factors. It is advisable that if any symptoms of eye problems persist, the ophthalmologist must be consulted immediately. People with obesity or who are diabetic should have more routine checkups since they are more likely to develop certain eye diseases. The sunglasses or eyeglasses should be used during day time to prevent heavy exposure to ultraviolet light. People who smoke or take certain medications should ask their doctor if they are more likely to have eye diseases because of family background.

Since majority of the information/concept attainment is received through eyes. In this regard, eyes are to be protected, taken care in order to good vision. Due to many reasons, the vision used to be missed. In this unit, we learn about the process of seeing, causes for visual impairment, eye structure and eye care etc.

### Check your progress

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

1. What are the physical components of the visual system?

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2. What is the main cause of loss of vision?

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## UNIT 12 BLINDNESS AND LOW VISION

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If a person's inability to see is called as blind; where as missing the vision partially, called person with low vision.

Some of the symptoms of impairments / disabilities of vision are mentioned below. But one cannot be prescribed as impaired or disabled by finding one or two symptoms unless there should be a thorough medical check-up and functional assessment.

After completion of this Unit, you will be able to

- Describe the symptoms of visually impaired
- Distinguish the concepts of blindness and low vision

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### 12.1 Symptoms of Visually Impaired

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- Holds objects and books too close or too far.
- Rubs eyes extensively / watery eyes.
- Take help from peers to copy from the blackboard.
- Blinks more frequently / regular headaches.
- Not able to write in the prescribed space / line.
- Feel difficult to identify objects / people at a distance.
- Not able to follow moving objects.
- Poor eye-hand coordination.
- Depending too much on oral information.

- Not able to identify / match the colours.
- Unable to recognise the actions and facial expressions.
- Not able to read in poor lighting condition.

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## **12.2 Concepts of Blindness and Low vision**

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### **12.2.1 Blindness**

Blindness is frequently used to describe severe Visual Impairment with some remaining vision. Those described as having only light perception have no more sight than the ability to tell light from dark and the general direction of a light source. Blindness is generally referred as there is no useful vision in eyes.

#### **Definition of Blindness**

According to Persons with Disabilities Act (1995) blindness refers to a condition where a person suffers from any of the following conditions, namely:

- i) Total absence of sight or
- ii) Visual acuity not exceeding 6/60 or 20/200 (snellen) in the better eye with correcting lenses or
- iii) Limitations of the field of vision subtending an angle of 20 degree or worse.

#### **Classification of Blindness**

Blindness is classified into two broad categories, namely:

- **Congenital Blindness:** Blindness is present at birth.
- **Adventitious Blindness:** It is acquired blindness at a later stage after the individual has lived for some years as a sighted person.

### **12.2.2 Low Vision**

Low vision is a loss of eyesight that makes everyday tasks difficult. A person with low vision may find it difficult or impossible to accomplish activities such as reading, writing, shopping, watching television, driving a car or recognizing faces. Low vision is a condition of remaining vision in eyes which is useful for specific purpose.

#### **Definition of Low vision**

WHO (1992) defines that, a person with low vision is one who has impairment of visual functioning even after treatment and / or standard refractive correction and has a visual acuity of less than 6/18 to light perception or a visual field of less than 10 degrees from the point of fixations, but who uses, or is potentially able to use vision for the planning or execution of a task.

### **Degree of Vision Loss**

- Normal Vision 6/6 – 6/18
- Low Vision < 6/18 – 6/60
- Blind < 6/60 – 3/60
- Blind < 3/60 – 1/60
- Blind < 1/60 – PL
- Total Blindness NPL

### **Definitions given by the RPwD Act, 2016**

As per the Rights of Persons with Disabilities Act, 2016 the Definitions and Classifications are as follows:

- a) “blindness” means a condition where a person has any of the following conditions, after best correction
  1. Total absence of sight or
  2. Visual acuity less than 3/60 or less than 10/200 (Snellen) in the better eye with best possible correction or
  3. Limitation of the field of vision subtending an angle of less than 10 degree
- b) “low-vision” means a condition where a person has any of the following conditions, namely
  1. Visual acuity not exceeding 6/18 or less than 20/60 upto 3/60 or upto 10/200 (Snellen) in the better eye with best possible corrections or
  2. Limitations of the field of vision subtending an angle of less than 40 degree up to 10 degree



A person with blindness or the low vision exhibits some symptoms from the normal vision. Blindness may be by birth (congenital) or acquired at any stage of life.

**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

3. Mention any three symptoms of visually impaired.

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4. Define low vision.

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**UNIT 13 DEMOGRAPHIC INFORMATION**

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Demographic information allows you to better understand certain background characteristics of an audience, whether it's their age, race, ethnicity, income, work situation, marital status etc. as a background information, this helps us to understand completely.

After completion of this Unit, you will be able to

- Distinguish the concepts prevalence and incidence
- Describe the disable population by the type of disability, age group, and social groups.

**13.1 Prevalence and Incidence**

Generally, in the concept of census, two terminologies Incidence and Prevalence are used. Incidence conveys information about the risk of contracting the disease, where as prevalence indicates how widespread the disease is. Incidence is the rate of new (or newly diagnosed) cases of the disease. It is generally reported as the number of new cases occurring within a period of time (e.g., per month, per year). It is more meaningful when the incidence rate is reported as a fraction of the population at risk of developing the disease (e.g., per 100,000 or per million population). Prevalence is the actual number of cases alive, with the disease either during a period of time (period prevalence) or at a

particular date in time (point prevalence). Period prevalence provides the better measure of the disease load since it includes all new cases and all deaths between two dates, whereas point prevalence only counts those alive on a particular date.

Coming to the persons with visual impairment data, Incidence means the number of persons born with visual impairment or who acquired impairment per 1,00,000 population during 365 days prior to survey. Prevalence means the number of persons born with visual impairment or became visually impaired per 1,00,000 population in the country till the date of survey. The data available from National Sample Survey Organisation (NSSO) and or Census gives the prevalence and not the incidence.

### 13.2 Disabled Population by Type of Disability

Table -1

<b>Disabled Population by Type of Disability India : 2011 (with Percentage)</b>			
Type of Disability	Persons	Males	Females
<b>Total</b>	<b>26,810,557</b>	<b>14,986,202</b>	<b>11,824,355</b>
In Seeing	5,032,463 (18.8%)	2,638,516 (17.6%)	2,393,947 (20.2%)
In Hearing	5,071,007 (18.9)	2,677,544 (17.9%)	2,393,463 (20.2%)
In Speech	1,998,535 (7.5%)	1,122,896 (7.5%)	875,639 (7.4%)
In Movement	5,436,604 (20.3%)	3,370,374(22.5%)	2,066,230 (17.5%)
Mental Retardation	1,505,624 (5.6%)	870,708 (5.8%)	634,916 (5.4%)
Mental Illness	722,826 (2.7%)	415,732 (2.8%)	307,094 (2.6%)

Any Other	4,927,011 (18.4%)	2,727,828 (18.2%)	2,199,183 (18.6%)
Multiple Disability	2,116,487 (7.9%)	1,162,604 (7.8%)	953,883 (8.1%)

Source: C-Series, Table C-20, Census of India, 2011.

It is evident that the visually impaired are in 3<sup>rd</sup> place in the ratio of disability in India, after the disabled population of Movement. Female visually impaired are more than the male visually impaired.

### 13.3 Disabled population in the respective age groups

<b>Proportion of Disabled Population in the Respective Age Groups India : 2011</b>			
Age Group	Persons	Males	Females
<b>All Ages</b>	<b>2.21</b>	<b>2.41</b>	<b>2.01</b>
0-4	1.14	1.18	1.11
5-9	1.54	1.63	1.44
10-19	1.82	1.96	1.67
20-29	1.97	2.22	1.70
30-39	2.09	2.41	1.77
40-49	2.31	2.66	1.94
50-59	2.83	3.16	2.47
60-69	4.15	4.41	3.89
70-79	6.22	6.26	6.19
80-89	8.41	8.33	8.48
90+	8.40	7.88	8.85

Age Not Stated	3.07	3.21	2.91
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Source: C-Series, Table C-20, Census of India, 2011.

From the above table it is clear that the male population with disability are larger than the average disabled population as well as the female disabled population. The number as well as the percentage of children with disabilities indicating that there is an urgent need to take steps for eradication or reduce the prenatal and the natal causes for disability.

### 13.4 Disabled population by Social Groups

Proportion of Disabled Population by Social Groups India, 2011			
Social Group	Persons	Males	Females
<b>Total</b>	<b>2.21</b>	<b>2.41</b>	<b>2.01</b>
Scheduled Castes	2.45	2.68	2.20
Scheduled Tribes	2.05	2.18	1.92
Other than SC/ST	2.18	2.37	1.98

Source: C-Series, Table C-20, Census of India, 2011.

The above table indicates the overall disabled population by the various social groups in India. Among all the communities, SC community has major disabled population following by others and STs. Among all the communities, the many male population has disability than the female. While coming to the visually impaired persons, ST community people are more than the SC community visually impaired persons as per the following table.

Percentage Share of Disabled Population by Type of Disability Among Social Groups				
India : 2011				
Type of Disability	Total	SCs	STs	OTH
<b>Total</b>	100.0	100.0	100.0	100.0

In Seeing	18.8	19.1	20.0	18.6
In Hearing	18.9	17.4	19.3	19.2
In Speech	7.5	5.2	5.3	8.3
In Movement	20.3	20.5	22.5	20.0
Mental Retardation	5.6	5.1	4.9	5.8
Mental Illness	2.7	2.4	2.6	2.8
Any Other	18.4	22.9	16.5	17.4
Multiple Disability	7.9	7.3	8.9	7.9

Prevalence and incidence are the common terminologies use in the census of the differently abled. Prevalence refers to a condition that tells us how widespread a disease is in a population whereas incidence refers to new cases of the disease in the population in a year.

### Check your progress

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

5. What is the difference between incidence and prevalence?

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6. What is the percentage of disabled population with visual impairment?

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## UNIT 14 EARLY IDENTIFICATION AND INTERVENTION

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**Early intervention is a system of services that helps babies and toddlers with developmental delays or has physical and mental disabilities.**

After completion of this Unit, you will be able to

- Describe the concept of early intervention
- Discuss the importance of early intervention
- Illustrate and explain the types of early intervention

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### 14.1 Early Intervention

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Early intervention focuses on helping developmentally delayed babies and toddlers learn the basic and brand-new skills that typically develop during the first six years of life, such as:

0-2 years

- *motor development* (reaching, rolling, crawling, and walking)
- *cognitive* (thinking, learning, solving problems)
- *communication* (talking, listening, understanding)
- *social/emotional* (playing, feeling secure and happy) and
- *self-help* (eating, dressing)

2-6 years

- communication
- mealtime activities
- personal daily activities
- home living
- social relationships
- community use
- self direction
- health and safety
- reading & writing
- numbers
- leisure and work

The disabilities occurring or developing at childhood should be identified as early as possible to have a better habilitation process. The fact that infancy and early childhood are critical periods in the development of an individual itself substantiates the essentiality of the process of early intervention.

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## **14.2 Importance of Early intervention**

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- A. The rate of development of the preschool child is so rapid that the child can be given more learning experiences.
- B. Children are by nature very flexible and their growth and development can be modified extensively in a variety of directions.
- C. Parents can also benefit from an early intervention for their child because they can receive guidance.
- D. Especially when the child has some kind of disability the early intervention is more effective than introducing compensatory or remedial intervention at a later stage.
- E. It promotes biological, physical, emotional, social and intellectual growth of the child and for ecology in which the child lives.

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## **14.3 Types of Early intervention**

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### **14.3.1 Home visit**

Home visit mostly focus on vulnerable mothers and pregnant women. It ranges from informal social support through 'befriending' the family, to sharing specific parenting skills or delivering formal parenting programmes. This service work best if,

- there are clear goals, agency support and adequate resources,
- targeted at the neediest population, and culturally appropriate and designed to meet the needs of clients,
- balance the needs of parents and children,
- delivered according to the programme design, but flexible in intensity to suit families' needs,
- have specific strategies to address problems, including factors outside the programme that affect family functioning,
- supported by professionals or well-supervised paraprofessionals.

### **14.3.2 Combination of home visit and child intervention**

Usually this type targeted at parents and young children for parent education plus centre-based early childhood programme. It may also include an adult education or job skills/employment component. It will be best when the number of parents are more, high intensity and long term, with well-trained personnel or professional.

### **14.3.3 Community interventions**

This type usually target families identified as high-risk. It ranges from home visiting to centre-based group programmes for parents and children. Programmes can be more culturally sensitive and more acceptable to families who mistrust the mainstream services. Quality of delivery may vary and community services may need more support and oversight than they typically receive.

### **14.3.4 Multiple Interventions or Broad-based Family Support**

Most often it targeted to the families identified as being at high risk. Focus on reducing a variety of risk factors in several domains: family, schools, teachers, peer and environments.

### **14.3.5 ECE and Childcare**

This is meant for children between 0–6 years to provide education and care for young children. For them programmes must be of high quality to be effective.

### **14.3.6 Parenting Education and Training Programmes**

It usually targets at parents of young children with disabilities. Clearly planned and specified set of activities to be undertaken with parents or caregivers. This programme takes place in homes, clinics and community settings. A choice of parenting service is likely to be most helpful. But the relationship between parent and programme facilitator is critical. Need to be at a high level of intensity and have incentives for participation and appropriate programme content.

The Early Intervention process includes 1. Early Identification i.e., if possible identification of risk factors during pregnancy itself. 2.



Therapeutic Interventions and Intense Stimulation to promote maximum development in child's learning period itself. 3. Continued Evaluation and Follow Up making necessary modification and providing the adaptations necessary for functional independence.

**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

7. What is meant by Early Intervention?

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8. Why home visit is important in early intervention?

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**UNIT 15 FUNCTIONAL ASSESSMENT PROCEDURES**

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Every child is unique. Growth and development is at his or her own rate. Most of the time differences between children of the same age are nothing to worry about. But for one child in 10, the differences can be related to a developmental delay. The sooner these delays are identified, the quicker children may be able to catch up to their peers.

