NETAJI SUBHAS OPEN UNIVERSITY

B. Ed. Spl. Ed. (M.R./H.I./V.I.)-ODL

IDENTIFICATION OF CHILDREN WITH VISUAL IMPAIRMENT AND ASSESSMENT OF NEEDS

C-12 (V.I.)

B. Ed. Spl. Ed. (M. R. / H. I. / V. I)-
ODL Programme

AREA - C

C-12 : INDENTIFICATION OF CHILDREN WITH VISUAL IMPAIRMENT AND ASSESSMENT OF NEEDS

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INDENTIFICATION OF CHILDREN

WITH VISUAL IMPAIRMENT AND ASSESSMENT OF NEEDS

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The Self Instructional Material (SIM) is prepared keeping conformity with the B.Ed.Spl. Ed. (MR/HI/VI) - ODL Programme as prepared and circulated by the Rehabilitation Council of India, New Delhi and adopted by NSOU from the 2015-2017 academic session.

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Dr. Ashit Baran Aich
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From the Vice-Chancellor's Desk

Dear Students, from this Academic Session (2015-17) the Curriculum and Course Structure of B. Ed.- Special Education have been thoroughly revised as per the stipulations which featured in the Memorandum of Understanding (MoU) between the Rehabilitation Council of India (RCI) and the National Council for Teacher Education (NCTE). The newly designed course structure and syllabus is comprehensive and futuristic has, therefore, been contextualized and adopted by NSOU from the present academic session, following the directives of the aforesaid national statutory authorities.

Consequent upon the introduction of new syllabus the revision of Self Instructional Material (SIM) becomes imperative. The new syllabus was circulated by RCI for introduction in the month of June, 2015 while the new session begins in the month of July. So the difficulties of preparing the SIMs within such a short time can easily be understood. However, the School of Education of NSOU took up the challenge and put the best minds together in preparing SIM without compromising the standard and quality of such an academic package. It required many rigorous steps before printing and circulation of the entire academic package to our dear learners. Every intervening step was meticulously and methodically followed for ensuring quality in such a time bound manner.

The SIMs are prepared by eminent subject experts and edited by the senior members of the faculty specializing in the discipline concerned. Printing of the SIMs has been done with utmost care and attention. Students are the primary beneficiaries of these materials so developed. Therefore, you must go through the contents seriously and take your queries, if any, to the Counselors during Personal Contact Programs (PCPs) for clarifications. In comparison to F2F mode, the onus is on the learners in the ODL mode. So please change your mind accordingly and shrug off your old mindset of teacher dependence and spoon feeding habits immediately.

I would further urge you to go for other Open Educational Resources (OERs) - available on websites, for better understanding and gaining comprehensive mastery over the subject. From this year NSOU is also providing ICT enabled support services to the students enrolled under this University. So, in addition to the printed SIMs, the e-contents are also provided to the students to facilitate the usage and ensure more flexibility at the user end. The other ICT based support systems will be there for the benefit of the learners.

So please make the most of it and do your best in the examinations. However, any suggestion or constructive criticism regarding the SIMs and its improvement is welcome. 1 must acknowledge the contribution of all the content writers, editors and background minds at the SoE, NSOU for their respective efforts, expertise and hard work in producing the SIMs within a very short time.

Professor (Dr.) Subha Sankar Sarkar
Vice-Chancellor, NSOU

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AREA - C
C-12 : INDENTIFICATION OF CHILDREN WITH VISUAL IMPAIRMENT AND ASSESSMENT OF NEEDS

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AREA - C

C-12 : INDENTIFICATION OF CHILDREN WITH VISUAL IMPAIRMENT AND ASSESSMENT OF NEEDS

C-12 ❐ Indentification of Children with Visual Impairment and Assessment of Needs

Unit -1 ❐ Anatomy and Physiology of Human Eye

Structure

1.1 Introduction

The eye is one of the most complex sense organs of the human body which gives us the sense of light. It allows us to observe and learn more about the surrounding world

than we do with the help of any of the four other senses. We use our eyes in almost every activity we perform, whether watching, reading, writing, working, viewing television, driving a cycle, and in countless other ways. It also allows us to see and interpret the shapes, colours and dimensions of objects in the world they reflect or emit. The eye is able to detect bright light or dim light, but it cannot sense object when light is absent. In the following sections the structure and functions of human eye, vision development and process of seeing, principles of refraction and refractive errors, blindness and low vision and other related concepts are discussed.

1.2 Objectives

After going through the self-instructional materials in Sub-Unit 1, the learners will be able to:

- Know about the structure and functions of human eye;
- Understand normal vision development and process of seeing;
- Understand the principles of refraction and refractive error;
- Understand the blindness, impairment and low vision;
- Understand the Concepts of Visual Acuity, Visual Field, Depth Perception, and Contrast Sensitivity.

1.3 Structure and Function of Human Eye

1.3.1 Structure of Human Eye

The human eye is one of the most complex organs in our body. It is amazing that something so small an organ can have so many working parts. But when you consider how difficult the task of providing vision really is, perhaps it's no wonder after all.

The outer covering of the eyeball consists of a relatively tough, white layer called the **sclera** (or white part of the eye). Near the front of the eyeball, in the area protected by the eyelids, the sclera is covered by a thin, transparent membrane, known as **conjunctiva,** which runs to the edge of the cornea. The conjunctiva also covers the moist black surface of the eyelids and eyeballs (Figure: 1).

Light enters the eyeball through the **cornea,** the clear, curved layer in front of the **iris and pupil.** The cornea serves as a protective covering for the front of the eye and also helps focus light on the **retina** at the back of the eye. After passing through the cornea, light travels through the pupil (the black dot in the middle of the eye). The iris—the

circular, coloured area of the eye that surrounds the pupil—controls the amount of light that enters into the eyeball. The pupil dilates (enlarges) and constricts (shrinks) like the aperture of a camera lens as the amount of light in the immediate surroundings changes. The iris allows more light into the eye when the environment is dark and allows less light into the eye when the environment is bright. The size of the pupil is controlled by the actions of the pupillary **sphincter muscle and dilator muscle.**

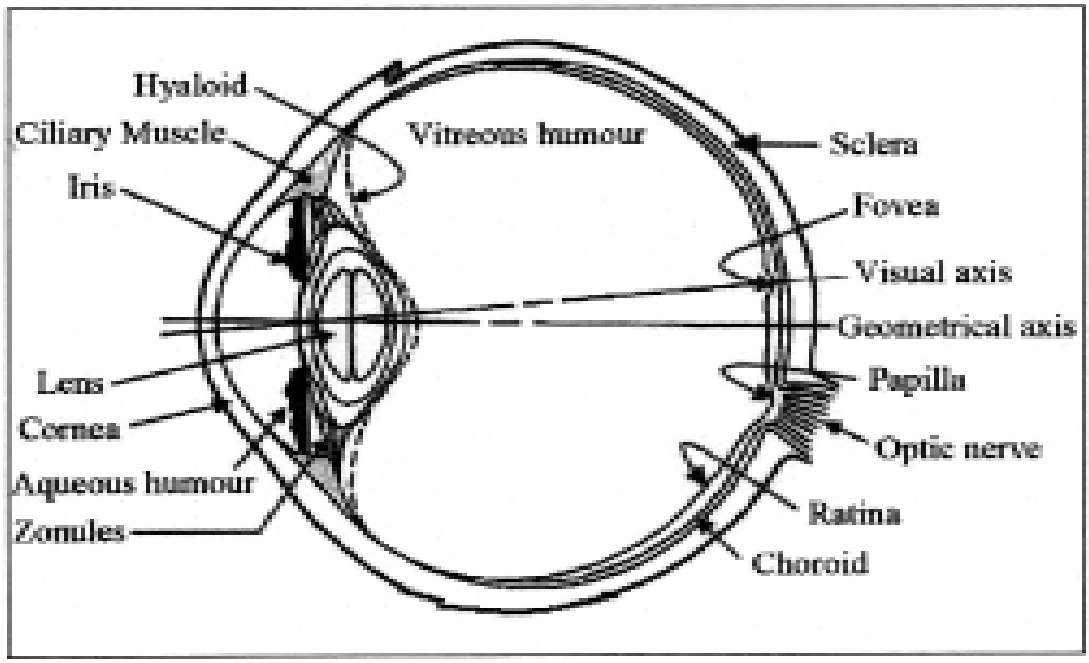

Figure 1: Schematic Diagram of Human Eye

Behind the iris sits the lens. By changing its shape, the lens focuses light onto the retina. Through the action of small muscles, the lens becomes thicker to focus on nearby objects and thinner to focus on distant objects.

The retina contains the cells that sense light (photoreceptors) and the blood vessels that nourish them. The most sensitive part of the retina is a small area called the **macula,** which has millions of tightly packed photoreceptors (the type called **cones).** The high density of cones in the macula makes the visual image detailed, just as a high-resolution digital camera has more megapixels, Each photoreceptor is linked to a nerve fibre. The nerve fibres from the photoreceptors are bundled together to form the **optic nerve.** The **optic disk,** the first part of the optic nerve, is at the back of the eye. The photoreceptors in the retina convert the image into electrical signals, which are carried to the brain by

the optic nerve.

There are two main types of photoreceptors - **cones and rods. Cones** are responsible for sharp, detailed central vision and colour vision and are clustered mainly in the macula. The **rods** are responsible for night and peripheral (side) vision. Rods are more numerous than cones and much more sensitive to light, but they do not register colour or contribute to detailed central vision as the cones do. Rods are grouped mainly in the peripheral areas of the retina.

The eyeball is divided into two sections, each of which is filled with fluid. The front section (anterior segment) extends from the inside of the cornea to the front surface of the lens. It is filled with a fluid called the **aqueous humor,** which nourishes the internal structures. The back section (posterior segment) extends from the back surface of the lens to the retina. It contains a jellylike fluid called the **vitreous humor.** The pressure generated by these fluids fills out the eyeball and helps maintain its shape.

The anterior segment is divided into two chambers. The front (anterior) chamber extends from the cornea to the iris. The back (posterior) chamber extends from the iris to the lens. Normally, the aqueous humor is produced in the posterior chamber, flows slowly through the pupil into the anterior chamber, and then drains out of the eyeball through outflow channels located where the iris meets the cornea.

Some important structural components of human eye and their functions are given below:

1. **Sclera** - Sclera is the white part of the eye which forms the larger portion of the eye ball.

Function: a. It helps to maintain the shape of the eye.

b. It supports delicate structures within the eye.

2. **Conjunctiva** - a thin clear mucous membrane which covers the front of the sclera and follows around to line the inside of the eyelids is the Conjunctiva.

Function: It covers the interior surface of lids and joins them to the eyeball.

3. **Cornea** - A crystal-clear window at the front of the eye is known as Cornea, it is a thin convex-concave living tissue which is kept moist by a thin film of tear and bathed on the posterior surface by the aqueous humour. It is kept smooth by blinking of the lids.

Function: It permits the light to pass through and helps focusing it on the retina along with the lens.

4. **Iris** - The black disc beneath the cornea is Iris. The posterior surface of the iris is pigmented. The colour of the iris decides colour of the eye.

Function: Muscle in the iris make the pupil larger or smaller.

5. **Pupil:** The black hole in the centre of the iris is Pupil. The pupils in both the eye-balls look black due to the darkness of the interior of the eye.

   Function: (a) It controls entry of light into the eye - In bright light, the circular muscles of the iris contract and the pupil becomes smaller to reduce the amount of light that enters into the eye, while in dark, muscles help the pupil to widen allowing more light to enter into the eye.

6. **Anterior Chamber** - is situated between the cornea and the iris. It is filled with clear fluid called the aqueous humour.

Function: a. The aqueous humour keeps the posterior surface of the cornea moist.

b. It plays a major role in the maintenance of the pressure of the eye.

7. **Lens** - Lens is situated behind the iris in the eye-ball. It is transparent and consists of an elastic capsule filled with clear material. It is suspended by transparent fibres of **zonules.** Function - Focusing the rays of light to the back of the eye.

8. **Retina** - it is the light sensitive membrane of nerves which lines the inner surface of the eye and consists of - (a) an outer layer of pigment epithelium, (b) inner portions of rods, cones and (c) connecting nerve cells.

Function - It changes light waves into electrical impulses.

9. **Vitreous Body** - It is the clear, viscous liquid, like a jelly filled in the open area between the lens and retina.

Function - This fluid basically holds the lens place and gives support to the eye coats.

10. **Optic Nerves** - the fine fibres arising from each nerve cell come out of the eye-ball through the optic nerve and join the fibres coming from the either eye at an interaction in the brain called 'chiasm'.

Function - It carries impulses to the back of the brain where the consciousness of colour and shapes takes place.

11. **Macula-** It is a small area situated at the centre of the retina. It is the most sensitive visual part of the eye which is also called the yellow spot.

Function - It is used for activities that need fine vision like reading and writing.

1.3.2 Functions of Human Eye

Basic function of the eye is to visualize world around us. It includes:

1. Optic system projecting an image;
2. System that perceives and encodes the received information for the brain;
3. Life-supporting' servicing system.

How does the Human Eye Work?

In a number of ways, the human eye works much like a digital camera:

1. Light is focused primarily by the cornea — the clear front surface of the eye, which acts like a camera lens.
2. The iris of the eye functions like the diaphragm of a camera, controlling the amount of light reaching the back of the eye by automatically adjusting the size of the pupil (aperture).
3. The eye's crystalline lens is located directly behind the pupil and further focuses light. Through a process called accommodation, this lens helps the eye automatically focus on near and approaching objects, like an autofocus camera lens.
4. Light focused by the cornea and crystalline lens (and limited by the iris and pupil) then reaches the retina — the light-sensitive inner lining of the back of the eye. The retina acts like an electronic image sensor of a digital camera, converting optical images into electronic signals. The optic nerve then transmits these signals to the visual cortex — the part of the brain that controls our sense of sight.

1.4 Vision Development and Process of Seeing

1.4.1 Normal Vision Development

At birth, baby sees only in black and white and shades of gray. Nerve cells in their retina and brain that control vision are not fully developed. Also, a newborn infant's eyes don't have the ability to accommodate (focus on near objects). If baby doesn't seem to be "focusing" on objects, including mother's face. It just takes time. Despite these visual limitations, studies show that within a few days after birth, infants prefer looking at an image of their mother's face to that of a stranger. Researchers believe this

preference depends on large, high-contrast stimuli, like the boundary of the mother's hairline to her face. {In studies, if these boundaries were masked with a scarf or bathing cap, the infants' preference of looking at their mother's face went away).

One thing anybody may notice about newborn baby is how large their eyes are. This is because that normal infant development proceeds from the head down. At birth, baby's eyes are almost 65 percent of their adult size.

Vision Development in Babies

Babies' vision goes through many changes in the first months after birth. Baby's eyes are not very sensitive to light in the first month of life. In fact, the amount of light required for a 1-month-old infant to be aware that light is present (called the light detection threshold) is 50 times higher than that of an adult.

Infants start to develop the ability to see in colours very quickly. At one week after birth, they can see red, orange, yellow and green. But it takes a little longer for them to be able to see blue and violet This is because blue light has shorter wavelengths, and fewer colour receptors exist in the human retina for blue light.

Many advances in vision development take place in months two and three. Infants develop sharper visual acuity during this period, and their eyes are beginning to move better as a team. The child should follow moving objects at this stage and starting to reach for things s/he sees. Also, infants at this stage of development learn how to shift their gaze from one object to another without having to move their head. And their eyes are becoming more sensitive to light; a 3 months old infant's light detection threshold is about 10 times that of an adult.

Focus and Tracking:

Newborn babies have peripheral vision (the ability to see to the sides) and in the first weeks of life gradually develop the ability to focus on an object or point in front of them. At one month, a baby can focus briefly on objects up to three feet away.

By two months, infants are also able to track (follow) moving objects, as their visual coordination and depth perception improve. By three months they also have the hand/arm control needed to bat at nearby moving objects. If a baby's eyes are not working together to focus and track objects by three months of age, a paediatrician should be consulted. Distance vision continues to develop in the early months. By four months a baby may smile when they see a parent across a room, and they can see objects outside when looking through a window.

Light and Images:

At birth, babies are very sensitive to bright light, so their pupils remain constricted to limit the light coming into the eyes. After about two weeks, the pupils begin to enlarge and babies can see a range of shades of light and dark. As the retinas (the light-sensitive tissue inside the eye) develop, the ability to see and recognize patterns improves. High contrast images like black-and-white pictures, bull's eyes or very simple face shapes are most likely to attract babies' attention in the early weeks.

The human face is always babies' favourite image. When someone holds a baby, he or she will look intently at the person's face, especially the eyes. As the baby's visual span increases in the first month, he/she will be able to see the person's whole face and will be much more responsive to facial expressions.

Colour Vision:

Babies' colour vision matures at about the same rate as the other visual abilities. At one

month, they are sensitive to the brightness or intensity of colour and will look longer at bold colours and contrasting patterns than at lighter tones. By about four months babies can differentiate and respond to the full range and shades of colours.

To help or stimulate a 2 to 3-month-oId child's vision development, the American Optometric Association (ADA) has the following recommendations:

- Add new items to their room or frequently change the location of their crib or existing items in the room.
- Talk to the baby as you walk around the room.
- Keep a night light on to provide visual stimulation when they are awake.
- While infants should be placed on their backs for sleep to decrease the risk of sudden infant death syndrome {SIDS}, put them on their stomachs when they are awake and you can supervise them. This provides important visual and motor experiences.

Vision Development in Preschool and School-aged Children:

The child is now mobile, crawling about and covering more distance than you could ever have imagined. S/He is better at judging distances and more accurate at grasping and throwing objects.

This is an important developmental period for the child. At this stage, infants are developing a better awareness of their overall body and are learning how to coordinate

their vision with their body movements.

Focusing, tracking, depth perception, and other aspects of vision continue to develop throughout early and middle childhood, Convergence, the ability of both eyes to focus on an object simultaneously, becomes more fully developed by about age seven; this is one reason any problems a child has with focusing or eye alignment should be treated before that age.

Most children are naturally somewhat **farsighted** (hyperopic) but can see well at other distances. More pronounced **myopia** (nearsightedness) and astigmatism are thought to be inherited. There is some evidence from recent studies in the United States and Australia that the amount of time school-aged children spend outdoors, in natural light, may have some impact on whether they develop mild myopia.

To stimulate the development of child's eye-hand-body coordination, get down on the floor with him and encourage him to crawl to objects. Place a favourite toy on the floor just out of his reach and encourage him to get it. Also provide plenty of objects and toys that she can take apart and put together.

1.4.2 Process of Seeing

The physical components of the human visual system include the eye, the visual centre in the brain, and the optic nerve which connects the eye to the visual centre. 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 reflect light rays passed through the pupil which is an opening in the iris. The pupil regulates the amount of light entering the 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 ceils namely rods and cones that transmit the image to the brain through optic nerves. Images form in the retina upside down until they are flipped over the visual centre of the brain as the brain interprets the images.

Both the eyes have slightly different fields of vision since they are separated by the nose. Each of these visual fields are divided into the right and leftside. Each individual eye takes in different information, due to the different visual fields. Signals from the left visual fields of both eyes are sent to the right visual cortex and vice-versa. The information received at one eye is incomplete since only one part of the image is available. Therefore, both eyes immediately send their information to the brain, so that the

information can be combined. Along the way at the **optic chiasma,** some of the nerves from each optic nerve cross over, so that information from the left visual fields comes together and the same goes for the right visual field. The **optic nerve** is essentially made up of a bundle of nerve fibres that carry electrical impulses down to minute cables. After reaching the optic chiasma, another swapping of information takes place at the cell station or the **geniculate body.** This connection functions in accordance with the reflexes of the pupils. From here, the nerve spread out on their respective sides around the temporal part of the brain. Finally, they pass through the main exchange reaching the visual cortex. The images are interpreted at this point.

How does the eye see ?

For people with normally functioning eyes, the following sequence takes place:

1. Light reflects off the object we are looking at.
2. Light rays enter the eye through the cornea at the front of the eye.
3. The light passes through a watery fluid (aqueous humor), and enters the pupil to reach the lens.
4. The lens can change in thickness to bend the light, which will focus it onto the retina at the back of the eye.
5. On the way to the retina, the light passes through a thick, clear fluid called a vitreous humor. The vitreous humor fills the eyeball and helps maintain its round shape.
6. The light then reaches the back of the eye and hits the retina. The retina translates the light into electrical impulses which are then carried to the brain by the optic nerve.
7. Finally, the visual cortex of the brain interprets these impulses as what we see.

1.5 Principles of Refraction and Refractive Error

1.5.1 Principles of Refraction

Refraction is the bending of light as it passes between materials of different optical density. If there is irregular bending of light due to error in medium of reflection, this becomes refractive error.

The purpose of the eye-ball is to receive light from the outside world and transmit it to the brain for processing. There are three aspects to this function. In the first instance, the light rays have to be correctly focused on to the back of the eye. Secondly, the light-sensation related information has to be converted to electrochemical signals by the cells within the retina. Finally, that electromechanical signal is to be transmitted to the brain through the optic nerve.

Refraction of Eye

Refraction refers to the state of focus of the eye. It is the ability of the eye to bend light so that an image is focused on the retina. So, refraction is the deflection of light from a straight path through the eye by various ocular tissues, including the cornea, lens, aqueous humour, and vitreous body.

1.5.2 Concept of Refractive Error

Error in refractive media, the eye gets unclear or blurring image. When there is a deviation in light rays from a distant object brought to a focus on the retina, the image that is formed on the retina appears blurred. The variation in image formation is known as **ametropia** in which parallel rays are not accurately focused on the retina. Ametropia includes **hypermetropia, myopia** and **astigmatism.** Therefore, refractive error is defined as "a defect in the eye that prevents light rays from being brought to a single focus exactly on the retina" (Bourgeault, 1969). The principles of refractive errors are:

1. Corneal curvature,
2. Depth of the anterior chamber,
3. Shape of the lens,
4. Length of the eye (axial length).

These four elements change over time as the eye grows (e.g., axial length) and matures in later years (e.g., quality of tears which affects the air-tear interface). The emmetropic eye is able to achieve a perfect focus. Ametropia is the global term referring to any refractive error. Refractive development is influenced by both the environmental and genetic factors.

Significance of Refractive Errors

- Refractive errors are important because they account for half the cases of avoidable vision impairment globally (153 million people).
- Undetected refractive errors in childhood may lead to behavioural problems and adversely affect social interaction and performance (academic or sporting) at school.

- It has been found that a minor reduction in vision has been associated with an increased risk of death and physical-social-emotional problems in people aged over 50 years.
- Under-corrected refractive error may account for up to 75% of all vision impairment in the third-world countries.

Interventions to treat refractive errors (e.g., spectacles) are simple and cost-effective. However, global estimates indicate that more than 2.3 billion people in the world experience poor vision due to refractive error of which 670 million people are considered visually impaired because they do not have access to corrective treatment.

Types of Refractive Error

There are different types eye-problems due to refractive errors in the eyes. Some of these are given below:

1. Myopia:

As the normal eye is virtually round, the rays of light coming from outside, touch the retina. The myopic eye is longer from the front to the back and the extra length prevents the image being in sharp focus. Actually, in myopia, the eyes are too deep and cornea is too curving which are the main causes of myopia.

There are mainly three types of myopia:

i. Congenital Myopia

- Present at birth,
- May be unilateral as well as bilateral,
- Bilateral myopia may be associated with squint.

ii. Simple Myopia

- Most common type of myopia,
- Does not progress after adolescence.

iii. Pathological Myopia

- Type of progressive and degenerative myopia,
- Begins at the age of 5-10 years,
- Strongly hereditary,

- Common in women, Jews and Japanese.

Symptoms of Myopia:

- Black spots are seen floating before the eyes,
- Discomfort in performing near work,
- Flashes of light may be seen,
- Indistinct distant vision is the most common symptom. Usually the young children are unable to see clearly.

Treatment of Myopia:

- It is treated by prescribing suitable corrected concave lens for concave use. In high myopia, spectacles should be made to fit closely to the eye.

2. Hypermetropia

This is opposite to myopia. Short length of eye ball is the cause of it. It may also consist of flat curvature of cornea.

Newborns are invariably hypermetropic. The incidence decreases rapidly with age remaining at about 50% after 20 years.

Symptoms of Hypermetropia

- Blurring of vision for near work,
- Frontal headache and eye strain,
- Burning and dryness in the eye.

Treatment of Hypermetroopia

- It is treated by prescribing suitable correcting spherical convex lenses.

3. Astigmatism

It is that condition of refraction in which a point of light cannot be made to produce a punctuate image upon the spherical retina. It is due to unequal curvature of cornea and decentring of lens.

Regular Astigmatism

Normally cornea is flatter from side to side (horizontal meridian) perhaps because of the pressure of the eyelids. It is curved above downwards (vertical). Regular astigmatism is present when the two principal meridians are at the right angles. It can be corrected by lenses.

- According to the rule - the vertical meridian is more curved, e.g., as in normal cornea.
- Against the rule - the horizontal meridian is more curved, e.g., as after cataract surgery.
- It is present when the corneal surface is irregular. It cannot be adequately corrected by lens, e.g., as following healed corneal ulcer. In that case, Soft Contact lens may be used.

Symptoms of Regular Astigmatism;

- Diminished visual acuity is the most troublesome clinical symptom;
- Eye strain and headache after short time of near work is usually present;
- The letters in the book appear to be 'running together'.

Treatments of Regular Astigmatism

- When there are symptoms, suitable cylindrical lenses are prescribed for constant use.

1.6 Concept and Definitions of Blindness and Low Vision

Visual impairment describes vision that cannot be fully corrected by ordinary prescription lenses, medical treatment, or surgery. The term visual impairment includes conditions ranging from the presence of good usable vision, low vision, or to the absence of any sight at all-total blindness. Many terms are used when people refer to visual impairment. These terms are explained below:

1.6.1 Blindness

The term blindness means no light perception of both the eyes of a human being. Probably the best way to describe this is not to stand in a dark place or cover your eyes, but rather think about what you can see directly behind you. Now, do not turn your head, but use your eyes to see directly behind you. That may utter sense of darkness where only other senses describe what is behind you is the closest to no light perception a sighted individual may see. Even if you close your eyes and stand with a blind fold in utter darkness, your eyes still try to perceive some form of imagery.

Blindness with light perception has several different forms. However, people often see light with shadows or shadows with some light. The way one sees in this state depends on the condition of the eye and the cause for the sight loss.

Legal blindness refers to a term developed to determine cut off assessments for sight loss. It refers to a visual acuity on a Snellen's Chart of 20/ 200 corrected with best eye. This means that the size of a sign of a normally sighted person sees at 200 feet, a legally blind individual must be 20 feet away. A second classification for legal blindness involves tunnel vision. In this case, a person must have a field of view less than 20 degrees while looking forward.

Definition of Blindness :

Simple Definition: Inability of a person to count fingers from a distance of 6 meters or 20 feet.

Technical Definition: Vision of 6/ 60 or less with the best possible spectacle correction and Diminution of field vision to 20° or less in better eye.

- ***Severe Visual Impairment***

  Severe visual impairment is a term used by researchers at the National Center for Health Statistics (NCHS) to describe visual impairment in people who are unable to read ordinary newsprint even with correction. This term, used primarily for studying visual impairment in the population, is not used in clinical references by eye care professionals. People with a severe visual impairment may or may not be legally blind.

- ***Visually Impaired***

  The term visually impaired, also used by the National Center for Health Statistics for studying visual impairment in the population, describes visual impairment in people who have difficulty reading ordinary newsprint even with correction. Like the term severe visual impairment, visual impairment is used by researchers who study the population, and is not used in clinical references.

- ***Presbyopia***

  Presbyopia refers to the eye's loss of accommodation, the eye's focusing power and ability to adjust the focus of the eye on the distance between the individual and the object People with presbyopia, typically those age 40 and older, experience a progressive inability to focus for near vision viewing as the lens becomes less elastic with age. Lenses with magnification are used to provide the correction needed. These lenses are commonly referred to as "reading glasses," or necessary magnification can be added to a person's regular eyeglasses as bifocals, or trifocals. Variable focus lenses are also available to correct presbyopia.

1.6.2 Low Vision

Low vision is a reduced level of vision that cannot be fully corrected with conventional glasses. It is not the same as blindness. Unlike a person who is blind, a person with low vision has some useful sight. However, low vision usually interferes with the performance of daily activities, such as reading or driving. A person with low vision may not recognize images at a distance or be able to differentiate colours of similar tones.

One is legally blind when the best corrected central acuity is less than 20/ 200 (perfect visual acuity is 20/ 20} in the better eye, or the side vision is narrowed to 20 degrees or less in the better eye. People who are legally blind may still have some useful vision. It may be noted that if anybody is legally blind, s/he may qualify for certain government benefits. Furthermore, It is estimated that approximately 17 percent of normal people over the age of 65 years are either blind or have low vision.

Symptoms of Low Vision:

- Difficulty in recognizing objects at a distance (viz., street signs or bus signs)
- Difficulty in differentiating colours (particularly in the green-blue-violet range)
- Difficulty in seeing well up close (viz., reading or cooking)

The symptoms described above may not necessarily mean that anybody has the low vision. However, if you experience one or more of these symptoms, contact the eye doctor for a complete examination. The specialist eye doctor can tell the difference between normal changes which are common with age and changes caused by eye disease.

Causes of Low Vision:

Although low vision can occur at any stage in life, it primarily affects the elderly, but it is not a natural part of aging. Although most people experience some physiological changes with age (presbyopia), these changes usually do not lead to low vision. Most people develop low vision because of eye diseases. Common causes of low vision, particularly with older adults, include muscular degeneration, glaucoma, and diabetic retinopathy. When vision impairment is recognized early, treatment can be more effective, enabling people to maintain as much independence as possible.

Low Vision Aids:

Many types of assistive devices are available to help people with low vision. These items include special glasses and other magnification devices and large print reading materials. Other communication aids include computer software and various other technological devices.

1.7 Concept of Visual Acuity, Visual Field, Depth Perception and Contrast Sensitivity

1.7.1 Visual Acuity

Visual acuity (VA) commonly refers to the clarity of vision. Visual Acuity is dependent on some optical and neural factors, i.e., (i) the sharpness of the retinal focus within the eye, (ii) the health and functioning of the retina, and (iii) the sensitivity of the interpretative faculty of the brain.

Visual acuity is a measure of our centra! vision, the ability to distinguish details and shapes of objects. Distant vision is tested with a chart with differently sized letters read from a distance of six metres away. This is called the Snellen's Test Types.

Visual acuity is typically measured while fixating, i.e. as a measure of central (orfoveal) vision, for the reason that it is highest there. However, acuity in peripheral vision can be of equal (or sometimes higher) importance in everyday life. Acuity declines towards the periphery in an inverse-linear (i.e. hyperbolic) fashion.

Visual acuity is a measure of the spatial resolution of the visual processing system. As it is sometimes referred to by optical professionals, visual acuity of a person is tested to identify so-called optotypes - stylized letters, Landolt rings, Le symbols, or other patterns - on a printed chart (or some other means) from a set viewing at a fixed distance. Optotypes are represented as black symbols against a white background (i.e. at maximum contrast). The distance between the person's eyes and the testing chart is set so as to approximate **optical infinity** in the way the lens attempts to focus (far acuity), or at a defined reading distance (near acuity).

Normal visual acuity is commonly referred to as 20/ 20 vision, the metric equivalent of which is 6/ 6 vision. At 20 feet or 6 meters, a human eye with nominal performance is able to separate contours that are approximately 1.75 mm apart. Vision of 20/ 40 corresponds to lower than nominal performance and vision of 20/10 corresponds to better performance.

Acuity is a measure of visual performance and does not directly relate to the eyeglass prescription required to correct vision. Instead, an eye examination seeks to find the prescription that will provide the best corrected visual performance achievable. The resulting acuity may be greater or less than 20/ 20 = 1.0. Indeed, a subject diagnosed as having 20/ 20 vision will often actually have higher visual acuity because, once this standard is attained, the subject is considered to have normal (in the sense of undisturbed)

vision and smaller optotypes are not tested. Emmetropic subjects with 20/ 20 vision or 'better' (20/ 15, 20/ 10, ect), may still require an eyeglass correction for other problems related to the visual system, such as eye strain ocular injuries.

Measurement:

Visual acuity is measured by a psychophysical procedure and as such relates the physical characteristics of a stimulus to a subject's percept and her/ his resulting responses. Measurement can be made by using an eye chart, by optical instruments, or by computerized tests like the 'FrACT.

Care must be taken that viewing conditions correspond to the standard, such as correct illumination of the room and the eye chart, correct viewing distance, enough time for responding, error allowance, and so forth. In the European countries, these conditions are standardized by the European norm (EN ISO 8596, previously DIN 58220).

1.7.2 Visual Field

The visual field refers to the total area in which objects can be seen in the side (peripheral) vision while you focus your eyes on a central point. The visual field is the "spatial array of visual sensations available to observation in introspectionist psychological experiments."

The equivalent concept for optical instruments and sensors is the 'field of view' (FOV).

In optometry and ophthalmology a visual field test is used to determine whether the visual field is affected by diseases that cause local scotoma a more extensive loss of vision or a reduction in sensitivity (increase in threshold).

Normal limits :

The normal human visual field extends to approximately 60 degrees nasally (toward the nose, or inward) from the vertical meridian in each eye, to 100 degrees temporary (away from the nose, or outwards) from the vertical meridian, and approximately 60 degrees above and 75 below the horizontal meridian. In the United Kingdoms, the minimum field requirement for driving is 60 degrees either side of the vertical meridian, and 20 degrees above and below horizontal. The macula corresponds to the central 13 degrees of the visual field; the fovea to the central 3 degrees.

Measuring the Visual Field:

The visual field is measured by perimetry. This may be kinetic, where points of light are moved inwards until the observer sees them, or static, where points of light are

flashed onto a white screen and the observer is asked to press a button if s/he sees it. The most common perimeter used is the automated Humphrey Field Analyzer and Heidelberg Edge Perimeter.

Another method is to use a campimeter, a small device designed to measure the visual field. Patterns testing the central 24 degrees or 30 degrees of the visual field, are most commonly used. Most perimeters are also capable of testing the full field of vision.

Another method is for the practitioner to hold up 1, 2, or 5 fingers in the four quadrants and center of a patient's visual field (with the other eye covered), ff the patient is able to report the number of fingers properly as compared with the visual field of the practitioner, the normal result is recorded as 'full to finger counting' (often abbreviated FTFC). The blind spot can also be assessed via holding a small red object between the practitioner and the patient. By comparing when the red object disappears for the practitioner, a patient's abnormally large blind spot can be identified. There are many variants of this type of examination (e.g., wiggling fingers at visual periphery in cardinal axes).

Visual Field Loss:

Visual field loss may occur due to disease or disorders of the eye, optic nerve, or brain. Classically, there are four types of visual field defects:

i. Altitudinal field defects, loss of vision above or below the horizontal - associated with ocular abnormalities;

ii. Bitemporal hemianopia, loss of vision at the sides;

iii. Central scotoma, loss of central vision Homonymous hemianopia, loss at one side in both eyes - defect behind optic chiasm (see below);

In humans, confrontational testing and other forms of perimetry are used to detect and measure visual field loss. Different neurological difficulties cause characteristic forms of visual disturbances, including hemianopsias (shown below *without* macula sparing), quadrantanopsia, and others.

1.7.3 Depth Perception

Depth perception is the visual ability to perceive the world in three dimensions (3D) and the distance of an object. Depth perception arises from a variety of depth cues. These are typically classified into binocular cues that are based on the receipt of sensory information in three dimensions from both eyes and monocular cues that can be represented in just two dimensions and observed with just one eye. Binocular cues

include stereopsis, eye convergence, disparity, and yielding depth from binocular vision through exploitation of parallax. Monocular cues include size: distant objects subtend smaller visual angles than near objects, grain, size, and motion parallax.

Disorders Affecting Depth Perception:

i. Ocular conditions such asamblyopia, optic nerve hypoplasia, and strabismus may reduce the perception of depth.

ii. Since (by definition), binocular depth perception requires two functioning eyes, a person with only one functioning eye has no *binocular* depth perception.

iii. It is typically felt that depth perception must be learned in infancy using an unconscious inference.

1.7.4 Contrast Sensitivity

Contrast sensitivity is a very important measure of visual function, especially in situations of low light, fog or glare, when the contrast between objects and their background is often reduced. Driving at night is an example of an activity that requires good contrast sensitivity for safety.

As mentioned above, contrast sensitivity describes the ability of the visual system to distinguish bright and dim components of a static image. Visual acuity can be defined as the angle with which one can resolve two points as being separate, given that the image is shown with 100% contrast and is projected onto the fovea of the retina. Thus, when an optometrist or ophthalmologist assesses a patient's visual acuity using a Snellen's chart or some other acuity chart, the target image is displayed at high contrast (e.g., black letters on a white background). A subsequent contrast sensitivity exam may demonstrate difficulty with decreased contrast (e.g., grey letters on a white background)

To assess a patient's contrast sensitivity, one of several diagnostic examinations may be used. Most charts in an ophthalmologist's or optometrist's office will show images of varying contrast and spatial frequency. Parallel bars of varying width and contrast, known as 'sine-wave gratings', are sequentially viewed by the patient. The width of the bars and their distance apart represent spatial frequency, measured in cycles per degree.

Studies have demonstrated that medium-level spatial frequency, approximately 5-7 cycles per degree, is optimally detected by most individuals, compared with low or high-level spatial frequencies. The contrast threshold can be defined as the minimum contrast that

can be resolved by the patient. The contrast sensitivity is equal to I/ contrast-threshold.

Using the results of a contrast sensitivity exam, a contrast sensitivity curve can be plotted, with spatial frequency on the horizontal, and contrast threshold on the vertical axis. Also known as contrast sensitivity function (CSF), the plot demonstrates the normal range of contrast sensitivity, and will indicate diminished contrast sensitivity in patients who fall below the normal curve. Some graphs contain "contrast sensitivity acuity equivalents", with lower acuity values falling in the area under the curve. In patients with normal visual acuity and concomitant reduced contrast sensitivity, the area under the curve serves as a graphical representation of the visual deficit. It can be because of this impairment in contrast sensitivity that patients have difficulty driving at night, climbing stairs and other activities of daily living in which contrast is reduced.

The graph demonstrates the relationship between contrast sensitivity and spatial frequency. The target-like images are representative of center-surround organization of neurons, with peripheral inhibition at low, intermediate and high spatial frequencies. Used with permission from Brian Wandell, PhD.

Recent studies have demonstrated that intermediate-frequency sinusoidal patterns are optimally-detected by the retina due to the center-surround arrangement of neuronal receptive fields. In an intermediate spatial frequency, the peak (brighter bars) of the pattern is detected by the center of the receptive field, while the troughs (darker bars) are detected by the inhibitory periphery of the receptive field. For this reason, low- and high-spatial frequencies elicit excitatory and inhibitory impulses by overlapping frequency peaks and troughs in the center and periphery of the neuronal receptive field. Other environmental, physiologic and anatomical factors influence the neuronal transmission of sinusoidal patterns, including adaptation.

Decreased contrast sensitivity arises from multiple etiologies, including retinal disorders such as Age-Related Macular Degeneration (ARMD), amblyopia, lens abnormalities, such as cataract, and by higher-order neural dysfunction, including stroke and Alzheimer's disease. In light of the multitude of etiologies leading to decreased contrast sensitivity, contrast sensitivity tests are useful in the characterization and monitoring of dysfunction, and less helpful in detection of disease.

1.8 Check your Progress

1. Draw the structure of human eye and label its different component.
2. Compare the functions of human eye with a digital camera.

3. What is Sclera?

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4. What do you mean by retina?

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5. State the structure and functions of cornea.

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6. What is the normal vision of the new born baby?

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7. Discuss the process of seeing with an illustration.

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8. What do you mean by ‘light direction threshold’?

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9. How images are formed in the eyes of the baby at the age between 2-12 weeks?

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10. What is meant by ‘Optic Chiasma’?

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11. Discuss the principles of refraction in the eye with a suitable diagram.

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12. Explain the concept of refractive error?

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13. What is the significance of refractive errors?

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14. Mention three types of refractive errors.

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14. What is Myopea?

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16. Define blindness.

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17. How can you try to express the feeling of blindness?

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18. How can blindness be differentiated from low vision?

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19. Explain the symptoms of low vision.

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20. What are the causes of low vision?

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21. Discuss the concept of visual acuity.

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22. How can the visual acuity be measured?

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23. What do you mean by visual field?

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24. What is depth perception?

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25. State the significance of contrast sensitivity.

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1.9 Let us sum up

Our eye is one of the most complex sense organs of the body. It helps us to see & interpret the shapes, colours & dimensions of the objective world. While cruesing into the lesson, we ventured through the sophisticated structure of an eye, its components, viz, sclera, conjunctiva, cornea, pupil, anterior chamber, lens, retina, vitreous body & optic nerves and their respective functions. All these structural components functions to visualize world around us. The human eye works much like a digital camera. At birth, babies are very sensitive to bright light & thus light coming to the eyes is limited. Babies vision goes through many changes. Vision development during the preschool & school-aged children are based on few parameters like-focusing, tracking, depth perception & other aspects of vision. All these functionaries follows certain principles of refraction & refractive error. There are different types of eye-sight problems like myopia, hypermetropea, astigmatism etc. All these problems are the result of certain refractive errors in the eyes. There are treatments available for such kinds of eye problems. Another pertinent issue concerning eye & vision is the concept of blindness & low vision. Visual impairment describes vision that cannot be fully corrected by ordinary prescription. There are different types of visual impairment, some are manageble while others are not. Many types of assistive devices are available to help people with low vision.

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Unit - 2 ❑ Types of Visual Impairment and Common Eye Disorders

Structure

2.1 Introduction

Many people have some type of visual problem at some point in their lives. Some can no longer see objects far away. Others have problems reading small print. These types of conditions are often easily treated with eyeglasses or contact lenses. Visual impairment (vision impairment, vision disability) is defined as a decreased ability to see to a degree that causes problems not fixable by usual means, such as glasses or medication. Visual impairment can be due to disease, trauma, or congenital or degenerative conditions. In the United States, the terms "partially sighted", "low vision", "legally blind" and "totally blind" are used by schools, colleges, and other educational institutions to describe students with visual impairments. Eye disorders which can lead to visual impairments can include retinal degeneration, albinism, cataracts, glaucoma, muscular problems that result in visual disturbances, corneal disorders, diabetic retinopathy, congenital disorders, and infection." Visual impairment can also be caused by brain and nerve disorders, in which case it is usually termed cortical visual impairment (CVI).