After completion of this Unit, you will be able to

- indicate the developmental milestones
- describe the procedure of assessment of the visual impairment

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**15.1 Developmental Milestones**

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**Average age of attainment of Major developmental Milestones** (adapted form, Capute1991)

**Gross motor:**

- 1 month: lifts head
- 4-6 months: reaches for objects; transfers objects

- 10-12 months: releases objects voluntarily, makes marks on paper with pencil
- 24 months: displays handedness
- 36 months: draws circles and basic images of people

#### **Visual and Problem solving:**

- 1 month: appears visually alert, briefly fixates on faces/objects, moves eyes vertically
- 2 months: shows some coordinated head and eye movement, visually follows moving objects
- 3 months: has good coordinated eye movement and head turning, displays some hand-eye coordination, reacts to visual threats
- 7-8 months: inspects objects
- 9-12 months: throws objects, uses two or more objects together, makes marks on paper with pencil
- 16-18 months: scribbles on paper

#### **Expressive language**

- 1-3 months: coos
- 4-6 months: ah-goos
- 6-10 months: babbles; uses non-specific “dada”and “mama”
- 11-14 months: says first three words; uses specific “dada”and “mama; uses immature jargons
- 15 months: uses 4-6 words
- 16-18 months: uses mature jargon, uses 7-20 words
- 19-21 months: uses 2- word combinations; has 50- word vocabulary
- 36 months: uses 250 words, forms 3-word sentences; repeats 3 digits; give age, sex and name

#### **Receptive language**

- 0-2 months: alerts to some sounds, smiles socially
- 2-4 months: orients to voices
- 4-8 months: responds to voices, bells and other sounds
- 9-10 months: understands “no”, gestures

- 11 months: follows 1-step command with gesture
- 14 months: follows 1- step command without gesture
- 15-18 months: points to pictures; recognises 5-10 body parts
- 24 months: follows 2-step command
- 36 months: identifies colours
- 54 months: follows 3- step commands

### **Social/adaptive**

- 4-6 months: smiles socially
- 7 months feeds self with fingers
- 12 months: helps dress self
- 12-18 months: learns toilet training and sphincter control; uses spoon and cup
- 24 months: engages in parallel play, does some undressing
- 30 months: uses fork
- 36 months: engages in group play, undresses self completely
- 48 months: dresses self completely
- 60-72 months: uses knife for spreading, ties shoes.

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## **15.2 Commonly used adapted tests for assessment of visual impairment**

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1. **Testing the Distance Visual Acuity:** The first step is to test distance visual acuity. It does not matter if a person cannot read this assessment using the E test card. He can just show his fingers according to the direction of the letter 'E'.

The test distance is 6 metres (20feet) for distance vision. The person must stand at 6 metres from the assessor. Six metre distance must be measured using a measuring tape. If measuring tape is not available, a six metre cloth tape preferably white in colour marked at each metre can be used or the assessor can measure or count the number or count the number of his/her steps equal to six metre. The chart should be placed at a distance of 6 metres from the child.

The E chart may be placed hanging against the wall or held at the hand. Whether it is hung or held at hands it should be at the

eye level of the child/client being assessed. The child should be explained that the arms of the letter E are directed in different directions. For younger children a E cut out made of black cardboard can be given in their hands to show the directions.

The visual acuity measurement can be started by testing the smallest symbol that can be (the directions) recognized. But due to limited visual ability it can be begun with the top line on the chart and proceed downward to the child's limit. Light should shine without glare on chart. Room illumination should be constant without light shining into child's eyes.

2. **Testing Near Vision:** The purpose of testing near vision to determine whether the child can perform near vision task like reading or what changes the child needs to perform the task or modifications in the environment required or visual aids would be useful. The results of a near vision show the child's ability to see the details of near objects within the arm's distance from the body. Near tasks include eating, personal care and hygiene, leisure activities, sewing and some work tasks like reading. Near and distance visions are not always affected to the same degree in all eye conditions. In children near vision is often not as severely affected as distance vision.

The near vision test card has three sizes of Es. The smallest size of the Es is N8 which are similar to the print size of the adult or children in middle school level. The middle size Es are N20 which are similar to the print size books of children in standard-1. The largest size of Es is N48 which are similar to headings in books and newspapers.

3. **Testing Visual Fields:** Some low vision might have trouble seeing objects to the side, above eye level, or on the ground. The child may bump into objects or trip over things on the ground. The child may also have trouble seeing in dull light and at night. It is difficult to test the visual fields of children less than 8 years of age because they may be unable to concentrate and follow the instructions.
  - Instruct the child/client to look straight at the assessor.
  - The assessor may stand or sit at 2 metres opposite the person. So that he/she can check instructions given are being followed.
  - Make sure that the child keeps looking straight ahead during testing.

- Tests of visual acuity and visual field can be used to identify person who are low vision or blind and who need a medical examination to see if the eye condition is curable.

**Measurement of Visual Field:** The commonly used tests for assessing field of vision are Lister's Perimeter and Bjerrum's Screen.

The visual field examination is very vital to assess the degree of vision. It can be assessed by performing either by peripheral field examination and central field examination. By using equipment, perimetry, the visual field can be plotted.

Development milestones indicate the stages of various attainments according to the age. Due to impairment, the visually challenged show delays in the some of the development milestones. Through various test for assessment, we can

**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

9. What is the distance to be maintained in testing the distance visual acuity?

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10. What is to be measured to assess the degree of vision?

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**LET US SUM UP**

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Vision is the most important sense required to observe and learn from what is happening around. Any type of impairment in vision create problem in the learning process. Visual impairment is a problem in seeing that, even with correction adversely affects a child's educational performance. The phrase does not include people with normal or near normal vision, but does include people with low visual functioning as well

as those who have only light perception or those who are totally without the sense of vision.

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## **GLOSSARIES**

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Blindness – inability to see anything, including light

Demographic – relating to the structure of populations

Genetic – study of genes pr based on genes

Incidence – rate of occurrence or influence

Peripheral – relating to

Prevalence – the fact or condition of being prevalent; commonness

Structure – an arrangement and organization of interrelated elements in a material object

Toddlers – a young child, usually one between the

Trachoma – an infectious disease caused by bacterium Chlamydia trachomatis

Vascular – relating to the vessels of the body

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## **ANSWERS TO CHECK YOUR PROGRESS**

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1. The physical components of the visual system include the eye, the brain (visual centre) and the optic nerve which connects the eye to the visual centre.
2. Due to unawareness of eye health and hygiene, people are susceptible to get eye diseases which leads to loss of vision.
3. Holds objects and books too close or too far, Poor eye-hand coordination.
4. WHO (1992) defines that a person with low vision is one who has impairment of visual functioning even after treatment and / or standard refractive correction, and has a visual acuity of less than 6/18 to light perception or a visual field of less than 10 degrees from the point of fixations, but who uses, or is potentially able to use vision for the planning or execution of a task.
5. Incidence conveys information about the risk of contracting the disease, where as prevalence indicates how widespread the disease is.

6. In the total disabled population 18.8% are suffering with visual impairment, in which 17.6% are male and 20.2% are female population.
7. Early intervention is a system of services that helps babies and toddlers with developmental delays or has physical and mental disabilities.
8. Home visit mostly focus on vulnerable mothers and pregnant women. It ranges from informal social support through 'befriending' the family, to sharing specific parenting skills or delivering formal parenting programmes.
9. The test distance is 6 metres (20 feet) for distance vision. The person must stand at 6 meters from the assessor.
10. The visual field examination is very vital to assess the degree of vision.

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#### **SUGGESTED READINGS**

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- Introduction to the education of children with visual impairment
- National Institute for the Visually Handicapped (2015). Information Booklet on Visual Impairment in India, Dehradun: Government of India
- Pooja Nirman. (2007). Encyclopaedia of Special Education. Anmol Publications Pvt.Ltd., New Delhi.
- Scholl, G.T. (1986). *Foundations of Education for Blind and Visually Handicapped Children and Youth*. New York: American Foundation for the BLind.
- Warren, D.H. (1994). *Blindness and Children: An Individual Differences Approach*. New York: Cambridge University Press.

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## **BLOCK 4 EDUCATIONAL IMPLICATIONS OF VISUAL IMPAIRMENT**

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### **Structure**

Introduction

Objectives

Unit 16 Effects of Blindness

16.1 Features of children with blindness

16.1.1 Primary features

16.1.2 Secondary features

16.2 Problems of Visually Impaired Adolescent

Unit 17 Selective educational placement

17.1 Braille

17.1.1 Braille reading

17.1.2 Braille writing

17.2 Educational Services

17.2.1 Cascade system

17.2.2 Hospital Schools

17.2.3 Special Schools

17.2.4 Integrated Education

17.2.5 Inclusive Education

Unit 18 Teaching Principles

18.1 Teaching Principles

18.2 Strategies for successful integration and inclusion

18.2.1 Capacity building in general education

18.2.2 Adopting need based instructional strategies

Unit 19 Expanded core curriculum

19.1 Core curriculum – concept

19.2 Areas of core curriculum adaptation

19.2.1 To the totally blind and severe low vision

19.2.2 To the low vision children

Unit 20 Advanced Assistive Devices

20.1 Educational devices

20.1.1 Braille duplicators and writers

20.1.2 Writing devices

20.1.3 Talking books and tape recorders

20.1.4 Reading machines

20.1.5 Braille computers



- 20.1.6 Mathematical devices
- 20.1.7 Sensory devices
- 20.1.8 Geography devices
- 20.2 Mobility devices
- 20.3 Vocational devices
- 20.4 Daily living devices
- 20.5 Low vision devices

Let us sum up

Glossaries

Answers to check your progress

Suggested readings

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## **INTRODUCTION**

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The basic structure of the Constitution of India as reflected in the preamble ensures social, economic and political justice as well as equality of status and of opportunity to all citizens of India. The Article 45 of the Constitution of India states, the state to provide free and compulsory education for all children until they complete the age of fourteen years. The Persons with Disabilities act, 1995 goes a step further and desires provision of free education to children with disabilities till the age of 18 yrs. Thus the constitution of India has duly recognized provision of education to all children including those with disabilities.

In this Block we will discuss on the educational implication of visually impaired mainly on the effects of blindness, need for selective educational placement, importance of teaching principles and expanded core curriculum and advanced assistive devices for education, mobility and daily living of visually impaired

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## **OBJECTIVES**

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After completion of this Block, you will

- Understand the effects of Blindness.
- Describe the selective educational placement.
- Explain the teaching principles.
- Recognize and narrate the importance of early identification and intervention.
- Discuss on the expanded core curriculum.

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## **UNIT 16 EFFECTS OF BLINDNESS**

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When a visual impairment is present from birth (congenital) it will have a more significant impact on development and learning than if the visual impairment is acquired later in life (adventitious). Loss of vision can affect all areas of development. There are several psychological and physiological effects that cause blindness that cause blindness to some visual stimulus.

After completion of this Unit, you will be able to

- Classify the features of children with blindness
- Describe the primary features of the children with blindness
- Explain the secondary features of the children with blindness
- Analyse the problems of visually impaired adolescent

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### **16.1 Features of children with blindness**

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Identification of children who are born blind is almost always made by parents within the first year of life. But, many children especially those whose eyes may look normal by general appearance may not be identified for a long time. But they will exhibit the following primary characteristics:

#### **16.1.1 Primary features**

##### **A. Behaviour**

- Rubs eyes excessively
- Covers one eye and tilts the head forward
- Holds objects and books close to the eyes.
- Asks other children when taking notes from the blackboard
- Blinks more frequently
- Squints eyelids together
- Bumps into people or objects
- Unable to participate in games requiring distance vision
- Excessive sensitivity to light

##### **B. Appearance:**

- Crossed eyes

- Red rimmed, encrusted or swollen eyelids
- Inflamed or watery eyes

**C. Complains:**

- Eyes itch, burn or feel scratchy
- Cannot see well
- Dizziness, headaches or nausea following close eye work

**D. Blurred or double vision.**

The Snellen chart is widely used as a screening device for detecting eye problems and for finding visual acuity because of the ease and speed with which it can be administered, its low cost and its wide range of applicability.

**16.1.2 Secondary features**

As a secondary feature, the visual impairment affects the intellectual ability, behaviour and social development of a person.

**A. Cognitive:** The students, who have visual impairments are not necessarily intellectually retarded, but they may perform poorly on most standard intelligence tests. Cognition depends on visual experiences. Visually impaired children are experientially deprived in terms of restricted mobility. They have problems in understanding abstract concepts.

**B. Psychological:** Visual impaired children have low self-concept, poor personality makeup and low level of need for achievement than normal persons.

**C. Academic:** With the exception of unique problems of input and possibly a greater demand in processing the fundamental learning procedures the blind children do not differ from those of normal children. The impact of visual impairments on academic performance is very much a function of the severity of the condition and the age at which the students' vision reduced.

**D. Motor development:** Loss of vision impacts motor development as a child may not be motivated to move toward that which can't be seen or causes inhibition to move for fear of the unknown. Exploration of the environment and materials is critical in cognitive

development, therefore movement is important not only for motor development but for development of concepts.

**E. Physical:** in terms of size and appearance people with visual impairments are no different from those with normal vision. However, low vision and blindness may affect the movement and quality of motor skills. Some children may develop repetitive stereotypic movements commonly referred to as 'blindisms' such as rocking, eye packing, head rolling and head waving.

**F. Behavioural:** there are a few social emotional characteristics specific to visual disabilities. They cannot see non-verbal forms of communication, non-verbal understanding and body language behaviour.

**G. Language:** Language acquisition can be affected by the loss of vision as active interaction with people and the environment is important in language development.

**H. Communication:** There is no difference between the language abilities of visually impaired children and normal children including communication skills. They experience difficulty to read and understand body language of others.

**I. Social Development:** It is affected as children are not able to pick up on non-verbal clues or if they are unable to make eye contact they may appear disinterested and can have reduced sustained social interactions.