2.2 Objectives

After going through this unit the learners will be able to -

- State the definitions of important terms related to visual functioning.
- Describe measure to be used in the assessment of loss of visual acuity and loss of visual field.
- Explain the different refractive errors with illustrations.
- Distinguish between vario us refractive errors.
- Describe the common eye diseases and influences upon visual Functioning
- Enumerate the educational implication of different eye disorders.

2.3 Visual acuity:

Means

- Ability to discriminate high contrast, fine detail at a distance.
- Ability of the eye to see details.
- The power of the eye to distinguish form.
- The sharpness and clarity of vision.

- The visual acuity for distance is measured as the maximum distance at which person can see a certain object, divided by the maximum distance at which a person with normal eye sight can see the same. Thus a visual acuity 6/60 meter means that the person examined cannot see properly at a distance of 6 meters the object, which a person with normal eye sight would be able to see at 60 meters or, visual acuity of 20/200 means that what a. r normal person can see at a distance of 200 feet a visually impaired child can not see it proposely at a distance of 20 feet.

2.3.1 Loss of visual acuity:

- Loss of visual acuity means inability to discriminate high contrast and unable to find detail at a distance.
- Lack of clarity and sharpness of vision.

2.3.2 Estimation of percentage of visual loss:

(Using best correcting spectacle lens). For purpose of calculating visual acuity loss, distance vision and near vision are equally weighted.

Distance (Snellen) vision			Near vision	
Visual acuity		Percentage Loss	Jaeger Test Type	Percentage Loss
English	Metric			
20/20	6/6	0	1	0
20/30	6/9	5	2	0
20/40	6/12	15	3	10
20/50	6/15	25	6	50
20/80	6/20	40	7	60
20/100	6/30	50	11	85
20/200	6/60	80	13	90

Example: If the distance acuity is 20/80 and the subject can read Jaeger 6.

Loss of visual acuity= 40+50/2=45%
Therefore Visual acuity efficiency=55%
Loss of visual acuity= 40+50/2=45%
Therefore Visual acuity efficiency=55%

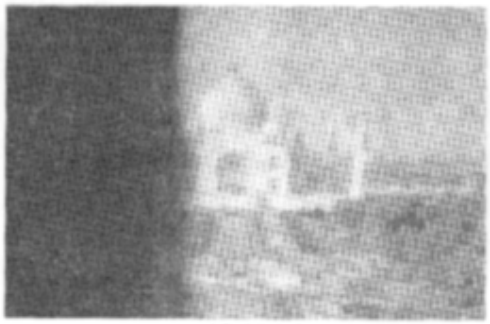
2.4 Visual Field :

Visual field is generally 180 degrees in a normal eye Normal fields in each eye can approximately see 60degrees to the nasal side by fixing on a centre point, 90 degree to the temporal side, 50 degree to the superior side that is up the centre and 70 degree inferior side that is down. This is peripheral field. Restrictions in the normal fields of vision may lead the child seeing only small portion of the environment at a time. It is like figuring out the entire puzzle from one piece. The child may not be able to see the objects on the left side or right side or in the centre. These restrictions in the field can be classified in the following way:

Mildfield restrictions: This means loss of peripheral vision and 20-40 degree of central field remains. Not very restricting but mobility problems may be there.

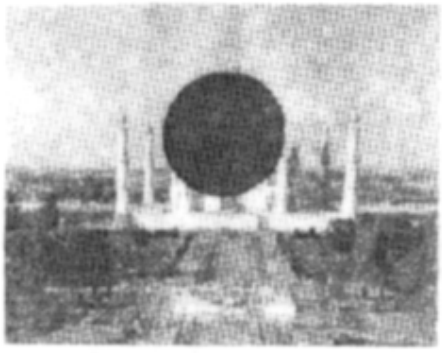
Moderate field restrictions: Central field is 10-20 degree or less. Some special consideration has to be given and the aids are to be prescribed.

Severe field restriction: When central field is just 10 degrees or less. The field of vision may have restrictions in the central field while the child's peripheral vision may remain.



Marginal field defect

Peripheral field defect



Central field defect

2.4.1 Loss of Visual Field:

Definintion: Loss of visual field means that the field of vision is very much limited or restricted and hence the area which can be seen without shifting eye gaze is narrowed down to a specific limit.

The commonly used tests for assessing field of vision are Lister's perimeter and Bjerrum's screen. A white test object is used in eight mendians as given below. This can be done with a 3mm object at 1/3 Inetre using a perimeter.

Directions	Range of minimal normal Visual Field	Moderate visual field	Severe visual field
Temporally	85degrees	60 degrees	30 degrees
Down and temporally	85 degrees	40 degrees	30 degrees
Down	65 degrees	40 degrees	30 degrees
Down and Nasally	50 degrees	30 degrees	20 degrees
Nasally	60 degrees	40 degrees	30 degrees
Up and Nasally	55 degrees	40 degrees	30 degrees
Up	45 degrees	30 degrees	20 degrees
Up and Temporally	55 degrees	40 degrees	30 degrees
Total	500 degrees	320 degrees	220 degrees

Calculation:

Visual field = 320×100/500 = 64%

Moderate Loss of visual field = 100 - 64 = 36%

Visual field = 220×100/500 = 44%

Severe Loss of visual field = 100-44 = 56%

Therefore, loss of visual field means that the field of vision is very much restricted or limitated.

Peripheral field loss: loss of peripheral visron causes a restricted field of vision.

Objects in the centre remain visible. The causes of peripheral field loss include glaucoma and retinitis pigmentosa.

2.5 Colour Vision Defect:

Colour vision defects are present in the community with a greater percentage of boys than girls affected. Red-green problems are the most common. The hereditary colour vision problems are present in the visual impaired persons but these are also some eye conditions that affect colour vision. Colour vision and fine detail are processed by the central part of the retina and any condition affecting this area can cause a colour vision defect.

There is a small percentage of students who have no colour vision and see everything in shades of grey similar to image on a black and white television.

If a colour vision defect is present care should be taken not to use colour cues or direction and when presenting work on the board, some colour will not be seen against the green surface.

2.5.1 Loss of contrast sensitivity:

Due to loss of visual acuity and field of vision, the sensitivity of the optic nerve is not actively interpreted with faculty of the brain. In that case, the relative difference between lightness and darkness of things is not observed clearly.

2.5.2 Role of teacher for low vision children:

The teacher can increase the amount of information available to a student by maximizing contrast. Sharp contrast between an object and its background makes the object more visible to the students. This is essential in reading, writing, drawing, cutting, pasting and physical education-

- Black and white or black and yellow provide the best contrast. Intense blye, green or purple on a buff or light yellow background may be referable if grave is a problem. The student prefers experiment with the colour of paper.
- Keep the chalkboard as clean as possible. The student may have a preference for yellow or white chalk. Large chalk can be purchased. A white board provides good contrast if glare can be eliminated and a dark marker is used.
- Reduce visual distractions around an object.
- A void using materials with confusing pattems.

Bold, sharp print provides good contrast. When enlarging print copies, try to achieve clear, non-blurry copies.

2.6 Refractive Errors and Common Eye Diseases

2.6.1. Refractive Errors

Refractive Error is defined as a defect in the eye that prevents light rays from being brought to a single focus exactly on the retina" (Bourgeault. S.E .. 1969). Numerous variables influence upon refraction, e.g. corneal curvature, depth of the anterior chamber, shape of the lens, and length of the eye. Upon entering the eye a ray of light passes through the cornea, the aqueous humour the anterior and posterior surfaces of the lens, and the vitreous to focus upon the retina's fovea.

The refractive power of the eye is determined by the radius of curvature of the cornea and the lens as well as the refractive index of the aqueous and the vitreous. This power can change during life with growth, age. or changes in health or exposure to certain drugs or chemicals. A normal physiological alteration in the ability of the lens to change its convexity occurs at a predictable rate from childhood to a later adult life. The lens of the child is very flexible and can readily change its curvature enabling the eye to focus on a very near object as well as a more distant object.

As the age of the lens increases, it grows in thickness and is less able to change its curvature.

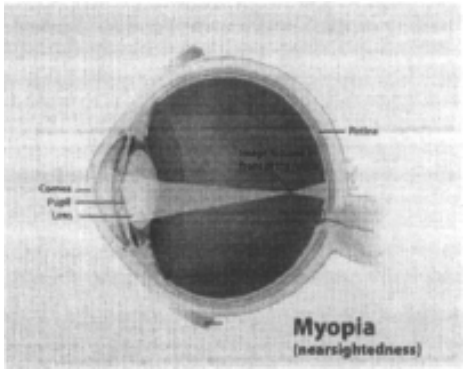
When it loses most of the adjusting mechanism or accommodation, it is termed as presbyopia.

1. Myopia

This is the condition in which the eye is too long and the light is focused in front of the retina. Distant objects are blurred but the near objects are seen clearly. The eye has too much optical power and to correct it the optical power is reduced by either minus glasses or contact lenses, or by surgery.

Description - myopic eyes have too much optical power and so focus the image in front of the retina. This arises as a result of the physiological variation in the length of the eye or an excessively curved cornea. This common condition affects about 1 in 4 adults in the UK and tends to manifest itself in adolescence or early adulthood. It is said to be mild (up to 3.0 D), moderate (3.0-6.0 D) or severe/high-degree 3.0-6.0 D). The latter affects about 200,000 British people and can be associated with degenerative fundal changes (Forster-Fuchsspots). It is also associated with an increased risk of retinal detachment, cataract formation and glaucoma.

1. Congenital or developmental



- Child born with elongated eyes
- Refraction may be up to -lO.OD
- Typical fundus changes are seen
- Progress is rare.

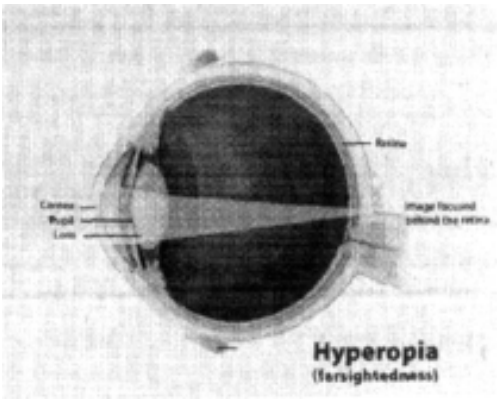
1 Myopia :

- Commonest clinical type
- Not progress much after the adolescence.
- May be up to-5D, or -6D.
- No degenerative changes are seen in the fundus
- Associated with good vision and good prognosis.

2 Hypermetropia (hyperopia)

This is the condition in which the eye is too short and the light is focused behind the retina. The eye has less optical power than is needed. When young the eye can use the lens within the eye to compensate, but reading glasses are needed at a relatively early age. Later, distance glasses (plus) are needed as well, such that glasses for distance and near are required.

Description - this is the opposite problem to myopia. In this case, the eye does not possess enough optical power for its refractive length and therefore an object is focused behind the retina, so giving rise to a blurred image. Mild hypermetropia is a common finding in babies and very young children and this usually resolves by about 3 years of age. Persistent hypermetropia is associated with an increased risk of glaucoma, squint and amblyopia.



- Physiological in almost all new-borns due to shortness of their globes (approx.+2.5D).
- Pathological: when the retina displaced forward (as in retinal detachment, CSR, orbital tumors and etc..)
- In microphthalmos or nanophthalmos - where the axial length is less than 20.mm

Symptoms:

According to the amount of hypermetropia and the age of the patient.

1. Blurred vision - more for near than for distance
3. Eye strain (accommodative asthenopia)
4. Convergent squint - due to continuous effort of accommodation Excess of convergence dissociation of muscle balance convergent squint.
4. Early onset of presbyopia.

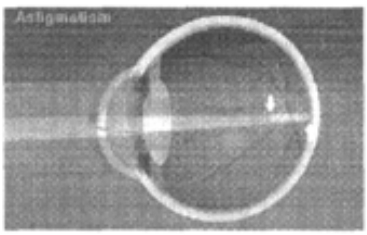
3. Astigmatism

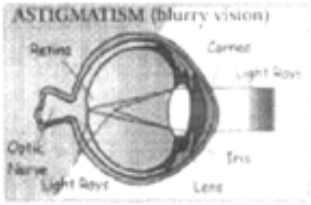
This is the condition where the eye does not focus the light evenly, usually due to the cornea of the eye being more curved in one direction than the other. It may occur on its own or may be associated with myopia or hypermetropia.

Description - not only do light rays have to focus at the level of the retina (as opposed to in front or behind it) but also on a single point. This is achieved through the symmetry of the corneal and lens curvatures around their circumference. In astigmatism, variations in the symmetry of these curvatures (usually corneal) result in rays failing to focus on a single point. The degree of astigmatism is measured in cylinders (cyl). Astigmatism is often present in association with some degree of myopia or hypermetropia. A mild degree of astigmatism is relatively common in childhood and resolves in a number of cases. More severe astigmatism may lead to amblyopia, especially if there is an associated squint.

Causes

- Previous eye surgery
- Previous corneal injury
- Corneal dystrophies
- Congenital cataract
- Optic nerve hypoplasia
- Retinitis pigmentosa





4. Presbyopia

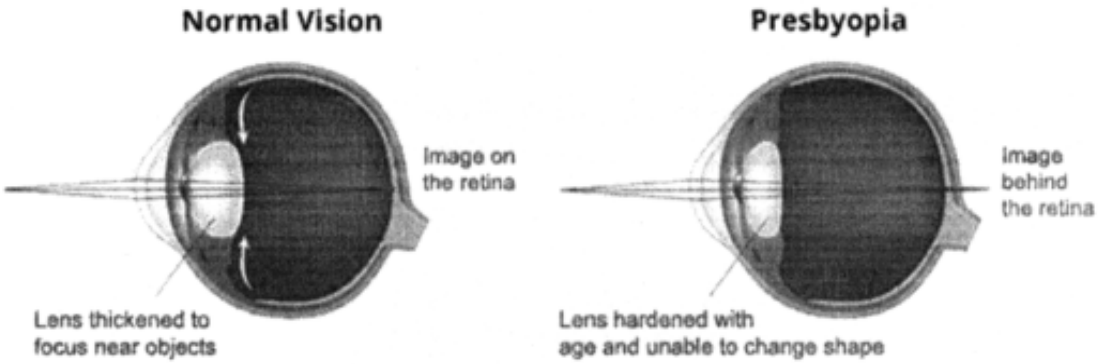
Presbyopia is a condition that occurs as a part of normal aging and is not considered to be an eye disease. The process occurs gradually over a number of years. Symptoms are usually noticeable by age 40-45 and continue to develop until the process stabilizes some 10-20 years later.

Presbyopia occurs without regard to other eye conditions.

Causes and symptoms

In the eye, the crystalline lens is located just behind the iris and the pupil. Tiny ciliary muscles pull and push the lens, adjusting its curvature, and thereby adjusting the eye's focal power to bring objects into focus. As individuals age, the lens becomes less flexible and elastic, and the muscles become less powerful. Because these changes result in inadequate adjustment of the lens of the eye for various distances, objects that are close will appear blurry. The major cause of presbyopia is loss of elasticity of the lens of the eye. Loss of ciliary muscle power, however, is also believed to contribute to the problem.

Symptoms of presbyopia result in the inability to focus on objects close at hand. As the lens hardens, it is unable to focus the rays of light that come from nearby objects. Individuals typically have difficulty reading small print, such as that in telephone directories and newspaper advertisements, and may need to hold reading materials at arm's length. Symptoms include headache and eyestrain when doing close work, blurry vision, and eye fatigue. Symptoms may be worse early in the morning or when individuals are fatigued. Dim lighting may also aggravate the problem.



2.6.2 Common Eye Diseases

Albinism

Lack of pigment in all parts of the body, the skin is white and the hair is pale yellow. Albinism often entails photophobia (acute sensitivity to light) Albinism children will exhibit visual effects such as reduced visual acuity for near and distance vision, astigmatism, nystagmus, very photophobic. A void glare of bright sunlight, reflected light from white or shiny surfaces, wearing tinted glasses or dark sunglasses are suggested for these children as safety measures and use of a barrier sun-cream to avoid sunburn.

Amblyopia/Amblyopia

- Amblyopia is known as lazy eye, It is a disorder of the visual system that is characterized by poor vision or indistinct vision in an eye that is otherwise physically normal or out of proportion to associated structural abnormalities. It has been estimated that 1-5% of the population are affected.

The problem is that no transmission or poor transmission of the visual stimulation through the optic nerve to the brain for a sustained period of dysfunction or during early childhood thus resulting in poor vision or dim vision. Amblyopia is normally affected by one eye, but it is possible to be amblyopic in both eyes if both are similarly deprived of a good or clear visual image. Detecting the condition in early childhood increases the chance of successful treatment.

Symptoms

- Poor deep perception.
- Poor spatial acuity.
- Poor visual image.
- Poor sensitivity to contrast.
- Poor sensitivity to motion.
- Problems of binocular vision, such as limited stereoscopic depth perception.
- Have difficulty seeing the three dimensional images in hidden stereoscopic displays such as auto stereo grams.

Optic atrophy or damaged nerve fibre:

- Complete or partial destruction of the optic nerve that causes the damaged nerve fibres of the optic disc to atrophy. The primary causes of optic atrophy are an injury to the head, retinal disease affecting the nerve itself and a lack of nourishment of the optic nerve. Optic atrophy can be congenital or acquired in later life Atrophy may be primary due to some diseases of the optic nerve itself, as in neuritis. lt may be consecutive from a retinal / lesion such as degeneration of the ganglion cells, as in retinitis pigmentosa. lt may also .e be the result of injury, such as a blow to the eye. The optic nerve is part of the brain and has no capacity for regeneration. Hence, there can be no recovery from optic atrophy.

The range of impairment can be from moderate to total loss of vision, affecting central acuity and fields of vision and colour vision.

Retinitis Pigmentosa (or) Degeneration of Retinal Tissue(RP).

- Retinitis pigmentosa (RP) is a hereditary slow degenerative disease of the retina. The condition affects the peripheral area of retina including rod cells. It may result into night blindness, tunnel vision and inability to see in dark. Though some children are bom with poor vision, it begins in childhood. It is progressive and results into blindness in middle or advanced age. Visual acuity is often normal, the field of vision is so poor that the person falls in the category of blindness.

- **Precaution:**

(i) A close watch by parents & teachers to note any changes in the vision.

(ii) Sympathetic & proper handling & understanding of socio-psychological & behaviour problems of the individual.

(iii) Training in visual skills of scanning and reorientation.

(iv) Training in orientation and mobility.

(v) Genetic counselling of the individual.

- **Treatment / Management :**

(i) Treatment by radiation or photo coagulation.

(ii) Generally surgery is necessary to remove the affected eye.

(iii) Genetic counselling is desirable.

(iv) Avoid consanguineous marriage.

Retinal Detachment

- Retinal detachment is disorder of the eye in which the retina peels away from its understanding layer of support tissue. Initial detachment may be localized, but without rapid treatment the entire retina may detach, leading to vision loss and blindness. It is a medical emergency.

The retina is a thin layer of light sensitive tissue on the back wall of the eye. The optical system of the eye focuses light on the retina much like light is focused on the film in a camera. The retina translates that focused image into neural impulses and sends them to the brain via the optic nerve.

Occasionally, posterior vitreous detachment, injury or trauma to the eye or head may cause a small tear in the retina. The tear allows vitreous fluid to seep through it under the retina, and peel it away like a bubble in wallpaper.

It refers to separation of retina from its pigment epithelium layer. From the clinical point of view it is divided into two classes-

(a) Secondary detachment due to an obvious mechanical cause, subsequent to other happenings in the eye.

(b) Simple detachment due to development of a hole in the retina.

It is caused by degeneratiye myopia, diabetes, inherited diabetic retinopathy. It leads to painless loss of vision, appearance of flashing light, visual field loss and decreased visual activity.

Symptoms

- A flash of light (photopia).
- A sudden dramatic increase in the number of floaters.
- A slight feeling of heaviness in the eye.
- A dense shadow that starts in the peripheral vision and slowly progresses towards the central vision.
- The impression that a veil or curtain was drawn over the field of vision.
- Central visual loss.

Treatment:

Surgical repair should be performed as soon as possible. It is generally treated by laser surgery and cryosurgery.

Nystagmus:

Nystagmus is an unintentional jittery movement of the eyes. This a condition in which the natural movement of the eye is grossly exaggerated, resulting in uncontrolled eye movements and seriously affects perceptual efficiency. When nystagmus is present, it is likely to be associated with seriously defective vision.

Causes:

Medication and drugs can cause nystagmus. Causes include excessive drinking of alcohol or use of medications such as those given for seizure control.

Diagnosis of Nystagmus

Diagnosis is made clinically based on the medical history and physical examination.

Treatment of Nystagmus:

The reduced vision may be improved with glasses and low vision aids, if the eyes are more stable looking in a certain direction, glasses with prisms or eye muscle surgery may improve the head position and allow better vision.

Vitamin-A deficiency:

Vitamin-A is essential for the build the surface tissues in our body, including parts of eye.

Vitamin-A deficiency may lead to corneal damage, ulceration and blindness particularly in combination with measles or malnutrition. It is also known as xeropthalmia. Keratomalacia is the severe from xeropthalmia. Night blindness is the earliest symptom of this disease.

Night blindness:

- In this condition the subjects cannot see small objects in dim light.
- Difficulty in reading in dim light in also experienced.

Xeropthalmia :

- In this condition conjunctiva and cornea appear dry due to the keratinisation of epithelial lining.
- The conjunctiva is dry thickened, wrinkled pigmented.

Keratomalacia:

- If xeropthalmia is not treated with vitamin-A, it develops into keratomalacia.
- In this condition, the corneal epithelium becomes opaque, ulceration and bacterial invasion of the cornea bring about its destruction resulting in blindness.

Early diagnosis and treatment will be the best way to check this defect. Due to deficiency of vitamin-A complaint from patient are poor vision, difficulty seeing in dim light, eyes become sensitive to bright light.

Symptoms:

- Thick white spots on both sides of the cornea.
- Spots on the conjunctiva.
- Conjunctiva becomes wrinkled.
- Cornea erupts.

Suggestions:

- It is necessary to teach the public to eat dark green vegetables which are rich in vitamin-A.
- This is particularly important for pregnant woman, weaning children, growing infants and adults.

Corneal ulcer:

The cornea is the front part of the eye through which the light ray passes prior to forming the visual image in the retina.

Two groups of corneal disorders are :–

1. Inflammation of the cornea.
2. Many abnormalsies growths are appearing at birth or at times later in life.

Corneal inflammations may be divided into three types :–

(a) Superficial keratitis.

(b) Deep dermatitis.

(c) Corneal ulcer.

Causes :

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. Due to indiscriminate use and abuse of antibiotics and steroids, the corneal ulcer is formed. Some specific viruses such as herpes simplex. etc. may also cause corneal ulcer.

Precaution:

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.

Trachoma:

Trachoma is a chronic contagious disease of the conjunctiva and cornea. It is one of the oldest infection diseases known to mankind. It is caused by chlamydia trachomatisa micro-organism which spreads through contact with eye discharge from the infected person (on towels, handkerchiefs, fingers etc.) and through transmission by eye seeking flies. The primary infection affects and conjunctiva follicles and corneal involvement cause ulcers. Basically, trachoma is a socio economic rather than a medical disease. It is found in those areas where living conditions are bad and where people are poor, dirty, ill nourished ignorant.

Trachoma goes through four stages:

- 1-3 weeks the early sign is that the conjunctiva of the upper eyelid becomes red;
- Small pink bumps appear on the conjunctiva of the upper eyelid, the upper part of the cornea becomes infected and inflamed;
- Healing now starts with formation of scar tissue on the eyelids, the conjunctiva and the cornea;
- The disease is, no longer, infections leaving scarring of the eyelids, the

conjunctiva and the cornea, together with the turning in of the eyelids and the scratching of the eye lashes against the cornea; leading to a loss of vision and possible blindness.

Causes:

- Caused by an organism chlamyidia trachomatis.
- Spreads by contact from one person to another though dirty hands, contaminated handkerchiefs or towels.
- Flourishes among people whose surroundings are unhygienic and who are crowed together in an unhealthy environment where there is : lot of dust, poor sanitation, many flies, scarcity of water, open and dirty latrines, open drainage system.

Symptoms:

- Redness
- Itching
- Tearing
- Irritations.

Treatment:

- Clean the eyes if there is discharge.
- Sulphacetamide eye drops 10% or 20% instilled at least four times a day for 6 weeks.
- Advice on personal hygiene and daily washing of face.
- Check other member of the family for trachoma.

Glaucoma or increased intraocular pressure:

Glaucoma is very dangerous and it occurs due to the increase in the intra ocular pressure. Glaucoma is not a disease but rather a complex of ocular disorders. The normal pressure level in the eye is 15 to 20 mm Hg. In glaucoma the pressure may be up to twice the normal. Normally the aqueous humour feels the anterior posterior chambers and permeates the vitreous humour. Aqueous humour is produced by the ciliary body.

The intraocular pressure is determined by the rate of aqueous humour production and the resistance to out flow aqueous humour from the eye. Normally a constant balance is maintained between the rate of formation and the rate of absorption of aqueous humour. The resulting increase in intra ocular pressure can damage the optic nerve. Glaucoma can occur at birth or develop later in childhood or adulthood.

Types:

(i) Chronic (open angle) glaucoma.

(ii) Acute (narrow angle) glaucoma.

(iii) Secondary glaucoma.

(iv) Childhood glaucoma.

Treatment of glaucoma can only prevent further loss of vision, it cannot bring back sight already lost. There are three types of treatment:

- Medical-open angle
- Surgical-open angle
- Medical and surgical- angle closure

Symptoms :

(i) An occasional vague headache or etching about the eyes.

(ii) An occasional blurring or cloudiness of vision.

(iii) An occasional watering of eye.

(iv) Diminished side vision.

(v) Frequent and unsatisfactory changes of glasses.

(vi) Occasional difficulty in the night vision.

(vii) Haloes (rainbow ring around bulbs) appear towards evening.

Cataract:

Opacity of a lens or its capsule is called "cataract". The clouding may be through out the entire lens or may involve a small localized area. If it is confined to the periphery, the vision may be normal or only slightly reduced. If it is centrally located in the direct line of vision it can distort the sight at an early stage offormation.

The greatest loss that can be sustained by a contract is a restriction of the ability to perceive light. The vision is lost because the normal clarity of the lens is reduced and the lens cannot focus the rays of light into an image on the retina. Cataracts may be associated with injury, infection, metabolic disorder or toxic condition. Bilateral cataracts in children are often associated with nystagmus and retinal disease. Children with congenital cataracts can be improved by glasses (bi-focal), contact lenses and low vision aids. Cataract surgery involves removing to cloudy lens from the eye replacing it with glasses, a contact lens or a plastic lens. Without effective treatments cataract account for as much as 50% of the world's mass blindness and it is one of the world's leading causes of blindness.

Common symptoms

- Diminished vision
- Double vision
- Decrease insensitivity to colour
- Poor vision in bright light and improved vision in dim light
- Newly acquired ability to read without glasses.

Causes:

- Aging
- Long duration of diabetes
- Dehydration
- Low levels of calcium
- Cigarette smoking.
- Congenital
- Other eye diseases
- Diabetes; certain drugs especially cortico-steroids.
- Injuries to the eye

In hot countries there are additional causes:

- Solar and heat radiation in desert areas
- Diarrhea in early life
- Poor nutrition

Measures to prevent cataracts:

- Increased awareness of the need eye for eye safety.
- Taking of safety measures in certain dangerous jobs.
- Ensuring the prompt surgical and medical treatment of eyes injures.
- Early detection of other eye diseases which may lead to cataracts.
- Monitoring of people taking those drugs which might form cataracts.
- Control of diabetes.

Cortical visual impairment:

Cortical visual impairment is the total or partial loss of vision in a normal appearing eye caused by damage to the visual area in the brains occipital cortex. This type of damage is most often caused by loss of blood flow to the occipital cortex from either unilateral or bilateral. Posterior cerebral artery blockage. A patient with critical visual impairment often has little or no insight that they have lost vision, a phenomenon known as Anton's syndrome or Anton Babinski syndrome.

Causes

The most common causes of cortical visual impairment is oxygen starvation to the occipital lobe caused by blockage to one or both of the posterior cerebral arteries however, other conditions have also been known to cause cortical blindness, including: Bilateral lesions of the primary visual cortex. Side effect of some anti-epilepsy drug.

Cortical visual impairment can be associated with visual hallucination, denial of visual loss, and the ability to perceive moving but not static objects.

Macular Degeneration:

This is a disease of the eye that results in central vision loss. It is more common among older individuals and is often hereditary. Macular degeneration is one of the more common causes of partial blindness in older individuals.

The destruction or poor development is the macular (central) portion of the retina. Often undetected in young, its consequence is extremely poor central vision.

Age related macular degeneration is one of the leading causes of visual impairment in the world and it presents as two forms.

- Dry or atrophic.
- Wet or exudative.

The atrophic form is more common than exudative, with about 90% of patients being diagnosed with atrophic age related macular degeneration.

The exudative form of disease usually leads to more serious vision loss. It is more common in people over 65years of age and female.

Causes:

Hereditary factors, age, nutrition, smoking, hypertension are all risk factors. But the exact causes of age related macular degeneration are still unknown.

The atrophic form the thinning of macular tissues, amorphous deposits and pigmentation in macula.

Exudative macular degeneration occurs when new vessels from a choroidal neovascular membrane to improve the blood supply to oxygen to deprive retinal tissue. These new vessels leak blood and fluid causing damage to the surrounding tissues.

Symptoms:

- Gradual diminution of vision.
- There may be shadowed area in the central visual field causing difficulty in reading.

Treatment:

- Zinc supplement and antioxidant vitamins may help to lower the progression of age related macular degeneration.
- Laser photo coagulation is effective in sealing leaking in eyes with "wet" macular degeneration.

Management:

Patient with central vision loss may benefit from the use of low vision aids.

2.7 Educational implication of different eye Disorders:

Albinism :

i) Environmental concerns such as glare from the windows and light in a classroom must be addressed, since they may cause sensitivity and pain.

ii) It is important to consider magnification aids and enhanced print for student such as longer font size and making text bold.

iii) Teachers should consider minimizing in small clutter on maps and other diagrams.

iv) The role of the orientation and mobility instructor is important in helping to familiarize the student with new areas particularly those which are subject to changing light.

Amblyopia (lazy eye):

Students with one damaged eye and one healthy one may require the good eye to be patched for a number of hour everyday to encourage development of the pathways from the weaker eye.

Cataract:

- Problems in near and distant tasks.
- Poor colour vision.
- Unable to read and write
- High illumination needs for peripheral loss.
- Low illumination needs for central loss
- Difficult to read glare materials.
- Mobility is restricted
- Unable to perform in the daily living
- Also students will need time for adaptation activities to light change.

Glaucoma:

- Adaptations to accommodate reduced Visual acuity or field of Vision, both factors would need to be considered, the student with reduced Visual acuity

may need to sit close to the front of the class to see board, low vision Aids as large print may be recommended.

- Able to read print to a limited extent.
- Extreme difficulty in travel.
- Unable or difficulty in reading at night
- Difficulty in seeing at night.
- Difficulties in scanning & tracking.
- Avoid vigorous activities.
- Reduced Peripheral Vision would have an impact on student's mobility in the classroom.
- Frequent hospital appointments may interfere with Schooling.
- Cataracts can affect student's visual acuity and cause decreased reading efficiency and problems seeing the board due to a cloudy Lens.

Hypermetropia:

- Difficulty in reading and other near Vision activities.
- Eye strain / Fatigue due to excessive accommodation.
- Learning impacted by reduced or difficult concentration.
- Interaction with others may be affected by lack of ability to recognize facial expressions and body language.
- Low Vision aids and text enlargement may assist with the reading of curricular and instructional materials.

Myopia (Nearsightedness):

- The use of eye glasses, contact lenses or low vision aids has proven particularly helpful in viewing distant objects.
- Learning may be infected by reduced or difficulty with concentration.
- Students may experience visual fatigue when asked to do a lot of reading.
- Inability to see black board, objects at a distance.

- Lack of interest in outdoor games and recreational activities.

Nystagmus:

- Students with nystagmus will often require environment support with lighting.
- Colour contrast test and other magnification tool will often be required helpful.
- Tasks such as copying from the board will be difficult as it involves frequent changes of focus, providing student with own copy of work to be copied would be preferable.
- A student with Nystagmus often suffers from vision fatigue especially when expected to do a lot of reading.
- Stress also affects the student and has been seen to increase the involuntary movement of the eyes.

Optic Atrophy:

- Problems in reading, if reading into the blind field area.
- Problems in mobility
- Good task lighting and high contrast materials (black & White) may improve readings speed.

Retinal Detachment:

- Where students have field loss it is important to recognize what part of their vision is missing and avoid placing objects in these are.
- Inability to concentrate
- Bumping into objects,
- Students with tendency to develop retinal detachment should avoid blows to the head in physical activity; if this occurs then parents should be notified immediately.

Retinitis Pigmentosa (RP):

- The student will benefit from preferential seating and may exhibit eccentric viewing or frequent head turning to compensate for the reduced visual field.

- Due to reduced vision in low light the student will benefit from good, even lighting.
- Mobility may also be affected due to reduced visual field.

Retinopathy of Prematurity:

- Depending on the severity of the visual impairment which may vary from low vision to blindness the student will require either large printor Braille, It the student is not a Braille user, he will likely need low vision aids used as magnifiers or a monocular.
- It is important to be aware of proper illumination for the student while trying to avoid glare.
- Orientation and mobility training is essential.

2.8 ‘‘Check your progress’’

1. What is legal blindness?

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   .....

2. What is visual acuity?

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   .....

3. What is visual field?

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   .....

   .....

6. How can the visual loss be calculated?

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.....

7. How can you estimate percentage of visual loss?

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.....

.....

8. How can you calculate loss of visual field?

.....

.....

.....

9. The Normal visual acuity of eye is

   a) 6/60

   b) 6/18

   c) 6/6

   d) 6/21

8. Normal field of vision is

   a) 900^{o}

   b) 1800^{o}

   c) 2700^{o}

   d) 3600^{o}

9. What represented by a fraction relating to the distance of objects seen by an individual ?

   a) Fusion

   b) Visual acuity

c) Refraction

d) Depth perception

10. Nearsightedness refers to

a) Myopia

b) Hyperopia

c) Presbyopia

d) Astigmatism

11. Myopic eyes are corrected by

a) Concave lens

b) Convex lens

c) Bifocal lens

d) Prism

12. Cataract means

a) Defective Lens

b) Dislocation of the lens

c) Development of the thin membrane over the lens

d) Opacity of the lens

2.9 Let us Sum Up

- Visual acuity refers to sharpness of vision.
- Visual field refers to the entire area which can be seen without shifting the gaze.
- Markedly reduced functional vision is called as low vision
- Refractive error is a defect in the eye that prevents light rays from being brought to a single focus exactly on the retina can corrected with lenses.
- Myopia is the condition in which the eye ball is excessively long and focuses light in front of retina; nearsightedness.
- Hyperopia is the condition characterized; refractive problem in which the

eyeball is excessively short and light rays are focused beyond the retina; farsightedness.

- Presbyopia is a normal and gradual decrease in power accommodation in the eye due to physiological change that starts in the middle age.
- Common causes of blindness are cataract, glaucoma, corneal ulcer, conjunctivitis, Trachoma etc.
- Visual impairment may also result from other eye disorder like retinal detachment, Albinism, astigmatism, Nystagmus, optic atrophy, retinitis pigmentosa etc.
- Glaucoma is the condition characterized by high pressure inside the eyeball.
- Trachoma is an infection caused by a specific virus which produces severe scarring of the eyelids and cornea.
- Corneal ulcer is developed due to bacteria, viral infection, fungus, vitamin deficiency etc.
- Cataract is the condition characterized by the eye lens becoming opaque and cloudy.

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Unit-3 ❑ Implication of Visual Impairment and Needs of Visually Impaired

Structure :

3.1 Introduction

As much as 90% of what we know is learned through vision. Children with no', partial or distorted vision will have difficulty in accessing information, leading to a typical knowledge and skill development. Unless aggressive efforts are made to Compensate for the reduced access to the environment, Children with visual impairment may have limited development of concepts and the world around them.

There is no separate psychology of persons with visual impairment. There are some psychological effects which emerge because of disability. A teacher should necessarily study the psychosocial implication of blindness in order to guide the children properly. The process of growth and development for any individual child is at same time similar to and different from that for any other child. It is similar because growth is sequential, with identifiable stages through which all children progress; it is different because each child progress at his own unique rate as a result of his own individual needs. This principle applies visually impaired children as well, and in general their similarities are greater than their difference from sighted children. The rate of growth of visual impaired children is affected by the visual impairment. However, visual impairment has either direct or indirect influence on the rate of growth and development of visual impaired children.

Development is normally defined as a continuous process of change. Studies on child development primarily focus on language development, motor development, personality development, emotions, cognitive functions, and the inter-relationship between them. Development in these areas is considered essential for every child

irrespective of his/her disability. However, blindness results in some implications on the psycho-social developments of these children. This chapter enumerates the developmental stages in the life of the child, psycho-social aspects of visual disability, mannerisms and verbalisms, and the implications of blindness on education.

The Success of students with visual impairment is measured by their ability to adapt to the regular curriculum and classroom expectations, and to perform the same way as their peer Although academic success is important, it should not be the only yard stick in measuring a student's future success at employment, life after school and personal independence.

Special educators for children with visual impairment recognize that a unique, specialized or disability specific curriculum is essential for all children with visual impairment to ensure optimal access to the academic curriculum in the schools, as well as future success in life.

Development is normally defined as a continuous process of change. Studies on child development primarily focus on language development motor development, Personality development, emotions Cognitive functions and the. inter relationship between them. Development in these areas is considered essential for every child irrespective of his disability. But Blindness results in some implication on the psycho-social development of these children.

Blindness is a medical phenomenon. It relates to impaired sense of vision. Stated simply, it only means that the person suffers from the loss of sight.

But the matter is not so simple. Blindness in all countries through ages, has come to develop as a connotative word; it evokes different emotional reactions in different persons. The societies, across the globe have developed their own perspective of blind persons, regarding their capabilities and their limitations.

Parents, as part of the community, share social ways and attitudes but when a blind child is born to them, they find their personal ways to cope.

The visually impaired person and his/her family face serious social challenges. Directly and indirectly visual impairment interferes with many daily activities. In the case of adults the possibilities for gainful employment are severely limited as is their participation in many activities. To this is often added a loss of social status and self-esteem. The physical limitation and psychological implications of visual impairment

cannot be measured in exact monetary terms. Nevertheless, it is clear that they diminish the quality of life not only for blind persons but for their families as well.

As a person with visual impairment adjustment to life in a seeing world is a complex process. After carrying out a review of studies on psychological adjustment of low vision children, Morse (1987) concluded that children with low vision tend to be more unsettled by the limits of their vision than compared to those whose handicap are more severe. The dynamics which impels one to adjust is necessity. But blind persons vary in their response to this demand of necessity due to various factors, among which are - i) age of onset of blindness, ii) Degree of vision and type of vision and type of vision loss iii) Prognosis and iv) Socio economic status of the family.

The visual system's immediate and simultaneous processing of extended spatial information affords fundamental information of depth, object permanence and constancies, brightness, and color. Loss of vision requires the successful integration of successive stimulus information from intact sensory systems, primarily touch and hearing. Such loss impacts negatively on perceptual, motor, cognitive, as well as social interpersonal behavioral development.

The amount of visual difficulty depends on the eye condition, so some babies and children have more difficulty than others. Most babies with limited vision tend to see very little in the early months, though the vision of most will improve. The rate and degree of improvement of vision varies in each child. In a very few eye conditions it is known from early on that the child will not develop any more vision. For most children with limited vision, there is uncertainty and it is important with these children to help them develop their vision to its maximum potential.

The possible effect of visual impairment on attachment and socialization has also been suggested, and the increased prevalence of specific emotional and behavioral problems, as well as developmental delays, among visually impaired children has been established Therefore the mutual effect of emotional problems on the development of visually impaired children, and vice versa, is of great importance. Such an understanding may influence treatment strategies that are related to development at different ages, particularly among infants and young children like these are.

3.2 Objectives :

After studying this unit the teacher trainees will be able to -

- Describe the psychosocial implication of blindness.
- Discuss the implication of child blindness for the parents and the family.
- Analyze the effects of family and community attitudes on the blind child.
- Explain his or her own role as a teacher in relation to the visually impaired child, parents and the community.
- Describe the factors affecting implications of visual impairment.
- Enumerate the effect of visual impairment on growth and development.
- Identify the educational needs of visual impaired children.
- Describe the needs for expanded core curriculum for the visual impaired children.
- Differentiate between blindness and low vision.
- State the educational needs of children with low-vision.

3.3 Psycho SociaI Implications of Visual impairment :

3.3.1 Basic Effects of Blindness :

The effects of Blindness are basically cognitive, since blindness relates to the sensory deficit of vision and because senses are the gateway to knowledge. Moreover vision is the most actively used sense of man and hence his knowledge grows chiefly from his visual experiences. The resulting effects have been discussed widely but the most accepted interpretation has come from Dr. Berthold Lowenfeld. In his own words, ''Blindness imposes three basic limitations on the individual''.

1. In the range and variety of experiences
2. In the ability to get about
3. In the control of the environment and the self in relation to it.

These three obstacles to independence and self-fulfillment are responsible for the special educational provisions for the blind child. A brief look at the three limitations may be helpful in understanding the losses in depth.

It has been estimated that 90 – 95% of all experiences comes through the eyes. Vision is the major mode of acquiring information about people, places and processes. Therefore, the blind child, by definition, is experientially deprived.

The blind child learns in pieces. He learns in a fragmentary way. He requires enough time to put, these bits and pieces together to a clarity Concept which is not exactly like ours but which is enough like ours so that we can communicate. And that is the restriction in the 'range and variety of experiences'.