**J. Daily living activities:** Delays in the area of independence in activities of daily living are impacted as incidental learning through observation is not possible for those with significant visual impairments. This impact can be magnified when caregivers, in an effort to help or to rush through activities, complete tasks for the child who creates a learned helplessness in the child.

## **16.2 Problems of Visually Impaired Adolescent**

Adolescence is a period for growth and development in life. It is to be a time of enjoying activities, friends and life in general. For adolescents who are blind this period of time can be difficult. The visually impaired adolescent faces certain unique problems as he/she matures. Cholden (1958) stated

that three special preoccupations of the blind adolescents are found among most seeing young men and women. But they are complicated by the fact of blindness. One preoccupation is with the importance of bodily attractiveness to the female and masculine strength and independence to the male. The desire to impress the opposite sex and the anxiety surrounding the sexual relationships are typical of adolescence but they are more difficulty for visually impaired adolescents. The second preoccupation is the concerns of independence and the dilemma of blind that cannot achieve certain degree of freedom from parents and others. The third common problem of all adolescents is to achieve a certain degree of exhibitionism, which is more difficult for the blind.

### **Self-esteem and identity**

Unlike sighted adolescents blind adolescents have a harder time with finding independence. They have to depend more on others to get where they want to go. Sighted adolescents can go off on their own. Adolescents can overcome their blindness and meet the demands that a sighted community can place on their lives. Lowenfeld(1971) feels that the difficulties encountered by the visually impaired adolescent who can possibly affect his/herself-concept and attitude towards interpersonal relationships. Their adjustments may be more severe than of all adolescents. It is important for a blind adolescent to feel independent. The feeling of independence fosters him to have a higher self-esteem and a better sense of identity. Blind adolescents who have high self-esteem and a strong sense of identity have an easier time adapting to their environments than those with low self-esteem and a weaker sense of identity.

Hence it is important that early diagnosis of the vision impairment so that intervention can begin immediately. Interaction with the child should begin early and that the sooner it occurs, the better the impact will be for the development of the child.

**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

1. What is the impact of loss of vision on psychological development?

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2. Mention the special preoccupations of the blind adolescents.

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**UNIT 17 SELECTIVE EDUCATIONAL PLACEMENT**

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Since ancient time, the educational services for children with visual impairment have been changing which take the evolutionary process. The evolutionary changes encountered different stages in the education of persons with visual impairment such as rejection and removal to acceptant, acceptant to benevolence. Benevolence to segregation, segregation to integration, and integration to inclusion. In the early developmental stages of education for children with visual impairment, there was no structured programme until the invention of Braille.

After completion of this Unit, you will be able to

- Convert the reading material into Braille
- Practice Braille reading and writing
- Describe the educational services
- Explain the educational placement of children with visual impairment

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**17.1 Braille**

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**17.1.1. Braille Reading**

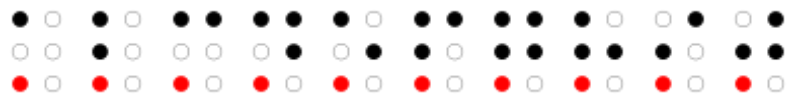
Research indicates that fingertips possess special nerve endings which enable touch-reading. The area covered by light pressure of the fingertips on the paper gives the necessary information to the child to discriminate between the different configurations of Braille letters. Braille is named after its creator, Frenchman Louis Braille, who lost his eyesight due to a childhood accident. In 1824, at the age of 15, he developed

Braille. Braille characters are small rectangular blocks called *cells* that contain tiny palpable bumps called *raised dots*. The number and arrangement of these dots distinguish one character from another.

Derivation of the 26 letters of the alphabet from the 10 numeric digits (black)



a/1   b/2   c/3   d/4   e/5   f/6   g/7   h/8   i/9   j/0



k   l   m   n   o   p   q   r   s   t



u   v   x   y   z   w

**Bharati Braille** or **Bhartiya Braille** is a largely unified Braille script for writing the languages of India.



(Bharathi Braille picture)

## **Teaching of Braille reading**

Braille cells are not the only thing to appear in embossed text. There may be embossed illustrations and graphs, with the lines either solid or made of series of dots, arrows, bullets that are larger than Braille dots, etc. There are more than 65 positions followed by visually disabled children for Braille reading. Using both the forefingers for Braille reading is universally recommended. When the right hand reaches the end of the line, the left hand should retrace the line, which was just read and identify the beginning of the next line. Then the right hand which is at the right corner of the previous line will be brought to the position of the left hand in a diagonal manner and the process continues. If the visually impaired follows some unconventional methods of Braille reading, the adopted style need not be discouraged if it helps for effective reading.

Emotional and psychological readiness along with physical readiness of the child contributes to the success of a child. Due to the slow process of Braille reading and the fatigue caused by it, some visually disabled children with poor motor abilities tend to overlook the tactile reading and rely upon audio instruction. But Braille reading is deemed essential for every educated blind individual.

### **17.1.2 Braille writing**

Braille can be written with the original slate and stylus or type it on a Braille writer, such as a portable Braille note-taker, or on a computer that prints with a Braille embosser. Since the various Braille alphabets originated as transcription codes of printed writing systems, the mappings (sets of character designations) vary from language to language.

Most probably, Slate and Stylus are used by the children in developing countries. But writing through the slate and stylus is typical. While writing, the child has to punch the dots from the right to left side of the slate. After this, the child should reverse the paper and read it from left to right. Even though this looks different and difficult the visually disabled children are tuned to this system. Those children who can afford a mechanical Braille writer can use it but due to its cost, all children cannot be benefited. While the impression of Braille dots will be downward in the slate and stylus, the impressions in the mechanical Braille writer are upward.

Writing in Braille slate and stylus needs enormous muscle control. Since establishing the hand position in slate and stylus is very important and



every child finds it very difficult to practice in early days. In holding the stylus the forefinger should be squarely placed over the top of the stylus resting of the area between the knuckle and first joint of the forefinger with the rest of the finger over the edge and pointed down the stylus shaft. The slate should rest on a firm surface at a lower left to upper right angle. This whole mechanism would be difficult for the child during the first year. Unless the child has the ability to read Braille words, he cannot check what he writes. So, Braille writing is usually taught to the child after Braille reading.

In teaching Braille writing, the easiest formation should be taught first. For example, the letter 'a', which is represented by dot 1, can be started. Similarly, the letters b, c, g, k, l, m, p, u, v, x could be given for practice. For developing the speed in writing, the left hand should always identify the Braille cell while the right hand punches the letter in the previous cell. The stylus and the left hand should be placed on the consecutive cells. By this the left hand is assisting the right hand to identify the correct dot in the Braille cell. While writing, the stylus should be held vertically. Tilting the stylus may make holes in the Braille paper which may be avoided to make the Braille writing as neat.

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## **17.2 Educational Services**

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### **17.2.1 Cascade system**

Cascade Model of Special Education services is a conceptualization of the range of placement and service options that used to be available for disabled children. The placement options were presented in hierarchical form and ranged from the least restrictive placement in the regular education classroom to the most restricted placement in hospital or institutional settings. The cascade model was first proposed by Reynold in 1962 and an amended version was proposed by Deno in 1970. The Cascade Model helped to create understanding of and support for a better system that “facilitate tailoring of treatment to individual needs rather than a system for sorting out children so they will fit conditions designed according to group standards not necessarily suitable for the particular case”.

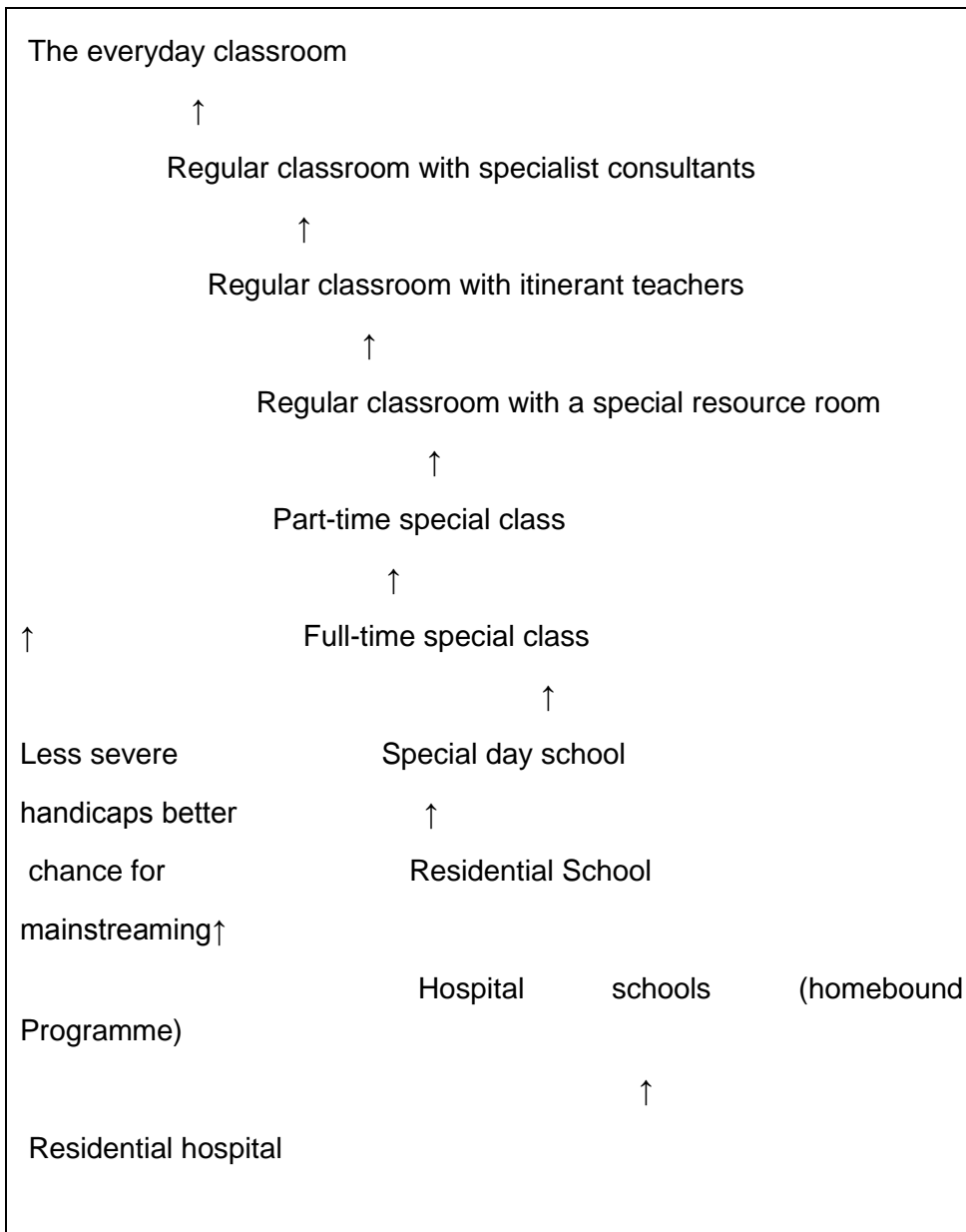
The instructional cascade envisioned the regular education system as the primary and optimal setting for the delivery of specialised services for disabled children. Children were seen as moving among the levels of the cascade for educational purposes. Ideally, a child would be moved to

a more restrictive setting only for compelling educational reasons and was moved back as quickly as possible.

**Cascade System - diagram**

The cascade system clearly explains the nature of educational services available for children with visual impairment depending upon their extent of disability it is very clear from the system that the children with less severe handicaps can up well in mainstreaming programmes.

The diagrammatic representation of the Cascade System is as follows:



The children with visual impairment with additional disabilities can normally get education in the lower half of the ladder whereas other

children who have only visual impairment can study in total integrated system.

### **17.2.2 Hospital Schools**

Hospital school is created to provide the medical facilities along with some educational facilities for the children suffering from visual impairment. This hospital school is otherwise called Homebound programme. Homebound programme is meant for children with visual impairment who are unable to move from one place to another to the extent that they cannot attend a school. The purpose of this school is that the physical incapacity should not and need not create inaccessibility of education. If the children are unable to attend the school education can be brought to this programme.

In this approach specialised teachers in the field of visual impairment are nominated routinely to take care of a student's education. The special teachers' in this system are assigned with a caseload and visit the student in the home on a regular base. The major responsibility of the teachers is to assist the child's regular classroom teacher in preparing instructional plans and guidelines which can be pursued with the homebound student on one-to-one tutorial basis. It is desirable that the learning environment should be made more compatible to the child's basic physical and emotional needs in this system. The homebound programmes are rarely practiced in Indian conditions.

### **17.2.3 Special Schools**

The special school admits the children with visual impairment along with the same disability group in the school. Here, there won't be any sighted children to study. This special school is categorized into two ways viz., Residential school and Special day school. Some schools have both group of children i.e., some children stay in the hospital attached to the school and some would come from their residence.

**Residential school:** the residential schools are meant only for children with visual impairment who are housed there. Countries have traditionally established residential schools to provide educational experiences for children with visual impairment. Just like normal schools subject teachers are appointed in residential schools to handle various subjects.

In most of the residential schools in India, the curriculum followed is similar to the one prescribed for non-disabled children of the same age group. However, some schools exempt visual oriented concepts in mathematics and science for children with visual impairment. Music, recreation activities and pre-vocational skills are taught to the children in residential schools in addition to curricular skills. Children with visual impairment in residential schools are provided hostel facilities too at free of cost and most of these schools are located in urban areas.

**Special Day School:** Children with visual impairment, who are coming as day-scholars from house to school, are enrolled in the school meant for children with visual impairment. The peer group is also having same visual disability condition. The special day schools conduct the classes in two different ways such as full time special class and part time special class. In full time special class, the children would be in the school throughout the day. In part-time special class, the children with visual impairment stay half a day in the special school for attending the classes. For remaining half of the day, the children would be participating in either integrated school vocational training centre. The growth of the integrated education system is redefining the role of residential schools in India. However, both integration and special school system are found relevant context specific situations.

#### **17.2.4 Integrated Education**

Integration aims at normalizing the life and education of children with visual impairment in the least restrictive environment. In this system children with visual impairment are educated with the seeing children in general schools. Integrated education is the programme implemented in regular schools with the assistance of special teachers. The special teacher called resource teacher is available full time in the school for teaching plus-curricular skills for the children with visual impairment. This kind of programme is known as “Regular classroom with a special resource room”. In some school, the special teacher called itinerant teacher visits the school in one part of the time for providing assistance to the children with visual impairment and this programme is known as “Regular classroom with itinerant teachers”. Some school engage the specialist consultant who visit the schools based on the requirement of the children with visual impairment. This programme is known as “Regular classroom with specialist consultants”.

The major objectives of integrated education are:

- To provide equal educational opportunities and educational experiences for children with visual impairment equal to those provided for the sighted children.
- To allow children with visual impairment and their families, neighbours and sighted peers to interact socially in normal settings.
- To change stereo-typed responses to blindness by demonstrating that children with visual impairment are children first and disabled next.
- To develop the personalities of children with visual impairment so as to provide a natural basis for adult life experiences. In short, to allow these children to take their proper places as contributing members in all sectors of society whatever the society may be.

#### **Factors contributing to successful integration**

The major means of attaining successful educational integration are:

- Provision of specialized teachers to serve as resource teachers of various levels.
- Provision of all appropriate educational texts and selected special aids and appliances.
- Provision of consultations to regular classroom teachers school administrations, families, local health authorities and the general public on matters of education of the children with visual impairment and
- Full utilization of local consultations specialists and volunteer for auxiliary services such as reading service and materials preparation.

#### **17.2.5 Inclusive Education**

The everyday classroom is the top of the ladder of cascade system. Here, the children with visual impairment are totally integrated in the regular classroom and the regular teacher assists for their needs. This every day classroom concept is at present known as inclusive education. Inclusive education is the recently spelled out concept which emerged after Salamanca declaration in 1994. Inclusive education aims at providing the educational facilities for all children with disabilities in the education programme available for non-disabled children in their locality.

The regular teacher who handles the non-disabled children would take up the responsibility of handling the children with disabilities in the regular classroom.

Education is very important for the all round development of any child. For the visually impaired, there can be Braille reading and writing; and educational services such as Cascade system, Hospital schools, special schools, integrated and inclusive education system to make the children with visual impairment be empowered.

### **Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

3. How is the creator of Braille reading and writing?

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4. What is meant by Cascade Model?

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## **UNIT 18      TEACHING PRINCIPLES**

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Teaching is a complex, multifaceted activity. To make this task more effective and efficient some of the principles are useful. After completion of this Unit, you will be able to

- Explain the teaching principles
- Describe the strategies for successful integration and inclusion
- Modify and adopt the need based instructional strategies

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### **18.1    Teaching Principles**

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Most of the learning and development of basic concepts are takes place by sight. Since vision plays an important role in understanding and gathering information, the lack of vision may hinder learning as well proper development of the concepts. This is typically true for the visually impaired people. Since they have no sight, they use words without associating it to the right concept. In other words, the visually

impaired mainly learn with the help of other senses and rely a lot on verbal learning.

### **1. Concept development**

A concept is a mental image, representation or idea of what something should be. As has already been said that the visually impaired develop abstract concepts as explained by others and do not have clear understanding of things around them. The visually impaired need assistance so that they can relate the concepts with real world images and objects and develop the right concepts. They need to be trained to correlate vocabulary and words they have learnt and know to the real objects, body movements and abstract objects. The visually impaired miss a lot on incidental learning because of their disability and so are unable to develop the right concepts. The following strategies must be employed for the concept development of the visually impaired:

- i. Pre-teach vocabulary and key concepts using verbal explanations and multi-sensory approach.
- ii. Review concepts and vocabulary for a better understanding.
- iii. Enable the visually impaired to learn and practice the same concepts in different environments.

The following must be a part of concept development for the visually impaired:

- Size, shape and function of objects in the world
- Texture and contour concepts of objects
- Time, distance, temperature, amount and weight connects.
- Identification and movement of the body parts.
- Position of self with respect objects and to other people.
- Specific indoor and outdoor environmental concepts.
- Feelings and emotions
- Gestures and body language.

Once the visually impaired develop these concepts in a clear and concise manner, they find it easier to communicate and comprehend what this being said. With the development of clear concepts, the visually impaired are able to relate the words or vocabulary being used to the actual object and can also identify the environment in which these concepts are being used.

## **2. Development of Listening Skills**

The people who are visually impaired often learn through their other senses and hearing plays a vital role in the learning and intellectual development of the visually impaired. Listening skills must be developed in the following areas for the visually impaired.

- Auditory perception
- Sound discrimination
- Sound location
- Association of sound with the right object
- Interpreting auditory information
- Listening for sequence
- Listening for details
- Listening for the main ideas
- Learning new vocabulary
- Listening to understand and follow instructions
- Learning to listen to audio cassettes
- Minimize distractions
- Listening and understand the reader.

## **3. Development of Reading Skills**

Visual impairment makes it difficult to read. In case of low vision, the visually impaired need to put a lot of strain on their eyes and need to make use of various visual skills like scanning, fixating and tacking to read effectively. Those who have lost vision completely need to make use of Braille in an effective manner so that they can read.

To read effectively, the visually impaired with low vision can do the followings:

- Use a multi-sensory approach to reading
- Modify the amount of reading
- Use audio-cassettes to read effectively
- Use a line marker to keep track of what is being read.
- Highlight important information when reading.



- Hold the page as close to the eyes as possible to facilitate clear and easy reading
- Take breaks for extended period of time so that the eyes can be rested when required.
- Use bold and high contrasting letters to read easily.

For people who have lost vision, it is important to develop skills and adapt themselves to reading Braille in an effective manner. Braille is a system of 6 raised dots which are arranged in a specific order. These dots can make up to 63 combinations which represent the alphabets, numerals as well as words which the blind can read and develop the essential reading skills.

#### **4. Development of Writing Skills**

Visually impaired people often find it difficult to write as well because of their disability. Those with low vision need to put in a lot of efforts to develop writing skills. For those people who have no vision, it is often difficult to develop writing skills. Most visually impaired people can be taught to write their signature only after the complete development of Braille reading skills. Braille writers are also available for the blind so that they can write as well. However, training is essential for using the Braille writer. Those who have low vision can do the following to develop the right writing skills:

- Write in size of print which is easy to read.
- Pay more attention to legibility rather than style and speed of writing
- Use the right writing tools like felt pens, raised and bold line paper, primary pencils etc.
- Develop keyboard skills so that the computer can be used easily.

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## **18.2 Strategies for successful integration and inclusion**

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### **18.2.1 Capacity building in general education**

For the effective implementation of integration and inclusive education for all types of disabled children, general classroom teachers need training on understanding the educational needs for these children. It is ideal to teach about special needs children in the pre-service teacher preparation course itself. The curriculum framework of the National Council for Teacher Education implemented the pre-service teacher

preparation include with the content on special need children. Teachers, this trained, will be a position to take care of the educational needs of children special needs too in general classroom if appropriate disability specific assistive devices are make available. The work of the general classroom teachers may be assisted by special teachers based on the specific demand.

The existing teachers who have no exposure to education of children with visual impairment can be given in-service training for a period of 5-10 days to learn the following areas:

- Definitions on visual impairment
- Psychological implications of visual impairment
- Learning behaviours of children with visual impairment
- Plus curricular activities.
- Assistive devices
- Preparation of teaching aids and learning materials
- Adaptation of existing devices and instructional materials for children with visual impairment
- Teaching methods
- Evaluation procedures

The in-service courses may be offered to at least one teacher to begin with from each school and eventually cover all general classroom teachers in a block. This initial investment on capacity building would be vital for making a strong base for inclusive education.

### **18.2.2. Adopting need based instructional strategies**

Inclusive education does not mean just enrolling a child with visual impairment in the regular classroom. The child should be given help to cope in the regular classroom work. Therefore, child centered approach is needed. Inclusive setting would enrol disabled children of all categories and also of different levels of disability. All of them may not require the same kind of assistance. Some may require guidance rarely whereas some others need continuous help. The children in inclusive education may be classified as following.

- a. Children with mild disabilities who can be handled by general classroom teachers with minimal training

- b. Children with mild/moderate disabilities who need counseling services.
- c. Children with moderate/severe disabilities who need resource assistance including corrective aids and periodical help in academic areas.
- d. Children with severe disabilities who require direct attention preparatory assistance from the special teachers.

Therefore, need-based instructional strategies are important in inclusive setting. The children in category D may require the assistance of special teacher to a large extent at the beginning to learn plus curriculum skills. Therefore, the extent of assistance should be decided on the basis of the instructional needs of the child. With the proper understanding of need based instructional strategies, integration and inclusive education will be successful.

**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

5. How to develop concepts among visually impaired?

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6. What is the importance of need based instructional strategies?

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**UNIT 19 EXPANDED CORE CURRICULUM**

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According to the Secondary Education Commission (1952-53), curriculum is much more than the boundaries by the academic subjects taught traditionally. It should include totality of experiences that a pupil receives through the manifold activities that go on in the school, in the classroom, library, laboratory, workshop, playgrounds and in the numerous informal activities and contact between teachers and pupils.

After completion of this Unit, you will be able to

- Discuss the core curriculum concept

- Distinguish the core curriculum adaptations for totally blind and the low vision children

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## **19.1 Core Curriculum – Concept**

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The whole gamut of the curriculum for children in school and community is centered around two significant aspects that include, the Opportunity and the Experience. Often children are provided with opportunities, but the mere provision of opportunities does not mean the acquisition of experience. Sighted children have an edge over children with visual impairment in the acquisition of knowledge through experience. But the learning of children with visual impairment is not 'whole' but in 'pieces' of information. Adaptations must be made in order to maximize the learning potential of children with visual impairment to compensate for learning which occurs through visual observation. Therefore, there is no change in the curriculum of school for children with visual impairment. However, certain adaptations are required in the present curriculum for transacting to children with visual impairment to learn the visual oriented concepts. To teach children with visual impairment, the teacher should adopt a consistent, realistic and flexible approach in curriculum planning and implementation. The **definition of core curriculum** is a set of courses that are considered basic and essential for future class work and graduation. Math, science, English, history and geography are an example of **core curriculum** in a middle school or high school.

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## **19.2 Areas of core curriculum adaptation**

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### **19.2.1 Adaptations to the core-curriculum for totally blind and severe low vision.**

The following aspects are very much essential for totally blind and severe low vision children to cope with curriculum in mainstreaming school.

#### **1. Learning Braille**

Languages are the basic subject in the school curriculum. Instead of learning language characters, totally blind and severe low vision children are taught to read and write Braille as their medium of learning for corresponding languages.

#### **2. To help for learning language**

Textbooks and supplementary learning materials can be transcribed into Braille. Various language activities such as story-telling, singing, role-play etc. can be used to reinforce the children's language skills and to improve their understanding of the language. Great emphasis should be put on the explanation of synonyms and the homophones. In introducing new vocabulary and language items, more explanation or experience sharing is required as visually impaired children have little actual experience. In composition, it is advisable to provide the children with more organized activities such as visits, picnics, debates, radio plays, drama and interviews so that these concrete experiences can help to enrich the content of their composition. For picture-guided composition, verbal clues and descriptions of pictures in Braille are also of great help.

### **3. Mathematics**

Mathematics is an important subject in the curriculum. In learning Mathematics, totally blind and severe low vision children need first-hand experience because they lack visual stimulation related to the development of mathematical concepts such as size, shape, colour etc. The teacher needs to adapt the learning materials and give examples appropriate to the children's levels of understanding. The mathematical language and terms used should be consistent. To teach mathematical concepts, the teacher needs to train the children's tactile skills by using teaching aids such as toys, counting apparatus, embossed pictures and diagrams etc. Learning materials which provide the children with opportunities to touch and count are necessary to help them acquire mathematical concepts. Learning activities used in Mathematics lessons should be closely related to the children's daily life experiences.

Mathematics Braille should be introduced for mathematical computation. Calculation frames such as Taylor Board and abacuses can also be used. The children can also be taught to use talking calculators, which simplify operation involving complicated calculations. In teaching Geometry, Statistics and Graphs, embossed diagrams should be used. The teacher should ensure that embossed diagrams have been simplified without compromising accuracy.

#### **4. Social Studies**

To teach these subjects, learning materials have to be prepared in Braille copies and embossed Braille maps or pictures should be used. The teacher should simplify the important items depicted from original maps or use separate maps to show different items. Teacher should use models or real objects to reinforce the children's learning.

Activities such as visits to towns, exhibitions and museums, quiz and model-making would help to promote the children's interest, enrich their experience and arouse their social awareness. The teacher should also make use of community resources such as large posters available from Government departments or other agencies to teach related topics.

#### **5. Biology**

Biology helps the children to understand about living organisms in the environment. By using their sense of hearing, touch and smell, the children's curiosity in the natural environment can be stimulated. Real objects, living things, models and diagrams can be used to develop the children's power of observation and understanding of concepts. Active participation in visits, excursions, and data-collection not only helps to stimulate the children's interest to learn, but also develops in them an enquiring mind and a positive attitude towards nature.

#### **6. Computer Literacy**

When using the computer, visually impaired children have problems in perceiving visual displays on the screen and the text of a hard copy in ink-print. They may also have difficulties in keying data into the computer. To help the children cope with these problems, adaptations to the syllabus for Computer Literacy is necessary. Additional time is required to teach the keyboard skills and operations of special adaptive devices in order to get access to computers.

#### **7. Music**

Through playing musical instruments, singing, listening and creative activities, the children may experience enjoyment and satisfaction in music. A sense of rhythm can also be developed

through movements to music, which strengthen the children's body awareness and spatial concept. The music teacher or teacher who sings will may use his own voice to demonstrate accurate and natural voice production as well as good models of singing.