Secondly blindness tends to create a very sedentary kind of existence. A blind person will just sit unless he is pulled out, motivated to get out and move about independently. He sits because of fear. He sits because of lack of skill in using information available in his environment and lack of skill in moving about within it. Certainly the ability to get about is restricted.

Thirdly a blind person talks loudly in a room that is too small for a loud voice or he talks to a corner, or to an empty chair rather than to another person, the common reaction is akin to a silly man. But it is not silly. If simply shows how a blind person is very much at his disadvantage. Not knowing where one is, being unable to control one's environment and oneself in relation to it is a significant deficit.

Verbalism :

Verbal learning without adequate concrete experience is considered to be a significant problem in the education of the blind. The visually impaired child frequently accepts verbal descriptions from the sighted instead of having them based on his own concrete experience. This is not surprising since he has limitation in exploring the world around him and at the same time, he is tagged constantly in visual term. In gaining concrete experience he cannot touch objects that the sighted can see, such as the moon, waterfall, a rainbow, certain animals, fire or lightening and he cannot conceive of colours therefore, he must accept many visually oriented verbal descriptions from the sighted. The sense of sight permits much greater perceptual activity than the sense of touch. Although in time he is able to describe visual concepts well verbally he still may have a hazy, partial and inaccurate understanding of them. This phenomenon is called verbalism which is closely related to concept formation.

Mannerism:

The psychological implication is that blindness does not mean 'loss of life' since

blind persons are more like than unlike sighted persons in terms of basic needs. The educational implication is that the reduction of experience caused by blindness can be overcome by appropriate training to the affected individual. Education and rehabilitation programmers for visually disabled children are growing in large numbers in the present scenario and the independence of disabled person is assured in every respect. These objective effects certainly result in some mannerism such as head movement, tapping on the floor, clapping to find the way out etc. Conscious efforts must be made by the teachers to teach the visually disabled child, what mannerism is acceptable and which ones are unacceptable for his/her inclusion in the society.

Community Attitudes and Reactions :

Unfortunately the deficits are caused by the community as they occur to the individual. The reactions, however, vary from community to community depending on its traditions, culture and belief. Certain communities used to kill a disabled child as the community which depends on skills of war for its survival could not accord a place to a handicapped child. As the society progressed towards becoming a welfare state rather than warfare state, so did the changes occur in the total outlook. The blind person became members of the society who needed to be looked after but not at the equal level with others they were to live on 'charity'. It has also an under tone of religious belief. Today, the scenario is changing. The Community is based on the principles of equality and fraternity. Later is a rare phenomenon. The motto is equal opportunities for all including handicapped people. But this motto is a recent development.

It is dangerous to generalise without sufficient experience and exposure to the characteristics of blind. As one comes across very few blind person in life-time, we tend to generalise about blindness on the basis of limited experiences. Due to the place accrued to the blind being that of 'charity' general tendency is to perceive a blind person as one who can make a livelihood only through begging, hence, blindness implies low level of living. They depend on senses of hearing and touch as the light is denied.

People need to be educated to write about blindness accurately and carefully. The public needs information not only on the realities of blindness but also on the techniques which make both the blind and the sighted person comfortable. How do you manage a blind person? How do you behave when you teach a blind person? How do you show a blind person where to sit down? How do you talk to some of one who is blind?

Need For Community Orientation :

People need to be educated about visual disability. There is a need to present the positive sides of the lives of disabled persons too, to change the stereotype attitude of the society. The community needs information not only on the realities of visual impairment but also on the techniques which make both the visually impaired and sighted person comfortable. Print and non-print material on themes such as how do you manage a visually impaired person? etc. need to be developed for orientation of the community.

Some people are so inhabited that they hesitate about being with a visually impaired person. They also become hyper sensitive. They are afraid to use certain words such as 'see' and 'look'. Regular classroom teachers are frequently faced with this problem and instead of saying "look at this to mean explore and learn to understand this". Most people are well intended but miss-directed in this way. They do not want to offend a visually impaired person. Proper community education is the answer to these misplaced misconceptions.

Parental Reaction to Blindness :

We form our reactions to unknown and inexperienced on the basis of our general impressions. Blindness causes many types of reactions. When we come across a blind child, the general attitude is of sympathy or at times neutrality but seldom of empathy. The reason is the general reaction "Such things happen to others and not us". But when it does happen, the parents feel at a loss. For so many social-Personal and psychological reasons, the reactions occur on a continuum of neglect to over protection.

Due to inability of most parents to understand the implications of an impairment, the impairment is perceived as a handicap. On one extreme is the response of neglect, because it is felt that a blind person is devoid of all normal human functions of being an active Member of the society. Not only this, even parents at times feel the birth of a blind child to be the result of some sin. Hence in their own frustration, the child is ignored and naturally, 'the expectancy prophency' come to be true, the child develops into a person who cannot contribute socially or economically to the society.

Neglect causes certain personality problems but the child has to learn certain basic living skills. Over protection is more dangerous. It denies the child of all the natural demands or expectations of the society.

The social structure is such that we try to say or act what is socially acceptable. Real feelings are rarely expressed especially when they are contrary to the socially desirable ones. The parents of a blind child at times, pose the full acceptance of the blind child as an overt behavior because today society expects parents to stand by their children. But it is difficult to accept a child who becomes a liability, a reason for social talk and criticism. Overt rejections is manageable but covert rejection does not deceive a child. It hurts him psychologically. It affects not only his growth and social relationships but also his own self-concept, the very basic of a person's development.

Role of peer groups :

Peer group influence is substantial in the making of individuals whether it is in the childhood, adulthood or in old age. A disabled individual should have better interaction with other disabled persons of the same age group. Experiences have revealed that disabled children integrated with the mainstream programme tend to accept the disability condition and move forward for constructive life. Therefore, disabled persons should be main streamed as early as possibly to experience the positive effects of personality development on the individual with disability.

Role of Teachers :

The teachers should help the parents to observe disabled children in the classroom setting and notice the nature of training he or she requires—proper language, Cognitive, motor, emotional and social developments. The teachers should encourage parents to ask questions and clarify doubts. Moreover, the parents should be oriented by the teachers to identify the areas where the child needs maximum assistance. In general. The close collaboration with the teachers and parents of disabled children could cast a tremendous impact on the overall development of the child.

Often, teachers are looked upon by parents and disabled children as the major source for guidance. As teachers are trained to handle children with disabilities in the professional way, their influence on the personality development of the child is undisputable. They should act as mentors for children with disabilities and their parents. If possible, making visits to the families of children with disabilities and interacting with the child, their parents and siblings may have a positive influence on the personality development of the child.

Psycho-Social Effects on the child :

Really speaking, psycho-social development of a blind child is not affected so much by blindness as it is disrupted by the emotional overtones of blindness, for the parents and the community. It is now a well-known fact from research that children tend to achieve as much and only as much as their parents aspire them to achieve or the significant persons in their environment expect them to achieve. But, once, the community does not treat them as individuals they are lost in a crowd, the crowd of blind persons-beggars, musicians or do whatever they like. Once, the parents stop treating the child as a developing individual, once they refuse to accept his capabilities and limitations both, in a realistic and positive manner, his self-concept is bound to be severely affected. Overprotection robs him of his independence, neglect turns him to undesirable behaviour.

3.4 Factor affecting implications of Visual impairment: Age of onset, degree of vision, type of vision loss, prognosis, and socio economic status of the family.

3.4.1. Age of Onset :

Development "norms" are based on observation of sighted children. Although it - appears to be true that the more likely he/she is to develop at a normal rate there is little research to support a direct comparison of blind children to sighted norms. In fact current research suggests that blind children may have their own set of norms (i.e. they may not follow all of the same sequences, in the same order, at the same time, as sighted children). Human life can be divided into four broad stages; Infancy, childhood, adolescence and adulthood - the first three of which correspond roughly to the Piagetian stages of sensory-motor (0-2), Pre-operational(2-7), Concrete operation(7-12) and formal operation (12 onward). The stages can again be divided into early and late sub-stages. In shaping personality and attitude each stage has its own contribution to make.

Orientation is the ability of the visually impaired child to perceive and understand his/her position and location within a given environment. Mobility is the ability to move within a given environment. This ability does not suddenly appear at a specified time or age, but has an underlying conceptual foundation which begins at birth. For visually impaired infants, many factors contribute to the qualities of these emerging

conceptual foundations. Initial mobility factors are largely motor based, and depend to a great extent on the development of the motor system. Milestone skills such as head control, sitting unsupported, independent hand/arm use (as in grasping and reaching) creeping / crawling, standing alone and walking independently are all pre-mobility skills.

In childhood - the period between 6 and 12 the chaotic and disorganized emotional life of the infants becomes more stable, and definite social relations are established. The main characteristic of this period is socialization of the child owing to more diversified, and at the same time, more selective activities.

A child who loses his sight during this period is suddenly pushed off the track which he was following so long. Emotional disturbance may not be as severe as we understand in the adult sense, but social bonds being snapped, his ability to establish social relation may become less effective. Isolation from the peer group and lack of activities tend to produce anxiety and tension which, when unresolved may lead the child to non-coping and non-adjective, mannerist behaviour and verbalism.

The effect of onset of blindness in adolescence period is more complex. Theoretically it may be true that, as the individual has already passed through the previous stages undisturbed there would not be great developmental deficits in the psychomotor and cognitive areas due to blindness, but from the personality point of view, the effect may be highly damaging.

The human being who is getting ready both physically and mentally to become a full-fledged individual in this world, suddenly becomes a non-person at the blow of blindness - at least, he or she feels so. The budding self-image and self-concept of the adolescent, who already having the normal quota of "Storm and Stress" of this period is shattered with the onset of blindness. An adult also experiences almost the same emotional instability after losing eyesight.

3.4.2. Degree of vision:

Visual impairment refers to a significant loss of vision in both eyes which may vary significantly, which means that each student with low vision or blindness needs individual adjustments to learn most effectively. There are two main categories of visual impairment: Low vision and blind.

The classification of visual impairment varies worldwide. The "WHO" classifies levels of visual impairment based on visual acuity and visual field limitation, and

defines blindness as profound impairment. The "WHO" definition of blindness specifies visual acuity less than 20/400 and or remaining visual field less than 10 degrees in the better Seeing Eye. Visual acuity of 20/70 to 20/400 (inclusive) is considered moderate visual impairment of or low vision. The national eye institute defines low vision more loosely as a visual impairment not correctable by standard glasses, contact lenses, medication or surgery that interferes with the ability to perform activities of daily living.

Though the dictionary meaning of blindness is lack of sight that is total absence of vision, in reality we find blind persons not all of them are totally blind but with varying degree of visual loss. We would get different degree of visual ability in the intermediate stages like "light perception" (the ability to differentiate between light and darkness) "light projection" (the ability to detect the direction and source of light), and gradual increase in low vision up to 20/200 ft.. Different degrees of visual disabilities affect the individual adjustment to their handicapped differently. Every case requires individual attention.

3.4.3. Type of Vision Loss:

There are some children who are not blind in the medical or legal sense of the term but their visual impairment is serious enough to call for special help in education. They are called partially sighted. They are not admitted in to the institutions for the visually handicapped as they do not generally use touch as the main mode of learning. With the help of optical and mechanical aids, they can read prints. But due to constant pre- occupation with vision and efforts to see a little better, the partially sighted child, who acquires somewhat abnormal gaits and posture, may become self-centered and sluggish in social behavior.

Most of eye disorders is considered to affect the human being which is most commonly of two types. One is adult vision problems which consist mostly.

i) blurred vision (Called refractive errors) ii) Age related macular degeneration iii) Glaucoma iv) Cataract v) Diabetic retinopathy.

On the other hand, most of childhood vision problems are like (i) Blurred Vision (called refractive errors) (ii) Crossed eyes (called strabismus) (iii) Lazy eye (called amblyopic) (iv) Albinism.

Blurred Vision (Refractive errors) :

- Near sightedness (called myopia) is when we can see clearly the close ups but blurry in the distance.
- Farsightedness (called hyperopia) is when we can see clearly in the distance but blurry ups close.
- If you are older than 40 and have trouble reading small print or focusing a close-up this is usually due to a condition called Presbyopia.
- Astigmatism is another condition that causes blurred vision but it is because of the shape of the cornea.

Crossed eyes (Strabismus) :

Strabismus occurs when the eyes do not line up or they are crossed. One eye however, usually remains straight any given time. Common forms of strabismus include -

- Esotropia: One or both eyes turn inward toward the nose.
- Extropia: One or both eyes turn out, also called wall -eyed.
- Hypertropia: One or both eyes turn up.
- Hypotropia: One or both eyes turn down.

Lazy Eye (amblyopia):

Amblyopia often called lazy eye is a problem that is common in children. Amblyopia is a result of the brain and the eyes not working together. The brain ignores visual information from one eye, which causes problems with vision development.

Treatment for amblyopia works well if the condition is found early. If untreated, amblyopia causes permanent vision loss.

Albinism:

Albinism is a pigment deficiency causing several physical condition including vision problems. People with albinism often have low vision including severe light and glare sensitivity.

Effects on Vision : Albinisim is a non-progressive condition and so as the individual ages it will not. Albinism can cause Photophobia (an aversion to bright light) A student may notice their vision is worse in bright light and better in dim light (especially central vision). Along with light sensitivity the student may also have astigmatism, lowered visual acuity and nystagmus (side to side rhythmic eye movement).

Cataracts:

Cataracts are the leading cause of preventable blindness worldwide. They are responsible for over 50% of the world's blindness, over 20 million people. Cataracts are a clouding of the lenses of the eye that cause light to be diffused as it enters the eye impacting the clarity of the visual image. Most cataracts are a natural result of aging out they can also happen due to trauma to the eye.

Effects on Vision : The lens of the eye is affected by cataracts. Often the lens becomes cloudy and prevents light from refracting onto the retina at the back of the eye.

Retinopathy of Prematurity

Retinopathy of prematurity is characterized by the abnormal growth of blood vessels in the retina of some premature infants. The use of oxygen administered to premature babies in incubators was suspected as a possible cause of the abnormal growth of the blood vessels. Other factors include low birth weight, premature birth 32 weeks or younger and the baby being severely ill at birth.

Effects on Vision: The retina is affected because blood vessels do not reach the edges so blood flow is disrupted. If there is normal growth of the blood vessels, the area is well supplied with nutrients and oxygen.

The optic nerve and macula are affected as well as the mid and far periphery. Retinopathy of prematurity can range from a mild reduction in visual acuity to complete retinal detachment and blindness.

Glaucoma:

Glaucoma is the most common eye disease, affecting more than 80 million people worldwide. Glaucoma involves damage of the optic nerve, usually caused by

fluid buildup and increased pressure inside the eye. The result is a loss of peripheral vision and often difficulty seeing in dim lighting.

Effects on Vision: Early detection and intervention can control the pressure and reduce the impact on vision.

Blindness can occur in a few cases, the combination of eye structures affected with the addition of amblyopia caused by visual deprivation in the formative years contribute to the visual impairment. Peripheral vision often first affected as nerve fibres from the peripheral retina are most susceptible to raised pressure. Some students experience photophobia.

Age related Macular Degeneration (AMD) :

Age related Macular Degeneration (AMD) is the foremost cause of Vision loss among all over the world people who are 60 and older. AMD involves damage to the macula in the back of the eye, resulting in loss of central vision to effect on many tasks, including reading and writing. This can result in a loss of independence.

Retinitis Pigmentosa(RP) :

Retinitis Pigmentosa is the general name given to a wide range of genetic eye conditions predominantly characterized by problems with the rod photoreceptors, however in advanced cases the cones may also be compromised. Specific eye conditions associated with Retinitis Pigmentosa are Rod Cone Dystrophy, Leber's Amaurosis and Usher's Syndrome. RP usually progresses slowly. Cataracts and retinal swelling are also associated with retinitis pigmentosa.

Effects on Vision: Usually the rods are more affected than the cones meaning night vision and movement of things are compromised. There will also be a loss of peripheral vision. If the cones are affected then there will be central and colour vision loss.

Stargardt Disease :

Stargardt disease is the most common form of inherited juvenile macular degeneration, occurring in one in every 8000 to 10,000 people worldwide; It causes gradual loss of central vision. It usually develops during childhood or adolescence resulting in a loss of the center part of the visual field.

3.4.4 Prognosis

What is Prognosis? :

"Prognosis means what is expected in the future?" In general vision loss does not improve over time. There are exceptions of course such as when you are correcting a problem such as amblyopia or near sightedness. In addition, as a visually impaired infant grows and develops, they may be better able to use their vision and demonstrate what they see, so that it appears as though improvement has been made. But vision loss that is present from birth or early childhood, particularly when it occurs with other disabilities will usually not get better. However with the right training, technology and other assistance, a child can live a full life even with vision loss.

Children with vision impairment may have some delay in development related specifically to not being able to interact with their environment visually since much of what a child learns comes from visual clues. As a child receives vision supports and early intervention services, these gaps will close.

If a child has other disabilities, along with vision loss, one can still give one's baby a high quality of life through early intervention services, adaptive devices and other methods of treatment.

3.4.5 Socio economic status of the family :

The family plays in shaping our personality. It is the first social environment that a child gets in its life. It has been proved that the adjustment problems of each individual member in the family are usually related to inter dependencies with other members. The culture, socio-economic status, the educational level of the family particularly the parents and their relation with the visually handicapped child determines the level and quality of adjustment of the child to his own disability and to the society. The role of the parents, especially the mother, is most crucial in this process.

An analysis of the global distribution of visual impairment shows a dis-proportionately large prevalence in low income developing countries. In these countries cataract and trachoma are the greatest causes of avoidable blindness. The lack of and inequity of access to prevention and eye care services severely limit in these regions of the world.

The lack of economic development is a factor that aggravates the prevalence of visual impairment. For this reason, blindness prevention programmes must concern

themselves not only with the elimination of avoidable blindness but also with concurrent economic development. The cost of rehabilitation and care provided to the visually impaired are the most obvious. Less apparent but just as significant however is the indirect cost resulting from the loss of productivity.

Family can be the most important factor in a child's success in recalling his or her full potential. The efforts of a child family to provide life experiences and obtain necessary services can make a tremendous difference. In addition to finding knowledgeable, medical and educational professionals who can help meet the needs of their children. Families can help a visually impaired or disabled child grow and develop by having expectations that their child will in fact do exactly that. When children are a part of family life, they learn about the world around them about the people in that world and about themselves as a person as well.

For that reason, It is important for a child to be involved in meal times in home, even if she may not eat solid food using a fork, knife, or spoon, sitting at the table with the rest of the family gives her the chance to be social and to communicate. Perhaps you may need feed her before everyone else because she's on a particular schedule or is to be fed, but finding ways to bring her to the table when the rest of the family eats can be important for her and for all as family.

3.5 Effect of visual impairment on growth and development: Physical, Motor, Language, Socio-emotional, and cognitive development.

3.5.1. Physical Development

The child's rate of physical growth begins to taper off after toddlerhood, the period when physical development is at its greatest. Yet body proportions continue to change, and motor skills continue to be refined at a relatively fast rate, enabling children become more adept at dealing with their own needs and coping with their physical surroundings. By the age of 5, the average child stands 43 inches tall (about 3.5 feet), which is just over double the birth length, and weight 42.8 lbs., approximately five times the weight at birth. At birth, the head measures between 12 to 14 inches in circumference. By the first year it has increased 33 percent, and at the fourth year the head has increased approximately 48 percent. And by the end of the sixth year,

the head has attained almost 90 percent of its adult size. The brain, growing in relation to cranial growth, has attained 75 percent of its adult weight by the fifth year, as the billions of nerve fibers become increasingly myelinated and the dendrites in all layers of the cortex increase in both size and number. These maturation processes will enhance the connectivity and transmission of nerve impulses, which is critical to more complicated brain functions.

Physical Changes during Preschool Years

By the time children enroll in nursery school or kindergarten, there have been noticeable physical changes in their bodies. This is largely due to a growth spurt that affects height, as well as to the preschooler's participation in numerous and diverse physical activities, which affect muscular growth and body building. Changes in postural patterns also become quite evident during the early years.

Force of gravity. The force of gravity affects the body (the center being the trunk), whether sitting, standing, or running. Each child must maintain equilibrium in order to produce good posture and balance. With age, body proportions change, and the centre of gravity drops lower in the trunk. This makes it easier for the child to maintain equilibrium in the standing position

Type of body build. Posture is also affected by the child's body build. Correct posture is also influenced by the strength of the bones, the firmness of the muscles, and the kinesthetic sense.

Course of development. The stages of the child's development are another factor to consider the early phases ofiocomotion, for example, influence certain parts of the body, such as the neck muscles or the lumber curve in the lower part of the back. When walking, the weight of the body falls on the inner part of the foot, resulting in the foot's sagging in the area of the ankle.

Interactions with the environment. Environmental factors, such as nutrition, rest, and activity also are important to posture. The child now has incentives to excel in certain areas, such as sports, to be physically attractive, or to perfect certain motor skills. All of these may encourage a child to learn proper body balance and posture.