## **8. Physical Education**

Physical Education is an indispensable part of the curriculum. In teaching Physical education, each motor skill has to be given a specific name so that the children know how to distinguish one from another. Instructions need to be clear and concise. Sound source devices should be applied in activities such as running, bean bag throwing and ball games. The teacher should take special safety precautions when conducting physical education lessons, outdoor activities, sports and games.

## **9. Communicative and Social Skills Training**

Visually impaired children need particularly to learn communicative and social skills. The teacher should provide them with sufficient opportunities for social interaction and exposure to general knowledge and what happens around them both at school and at home. The teacher should help them to develop a pleasant personality, a good body image and a proper way of walking. Visually impaired children should also learn the rules of social courtesy e.g. to initiate and maintain a conversation in a suitable tone and with appropriate facial expressions.

## **10. Self-care skills training**

Since visually impaired children are unable to learn by observation, daily living skills need to be learnt by actual practice. These skills include feeding, dressing, toileting, personal hygiene, cleaning and cooking. These have to be taught right from the lowest class gradually up to higher classes.

### 19.2.2 Adaptation to the curriculum for Low vision children

The children with low vision should be provided assistive devices for the learning. The magnifiers are given for reading the print materials. Large print materials should also be produced. The telescopic lenses should also be provided for distance vision. CCTV and other electronic devices useful for children with low vision are to be used for them for their learning. The optical and non-optical aids are to be prescribed and obtained based on the individual need and assessment. The proper illumination, contrast, magnification, glare avoidance should be properly provided to the children with low vision for coping with curricular instruction.

Due to missing of sight, the children with visual impairment will miss the concept on the holistic sense. The same curriculum may not be suited for both the normal and the children with visual impairment. Here comes the need for adaptation. Adaptation should be according to the subject taught, according to the level of the child etc.

#### Check your progress

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

7. Why curriculum should be adapted?

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8. How will you teach self-care skills to the visually impaired?

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## UNIT 20    ADVANCED ASSISTIVE DEVICES

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Visually impaired children can be generally categorized into

- a. Partially seeing, whose vision can be corrected to such an extent that ink print can be employed for their education
- b. The blind, who cannot use vision to acquire education.



With the helping plans and strategies, the visual impaired will get the whole concept as of normal children.

After completion of this Unit, you will be able to

- Explain the importance of advanced assistive devices
  - Describe the devices for education, mobility, vocational, daily living
  - Narrate the low vision devices

Assistive devices for the visually impaired can be divided into the following categories:

1. Educational devices
2. Mobility devices
3. Vocational devices
4. Daily living devices
5. Low vision devices.

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## **20.1 Educational Devices**

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The educational devices can be further classified into

### **20.1.1 Braille duplicators and writers**

'Indutherm' is an indigenous semi-automatic Braille duplicating machine. It is useful for taking out multiple copies of the Braille matter on the Indutherm (or Brailon) sheets format the masters generally prepared on the Braille paper. The machine operates on the principle of vacuum and high temperature.

Braille Writer is an upward writing machine for writing on one side of the paper, enabling the Braille to be read as it is written. This machine can be compared to a normal type writer with a major difference that it has only nine keys, three for paper setting and six for embossing the Braille embosses combinations of six dots in a Braille cell. The most popular Braille writers are, Stensby Braille Writers, Perkins Brailers.

### **20.1.2 Writing devices**

- a) Interline Braille Frame: It is used for writing standard character interline Braille. The frame comprises a wooden board, a metal guide, a reversible paper clamp and a stylus. The clamp fits at the top of the board and has a small swivel stud for locking and holding Braille paper. When one side of the paper has been

Brailled, the clamp with the paper still held, is turned over as a unit. The binding margin is made automatically.

- b) Taylor Postcard Frame: It is used for writing small character Braille on one side of the paper. The corner pins are arranged in such a way that the Braille can be read without removing the paper from the frame. When the top section is lifted, the paper remains attached to it.
- c) Pocket Braille Frame: The four-line pocket Braille frame produces small character Braille on one side of the Braille paper. This is specially used for making small and occasional notes.
- d) Sytli: these are produced with handles of various shapes to suit individual needs. The points of all are made of stainless steel and the handles are of polished hardwood or synthetic material.
- e) Braille kit: it is rexine coated or a decorative wood box 36 cms by 28.5 cms with a weight of 3085 gms. And contains the following:
  - Braille Writing Frame
  - Braille Writing Pocket Frame
  - Rubber sheet
  - Foot ruler
  - Compass set
  - Tow styli
  - Fording stick or abacus and
  - Signature guide.

### **20.1.3 Talking books and tape recorders**

The material recorder on cassettes has emerged to be the most popular mode of imparting education to visually impaired persons. As Braille books are very heavy and many newly blind persons are not able to learn Braille easily, talking books are emerging to be the most viable alternative. For listening to the talking books, the conventional cassette players with the compact cassettes with a playing time of either 60 or 90 minutes is generally used.

#### 20.1.4 Reading machines

a) Kurzweil Reading Machine: A portable optical scanner that reads type-set to type-written text and turns it into speech. Its features include:

- A large memory to provide improved processing of incoming text.
- An automatic contrast control
- Tools for format analysis
- Multi-lingual capability of text input of these verbal language.
- Communication interface which allows it to serve as an input device with other data or text processing equipment.

b) Optacon

It is a book-sized electronic device with a movable camera, the size of a pocket knife and a tactile screen the size of a fingertip which presents a tactile image on an array of vibratory pins. The reader passes the camera over printed material with his right hand and his left index finger feels in vibratory relief the image the camera sees. The manufacturer claims that an experienced Optacon user reads up to 90 words per minute, about half his Braille reading speed.

#### 20.1.5 Braille computers

- i. Braille Window: It is the Braille-display for connection to all or of IBM compatible personal computers.
- ii. Keytone: It is a portable information handling, word processor and computer access device that talks to its user.
- iii. EHG-BW/2-PIEZO: It is a monitor and key board which provides output in raised dots and can be conveniently used by the visually impaired persons.
- iv. Galaxy Piezo: It is a special computer for the visually impaired and it gives output in embossed dots.
- v. Galaxy Speed: It is a special computer for the visually impaired with speech output.

- vi. Braille's Speak: It is a pocket note taker. It can be used for word processing, as a calculator, as a clock and a calendar. It can store 200 pages of Braille text
- vii. Versa-Braille II+: It is recognized as a convenient Braille operating system. It can be used for editing, programming and word processing. The input is from six keys and output is in the form of raised dots. It is a product of Telesensory Systems Inc.
- viii. Index Braille: Index Braille is a Sweden based privately owned business with a mission devoted to development and production of Braille Embosser.

The company has introduced Double-sided Braille Embosser, popularly known as "Index Everest". Over the years, the Everest has proved to be one of the most reliable Embossers on the market.

- ix. Speech Synthesizers: A speech access system converts text from a computer into spoken words. It is the hardware device that does the speaking in a speech access system.
  - External device: It connects to a computer externally and comes with a speaker and a socket for headphones and can be moved around to different machines.
  - Internal device: It comes as a chip or a circuit board that must be inserted inside the computer with sockets for speakers and headphones. It can be moved around to different machines. It works faster than an external device.
  - Software based device: It is loaded as software on a compatible computer and it gives speech out through the sound system of the computer itself. The Microsoft Voice is useful for reading the documents and for operating window commands with the help of multimedia kit.
  - Language software: The Indian Institute of Technology (IIT) Chennai has developed Braille Software as well as Language Software which enables a visually impaired person to access computers for Braille as well as language outputs in all the Indian languages.

### **20.1.6 Mathematical devices**

- i. Taylor Arithmetic Frame: the surface of this aluminium frame is divided into star shaped holes with eight angles, thus allowing the double-ended metal types to be placed in different positions according to a set system. This frame is suitable for teaching arithmetic to visually impaired persons.
- ii. Arithmetic and Braille Writing Slate: This has a Arithmetic frame on one side and a writing slate on the other. It also has reversible type clamp and two guide lines supplied with a wooden stylus.
- iii. Abacus: A simple instrument for performing rapid arithmetical calculations. It consists of a frame holding thirteen vertically arranged rods on which beads slide up and down. The beam supporting the beads is marked with a raised dot at each rod position and a raised bar between every third rod. The bars serve to indicate the decimal point and other units of decimal measure.
- iv. Talking Calculator: Audible calculator in synthesized speech. Useful for calculation, clock, alarm and calendar. Manufactured by Casio and Sharp companies of Japan.
- v. Spur Wheel: A serrated wheel revolving in a plated metal handle. It is used for making continuous embossed lines on the reverse side of the paper.
- vi. Compass set: It includes a foot ruler, a protractor and a set squared in nylon and a spur wheel. It enables visually impaired students to use the same techniques as his sighted counterpart. The foot ruler and set square have embossed markings for their convenience. The compass has a removable component fitted with a toothed wheel for drawing embossed dotted lines on the reverse of the Braille paper.
- vii. Geometry Mat: A sheet of rubber for use as a base in conjunction with the spur wheel and Braille paper for making geometrical drawing.
- viii. Opisometer: A bell rings each time the disc moves a distance of one meter. Useful for mapping and understanding mathematical problems in length and perimeter.

### **20.1.7 Science devices**

- i. Conductivity Apparatus: Demonstrates the difference in the heat conductivity of copper and iron. It consists of a wooden stand with horizontal heating rods.

- ii. Three Dimensional Raised Relief Plastic Charts: Rigid PVC sheet, printed and formed in multi-colours. The following charts are available:
  - a. Botany General: Includes typical plant cell, plant meiosis, plant mitosis, Ribo-Nucleic Acid, bacterial forms, Spirogyra and Funaria- Common Moss in Botany.
  - b. Botany Advance: Depicts fertilisation, T.S. dicot leaf, dicot stem, types of placentation.
  - c. Zoology: Vertebrate and invertebrate.
  - d. Human Physiology and Human body systems: Including human skeleton, circulation system, heart, nervous system, a section of the brain, muscles, digestive system, the ear, the nose and the eye.
  - e. Human Reproduction: Includes male and female reproduction organs, fertilisation and foetus.

#### **20.1.8 Geography devices**

- i. Sensory Quill: It is equipment for obtaining a raised line format of any writing or drawing. The height and texture of the line can be altered. Useful in learning handwriting skills, mathematics, science, drawing and spellings.
- ii. Maps and Globes
  - a. Raised relief plastic Maps: vacuum formed plastic maps printed in strong colours with name in letter press for the benefit of person with low vision. The main towns are shown by large dots and Principle Rivers by depressions. Braille symbols denote the name of seas, main rivers and towns, a key to which is given in the guide. The boundaries on political maps are indicated by raised lines.  
  
In India, political and physical maps are available for Asia and India. The vacuum printed diagrams are also available for various body systems, anatomy, physiology etc.
  - b. Relief Globes: a plastic globe in textured relief. The land masses are shown in different colours. The principle towns are indicated by raised dots, rivers and lakes by depressions. Dotted lines indicate the tropics, arctic, and

Antarctic circles, the international date-line and meridians. The names of oceans and the main land are shown in Braille. Nystrom's Bathymetric World Model is raised relief map of the world with oceans drained. All under water features are exposed. A cassette recording explaining the features is supplied with the product.

- c. Braille Diagram Board: metal sheet fixed on a board with closely formed holes in which round headed pins are stuck to form maps and diagrams.

## **20.2 Mobility Devices**

### **Canes**

- i. Symbol Canes

Made of sections of light metal tubing, generally aluminium or its alloys, joined through the center by means of an elastic cord. The canes fold up conveniently for carrying in the pocket or handbag. When required for use, the top section is held and other automatically fall into position.

Devised for portability and not intended to be used other than as guide aid and an indication that the user is a visually impaired person. This cane is popularly known as a Braille folding stick.

- ii. Guide Canes

A stronger version of the symbol cane and intended to be more of a mobility aid but not a means of support. The four sections, covered with ribbed plastic sleeving, are joined through the center by means of an elastic cord enclosed in nylon sleeving. It is fitted with an elastic loop handle and a standard nylon tip.

- iii. Long Canes

A wooden or aluminium stick with a length of 85 to 90 centimetres. There models are available:

- Rigid
- Two piece and
- Four piece.

The aluminium can is generally sleeved with PVC material, having a rubber grip and a nylon tip with or without a crook.

- iv. Electronic Travel Devices

An ETA is described as a device that sends out signals to sense the environment within a certain range or distance processes the information received and furnishes the person with relevant information about the environment. Most of these devices are based on integrated circuits and emit sound or tactile signals.

The ETAs are not available and prevent in India, it is not very necessary to give description of these devices. However, for the sake of information, these devices are listed below:

- Lind Say Russel E-model Path Sounder
- C5 Laser Cane
- Ultrasonic Torch
- Sonic Guide
- Light Probes
- Mowat Sonar Sensor
- Nottingham Obstacle Sensor
- Electro-cortical Prosthesis
- Electro Roftalm
- AFB's Computerised Travel Aid
- Polaroid Ultrasonic Travel Aid

### **Mobility Show Card**

A plastic show card to help visually impaired persons to cross bus/roads and to hail a taxi.

### **Mini Beeper**

A battery operated, hand-held electronic gadget having application in mobility, recreation, sports and obstacle location.

## **20.3 Vocational devices**

The Vocational devices should ensure the following:

- A visually impaired person's ability to perform a definite technological operation.
- Employment of various means of mechanization with the aim of lightening jobs for such person.



- Complete safety of a person's labour.
- Preservation of residual touch, sight and hearing.
- High quality of manufactured products.
- Increase in labour productivity
- Self reliability as regard the operations he is required to perform

### **Goinometer**

It is an instrument to measure body angles and it is useful to physuitgeraousts,

### **Attachment to Lathe**

It enables the visually impaired to operate the Capstan as well as a Central lathe. It is a attachment which can be mouted on the movement bar and can be fixed to enable the person to operate the machine to a desired length.

A new device has also been developed which emits a sound signal when the tool carriage reaches a desired point. A movable switch is fitted on the movement bar and can be fixed as desired. Whenever the tool carriage touches the switch, the sound signal is emitted.