3.5.2. Motor Development

Generally, either no delay or only slight delays have been reported in motor-skills of blind children that require stable, in-place movement (such as sitting, rolling, and standing alone). However, more severe delays have been reported for those associated with locomotion (holding-up head, crawling, creeping and walking). There can be a longer delay between crawling and walking for children who are blind relative to their peers with vision.

Motor skill development rapidly accelerates in the physical play world through such activities as jumping, climbing, running, and tricycle riding. Knowing what preschoolers are physically capable of undertaking and their degree of efficiency is important not only to parents but also to day-care and nursery-school teachers, people who will be structuring their physical activities. Adults need to develop children's motor skill activities so that they may alleviate any frustration.

Hand

Although the hands are a major perceptual organ, a blind infant has significant developmental delays in his ability to employ his hands functionally. Even at 5 months a blind infant's hands will be fisted and held at shoulder height. There will be no mutual fingering, no engaging at the midline. At this age, a sighted child practise coordinated reaching and transference of objects from one hand to another. This delay in hand utilization will result in delayed fine motor and gross motor development.

Body

A blind infant usually achieves control of his posture at approximately the same age as sighted Infants through the following normal progression:

- sits alone momentarily
- rolls from back to stomach
- sits alone steadily
- takes stepping movements when hands are held
- stands alone
- bridges on hands and knees

However, the achievements that require self- initiated mobility are significantly delayed:

- elevated on arms in prone
- raising to a sitting position
- pulling to a stand
- walking alone

Until a blind child will reach out to grasp a sound cue (12 months), he will not move out in space either on hands and knees or feet.

Milestone's in Preschool Motor Developments.

Age	Gross Motor Skills	Fine Motor Skills
2.5-3.5 years	Walks well; runs in straight line; jumps in air with both feet	Copies a circle; scribbles; can use eating utensils; stacks a few small blocks
3.5-4.5 vears	Walking stride 80 percent of adult; runs at one-third adult speed; and catches large ball, but stiff-	Buttons with large buttons; copies simple shapes; makes simple representational drawings
4.5-5.5 years	Balances on one foot; runs far without falling; can swim in water for short distance	Uses scissors; draws people; copies simple letters and numbers; builds complex structures with blocks

3.5.3. Language Development

The foundation of communication starts in the earliest days, when babies express their feelings and parents respond to their cries or vocal sounds. This helps babies learn to influence their parents and to attract their attention. During the first year they become more purposeful in communicating their wishes and needs. This is done through vocal and emotional expressions, eye contact and/or body movements. In the second year, children start using language to communicate their wishes and needs, to request and refer to things and to draw attention to events of interest.

The toddler years are typically the time of great language development as children begin to make connections and verbally label and identify objects. Children who are

blind or visually impaired will not have the same opportunity to casually observe and make connections with gestures and materials in their environment. Unless the student was intentionally taught through direct experiences paired with language, their language development will undoubtedly be delayed. To encourage the student to develop language, it is important for the student to be exposed to good language models in active learning environment. The following strategies can help a student develop their language skills:

- Pronounce the language properly.
- Speak with grammatical accuracy.
- Build vocabulary.
- Understand and produce longer stretches of speech, such as stories, directions, or instructions.
- Use the language to accomplish purposes and get things done.
- Use words and ways of speaking appropriate for different situations.
- Interact with other people appropriately when talking with them.
- Understand more about what the people are like and why they behave the way they do.

Verbalism

It is common for a student to talk about people, objects, and events without having the understanding of the concepts. Because they haven't had the experiences related to the topic, but have heard others talk about the said topic. Having a vocabulary or language without the understanding is called verbalism. It is the ability to talk about a subject without the concepts or understanding related to it.

Echolalia

Many students who are blind or visually impaired learn to talk by echoing or copying phrases or sentences even if they do not understand it. They may echo what they just heard, or have delayed echolalia where they repeat language heard earlier in association with a particular subject.

Sustaining Conversations

Students who are blind or visually impaired also can have difficulty sustaining conversations. They can tend to focus on their own interests and not appear to have

an interest in others. Students may need explicit instruction in participating in conversations.

Preschooler's language development can be improved responding to an encouraging young child's speech, Adults can do a great deal to help facilitate overall language development. Adults should consider the following suggestions: (1) Establish a satisfactory speech model. (2) Encourage verbal and nonverbal communication. (3) Provide experiences that will make words meaningful (4) Encourage listening and attention skills. (5) Encourage speech as a substitute for action (6) Use exact terminology and talk with children at their level.

3.5.4. Socio-emotional development

During early childhood, children start to develop a "self-concept", the attributes, abilities, attitudes and values that they believe define them. By age 3,(between 18 and 30 months), children have developed their categorical self, which is concrete way of viewing themselves in "this or that" labels. For example young children labels themselves in terms of age "child or adult", "gender", physical characteristics "short or tall" and value, "good or bad." The labels are used to explain children's self-concept in very concrete, observable terms.

Children's social-emotional development influences all other areas of development: Cognitive, motor, and language development are all greatly affected by how a child feels about herself and how she is able to express ideas and emotions. Professionals sometimes define healthy social-emotional development in young children as early childhood mental health. Healthy social-emotional development includes the ability to:

1. Form and sustain positive relationships
2. Experience, manage, and express emotions
3. Explore and engage with the environment

Children with well-developed social-emotional skills are also more able to : Express their ideas and feelings

- Display empathy towards others
- Manage their feelings of frustration and disappointment more easily

- Feel self-confident
- More easily make and develop friendships
- Succeed in school

Social-emotional development provides the foundation for how we feel about ourselves and how we experience others. This foundation begins the day we are born and continues to develop throughout our lifespan.

The greatest influence on a child's social-emotional development is the quality of the relationships that he develops with his primary caregivers.

Positive and nurturing early experiences and relationships have a significant impact on a child's social-emotional development. They also influence how the young child's brain develops.

Social interaction

Several researchers have noted that whereas sighted children spend most of their playtime interacting with other children, children who are blind spend about half their time in solitary play. Children who are blind are also more likely to choose to spend playtime with adults than age-peers. Blind children in nursery school were observed to have severe difficulty in social interactions with sighted peers. In contrast to normal exploration, behaviours such as eye-pressing, body-rocking, and head-nodding can present serious problems. Such behaviqrs, which are described as "stereotyped behaviours", "blindisms," or "mannerisms," are prevalent among children who are blind or visually-impaired, although they are not found only in this population. The behaviours usually decrease with age, but can persist to adulthood. Possible reasons for these behaviors include monotony, boredom, stress, and excitement.

3.5.5. Cognitive Development

A general issue relevant for school aged children is the possible impact of vision impairment on areas of cognitive development that are associated with interpreting information available to the senses. Examples of such areas are classification, conservation, spatial knowledge, and memory.

Cognitive development refers to such skills as reasoning, storing and remembering information, seeing relationships and differences, classifying things, defining and

describing, evaluating, comparing and contrasting, inventing, problem solving and other higher order skills. Non-disabled children of this age group are usually able to perform the following tasks.

1. Asking question for more information
2. Building blocks
3. Identification of basic colours
4. Awareness of age and name of self
5. Symbolic and thematic kinds of play activities
6. Creative responses
7. Matching three dimensional objects and pictures
8. Imitating adults

Visually impaired children have the same potential for cognitive development as non-disabled children during this age.

Construct of World

The blind child has limited ability to coordinate and organize elements into higher levels of abstraction, and to verify the information. Therefore, he constructs a reality that is different from the sighted child's. The process of establishing concept-defining attributes and relationships is more problematic for the blind child and less accessible to guidance. The blind child is continually involved in problem solving, but this process, which is essential to future development, is more difficult and less rewarding for him.

Object Permanence

A stable visual field is the basis of object permanence and other conceptual tasks. Object permanence cannot be obtained by a blind child until he has the ability to reach for objects based on sound cue alone. It is acquired nearly a year later than in sighted children.

Causal Relationship

Since the results of actions cannot be seen, the blind child may not be motivated to action. He may not understand his ability to cause things to happen or to retain pleasurable stimuli.

Constancy

Understanding how to align blocks or orient his hands on a page in order to duplicate a pattern will be difficult ifhe hasn't observed objects in various orientations to know that an object is the same regardless of its position in space.

3.6 Educational needs of the Visually Impaired and Need for Expanded Core Curriculum for Visually Impaired children

3.6.1. Educational needs for the Visually Impaired Children

The challenge for educators of visually impaired children, including those with other disabilities, is how to teach skills that sighted children typically acquire through vision. Visually impaired students have used a variety of methods to learn to read, write, and acquire other skills, both academic and nonacademic. For example, for reading purposes, some students use braille exclusively; others use large print or regular print with or without low vision aids. Still others use a combination of methods, including braille, large print, low vision aids and devices with computer-generated speech, while others have sufficient functional vision to use regular print, although with difficulty.

Parents along with other team members are responsible for providing opportunities at various stages to identify variables to be considered and decisions to be made as the challenges increase. As progress is made and children become more responsible, the focus gradually changes to the individual for more involvement in educational and personal decisions.

Promoting education for children with visual impairment

- Determine what medium is best for an individual child through the Learning Media Assessment.
- This may be braille, print, dual media, auditory strategies, objects, symbols, or some combination.
- Provide books and literacy tools in a format that is accessible to the child.
- Read aloud using stories and books that are interesting and appropriate for the child.
- Create a literacy-rich environment, in which the child knows that others are reading and writing. There are a variety of methods that students with visual

impairments use to read. Often a single student will use different strategies in particular settings or for specific materials or content.

There are six stages in development in which parents and various team members are involved as children's educational development.

1. Infants and Parents, (from Birth to 2 years)

Parents are dealing with emotional issues of shock, trauma, and grief associated with the first diagnosis of visual impairment. Confusion and uncertainty cloud their thinking until they can begin to understand and accept the reality of the situation. By then, they need to seek information though support systems, reading and learning what to do.

Certified Orientation and Mobility Specialists (COMS) begin to teach infants orientation to touch, sound, and visual objects. They give checklists of activities for parents to follow, and model teaching to reach, learning to sit alone, to crawl, and later to encourage walking. They also teach body parts, body positioning, spatial concepts, and body movements.

2. Preschoolers, (from 2-4 years)

This is the stage when a child is striving for independence. Parents (or primary caregivers) are still the primary members of the team. The major decision is to determine who gives the regular care during the day; parents, another family member, or day care. One-on-one teaching of skills and language is a necessity.

Preschool teachers begin to be the leaders for learning development and diagnostic assessments and report to parents and therapists. It may best for the student to be placed in a regular classroom with a consulting teacher of students with visual impairments (TVI) or a special classroom, whichever is most appropriate for the child.

3. The Primary Grades, (from 5-7 years)

Parents, in consultation with teachers have important decisions to make in regard to placement and instructional service delivery depending upon the child's readiness for and progress in the general and YI- specific expanded core curriculum. The visual status of the child is not the only determinant in placement. At home, the parents are challenged to encourage more independence in personal and home activities. Play opportunities with peers are especially critical as is time with parents to talk about incidents of the day.

The Educational Diagnostician is part of the team to develop educational and cognitive measures as indicated, and share assessment data with parents and teachers to develop the individualized educational programme (IEP).

4. Middle to Late Elementary School, (from 8-12 years)

The key challenge is to develop the learning scope and efficiency of the students as a priority to make maximum progress possible. Instructional decisions based upon student achievement will determine the type and amount of Vl specialized instruction. New skills to be emphasized are keyboarding for the computer and other technology-related instruction. Social skills are important to enhance communication and interaction with peers and teachers, and as a means to effect natural independence as a prelude to middle and high school.

5. Middle School and High School, (from 12 to 18 years)

The early and later teen years indicate the need for additional members of the previous teams to ensure a broader scope of academic, vocational and job-seeking considerations. Rehabilitation counselors and/or job coaches, adults with visual impairments as role-models, and extended family members are valuable members of the team.

6. Transition to Adulthood, (from 18 years and beyond)

The major decisions center around, i. what now? ii. Where do I live? iii. Where can I work? iv. Should I pursue further education? When an individual has other disabling conditions, these decisions require consultation with team members about the optimal situation for each individual. Some may be unable to live away from home or other protected environments. Creative personal living and working situations, including sheltered or supported employment, may be suitable for those with limited independence.

So there are various range of inclusive teaching strategies that can assist all students to learn but there are some specific strategies that are useful in teaching a group which includes students with visual impairments. In considering alternative forms of assessment, equal opportunity, not a guaranteed outcome, is the objective. You are not expected to lower standards to accommodate students with a disability, but rather are required to give them a reasonable opportunity to demonstrate what they have learned. Disability-specific compensatory skills refer to the use of strategies, techniques, and adapted materials that students with visual impairments need to access the general education and common core curricula.

BLINDNESS AND ITS IMPLICATION FOR EDUCATION

1) In learning visually disabled Children to perceive an idea through 'structure' rather than 'form' as in the case of sighted children. Therefore, visually disabled children are likely to miss specific information of the learning activities.

2) Visually disabled children may take more time for forming a concept Since the tactile and auditory perception cannot replace visual perception and not even match the experiences formed out of visual perception, visually disabled children tend to attain reduced experiences.

3) The visually disabled child may need to be given direct assistance to learn systematically even the simple skills which sighted children learn almost spontaneously through imitation and contact with the environment.

4) Due to the lack of visual feedback, the visually disabled child may skip a number of intervening steps of an activity which requires more visual orientation.

5) The visually disabled child may have difficulty in forming exact concepts as he has to manipulate from part to whole.

6) The visually disabled child may develop verbal expression without associating proper meaning for that expression.

7) The visually disabled child may show deficiencies in some subjects when he is untaught.

   Predictions should not be made that he is unteachable. Efforts are necessary to teach him difficult concepts too

8) A misconception that visually disabled children possess extra power in their auditory and tactile ability should be overcome. They need sufficient practice for developing these skills in them.

3.6.2. Need for Expanded Core Curriculum for Visually Impaired Children

The expanded core curriculum (ECC) is used to define concepts and skills that often require specialized instruction with students who are blind or visually impaired in order to compensate for decreased opportunities to learn incidentally by observing others. In addition to the general education core curriculum that all students are taught, students with visual impairments, starting at birth, also need instruction in

the ECC. The ECC areas include needs that result from the visual impairment that enable the student to be involved in and make progress in the general education curriculum and other educational need that result from the child's disabilitiy"

The Expanded Core Curriculum, first developed by Halted (1997), defines the concept and skills typically learned incidentally by sighted students that must be sequential presented to the blind students or low vision. Components of the expanded core Curriculum have been adopted as the essential core curriculum for student with visual impairment.

These unique curriculum areas need to be included in the personal programme plan.

Concept Development

Students with blindness need assistance in making the connection between vocabulary and real objects, body movements and abstract ideas.

- Pre-teach vocabulary and key concepts which relate to the curriculum through verbal The explanations and concrete experiences using a multisensory approach.
- Pre-teaching can be provided by someone other than the teacher, such as a peer, an older student, a teacher assistant or a parent.
- After the student has participated in pre-teaching and classroom instruction, it is crucial to review concepts and vocabulary.

Organizational Skills

- Organizational skills are an integral part of student success and are essential for the student with blindness.
- Have the student organize, use and take responsibility for his/her personal work space.
- Provide the student with a definite place to put things, with the expectation that the student uses this space.
- Use containers and zippered pencil cases to store objects.
- Use techniques for safely locating and searching for dropped objects.
- Attach braille labels to binders and folders for the student.

- Provide sufficient space for materials and equipment. Often a special room is required for storage and use of specialized equipment. A desk may need to be adapted to provide a larger working area.
- Brailled texts require more storage space and should be stored upright.

Communication

Listening Skills

A student with blindness learns through listening, so it is important that he/she develops good listening skills. Listening skills are taught as an integral part of the language arts curriculum in the elementary grades and a student with blindness will benefit from these activities.

- Discriminate between different sounds;
- locate the direction of sounds; and
- Associate sounds with objects and situations.

Listening and interpreting oral information:

- to listen for sequence;
- to listen for details;
- to listen for main ideas;
- to listen to follow instructions; and
- New vocabulary. Check that the vocabulary is within the student's experience and has meaning.

Listening to audiocassettes:

- minimize distractions to increase attending;
- read the questions to be answered before listening to the information;
- listen to the pertinent parts of the tape prior to the lesson;
- play a short portion of the tape, then stop to write notes; and
- adjust the speed of the recorder.

Listening to a reader:

- Having someone read to the student has the following advantages:

- the student has immediate access to the same reading material as other students;
- the reader can scan the text to find appropriate material;
- the reader can give information on spelling and punctuation; and
- this is an option when taking tests.

Braille Reading Skills

The student will require a pre-braille and braille reading program, in addition to participating in the regular reading programme.

Writing Skills

- Teach a student who uses braille to write his/her signature. Raised lined paper and signature guides are available.
- Teach keyboarding skills (grade 3 or 4) after the braille writing skills are established.
- Provide access to a computer at an early age. Adaptations may be necessary.
- The student should be able to spell words letter by letter as well as by using braille contractions.

Speaking Skills - A student should:

- look directly at the speaker;
- learn to participate in a discussion;
- learn when to speak;
- learn to use and interpret voice modulation;
- learn to initiate and contribute to a conversation;

Mathematics Skills

There may be a number of gaps in the student's general knowledge that would normally have been gained through visual observation. Math for the student with blindness is prepared in Nemeth code.

- Speed may be improved by adapting or shortening assignments.
- Make or purchase braille flash cards.
- Raised pictures, diagrams and concrete objects are necessary to develop concepts. Simple raised outlines are preferred.

Independent Living Skills

This area of the expanded core curriculum is often referred to as "daily living skills." It consists of all the tasks and functions persons perform, in accordance with their abilities, in order to lead lives as independently as possible. These curricular needs are varied, as they include skills in personal hygiene, food preparation, money management, time monitoring, organization, etc. Some independent living skills are addressed in the existing core curriculum, but they often are introduced as splinter skills, appearing in learning material, disappearing, and then re-appearing. This approach will not adequately prepare blind and visually impaired students for adult life. Traditional classes in home economics and family life are not enough to meet the learning needs of most visually impaired students, since they assume a basic level of knowledge, acquired incidentally through vision. The skills and knowledge that sighted students acquire by casually and incidentally observing and interacting with their environment are often difficult, if not impossible, for blind and visually impaired students to learn without direct, sequential instruction by knowledgeable persons.

Recreation and Leisure

Recreation and leisure activities will vary with the student's age and functional vision. These activities may range from pretending and playing with toys to artistic abilities and using technology, equipment and tools. Recreation and leisure offer opportunities for students to use their abilities, be active, feel self-worth, release tension, show others what they can do, get along with others and receive recognition or rewards. Many recreation and leisure activities promote lifetime skills that play an important part in developing a satisfactory life. Recreation and leisure activities provide opportunities for students to integrate and apply skills acquired in many curricular areas. Students with blindness need additional encouragement to pursue these activities. The student should develop:

- an awareness of leisure activities and the skills to manage leisure time well;
- skills for solitary play and solitary leisure activities;
- skills for social play and social leisure activities;
- an interest in learning about or joining a community club or group;
- an interest in physical play, physical games, physical fitness and sports;
- an enjoyment of pets and nature;
- an enjoyment of music and dance;
- an interest in a hobby;

- skills for reading, writing, speaking and drama as leisure activities;
- skills for using science and technology for leisure purposes;
- an interest in taking lessons (music, gym, drama, swimming, dance); and
- an interest in attending camps.

Knowledge of the Eye Condition

A student needs to understand and be able to tell others comfortably about the cause of his/her blindness. Understanding of the following leads to acceptance and dealing with the blindness:

- Name, cause, implications and prognosis ofthe student's eye condition;
- Genetics counseling;
- Eye care and service; and
- Knowledge of factors secondary to the eye condition (diet, medication).

Orientation and Mobility

Orientation and mobility (O & M) instruction prepares a student with visual impairment to travel independently and safely. Orientation skills help a student to be aware of his/her own body in space and the surrounding environment. Mobility skills are specific techniques used to enable a student to move easily from one place to another. Orientation and mobility includes both mental orientation and physical locomotion.

Orientation and mobility skills contribute to development in social skills, mental and physical interactions and the general well-being of the student. These skills are needed for the student with low vision as well as the student with blindness.

As a part of the expanded core curriculum, orientation and mobility is a vital area of learning. Teachers who have been specifically prepared to teach orientation and mobility to blind and visually impaired learners are necessary in the delivery of this curriculum. Students will need to learn about themselves and the environment in which they move - from basic body image to independent travel inrural areas and busy cities. The existing core curriculum does not include provision for this instruction. It has been said that the two primary effects of blindness on the individual are communication and locomotion. The expanded core curriculum must include emphasis on the fundamental need and basic right of visually impaired persons to travel as independently as possible, enjoying and learning from the environment through which they are passing to the greatest extent possible.

Orientation & Mobility should be incorporated into the student's Programme and timetable. An individual program is determined by considering the following factors:

- diagnosis and degree of visual impairment;
- prognosis of visual impairment;
- functional vision;
- presence of other disabilities;
- age;
- cognitive functioning;
- general health;
- school and community environment; and
- family, school and community resources.