### **Continuity Tester**

It is low voltage electric circuit for testing continuity of winding or other such operations. The light signal is replaced by the sound signal for enabling the operators to establish continuity of the wires.

### **Braille Micrometer**

The centre for Biomedical Engineering, Indian Institute of Technology, New Delhi has developed a new attachment of the precision micrometer for the visually impaired. With the use of the attachment, conventional micrometer readily available in the market is adapted for the use of visually impaired persons.

## **20.4 Daily living devices**

These devices can be further classified into the following five categories.

- Clocks and watches

- Games and puzzles
- Sports
- Kitchen equipment
- Personal devices.

## **20.5 Low vision devices**

Current educational materials for seeing children are adapted or the partially seeing in the form of large type printing and through the use of low vision aids.

- An interface incorporating the cathode ray tube could provide a means for the magnification of materials. Materials of instruction could be programmed in such a fashion that the student should immediately be able to control the size, contrast, and brightness of the image to fit his individual needs. This would enable the student to read most books with a minimum of difficulty.
- Consideration should be given to physical aspects. Green chalkboard is recommended for the partially seeing. Children with severe visual limitations may need to be quite close to the interface console. External lighting should be carefully controlled for those who are sensitive to glare.
- Instructional programmes for the blind should be in aural, tactile, and olfactory in nature.
- Any aural programmes for normal children could be used without modification for low vision children. Information could thus be compressed and programmed on audio tape. An automatic selection device could be constructed which would enable the student to make selections of appropriate materials and regulate the rate for playback. These programs could be used individually or entire classes.
- Reading instruction could be programmed on computer operated Braille writers. The student would be presented with a Braille stimulus to which he would respond orally. Aural reinforcement or correction would be given with the student making the appropriate corrections as necessary.
- Punched tape that is phonetically coded activated the keyboard of a steno-type machine (developed by Massachusetts Institute of Technology) by which a blind person can be taught to read at

speeds of 300 to 400 words per minute by feeling the movement of the keys with his fingers. Once the learner has become proficient in the operation of this device, conventional programs requiring reading could be adapted for the blind.

- Mathematical concepts are most difficult for the blind to learn. A modified Cuisenaire programme could be structures with the manipulation board for instruction in algebra and geometry. Manipulation board is a surface capable of providing information concerning the identity and orientation of specific items located on its surface. This device would have the capacity of providing information regarding patterns or arrangements of specific items which can then be interpreted by associated equipment in accordance with a particular programme. Equipment controlled three dimensional models would also be of value.
- Blind children could respond to the programmes either orally or by using the typewriter. In fact, instruction in the use of both the Braille writer and the conventional typewriter would prove very amenable to programming.
- The blind depend to a large extent on olfactory cues. Hence the child should be trained on different odours for olfactory discrimination. This would be a valuable adjunct to mobility training since the student would be able to experience many different olfactory sensations in the controlled environment of the classroom or training area.
- Parts of an interface, such as switches, that the blind child must manipulate would have to be either labeled in Braille, be of various shapes and sizes, or be constructed in such a manner that auditory cues are made available in the form of click stops.

Assistive devices indicate any item, piece of equipment, software programme, or product system those are used to increase, maintain, or improve the functional capabilities of persons with disabilities. The visually impaired for the successful leading of life should have the assistive devices to help or to meet their issues related to education, mobility, vocational, and daily living. In educational devices include writing, reading, mathematical, sensory, geography devices, Braille etc.

### Check your progress

**Notes:** a) Write your answer in the space given below.

c) Compare your answer with those given at the end of the Block.

9. Mention the classification of assistive devices for the visually impaired.

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10. What is an ETA?

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### LET US SUM UP

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Loss of vision can affect all areas of development. The education of persons with visual impairment has come across the stages of rejection and removal → acceptant → benevolence → segregation → integration → inclusion. The invention of Braille made the educational system of Visually Impaired to be structured programme. Expanded core curriculum to cope the VI children with curriculum in mainstreaming school and advanced assistive devices for education, mobility and for daily living are the significant transforms of science and technology in the education of the visually impaired.

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### GLOSSARIES

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- Adolescent – transitional phase of growth nad development between childhood and adulthood
- Assistive devices – aids of assistance to improve the functional capabilities
- Blurred – to make indistinct and hazy in outline or appearance
- Braille – universally accepted system of writing used by and for blind persons and consisting of a code
- Cognitive – connected with thinking or conscious mental processes
- Integrated – combining or coordinating separate elements so as to provide a harmonious, interrelated whole

- Motor development – development of bones, muscles and ability to move around
- Primary features – first and foremost features
- Self-esteem – individual’s subjective evaluation of their own worth
- Teaching principles – principles used to make the teaching effective and efficient

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### **ANSWERS TO CHECK YOUR PROGRESS**

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1. Visual impaired children have low self-concept, poor personality makeup and low level of need for achievement than normal persons.
2. One preoccupation is with the importance of bodily attractiveness to the female and masculine strength and independence to the male. The desire to impress the opposite sex and the anxiety surrounding the sexual relationships are typical of adolescence but they are more difficulty for visually impaired adolescents. The second preoccupation is the concerns of independence and the dilemma of blind that cannot achieve certain degree of freedom from parents and others. The third common problem of all adolescents is to achieve a certain degree of exhibitionism, which is more difficult for the blind.
  1. Frenchman Louis Braille, who lost eyesight due to an accident in childhood create Braille reading and writing in 1824.
  2. Cascade Model of Special Education services is a conceptualization of the range of placement and service options that used to be available for disabled children.
  3. The following strategies must be employed for the concept development of the visually impaired:
    - Pre-teach vocabulary and key concepts using verbal explanations and multi-sensory approach.
    - Review concepts and vocabulary for a better understanding.
    - Enable the visually impaired to learn and practice the same concepts in different environments.

4. In inclusive schools, students differ in their levels of learning for which need based instructional strategies are very much useful.
5. Since the visually impaired are unable to understand the concept by seeing, the curriculum should be adapted so as to make them also learn on par with the normal children.
6. Since visually impaired children are unable to learn by observation, daily living skills need to be learnt by actual practice. These skills include feeding, dressing, toileting, personal hygiene, cleaning and cooking. These have to be taught right from the lowest class gradually up to higher classes.
7. Assistive devices for the visually impaired can be divided into the following categories:
  - Educational devices
  - Mobility devices
  - Vocational devices
  - Daily living devices
8. Electronic Travel Devices (ETA) is described as a device that sends out signals to sense the environment within a certain range or distance processes the information received and furnishes the person with relevant information about the environment

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## **SUGGESTED READINGS**

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- Inclusive Education, M.Ed. course book, Dr.B.R.Ambedkar Open University, 2014
- Instructional Methods and Strategies for Teaching Children with Visual Impairment. – B.Ed.SE material by TNOU.
- Kelley, P., & Gale, G. (1998). Towards Excellence: Effective education for students with vision impairments. Sydney: North Rocks Press.
- Lowenfeld, B. (1973). Visually Handicapped Child in School and Society; American Foundation for the Blind; NewYork.
- Nature and Needs of various Disabilities – An Introduction, B.Ed.SE material by TNOU.

- Mani, M.N.G. (1992). Techniques of Teaching Blind Children. Sterling Publishers, New delhi
- Manivannan, M. (2005).Educating Visually Impaired Children. Venkatasamudram; Mugil Publishers.
- PoojaNirman (2007) Encyclopaedia of Special Education, Anmol Publications PVT.LTD

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**BLOCK 5 DEAF-BLINDNESS**

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**Structure**

Introduction

Objectives

Unit 21 Concept of Deafblindness

21.1 Definitions

21.2 Causes

21.3 Classification

21.4 Characteristics of deafblind

21.5 prevalence

Unit 22 Effects and implications of deafblindness

22.1 Education provisions

22.2 Educational Principles

22.3 Educational Practices

22.4 Higher education

Unit 23 Assessment and intervention of Deafblind

23.1 Vision Assessment

23.2 Hearing Assessment

23.2.1 Formal and Informal language testing

23.3 Diagnostic Services of the Deafblind

23.4 Early Identification and Prevention

Unit 24 Fostering Early Communication development

24.1 Deafblindness and Communication

24.2 Teaching communicating skills-verbal and nonverbal

24.3 AAC and Deafblind

Unit 25 Orientation and Mobility – Educational Needs of Deafblind

25.1 O&M for the Child Who Is Deaf-Blind

25.2 Mobility Devices

25.3 Principles of Educational Programming for Deafblind Child

25.4 Best Educational Practices for Students with Deafblindness

Let us sum up

Glossaries

Answers to check your progress

Suggested readings.



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## **INTRODUCTION**

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About 95% of what we learn is through the distant senses of vision and hearing. Students who have hearing or vision impairment cannot access the same amount or quality of information without accommodation for their sensory losses. Deafblindness is the combination of significant auditory and visual impairments in a person. As of 2012 there are 4,85,000 deaf-blind people in India waiting for services and human resources. Overall we can predict that 0.04% of general population have deafblindness as disability. In this block you will learn about the concept of deafblind, implications of deafblindness, assessment and fostering of early communication and addressing orientation, mobility and educational needs of students with deafblindness.

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## **OBJECTIVES**

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After completion of this block, you will be able to

- Define and explain the concept of Deafblindness.
- Describe the effects and Implications of deafblindness.
- Explain the assessment and intervention techniques of deafblindness.
- List out the ways and means to foster early communication development.
- Explain the Orientation & Mobility – Educational needs of deafblind.

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## **UNIT 21 CONCEPT OF DEAF-BLINDNESS**

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Various terms have been used in the past to refer to this heterogeneous group of population. Earlier, the term 'deaf blind' or 'deaf-blind' was used. However, keeping with the belief that impairments in both hearing and vision have, not an additive, but a multiplicative effect on the affected individual, the term 'deafblind' is now used (Aitken, 2000).

After completion of this Unit, you will be able to

- Define the deaf-blindness
- Explain the causes for deafblindness
- Describe the characteristics of deafblind
- Express the prevalence of deafblind

## 21.1 Definitions

- Deafblindness is a combination of hearing and visual impairments causing such severe communication, development, and educational problems that the child cannot be accommodated in either a programme specifically for the deaf or a programme specifically for the blind. The Education for All Handicapped Children Act of 1975 and Individuals with Disabilities Act (IDEA), 1990.
- Blindness takes an individual away from things, and deafness takes him away from people, Deafblindness creates unique problems of communication, mobility and orientation peculiarly its own (Robbins, 1983).
- Robert Smithdas, a man who is deafblind said, for a deafblind person, the world literally shrinks in size and scope, and whatever knowledge is obtained must come through the secondary sense of taste, touch, and smell and the exercise of personal curiosity and initiative. Consequently, a deafblind person matures more slowly than is considered normally acceptable, and the individual will be prone to greater frustrations in expressing wants and needs.

## 21.2 Causes

The cause for multisensory impairment and deafblindness is more or less similar to the causes for single category disability. Some of the most common causes of deafblindness are Usher's Syndrome, Congenital Rubella Syndrome, CHARGE Association and old age. Other causes include severe head injuries, traumas, sexually transmitted diseases such as syphilis and AIDS, drug overdosing, medical errors and self inflicted injuries.

### **Four primary causes of vision and hearing loss:**

- Hereditary/Chromosomal Disorders.
- Prenatal viral/ bacterial diseases, or harmful chemicals (Teratogens).
- Complications at birth.
- Postnatal injuries and/or illnesses.

Deafblindness is not caused by a single condition. People can be born deafblind, possibly as a result of infection, a genetic syndrome or birth trauma. This may result in congenital deafblindness. Acquired deafblindness refers to instances where a person becomes deafblind

later in life, as a result of a progressive condition or through infection, accident or due to the process of ageing.

The main cause of deafblindness in children in the developing countries is rubella contracted by the pregnant mother. Other causes include premature birth, birth trauma and various syndromes.

Based on the causes the persons with deafblindness can be categorized into four types:

1. Those who are born deaf and blind, which can happen if the mother, inter alia, contacted Rubella (German measles) during pregnancy.
2. Those who were born deaf and then lost their sight. This is often caused by the Usher Syndrome in this deafness followed by a decrease in sight because of retinitis pigmentosa (tunnel vision). Other reasons for loss of vision later in life could also be cataract, glaucoma, accidental injury or trauma.
3. Those who were born blind and then lost their hearing due to severe infections, accidents or trauma.
4. The adventitious deafblind, as a result of old age, or through an illness or accident later in life.

### **21.3 Classification**

Deafblindness is classified as follows:

- Totally deaf and totally blind
- Totally deaf and partially blind
- Totally blind and partially deaf
- Partially blind and partially deaf.

### **21.4 Characteristics of deafblind**

There are several definitions of deafblindness. But most of the definitions include the following characteristics.

- Simultaneous present of vision and hearing impairment which may vary in degrees.
- Does not imply total loss of either vision or hearing.
- Communication is most severely affected.
- Highly individualized training is needed to cope with the condition.

- The world is much narrower as the distant senses are affected, and it is usually within the arm's reach.
- Affects person in totality.
- Associated medical conditions with hearing and visual loss may be present.
- 

### 21.5 prevalence

Incidence of deafblindness is very low and exact data and number is not known. However, the generally accepted estimates are that approximately 10% of the general population has a hearing loss, out of which approximately 1% is also blind or has a serious loss of vision. In India, it is estimated that the number of persons with various disability is over 90 million. There is no data available regarding the size of the deafblind population in India. Estimates, based on information gathered from community-based projects, indicate that there could be more than 400,000 deafblind people in our country. Overall we can predict that 0.04% of general population have deafblindness as disability.

Deafblind indicates the impairment in the hearing as well as the vision. Since both important senses are impaired the deafblind person becomes more handicaps in majority of the aspects rather than the single impaired persons. The causes, types, characteristics and prevalence of the deafblind explained in this unit.

#### Check your progress

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

1. What is deafblindness?

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2. Mentioned the classification of Deafblindness.

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## **UNIT 22 EFFECTS AND IMPLICATIONS OF DEAFBLINDNESS**

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All the senses, in one way or the other, are important in getting the information. Missing the two major senses show much impact on many aspects.