Technology

Technology is a tool to unlock learning and expand the horizons of students. It is not, in reality, a curriculum area. However, it is added to the expanded core curriculum because technology occupies a special place in the education of blind and visually impaired students. Technology can be a great equalizer. For the braille user, it allows the student to provide feedback to teachers by first producing material in braille for personal use, and then in print for the teacher, classmates, and parents. It gives blind persons the capability of storing and retrieving information. It brings the gift of a library under the fingertips of the visually impaired person. Technology enhances communication and learning, as well as expands the world of blind and visually impaired persons in many significant ways. Thus, technology is a tool to master, and is essential as a part of the expanded core curriculum.

Technology for Students with Blindness

A computer system for a student with blindness will include a computer or laptop with the following components.

- ✓ Screen Reader/Speech Synthesizer
- ✓ Voice Access
- ✓ Scanner
- ✓ Optical Character Recognition Software

- ✓ Electronic Braillewriters
- ✓ Print-to-Braille Software
- ✓ Braille Printer or Embosser
- ✓ Calculator
- ✓ Cassette Recorder
- ✓ Descriptive Video Service (DVS)
- ✓ Language Master

Career Education

There is a need for general vocational education, as offered in the traditional core curriculum, as well as the need for career education offered specifically for visually impaired students. Many of the skills and knowledge offered to all students through vocational education can be of value to visually impaired students. They will not be sufficient, however, to prepare students for adult life, since such instruction assumes a basic knowledge of the world of work based on prior visual experiences. Career education in an expanded core curriculum will provide the visually impaired learner of all ages with the opportunity to learn first-hand the work done by the bank teller, the gardener, the social worker, the artist, etc. It will provide the student opportunities to explore strengths and interests in a systematic, well-planned manner. Once more, the disadvantage facing the visually impaired learner is the lack of information about work and jobs that the sighted student acquires by observation.

Because unemployment and underemployment have been the leading problem facing adult visually impaired persons, this portion of the expanded core curriculum is vital to students, and should be part of the expanded curriculum for even the youngest of these individuals.

Self Concept and Socialization

Social and life skills that other students can learn naturally through observing others and modeling, must be taught specifically to the student with blindness.

- ➪ Teach the student to turn and face the speaker.
- ➪ A student with blindness may have mannerisms, such as rocking or repeatedly

rubbing the eyes. Such mannerisms can interfere with social interactions. This is a sensitive issue; professional advice should be sought.

- ⇨ Encourage the student to initiate a conversation or play activity. The student will often wait silently until someone else takes the initiative.
- ⇨ Help the student to understand and respect the personal space of others. The student will also need to be able to ask others, in a courteous way, to respect his or her personal space.

Social interaction skills needed to respond appropriately and participate actively in social situations, such as:

- shaking hands
- turning toward others when speaking or being spoken to
- using language to make a request, decline assistance, or express a need
- expressing emotion and affection appropriately
- participating appropriately in conversations in various situations

3.7. Implications of Low vision and needs of Children with low visions

3.7.1 Low Vision

Students with low vision exhibit a wide range of visual impairment. Teachers should be aware of that no two students with low vision have the same functional vision. Even if they are diagnosed as having the same eye condition and similar acuity. Vision may fluctuate and be influenced by such factors as fatigue, light glare, lighting conditions and time of day. Therefore special attention must be given in assessing the needs of the students with low vision and A 1 education of them requires unique strategies.

Definition of low vision :

''Persons with low vision'' in the PWD act means persons with impairment of visual functioning even after treatment or standard refractive correction but who uses or is potentially capable of using vision for the planning or execution of a task with appropriate assistive device.

The points to be emphasized from the definition of low vision are:

- There is significantly reduced vision.
- This can affect the performance.
- The vision can be used for various purposes including reading.
- There is need for assistive devices.
- Assessment has to be made of the distance and near visual acuity and other visual functions such as contrast, light sensitivity, colour vision and visual field.

Difference between blindness and low vision:

a) Blindness can be defined as having no vision or no significant usual vision while low vision involved significant usable residual vision.

b) Blindness mean visual acuity of less than 3/60 and low vision means visual acuity of less than 6/18 but equals to or better than 3/60.

Some of the characteristics of low vision children that are important for a teacher to know are :

- Limited opportunities for incidental learning.
- Limitation in the range and variety of experience.
- Limitation in the ability to get around.
- Limitation in interaction with the environment.

Specific implications of low vision

For each person it is necessary to

- Determine the activities normally done by the person with low vision and other people in the same community and what visual skills are required to carry these out. This may be at school, in the village, or at work. The person should be assessed in a place appropriate for those tasks.
- Analyze the visual elements of a task so that the task can be modified and the environment adapted to the special equipment used
- Observe the visual environment and assess/observe the person under different environmental conditions. Vary aspects of the environment also, e.g. distance from the task, lighting, contrast, colour and time allowed.

- Determine which sense is the most efficient for a particular task. For example, vision, enhanced vision, auditory, tactual, or some combination of these senses.

In order for students with low vision to achieve high levels of academic and social success, the following recommendations must be incorporated into the educational prograr:/for these students. Families, teachers, and students need to recognize the unique skills tliat students who have low vision must be taught and maintained throughout their formal education.

1. *Students with low vision must be given opportunities by teachers and family members to understand and communicate their visual impairment and their visual needs to others*. Beginning in the preschool years on, it is incumbent that professionals and families work together to assist students who have low vision to understand and to communicate their vision needs in a straight-forward manner to their teachers, peers, and members of the community. Initially students should be able to identify the name of their visual impairment. As students mature and gain more social competence, they must be able to explain their visual impairment to others. Students should also be able to communicate their needs resulting from visual impairment in a succinct and straight-forward manner, given their age and developmental levels.
2. Students with low vision must receive guidance in strategies to promote effective interactions in a variety of social situations. This is especially important for students with low vision who have additional disabilities.

   Strategies and curricula must be provided to help students with low vision to become more socially competent in the following areas:

- Developing effective interaction skills that include social initiations, turn taking, gaining entry into a group, using auditory cues to assist with the interpretation of body language.
- Learning to use a combination of senses to help support and interpret social encounters with peers, family members, and co-workers.
- Asking for assistance when needed in social situations.
- learning effective communication techniques to promote confidence in a range of situations
- Providing opportunities for the students with low vision to practice communicating A I their needs and concerns with family members in a safe, nurturing environment.

3. *Students with low vision need guidance to develop strategies to promote self-advocacy skills in schools, communities, and vocational settings.*

   Students with low vision, including those with multiple disabilities, need to be able to ask for assistance, and make their needs known in a clear and socially-acceptable manner. Teachers, families, and other professionals can support students in this area by providing the following opportunities:

- Meeting and interacting with role models who have similar visual impairments.
- Engaging in consumer-related activities through organizations such as the All India Council of the Blind, the National Federation of the Blind, and the National Association for the Blind.
- engaging in role play situations in which the need to use self-advocacy skills, such as asking for front row seating at a concert, or the opportunities to use low vision devices in school situations.
- Providing information regarding modifications for accessible materials and clinical low vision evaluations.
- Providing direction and advice in a range of real life experiences where students can learn to cope with a variety of independent activities.
- Providing effective strategies to ask for assistance from others.
- Learning strategies to promote positive social relationships in work situations.
- Encouraging families to provide safe situations in which students must advocate for themselves.

4. *Students with low vision must be supported in establishing an identity that is unique to themselves that is neither as a blind individual or an individual who is sighted. Ongoing support is required for students whose vision loss is progressive and who may eventually require sight substitution techniques.*

   It is essential that students who are low vision have an identity that is their own. Identifying oneself as low vision should not be viewed as a negative, but rather as a unique part of the student as an individual entity. Promoting oneself as an individual with low vision enhances social and emotional stability. The following strategies may help to support the importance of establishing a strong identity as a person with low vision:

- Engaging in activities that promote a positive self-image by having students identify their strong attributes.

- Providing opportunities for the students with low vision to enhance their physical appearance through the selection of clothing, use of make-up, use of attractive low vision devices, and by learning strategies to improve body stance and posture, gestures, and facial expressions.
- Providing experiences that allow students with low vision to discuss their visual impairment with peers and trusted adults in a safe and nurturing environment.
- Providing experiences that allow students with low vision to excel and to demonstrate specialized skills or strengths.
- Allowing students who are low vision to feel comfortable with identifying themselves as a person with low vision, and promoting their status as an attribute.
- Providing opportunities for students with low vision to discuss strategies for disclosing their visual impairment to others.
- Providing experiences for students with low vision to drive, and to develop strategies for non-driving.
- Encouraging families to provide opportunities in the home environment for students to take responsibility for chores, homework assignments or projects, and personal belongings.

3.7.2 The needs of people with low vision

This includes individuals trying out different optical and electronic aids in their home environment. The challenge is in finding the right balance between visual performance, comfort and aesthetics so that people can easily and happily integrate the right solution for them in their daily life.

Lighting

Lighting is one of the most important and simple aids. One of the key aspects of any low vision assessment is to check the lighting to ensure there is the right lighting and it is positioned correctly. Some types of light will work better than others depending upon the eye disease. Having good lighting while reading, writing or undertaking fine work is very important; it can make a huge difference to the ability to see the task being undertaken.

Talking aids:

There is a large range of talking aids available including talking scales, timers, clocks, watches, calculators, good thermometers, key chain alarms, key ring voice memo devices, vibrating and beeping liquid level indicators and talking colour detectors.

Large Print Books:

Large print books are usually printed in 16 or 18 point font and this can be a good option if sight allows for this level of print size. A selection may be available from the local library or a low vision service to borrow or purchase.

Reading:

Reading guides are simple devices that enable better focus when reading either normal or large print. They are simple black cards or sheets with a block cut into them to guide the writer or reader. Reading stands and lap desks with built in lighting can help with correct positioning while reading.

Writing :

There are a number of writing aids available including large print or tactile address books, diaries, organizers and notebooks along with:

- Writing frames or simple rail line guides, available in various formats including envelopes guides and signature guides, raised line or bold writing paper
- A range of thick felt tip pens

Optical Magnifiers:

There is a large range of optical magnifiers in different magnification strengths and sizes. The more powerful magnifiers are smaller, and need to be held close to the eye when being used.

- Hand-held magnifiers, some with built-in lighting
- Bar magnifiers that can magnify one line of writing at a time
- Dome magnifiers which many find easier to use
- Fixed stand magnifiers which keep your hands free for reading, writing and

other activities such as signing a cheque.

- Spectacle binoculars available in clear or tinted colour for reading or close detail work.

Primary Aids : Canes

Many people with low vision may never need or use a cane but it can be very useful for negotiating the environment. Many people find that a cane gives them much greater confidence to move about.

Technologies

Audio Books

Audio books or talking books are available from a range of providers including low vision agencies, council libraries and audio book websites. Some local newspapers are also available in audio format.

Television

To help with TV viewing there are large screen televisions and universal remote controls with large buttons.

Electronic magnifiers

Electronic magnifiers are excellent for high magnification reading and writing to support a wide range of daily living

Computers

There is a range of ways to assist those with low vision to use a computer including a large screen to increase the viewing area and ways to increase the size of items on the screen. For those with low vision, simple fonts without decorative curves are easier to read (eg Arial or Calibri) and use upper and lower case instead of typing in all capitals. Also, when typing, try to add extra spacing between words and lines of text so the breakdown of sentences and paragraphs is clearer.

Close Circuit Television (CCTV): An electronics projection magnifier that enlarges reading materials by projecting on the screen.

Talking Calculator:

Calculators with voice output allow studenfto do a wide variety of mathematical calculation.

Screen Enlarger

Screen enlarger software programmes display information on a computer screen in a variety of magnification levels. The entire screen, a portion of the screen or just one line may be enlarged. Students with low vision may benefit from these programmes (ZoomText, MAGic, VisAbility).

Screen Reader/Speech Synthesizer

Screen readers provide auditory feedback when using the keyboard as well as auditory access to information displayed on the monitor. These systems consist of a software programmes and speech synthesizer. The software programmes sends information from the computer to the synthesizer, where phonemmes are combined into words and the words are spoken. Most systems allow choices in volume, voice quality and speed of output. Students with limited vision will find these devices useful, especially when connected to a regular printer for output (JAWS, Intellitalk, IBM ScreenReader/DOS).

Voice Access

Voice access systems allow the user to interact with the computer screen by using voice commands instead of the keyboard. They are particularly useful for students who have difficulties with fine motor control as well as visual impairments. These systems include special software and sound cards to allow for voice output of information on the screen. As with screen readers, they can be connected to braille and regular printers for output (DragonDictate, Naturally Speaking).

Scanner

The scanner will scan print text of good quality. It must be used in conjunction with optical character recognition software. Then the scanned text can be saved to be printed in braille or accessed through a speech synthesizer.

Cassette Recorder

Cassette recorders can be used as writing tools as well as reading tools. Students with no vision, as well as those with limited vision can benefit from the use of cassette recorders.

3.7.3 Teaching Implication :

★ A programme plan is usually develop on an annual basis by the student's support team and is reviewed regularly.

- ★ Talk while you teach. The student may miss visual clue and written.
- ★ Make the lesson attractive by using colourful sketches pictures and charts.
- ★ Teach in close proximity to the student when doing demonstration or using visual aids.
- ★ Allow the student to go up to the board or move the desk closer in order to view or copy the material.
- ★ Check regularly to ensure that the student is making accurate notes.
- ★ Replace the print with large size if there is a need or use appropriate spacing, contrast or a projection device.
- ★ Never use glossy paper as it has glare. Putting a transparent sheet on the pages can reduce the glare.
- ★ Alternate visual task with nonvisual task to avoid eye fatigue.
- ★ Provide extra time to the student he/she will take longer to complete most tasks. The quantity of work required may be decreased.
- ★ The good contrast light yellow-red, light blue-red in visual materials like charts diagrams make these accessible to a low vision child. Contrast light brown-maroon are of no use of these children.
- ★ Use of bold line paper can help in keeping the lining of writing straight. It is the darkness and not the thickness of the lines that helps a low vision child in writing.
- ★ Question papers can be written with felt-tip pens for low vision children.
- ★ Some cases oral exams or a scribe to write exam answer.
- ★ Encourage use of tape recorders talking books whenever there is need.
- ★ Teacher has to encourage and motivate the child to continue his/her reading and writing.
- ★ The student's with low vision may need extra explanation of some materials.
- ★ The child may have difficulty reading cursive hand writing. A void using it on the black board.
- ★ The studen's ability to participate in certain activities such as physical,

Educational, Science, labs and visual arts may be affected by his/her functional vision. Modification may be required.

- ★ Use real life objects concrete and tactile materials as much as possible. This provides opportunities for kinesthetic and tactile learning.
- ★ Never allow student to continue struggling with print.
- ★ The light from the lamps should never come from the front. It should always fall on the back from left or right side or even from behind the child.

Glossary

Assessment: A procedure to determine self-sufficiency of low vision involving functional and clinical measurements.

Braille: A tactile method of reading and writing, generally used by the blind. It involves combinations of six raised dots punched into paper, which can be read with fingertips.

Cane: A mobility aid that helps in knowing the obstacles while the person is moving.

Close Circuit Television (CCTV) - An electronic magnifier that enlarges reading material by projecting on the screen.

Disability: Results from a loss of physical functioning or difficulties in learning and social adjustment that significantly interferes with growth and development.

Field of Vision: defects of degree of an angle that a person can see without turning his/her head or moving the eyes. includes the limits of peripheral sight or that which lies to the sides of straight ahead

Filters: Illumination control device used to provide excellent protection from glare. They can be used with most optical aids systems.

Functional Vision: the level and use of residual vision to cope up with requirement of daily life.

Handicap: Refers to a disadvantage imposed by the environment and the person's capacity to cope up with the disadvantage.

Impairment: Refers to identifiable defect in the function of the organ. Subject of medical profession.

Individualized Educational Plan (IEP): - An educational plan tailored to an individual students needs.

Magnifiers: Use of deep plus lens to magnify small objects so that they can be seen more easily.

Non-Optical Aids: Aids used to enhance vision through non-optical means, for example illumination, contrast etc.

Ophthalmologist: Medical personnel involved in examining a person with visual impairment and prescribing medical treatment.

Optical Aids: Lenses placed between an eye and an object to alter the retinal image of the object.

Orientation: Understanding of one's own relative position in space that restricts movement.

Pinhole Aperture: A device to control illumination. Placing it before an eye reduce blur.

Retina: Neural tissue that sends impulses to the cortex (brain) via the optic nerve for visual perception.

Tactile Clues: Learning about various objects in the environment through the sense of touch.

Tracking: Concentrate .following of the objects with eyes.

Typoscopes: A piece of black cardboard with a slit in it, to block out all but the line of print view while reading.

3.8 ‘‘Check your Progress’’

I. Choose the correct response

1. The ability to locate one self in one's environment is known as

   a) Orientation.

   b) Daily living activities.

c) Sensory training.

d) Mobility.

2. The ability to move in the environment from one place to another is called as

a) Orientation.

b) Daily living activity.

c) Sensory training.

d) Mobility.

3. Introduction of daily living skills to a visually impaired child depends on the assessment of his :

a) Social achievements.

b) Maturity level.

c) Independent mobility.

d) All the above.

4. Language development mainly depends on

a) Understanding of syntax

b) Ability to hear to sound properly

c) Reading great classics

d) Proper attention

5. 'Verbalism' develops in visual impaired children due to

a) Poor vocabulary.

b) Good vocabulary.

c) Lak of personal direct experience.

d) Misunderstanding word meaning.

6. Communication with the blind child in the initial years must be through

a) Dialogue

b) Imitation

c) Facial expression

d) Direct physical contact

7. Stereo type attitude means

a) Conventional behaviour

b) Unhealthy behaviour

c) Aggressive feeling

d) Favourable towards blindness

8. Reduction in the range and variety of experiences

a) Is a subjective effect of blindness

b) Is an objective effect of blindness

c) Is impersonal loss of visual impaired children

d) Reduction in experience provided to children

II. State true or false for each of the following statements

1. Blind persons do not have to learn special technique for all the activities of the daily living.

2. 'Orientation mobility' is essential for independent living of the visual impaired persons.

2. Senses are the gateway to knowledge. Hence the effects of blindness are not basically cognitive.

4. All blind are special talent like musical talent and fantastic memory.

5. Although blind children may have delayed physical development due to their inability to do some physical activities, they typically do not differ in physical ability from normally seeing children.

III Answer the following questions

1 Observe any six manneristic behaviours which are found in visually impaired children and investigate why souch behaviours are present in them?

2 Verbalism is mostly found in V.I.C. Investigate why such behaviour present in them?

3 Compare the concept development skills of non-disabled clildren and visually impaired children with additional disabilities?

4 Identify one object in your surrounding, which you find that a visually impaired child differently and modify it to him needs.

5 Discuss with five visually impaired to find out the extent of their social and emotional development.

6 Prepare a case study of a visually impaired child's language development processes.

7 Anita lives in a urban slum area. She was detected with central vision loss at birth. Discuss how his psychological development will be affected.

3.9 Let us Sum up

- The societies, across the globe have developed their own images of blind persons, oftheir capabilities and of their limitations. Even beyond that, they have developed their own ways of coping with the capabilities and/or limitations of the blind.
- All low vision children are different from each other and there functioning level depend on what area of their visual system is damaged.
- Presence of just one or two symptoms does not indicate low vision.
- Verbalism and word-mindedness is reported to be exhibited by the visually impaired children due to absence of sight.
- Visually impaired children may experience developmental delays in acquiring concepts because of their visual loss.
- Low vision children with additional disabilities have more learning problems and psychological problems as well.
- The doctor has to indicate whether the vision will deteriorate further or remain as such. The decision to learn braille, use of magnifiers in some cases or reading prints can also depend on this.
- Children's with peripheral vision can read and write but may find moving about difficult.

- Whether a child with low vision enters adulthood with an inferiority complex or with a positive self-concept depends on his/her teacher, parents and other significant people in his life. The child should be treated normally like any other child except for having special needs.
- No one educational plan is beneficial for all low vision persons.
- Each individual child has to be comprehensively assessed.
- Cognitive development is the result of sensory development, perceptual development in the way in which the child interprets sensory impulses received by him, as well as the ability to form concepts, exercise judgment, reason and solve problems.
- Development of proper mannerism contributes to the social integration of the visually disabled child. Unwanted mannerisms of visually disabled children could be controlled through timely invention and substitute activities.

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Unit 4 ❐ Identification and Assessment of Visual Impairment

Structure

4.1 Introduction

It is important to identify children who have impaired vision. The children with visual problems can be identified with some simple techniques; Vision may be improved with spectacles, treatment or operation. Early intervention services have significant impact on improving visual functioning of the visually impaired infants and toddlers. Thus, it is important to identify children who have impaired vision at an appropriate time. The identification of these children must be carried out on the basis of objective assessment of the eye condition and visual functioning. This assessment provides information regarding a student's ability to use his vision within the learning environment. In this unit we shall discuss the meaning, need and importance of clinical and functional assessment procedures – attention, tracking, visual closure visual background, from constancy, eye- hand coordination and eye-foot coordination and the activities to improve the visual efficiencies. The report on the "Global initiative for the elimination of avoidable blindness by the World Health Organization" documents that there are 8.9 million blind people in India.