After completion of this unit, you will be able to

- Explain the education provisions
- Describe the educational principles
- Narrate the educational practices
- Predict the higher education system for the deafblind

Throughout these children's lives, their eyes and ears either distort or altogether omit incoming information. They only experience fragments of any experience.

- Generally children with deafblindness use a variety of adaptive assistive devices. Knowing how to use this equipment and how to keep it in working order is no small accomplishment. For example, a child may have both a personal hearing aid, glasses and a cane. They may rely on a communication book for much of their communication. The child and all of the people working with him have to be trained to use all these devices.
- Communication is one of the main areas which is critically affected by deafblindness and is usually the highest priority in their educational programming. These children's communication systems typically contain a variety of forms which can include signals, tactile sign language, object symbols, tactile symbol systems, Braille, as well as a variety of other options. Each child's system must be individually designed for him and used with a high degree of consistency across the day. Developing a communication system for these students frequently requires technical assistance for the staff since few have had pre-service training regarding this population.
- Individuals with deafblindness have unique life-long support needs that must be addressed in order to function in a world driven by sight and sound. Consistent with this, they have unique needs within the educational system.

## **22.1 Education Provisions**

Education for a child or youth with deafblindness needs to be highly individualised. The limited channels available for learning necessitate organising a program for each child that will address the child's unique ways of learning and his or her own interests. Assessment is crucial at every step of development and sensory deficits can easily mislead even experienced educators into under-estimating (or occasionally over-estimating) intelligence and consequently at risk of putting together an inappropriate program.

- There are less than 100 school-aged children enrolled in regular schools throughout India who meet the criteria for deafblindness. Most of the States understandably build programs and hire staff to target the majority of children with disabilities in their particular area.
- There are about more than 43,000 deafblind individuals receiving educational services in India as per the report of Sense International (India) (Source: Sense International India, Annual report – 2010.) Among them about 11,000 deafblind children are receiving direct support and others are receiving indirect services through the SarvaShikshaAbhiyan (Education for All Scheme) of Government of India.

## **22.2 Educational Principles**

### **Points for Consideration for Education of Children with Deafblindness**

The education of children with deafblindness is a relatively new area, there are certain points to consider, keeping in view the principles of education.

Educational placements should be selected on the basis of individual abilities and needs, age of onset and amount of auditory and visual impairments, mode of communication, cognition and existence of additional disabilities.

- Teachers who have had specific training in deafblindness are necessary to provide optimal integrated programming.
- Communication to be embedded in the curriculum across different areas and environments.

- Integration of appropriate age related educational and support services are necessary for a successful educational program for a student with deafblindness.
- Various specialists may contribute towards assessment, direct instruction, or consultation for the group.

### **22.3 Best Educational practices for Students with Deafblindness**

- Respect the child and see beyond the disability.
- Always acknowledge your presence as you enter and absence as you leave.
- Always encourage and motivate.
- Use words and language naturally.
- Provide assistance as per need.
- Remember all behaviours communicate.
- Plan a functional, age appropriate curriculum.
- Plan for inclusive activities.
- Involve parents as partners in the educational process.
- Have a transition plan in place.
- Explore various service delivery options such as community based instruction, such as community based instruction, home based instruction and regular school with resource room.
- Braille can be taught to the deafblind
- Use deafblind manual alphabet to communicate with deafblind
- Vibratory devices are useful for the independency of the deafblind.

### **22.4 Higher Education**

A few students with deafblindness in the Helan Keller Institute for Deaf and Deafblind, Mumbai have completed their 10<sup>th</sup> standard through the National Institute for Open Schooling (NIOS) and are now studying to complete their XII standard through the system. Technology and computer education has been a boon for this world in terms of access to information and participating in the examination process.

There are a few students with deafblindness in the Blind Peoples Association, Ahmedabad and Clarke School for the Deaf and Mentally Retarded, Chennai who are currently preparing to appear for their X standard examination. Fredrick, a deafblind young adult from Trichy has

successfully completed his preliminary examination of Indian Administrative Service (IAS).

It is known situation that the deafness as well as the blindness the child/person couldn't get the complete information and have major influence on his personal and educational life.

**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

3. Which is the main area that is critically affected by deafblindness?

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4. What is the approximate figure of deafblind in India?

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**UNIT 23 ASSESSMENT AND INTERVENTION OF DEAF-BLINDNESS**

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The deafblind has both visual impairment and hearing impairment. Hence it is better to understand the assessment of deafblind on the aspects of Vision assessment and Hearing assessment.

After completion of this unit, you will be able to

- Categorise the assessment based on visual impairment and hearing impairment
- Explain the diagnostic services of the deafblind
- Appraise the early identification and prevention

**23.1 Vision Assessment**

It is the procedure and the recording of the assessment of vision function, and the vision function contains **Vision acuity** which includes binocular, monocular, with and without correction. **Color vision** is differentiating colours, **Contrast sensitivity** requires high or low



contrast, and **Visual field** is the whole area seen when looking straight ahead.

### **Assessment of vision functions and functioning**

#### **A. Visual Behaviour**

- Does the child use both eyes or does he/she prefer using one particular eye.
- Special head posture
- Sensitivity to the light or better vision in day light
- Reaction to the sudden movement in front of the eyes
- Does the child use glasses
- Does the child use glasses during the assessment

**B. Eye movements** – Nystagmus, strabismus, non coordinated eye movements, smooth coordinated movements, convergence to the near

**C. Visual attention** – To light, shiny object, contrast colored object, faces etc.

**D. Localization and fixation** – Indicate object, its size, distance of the object, length of fixation.

**E. Following moving object** – Follow over central line, move eyes and head or only eyes.

**F. Scanning in the near space, on the desk** (looks for one, two, more object on the desk).

#### **G. Eye/hand coordination**

- Follows the hand during activity
- Looks first, then grasps without eye control
- Search things only by touch or vision or both

#### **H. Recognition**

- Recognizes photographs, pictures of real objects
- Recognises geometric shapes, pictograms, symbols separately.
- In all the vision function assessment, indicate the material used its size, contrast and distance

- All observations, conclusions and recommendations are written down. Whether the child dominantly uses vision, hearing, touch, integrates senses etc., should be indicated in the recommendation.

The care giver/parents/teachers should plan the intervention strategies based on the assessment done by the specialist team. The parents care givers should plan of training skills-vision stimulation, motor skills, environmental adaptations, use of special toys and aids and recommended activities.

## 23.2 Hearing Assessment

Hearing is the main sensory pathway through which speech and verbal communication develop. If a child hears imperfectly, he is likely to speak incorrectly. Again, hearing also influences learning and other aspects of maturation. Early detection of hearing impairment is important for the child's over all development. If there is a defect in hearing mechanism there is also problem in perception. Hearing impairment reduces our knowledge of the world around us. Again, it also adversely affects the child's performance in learning.

Children with auditory impairment may have difficulty in hearing in either one or both ears or no power of hearing at all.

### Screening Procedure

- Behaviour observation:** This technique involves presentation of known fixed intensity sound at various frequency, when the child's is asleep and observing whether or not he/she responds by generalised body movement whenever the sound is presented.
- Cribogram technique:** It is an instrument used for early testing of hearing impaired infants. It comprises a crib to the sides of which true speakers are connected which are in turn connected to sound source. Whenever the sound is produced the child makes a movement. The movement is recorded withthe help of a recorder kept below the child bed. The high frequency sound is presented at known interval of time and the child's movement as a response to the given sound is recorded and measured.
- Objective measurement:** Brainstem Auditory Evoked Responses are used for screening of infants at intensive care units, using the electro encephalograph recording. This is used

for not only the severely or profound hearing infants but also mildly affected infants.

- D. **Impedance Audiometry:** This could be used both for middle ear screening.

### 23.2.1 Formal and Informal Language testing

Language assessment is necessary in young children who show signs of delayed speech, which could be due to heredity and environmental factors. Language assessment in hearing impaired children is done in order to establish language problems.

#### 1. Informal testing

- a. **Oral testing:** Picture tests may be widely used at an early stage to those children who have not yet learnt reading & writing. Informally the teacher can, with the help of pictures, determine the child's vocabulary and phonological problems.
- b. **Direction:** The teacher speaks out the words, sentences or passages depending on the level of the students. Test whether the children discriminate and recognize sounds. It can be used a group test. It tests spelling ability.
- c. **Reading:** The child may informally be asked to read aloud. From the reading the teacher judges whether the child can pronounce different words in different contents correctly stress and intonation also judged.

#### 2. Formal testing

It is designed to cope with the general concept of language & communication. Various types of objective tests are:

- a) Multiple choice test, listening test, vocabulary test pronunciation test.
- b) Listening test: Vowels and consonants, similar words, two words have same vowel sound vocabulary test.
- c) Pictures given in the answer sheets and the words are spoken by teacher.
- d) Testing grammatical structure.
- e) Matching the item.

- f) Transformation from one pattern to another.
- g) Complete the sentences by rearrange the alternation.

### **23.3 Diagnostic Services of the Deafblinding**

The diagnosis of the condition of deafblindness can be made early by the clinical and related service professionals. The ophthalmologist and the audiologist can detect visual and hearing problem at birth. To detect deafblindness effectively, the screening must be done on specific populations such as children with one sensory disability in schools for the blind or in schools for the deaf and also in schools for the children with Learning Disability and Multiple Disabilities. Institutes like Blind People's Association, Ahmedabad. L. V. Prasad Eye Institute at Hyderabad, Helen Keller Institute for the Deaf & Deafblind, Mumbai, Clarke School for the Deaf and Mentally Retarded, Chennai, National Association for the Blind, Delhi, Spastic Society of Tamil Nadu, Chennai, National Institute for the Mentally Handicapped (NIMH), Secunderabad, Ali Yavar Jung National Institute for Hearing Handicapped (AYJNIHH), Mumbai, National Institute for the Empowerment of Persons with Multiple Disabilities (NIEPMD), Chennai, Holy Cross Service Society, Trichy are some of the places equipped to do this kind of diagnosis. There are many other institutions and organisations in our country where early detection of this condition may take place.

### **23.4 Early Identification and Prevention**

Early intervention and prevention pay substantial dividends to infants as well as to their families and society at large. In all likelihood, many infants who, in the past, grew up disabled could have developed normally if appropriate preventive steps had been taken early in their lives. Additionally, people with disabilities are far less disabled if effective interventions have been applied from birth.

Aims of intervention programs, for infants with deafblindness or for those at risk, are multifaceted. Goals include diminishing the effects of dual sensory loss or the disabling condition on the child's growth and development and preventing, as much as possible, the worsening of the at-risk condition. Timing is critical in the delivery of the interventions. The saying "the earlier, the better" is very true. Moreover, early intervention may be less costly and more effective than providing services later in life.

**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

5. What is the link between the hearing and speech?

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6. Mention any two famous institutes to diagnose the disabled.

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**UNIT 24 FOSTERING EARLY COMMUNICATION**

**DEVELOPMENT**

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Caring for an infant who has both a hearing loss and visual impairment can be a challenging experience. Infants with deafblind must receive comprehensive audiological and ophthalmological evaluation since they are more likely to have vision and hearing problems than infants without disabilities. An infant's visual impairment is usually identified before a hearing problem because it is more obvious. If an infant is identified as having a visual impairment and hearing loss, then every effort must be made to determine whether the infant would benefit from corrective lenses and hearing aids.

After completion of this unit, you will be able to

- Explain the deafblindness and communication
- Generalise the teaching communicating skills through verbal and nonverbal mode
- Describe AAC and deafblind

**24.1 Deafblindness and Communication**

Quite a few deafblind people still have a little useful sight and hearing, which can be improved by wearing glasses and/or through hearing aid usage. However, conditions such as excessive background noise, poor illumination, depriving utility of visual cues, insufficient knowledge in

hearing aid usage, poor initial selection of the instrument may limit the utility derived from wearing hearing aids. Deafblind people who were born deaf or went deaf in early years may depend on Sign Language, rather than spoken language. Those who have some remaining sight may still be able to see Sign Language at close quarters. If they can't, they may place their hands on the hands of the person signing to them to help recognise the signs through touch. Other deafblind people who have either very limited or no sight or hearing at all, need the speaker to communicate with them on the palm of their hand. One-way is to trace out the letters of each word in block capitals, one on top of the other. This is simple but the drawback is that it is slow and also a person who has been blind all his/her life may not easily recognise the letters as they are more used to reading Braille. A quicker method is called '**Deafblind manual alphabets**' and is like the finger spelling used in Sign Language, but placed on the hand. Different letters are spelt out by touching specific areas of the fingertips and palm of the deafblind person. For example "**A**" is made by touching the person's thumb. Deafblind manual can be learnt quickly. With practice, it may be possible to have a conversation at a reasonable pace by using this type of finger spelling. Sadly, many people don't learn this easy method of communication. If they meet a deafblind person who uses it, there may be a total breakdown of communication, which is frustrating and embarrassing for those involved.

Deafblind people have many different ways of communication the methods they use vary, depending on the causes of their combined vision and hearing loss, their backgrounds, and their education.

- Some deaf with low vision use sign language, finger spelling.
- Hands-on signing: Hands-on signing is used by British Sign Language users whose vision no longer allows them to see sign language and they therefore feel sign language by resting their hands on the communicator's hands.
- Some deaf-blind people use a Screen Braille Communicator (SBC). This is a small, portable device that enables them to communicate with sighted people. The device has a QWERTY keyboard with a LCD display on one side, and an eight-cell braille display on the other side. The sighted person types short text on the QWERTY keyboard. The deaf-blind person reads the printed text by placing his or her fingers on the braille display. He

or she then uses the braille display to type back text. The sighted person can read the text on the LCD display.

- Some people with hearing and vision loss use CapTel to make telephone calls. Using a special phone, the CapTel USB, people can dial into a captioning service that types the other caller's conversation onto a computer screen. Then, deaf-blind callers can read a conversation script on their screens in addition to listening to another caller on their telephones. The captions can be adjusted for color, size or font style on the screen.
- Deaf-blind people can also use braille notetakers to communicate with others who don't know braille or their communication system. Many braille notetakers can be connected with personal digital assistants (PDAs) that are commonly used by others.

#### **24.2 Teaching communication skills-verbal and nonverbal**

Building up of the child's vocabulary should be begun with concrete words denoting only specific objects which the child possesses or with which it comes into contact. First to be introduced are the nouns, and not a single verb is to be introduced until the child begins to make simple unexpanded sentences. This is the most important requirement in the system of teaching verbal speech to blind and deaf and dumb children.

1. **Hands-on signing:** Hands-on signing is used by British Sign Language users whose vision no longer allows them to see sign language and they therefore feel sign language by resting their hands on the communicator's hands.
2. **Sign language:** Some deaf blind persons are deaf from birth and became blind as teenagers or adults. They prefer the sign language used by deaf people. Instead of watching the hands and arms of friends, they touch the hands of the person making the signs to learn what is being said. It is usually necessary to restrict the movements involved in making signs so that a deafblind person can follow along conveniently. This system can lead to confusion. It requires the speaker to have extensive training in sign language. However, it is possible to interpret as quickly as English is spoken using this method.
3. **Total communication:** Total communication is a combined approach. Total communication encompasses oral, manual, print

(reading, writing, drawing), mime, dance, drama and spontaneous body language. This communication helps quickly develop cognitive levels. Total communication is important in the early years of child's development. It is particularly important for deafblind children total communication is a communication method and not teaching method. It is nothing more than an attempt to expand educational opportunities for the hearing impaired children. Total communication dictates the use of all the elements of instruction utilised by the oralist and accepts all form of manual communication as equally valid tool.

Help a child learn total communication in the following ways:

- The learning place should be well lit so that the child can see your hands, face and lips
- Face the child when you speak to her and be sure she is watching you.
- Talk to her a lot, even if she does not understand. Talk with your hands, face and lips and encourage her to watch them all.
- Speak clear and loud, but do not shout and do not exaggerate movement of your mouth and lips. This will help him learn to recognise normal speech.
- Be patient and repeat things often
- Be sure to let him know that you are pleased when he something does well.
- Encourage him whatever sounds he can. This will help him strengthen his voice for positive speech
- Have a lot of toys, pictures and other things ready to use in helping him learn signs and words for them.
- Make learning to communicate fun in a play way method.
- Play games that exercise the child's lips, tongue, and mouth muscles. Make a list of words that other children of his age use.
- Start with a short list and gradually make it longer. Use the words often in daily activities like feeding, bathing etc., and in play. Have the whole family learn the words of child's age use and make the signs for them. Encourage the family members use the words and signs together,



not only when they talk to the child, but when they talk with each other and for all the things they do in the home.

### **24.3 Augmentative and Alternative Communication & Deafblind**

Augmentative and Alternative Communication, (AAC) is a term that describes all forms of communication, except speech, that are used to express thoughts, needs, wants, and ideas. We all use AAC when we make facial expressions or gestures, use symbols or pictures, or write. Modified and tactile signing systems are types of AAC as are:-

- Object symbols, tangible symbols, object cues, objects of reference

These are all terms for using an object or part of an object to represent a particular activity, event or person. For example a person who is deafblind may use a cup to show that they want a drink. Other people may use this cup symbol to ask the person if they want a drink.

- Pictures & Photos can be used to represent words or simple messages. Using several photos or pictures together, creates specific messages and sentences. Careful consideration of the person's vision and the layout, detail, colour contrasts and size and the person's vision is required.
- Communication devices, Speech Generating Devices, Voice Output Communication Aids.

These are all names for electronic machines that can produce digital speech or pre-recorded speech at the push of a button. Words or messages can be spoken by the machine when particular symbols (often, but not always, pictures) or combinations of symbols are pressed or chosen. They range from single button, single message machines to complex displays with touch screens and thousands of words.

**Check your progress**

**Notes:** a) Write your answer in the space given below.

b) Compare your answer with those given at the end of the Block.

7. Mention any two modes of communication with the deafblind.

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8. What is meant by Augmentative and Alternative Communication?

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**UNIT 25      ORIENTATION & MOBILITY – EDUCATIONAL NEEDS OF DEAFBLIND**

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For the child who is deaf-blind, movement is an opportunity to gather sensory information, to communicate, and to make choices. Orientation and Mobility (O&M) instruction provides opportunities and skills that can broaden the student's awareness of the environment, resulting in increased motivation, independence and safety.

After completion of this unit, you will be able to

- Express the importance of orientation and mobility
- Listout the mobility devices
- Explain the principles of educational programming for the children with deafblind

**25.1 O&M for the Child Who Is Deaf-Blind**

O&M instruction for individuals who are deaf-blind is designed to teach them to move as independently and as purposefully as they are able.

- The most important adaptations are those related to communication. The O&M instructor will need to ensure that instructions are given to the student in his or her primary language. This may require the use of an interpreter and the development of touch cues or object cues. Certain accommodations that enable the student to interact with the public also need to be developed.

For some children, the lack of auditory and visual input may have severely limited opportunities to learn about his/her environment and to develop the language to talk about it. O&M instruction must often be augmented by hands-on learning to make up for the child's lack of prior experience. Language instruction is an integral part of any O&M training experience. Children who are deaf-blind use a variety of communication methods including tactile sign language or American Sign Language (ASL), speech, gestures, finger spelling, augmentative devices, pictures, objects, body movements, behavior and facial expressions. Instruction strategies must incorporate the child's primary communication methods.

- Motor development includes both gross and fine motor skills and focuses on developing and/or enhancing a student's motor abilities. These skills involve large muscle movements such as walking or running, as well as the finer skills associated with hand and wrist movements.
- Concept development is closely linked to general cognitive development. It involves the understanding of sizes, shapes, and functions of objects, as well as spatial and positional relationships. It includes the awareness and knowledge of one's own and another's body, an understanding of the body parts, of their movement capabilities and of body part relationships.
- Sensory development optimizes a student's ability to utilize the senses of residual sight and hearing, as well as the tactile, olfactory and kinesthetic senses. Most students who are deaf-blind have residual hearing and/or sight, and instruction can be provided to help them learn to use this sensory information to understand and interpret information they are gathering through their senses. It is important to teach the child to interpret sensory information, assisting him or her to use this information for purposeful movement.
- Orientation skills enable the student to use sensory information to move purposefully in the environment. Orientation skills instruction is designed to teach the student to use environmental cues (e.g., sounds, smells, and visual or tactile stimuli) to provide information about the present location and information about this location relative to other locales. For example, a child may learn to recognize that she is in the kitchen from the smell of coffee brewing or the living room because of the sensation of the carpet

beneath her feet. This information enhances her understanding about the environment and how to move within it.

- Mobility skills incorporate those O&M techniques that promote movement through the environment with safety and ease. These skills include walking with another person (guided travel), self-protection skills, and cane travel. For some, these also include the use of dog guides and electronic travel aids. For young children, these mobility skills will include early purposeful movements such as crawling and walking.
- **Guided Travel:** Many refer to the mobility technique involved in walking with another person as "Sighted Guide Travel." Using this technique, the deaf-blind child maintains a constant grip on the guide's arm while following the guide around obstacles as they travel through the environment.
- **Protective Techniques:** Protective techniques allow students to travel independently, yet safely, in familiar places, enabling them to locate objects while protecting their bodies. Protection skills are primarily used in familiar indoor environments and are designed to provide information about the environment during travel.
- **Parental Involvement:** Parents and family members play a central role in the lives of all children especially those with deafblindness. A partnership between parents and professionals is very essential for ensuring that children who are deafblind receive every opportunity to achieve their potentials. By strengthening this partnership, there is a great deal of learning for both groups, which help the deafblind child to reach his maximum potential.

## 25.2 Mobility Devices

There are many mobility devices that can, when properly used, provide a student with the means for independent, safe, efficient travel.

- The most commonly recognized mobility device is the long white cane. Many other mobility devices are also available, including adapted cane devices. Mobility devices serve as an "extension" of the user's arm(s), hand(s) and fingers, and provide protection from obstacles while allowing access to needed information about the environment. There are many theories about the selection of mobility devices, on the best times to begin instruction and the skills necessary to warrant instruction with a particular device. It is

vital that the student's team work closely with an O&M specialist in making decisions regarding the use of mobility devices.

- **Dog Guides:** Some individuals who are deaf-blind prefer to use dog guides rather than canes. Dog guide use is taught at special dog guide schools. It is important to remember that an individual who chooses to use a dog guide still maintains responsibility for his or her own travel. The dog does not assume responsibility for orientation, nor does it make decisions about safety.
- **Electronic Travel Aids:** Electronic Travel Aids (ETAs) are portable devices that emit sonar or laser signals that are reflected back to the user during travel and are converted to auditory and/or tactile signals. The devices are hand held, or chest, head, wheelchair or cane mounted and usually serve to provide supplementary information during travel.
- Allow your child or student to participate fully in daily activities and family routines. For example, if he wants to play with toys, help him go to the place where the toys are located and select the toy that interests him. Travel back to the play area together. This process allows him to understand his environment more completely, as compared to having the toys simply brought to him.
- Be sure lighting is adequate for children who have residual vision. The use of high contrasts can also assist some students. For example, using a light rug on a dark carpet may help the child recognize a transition to a different room.
- Provide opportunities for the child or student to solve problems on his or her own. Refrain from rescuing him or her prematurely.

### **25.3 Principles of Educational Programming for Deafblind Child**

- Early identification of sensory deficits is essential to provide optimal opportunities for individuals with deafblindness.
- Communication is the corner stone of an educational plan for a student who has deafblindness.
- Educational placements should be selected on the basis of individual abilities and needs.
- Age of onset of sensory impairments, amount of auditory and visual impairments, mode of communication, cognition and

existence of additional disabilities are major factors in determining the appropriate educational settings.

- Teachers with specific training are necessary to provide optimal integrated programming for students with dual sensory impairments.
- There is a variety of appropriate educational alternatives for children and youth with deafblindness.
- A functional program is integrated into community life and is based on real life situations. It must include opportunities to develop communication, social, recreational and leisure skills including pre-vocational/ vocational training, transition planning, self- help, domestic skills, orientation and independence within all environments.
- Integration of appropriate and related support services are necessary for a successful educational program for a student with deafblindness.
- Various specialists may contribute towards assessment, direct instruction, or consultation for the group.

#### **25.4 Best Educational Practices for Students with Deafblindness**

- Acknowledge your presence.
- Address children directly.
- Always encourage and motivate.
- Avoid too much help.
- Community based instruction.
- Describe things to them.
- Functional, age appropriate curricula.
- Integration with non-disabled peers.
- Integrative service delivery approach.
- Keep positive attitude and patience.
- Non-aversivebehaviour management.
- Offer help to deafblind child.
- Parent involvement.
- Respecting children.

- Transition planning.
- Using words naturally.

Children learn about their environment as they move through it about people and objects, sizes, shapes, and distances. For typically developing children the senses of sight and hearing provide the greatest motivation for exploration. A child who is deafblind must learn to understand his or her environment with minimal or distorted visual and auditory information. It is essential that children who are deaf-blind receive learning opportunities and instruction that facilitate purposeful movement. Orientation and Mobility (O&M) instruction provides students who are deafblind with a set of foundational skills to use residual visual, auditory and other sensory information to understand his or her environment.

**Check your progress**

- Notes:**
- a) Write your answer in the space given below.
  - b) Compare your answer with those given at the end of the Block.

9. Why Orientation and Mobility is important to deafblind?

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10. Mention any two mobility devices of deafblind.

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**LET US SUM UP**

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Deafblindness is the combination of significant auditory and visual impairments in a person. These impairments of the distant senses causes serious developmental delay in the child, affecting cognitive development, social development, acquisition of communication and language skills, orientation and mobility. The deafblind cannot be educated in special education programmes meant for the hearing impaired, or the visually impaired. Supplementary assistance would be required to address their unique educational needs consequential to the concurrent impairments of vision and hearing.

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## **GLOSSARIES**

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Audiometry – instrument to test the hearing sensitivity at various frequencies

Augmentative – morphological form of a word which expresses greater intensity, often in size but also in other attributes

Cognitive development – emergence of the ability to consciously cognize, understand, and articulate their understanding in adult terms

Deafblind – condition indicates the loss of sight and hearing

Hearing assessment – assessing the capacity of hearing

Localization – the process of making something local in character or restricting it to a particular place

Mobility – the quality or state of being mobile or movable

Orientation – the action of orienting someone or something relative to the points of a compass or other specified positions

Sign language – communicating by using signs

Transition – the process or a period of changing from one state or condition to another

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## **ANSWERS TO CHECK YOUR PROGRESS**

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1. Deafblindness is a combination of hearing and visual impairments causing such severe communication, development, and educational problems that the child cannot be accommodated in either a programme specifically for the deaf or a programme specifically for the blind.
2. Deafbliness is classified as follows:
  - Totally deaf and totally blind
  - Totally deaf and partially blind
  - Totally blind and partially deaf
  - Partially blind and partially deaf.
3. Communication is one of the main areas which is critically affected by deafblindness and is usually the highest priority in their educational programming.
4. There are about more than 43,000 deafblind individuals receiving educational services in India as per the report of Sense International (India), 2010.



5. Hearing is the main sensory pathway through which speech and verbal communication develop. If a child hears imperfectly, he is likely to speak incorrectly.
6. Helen Keller Institute for the Deaf & Deafblind, Mumbai, and National Institute for the Empowerment of Persons with Multiple Disabilities (NIEPMD), Chennai.
7. Hands on signing, and sign language.
8. Augmentative and Alternative Communication, (AAC) is a term that describes all forms of communication, except speech, that are used to express thoughts, needs, wants, and ideas.
9. O&M instruction provides opportunities and skills that can broaden the student's awareness of the environment, resulting in increased motivation, independence and safety.
10. Electronic Travel Aids (ETAs), Dog guides.

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### **SUGGESTED READINGS**

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