The definition of Low Vision defined by WHO-ICEVH conference on the "Management of the Low Vision in children is: A person with low vision is one who has impairment of visual functioning even after treatment 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° from the point of fixation, but who uses, or is potentially able to use vision for planning and / or execution of a task." This is a functional / working definition of low vision. It recognizes that people with limited amount of vision are low vision. While the educational service for blind persons in India is more than 100 years old, the education of low vision is of recent origin. In the 1980s, education of low vision was provided with non-visual methods. In this unit, we shall analyze the maximum use of remaining vision to increase the visual efficiency that all children and adult get the greatest benefits from whatever sight they have. In this unit, we shall analyze the concept of clinical

evaluation, functional vision, visual efficiency and activities to promote visual efficiency etc.

The Importance of early identification and intervention, clinical assessment, activities for functional assessment and the use of adapted tests for assessment are discussed in this unit.

Vision is responsible for 80 to 90% of what a child learns during the first six years of life. A child uses vision in real life situations and these real life situations are the environments which promote his/ her growth and development.

Functional vision refers to an individual's ability to use his/her vision in the everyday tasks of real life, such as reading, doing house work, getting around place to place.

A functional vision assessment measures how well a child uses his/her vision to perform routine tasks in different places and with different materials throughout the day. This information gathered in the assessment enables the Low Vision teacher and the parent/ caretaker to develop an educational programme which will further enhance the development of functional vision.

The assessment of functional vision aims to determine:

- What people see
- How they can see and use their vision
- Under what conditions they can see

The information can be used to understand why people can or cannot do particular activities. The purpose is to provide information about the use of vision plan training to enhance visual skills.

A functional vision assessment is conducted by rehabilitation professional –a low vision specialist, or a teacher who is specially trained in low vision; Information about how the child uses his / her vision is gathered from parents/caregivers and other teachers who know the child well. Specialist will review records and may talk to the eye doctor to learn more about the child's visual condition.

Functional Assessment can be done at various places and with a variety of materials. It is crucial to assess the child in everyday setting at home (indoors and outdoors); school(in the classroom or playground); or in the community, doing his/her usual activities and tasks. The low vision specialist will observe the child in his/her usual surroundings to learn how the child uses vision. It is essential to evaluate the child's effective use of vision

Factors that affect how well a person sees

- Visual Acuity
- Visual Field
- Control of eye movements
- Light
- Colour
- Contrast
- Duration and severity of low vision
- Use of low vision at an early age/ visual experience
- Intelligence

*** What is Functional Vision?**

Functional vision is the use of vision for particular activities. Functional visual skills are required to carry out every day activities.

4.2 Objectives

After studying this unit, the learners will be able to:

- Identify the children with visual problems
- Define and describe the need and importance of intervention
- Understand the importance of clinical assessment
- Distinguish "clinical evaluation" from " functional vision"
- Describe visual efficiency and suggest activities to promote visual efficiency to the visually impaired person;
- Explain the optical and non-optical devices that are used to increase visual function
- Suggest activities to promote visual efficiency training programme for the visually impaired person;
- Identify the useful activities to improve eye hand coordination and eye foot coordination;
- State the importance of guidance and counselling to promote visual efficiency training programme

- Use commonly adapted tests for visual assessment
- Carry out functional assessment to low vision children.

After studing this unit the students will be able to learn :—

- What is functional assessment of vision.
- How the assessment of functional vision aims to determine.
  — What people see
  — How they can see and use their vision.
  — Under what conditions they can see.
- Factors that effect how well a person sees.

4.3 Interpretation of clinical assessment of vision

4.3.1 Importance of Early Identification and Intervention:

Child development research has established that the rate of human learning and development is most rapid in the infant and toddler stage. Neglect of appropriate eye check-up of children reporting eye problems runs the risk of damaging the vision of children who otherwise can be helped to make the best use of their remaining vision. This will also run the risk of missing an opportunity to learn during a state of maximum readiness. Karnes and Lee (1978) have noted that only through early identification and appropriate programming can children develop their potential.

Children with low vision experience challenges in playing communicating, interaction, learning, problem-solving skills, and performing in daily routines and activities. Early intervention plays a significant role in preventing and reducing the extent of developmental delays. Early intervention applies to children of school age or younger who are discovered to have or be at risk of developing handicapping condition. These children can be helped in overcoming their difficulties by appropriate provision of services for the purpose of lessening the effects of the condition.

Early intervention is a part and parcel of total rehabilitation process. It is individual based. It aims to help attain independence in children with special needs resulting from low vision condition. Early intervention can be remedial or preventive or remedying the existing developmental problems or preventing their occurrence. Early intervention focuses on the child alone or the child and the family together. It could be centre-based,

home based, hospital based or a combination of these. Early intervention may begin at any time between birth and school age. There are three primary reasons for initiating early intervention. They are:

1. To enhance the child's development
2. To provide support and assistance to the family
3. To maximize the child's and family benefit to the society.

4.3.2. Tools for Low Vision Assessment

The tools for low vision assessment are long handled occluders, Janelli's and Halberg clips, printer, trial lens holder, clip-on pin-hole, universal and paediatric trial frames, jackson's cylinders up to 2 diopters, ruler and torch. The tools also include a full aperture trial lens set and a good range of auxiliary lenses like Stenopic slit, red green filters, prisms, etc.

These may include Snellen's, ETDRS LogMar, Sloan's Letter, Lea's symbols, VA Tester, Lea's preferential looking paddles, paediatric low vision test, Fienbloom distance test, Bailey-Hall Cereal test. Other tests include brightness acuity test for glare assessment. Panel D15 for quantitative colour vision assessment, Lea's low contrast symbol test for contrast sensitivity assessment, Amsler chart manual for central visual field assessment and Ishihara test for colour blindness.

Following is the routine for a low vision examination.

Steps of Low Vision Assessment

3 Steps:

1. Clinical Evaluation
2. Functional Evaluation
3. Vision Rehabilitation

It involves a complete understanding of the condition, its symptoms and concluding the management of the low vision patient. Careful observation of the client's behaviour and his physical status can provide an insight to the severity of the problem.

Importance of Diagnosis: the clinical team is primarily responsible for diagnosing the low vision client accurately as the functional implications of the cause of low vision is different in each eye disorder. The areas of intervention are specific to certain eye

disorders. Similarly, the age and the status of the eye disorder, whether progressive and non progressive also has a bearing on the interventions planned for the low vision client.

4.3.3 Clinical Low Vision Assessment:

A. Observation

Patients can be observed as they enter the room to see whether they walk unaided or are supported, whether they feel for a handrail or easily recognize open doorways. Wearing dark spectacle lenses or holding the head down may imply sensitivity to light, although this head position could be due to arthritis. Other things to look for are difficulty in holding things or, tremor. Many elderly low vision patients may attend with a care taker or relative. To summarize observe the following :

1. Mobility
2. Fixation
3. Posture
4. Psychology of patient

- Ready to accept the services
- Motivated/ depressed

B. Interview and History Taking

Interviewing is important in order to understand the emotional status and individual needs of the client. The interview also works as a platform for developing a rapport between the examiner and the client. The interview starts with the case history with emphasis on the visual problem. This is followed by the individual's personal history that includes occupation, education, living status and specific functional aspects, like independence, orientation, mobility and activities of daily routine.

The daily routine of the client can identify the needs of the individual and areas where help may be needed. Brining to focus activities that may be possible can help in narrowing down the objectives of the client. All the data from the interview have to be recorded in an organized manner so it could be used effectively in finding the solutions.

History taking is one of the most important aspects of any low vision evaluation

It is critical for the development of appropriate and realistic evaluation and management strategies. Following points should be covered.

*** General Information**

- Demographic Information
- Interaction between the patient and the accompanying family member
- Marital Status/ Living Situation

*** Ocular History**

- Ocular history correlates the onset of specific visual complaints with disease appearance, progression or treatment
- Diagnosis and onset of symptoms
- Past, current, or planned surgeries or treatments
- Stability of vision
- Family history of eye disease
- Previous history of eye disease or vision problem
- Current or previous use of spectacles, contact lenses, or low vision aids
- Patient's understanding of vision condition and implications for functioning
- Virtually, very ophthalmic intervention has functional consequences

*** Systemic History**

- Many systemic illness have direct ophthalmic effects, one of the most obvious being Diabetes.
- General health review
- Current medications
- Hearing impairment or other handicapping conditions
- Self- care needs (e.g., ileostomy, diabetes)
- Orthopaedic handicaps
- Psychology considerations (e.g., denial, depression, co-dependency, or suicidal tendencies)
- Activities critical to manage are:-

*** Educational or Vocational Status**

- School requirements

- Seeing blackboard
- Computers
- Reading Instrument
- Retired
- On leave from work due to low vision
- Homemaker
- Has the client considered retiring or resigning because of the vision
- Social activities hampering

*** Financial Status**

- It's important to understand the commitment to the device
- Basic needs of the client
- Affordability of the device

*** Task Related History**

- It is most important as it provides insight into day-to-day problems that the patient faces. Task –related history should also focus towards the occupation of the patient. It helps the practitioner to understand the basic requirement of the patient.
- Visual tasks can be divided into

*** Lighting Situation**

We also need to check the lighting situation to understand the patient's problem whether he is able to tolerate sunlight, having difficulty in seeing in dim light, Whether any difficulty in going from bright to dim light. Whether comfortable with sunglasses or requires more bright light(incandescent or fluorescent.)

Depending on patient's needs one's recommendation can differ from patient- to patient. It helps you to recognize patient potential as well as limitations and suggests possible interventions.

C. Visual Acuity

Measurement of visual acuity is one component of the evaluation that allows one to quantify the degree of high-contrast vision loss and, in many cases, clearly identifies

the patient's visual impairment as it relates to the chief complaint. Measuring visual acuity also allows the clinician to:

- Help determine best corrected visual acuity (BCVA)
- Monitor the effect of, stability and progression of the treatment of a disease
- Assess eccentric viewing postures and skills cases, afford the patient an opportunity to experience process
- Furthermore, the result of visual acuity testing are the basis for determining initial magnification requirements and the potential for specific rehabilitation strategies. Estimate the dioptric power of optical aids necessary for reading regular print size
- Verify the person's eligibility for tasks such as driving
- Classify patients as "legally blind" for the purposes of government, insurance and other benefits of exemptions
- The methods of assessing distance and near visual acuity in visual acuity in visually impaired patients may be modified to address specific concerns.

C.1- Visual Acuity Assessment (Distance)

The visual acuity assessment begins with determining the distance acuity of the patient. The procedure involves showing the patient large size numbers on sheets from a particular distance and asking him or her to identify them. Optotypes, single –letter chart gratings and crowded letters of different size may be shown to the patient alternatively. The same procedure is repeated for each eye individually also.

1. Traditional methods of testing acuity are not practical for low vision patients.
2. Vision charts designed for low vision are hand held or movable rather than fixed or projected. Each line contains several characters so memorization is less likely
3. ETDRS charts are recommended for more accurate recording.
4. Patients feel more confident when they are able to read more letters and the start of low vision is with a positive note.
5. The hand held charts avoid glare, give better contrast and can be moved closer so that letter size is doubled

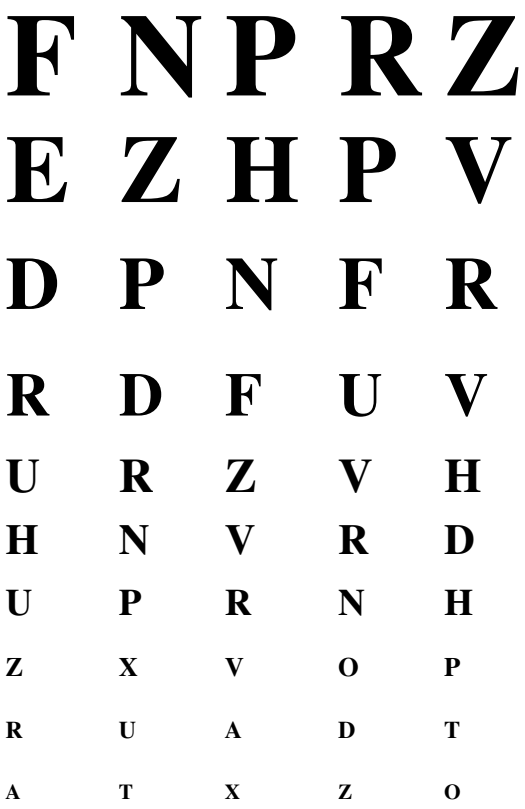
6. Changing testing distance requires recalculation of acuity.
7. All patients should be examined first in daylight condition
8. Special charts with grey background should be used in patients with glare problems
9. Bailey & Lovie charts are the logarithmic scale. Main advantage of chart is that it's near vision equivalent; greatly simplify the process of calculating the estimated magnification required by a patient.
10. Log MAR chart- ETDRS uses sloan optotype. Essentially it is same design as Bailey Lovie charts but differ in actual letters used.

*** LogMAR Charts**

- Principle of a LogMAR chart is that it uses a logarithmic scale. LogMAR means Log Minimum angle of Resolution
- Ian Bailey and jan Lovie first to incorporate a log scale which has stepwise changes
- Calculation of required magnification easy
- Five letters per line. There is constant size progression ratio of 5/4 and line is 1.25 X bigger/ smaller than previous

*** Advantage of a LogMAR chart: Design feature and advantages**

1. Equal number of optotypes per line and allows the use of single –letter scoring which reduces test-retest variability
2. Equal logarithmic interval between lines
3. Equal average legibility for each line. It ensures that letter size is the sole determinant of difficulty on a given line
4. Consistent spacing between letters and line i.e..proportional inter-letter and inter-line spacing
5. Geometric progression of letter sizes and allows testing distance to be variable. Vision recording is done at 4m to 2m to 1m. Correction factor of 0.3 should be added to the Log score when the distance is halved.



*** Pinhole Acuity Assessment**

Pinhole acuity test is used to assess the presence or absence of a refractive error improvement in vision and whether indicates that the person may benefit from refractive correction.

*** Low Contrast Visual Acuity**

1. The vast majority of our visual interaction with the world involves resolving low contrast details. Variation in contrast in everyday tasks is undertaken by all patients.
2. Bailey- Lovie low contrast chart, Pelli Robson charts; symbol charts- Lea's symbol charts, hiding Heidi charts with smiling faces to measure low contrast acuity.
3. When optotype based letter charts are used for assessing contrast sensitivity, patient should be given enough time to recognize the letters (temporal summation)

4. Practical relevance of low vision contrast visual acuity is that it helps the patient for better understanding of the nature of their visual impairment.
5. Patients feel relieved to see a clinical test that equates to their experience.

C.2-Near Acuity Assessment

In this step the patient identifies or reads certain typeset of a smaller size from a nearer distance. The distance is accurately recorded. The typeset size is denoted in M units. Reading acuity is the patient's ability to read a more congested and complex typeset prints from a measured distance.

Near Vision Testing

1. In low vision near vision is recorded as the size of print that can be read fluently and easily.
2. Perform near vision at two distance allow the patient to read at his/ her preferred distance. Measure the distance
3. Secondly measure functional reading ability for each eye at 40 cms.
4. For both near testing situation use reading cards specifically designed for low vision.
5. It is imperative to undertake near vision assessment only after having completed an accurate refraction and having determined optimal distance vision, low contrast vision, contrast sensitivity measurements.
6. Use M System along with testing distance for recording visual acuity. Discrepancy of more than two M units between the two eyes when tested at same distance, in this case better seeing Eye alone can be corrected by low vision aids.
7. Record near acuity as fraction – the reading distance in cms is the numerator. The print size in M units is denominator eg. 40/4m
8. Use single character visual acuity
9. Evaluate word recognition abilities.
10. Measure continuous text visual acuity. Graded continuous text materials will provide a more accurate measure of reading ability than single optotype measures and are recommended for evaluation of performance with reading devices.

11. Assess effects of illumination.
12. Use appropriate vision charts (Lighthouse near acuity chart, near ETDRS chart, LVRC, Sloan M series charts- these are calibrated in mater equivalents (M Units); and these simplify calculation of magnification.
13. Final determination and prescription of low vision device should be based on performance (i.e., reading actual printed materials such as newspaper and labels not printed acuity charts.)

4.4 Functional Assessment of Vision : Concept, need and methods

4.4.1 Concept

Functional vision is the ability to use vision to perform desired tasks. Because of impairment in the eye and other parts of the system, low- vision children will not learn visually without intervention and help. Selection of instructional programmes and techniques requires a thorough assessment and understanding of the child's capabilities. This is mostly done by the educators. In vision evaluation procedures, there are two levels- the screening and grouping of children with different degrees of impairment, and assessment of the disability of the child. The children can be classified into several groups: those with

Light perception

Light perception without projection

Visual acuity less than 3/60

Visual acuity 3/60-6/24

The children are assessed for visual disability- Dr Jill Keeffe's procedure of screening for impaired vision can be adopted. The assessment is done for distance visual acuity, near vision, visual field, contrast sensitivity, and colour vision. The functional vision skills of individuals are also assessed. The functional assessment explores how the child uses vision, at what distance he/she sees object, at what distance certain size symbols can be read, the visual language understood by the child and other educationally and related skills. Observation should be made to determine the technique that the child presently uses in communication, orientation, mobility and daily living skills.

After assessment, a training programme should be planned. The training programme includes appropriate sequential visual stimulation activity which would help the child to enhance visual efficiency.

4.4.2 Need for Assessment of Functional Vision

This assessment provides information regarding a student's ability to us his vision within the learning environment. It includes acuity, colour, field and environmental accommodations. It will include a list of recommendations for modification and adaptations of instructional materials. The clinical evaluation of a student with visual impairment does not always reflect the student's true visual abilities. It is the responsibility of teachers of visually impaired to gather assessment data of a student's functional vision, it is recommended that materials be used with which the student is already familiar and which are at the student's current level of functioning. The activities used for the functional vision assessment should be drawn from a variety of task, i.e. academic, non-academic, extracurricular, and special context. In addition to the visual functioning information, information should be gathered from parents and the staff involved with the students. A functional vision assessment tends to be subjective; therefore, care must be taken into account.

Children develop visual skills at different rates. The specific nature of visual impairment will influence the rate and level of achievement. In other words, visual functioning is related in part to the condition of the eye or the structure of impairment. The use of functional vision may be improved with training.

Many children can learn to make better use of their residual vision and can function effectively with only small amount of visual information. Objects and print can be recognized even when they are blurry or even if only parts of them can be seen.

*** Aim of the Assessment of Visual Functioning**

- To Determine current visual functioning level of the child/ adult
- To determine the visual stimulation and instruction needed to help the person make use of remaining vision
- To help the child to use this limited vision to the highest potential.
- To plan programmes for specific curricular areas like orientation and mobility training or adaptive training in use of optical devices like magnifiers, telescopes etc. and non-optical a devices like reading stands, table lamp etc.

- To find which visual stimulation materials is most appropriate to the child
- Determine nature of the primary reading medium-i.e., whether the child will need to be taught Braille or can he use large print.

4.4.3 Areas and skills covered in functional vision

Visual skills used for functional vision follows the sequence of normal visual development. These visual skills are used to carry out every day activities.

The assessment of functional vision has been based on the **Low Vision Kit.**

The seven areas of skills to be assessed are:

1. **Awareness and attention to objects**

Finding an object or target and looking at it (fixating) long enough to be aware of it or recognize it.

Importance of assessment: Can a person see objects close to them? Does the person search for objects visually or with their hands? What makes objects easier or possible to be seen? Factors that affect how easy an object is to find or recognize are:

- Size
- Distance
- Contrast
- Familiarity (makes it easier to recognize)

2. **Control of eye movements –Tracking**

Being able to follow moving objects with the eyes or hand movement

Reason for assessment: can the person follow the movement of objects without "losing" where they have gone?

Different direction of movements should be tested:

- Up and down
- Side to side
- Diagonal and
- Near to far

3. Control of eye movements- Scanning

Accurately moving eyes and shifting his/ her from one object to another.

Reason for assessment: Some people with low vision have to search around for a long time to find objects, and others may find it difficult to change from looking at near objects to look for something further away.

4. Discrimination of objects

Recognizing objects from an outline or general shape.

Reason for assessment: to learn if a person can discriminate between people and objects recognize familiar objects, recognize different or similar object. Objects can be discriminated because of their colours shape, contrast with the back ground, position or size, its distance the type of object, how familiar it is, and whether the objects is moving or still etc. Good scanning and discrimination skills is needed to discriminate an object.

5. Discrimination of details to identify actions and match objects

The discrimination of details to identify an object is more difficult than seeing the object. Features of the object have to be identified.

Reason for assessment: Most learning occurs from visual awareness and imitation. It is important to know what can be seen and how the environment (Such as lighting) affects what can be seen. The factors of distance, size, colour and contrast are very important.

6. Discrimination of details in picture

Pictures can be simple outline or complex, detailed. The important features (parts) in pictures have to be identified so that the meaning of the picture can be understood.

Reason for assessment: Pictures give useful information on posters , advertisement or in books, objects in pictures may be difficult to find and recognize

7. Identification and perception of patterns, numbers and words

Matching letters and number by their similarity or their differences; this does not require reading but is a necessary skill for reading.

Reason for assessment: to find out if a person can discriminate between similar and different shapes and letters. The result will help in making decision on whether a person should use normal size print, large print, low vision devices or needs Braille.

* Guidelines to develop better functional vision

- Recognize full sensory utilization and encourage it
- Get visual attention to all tasks
- The utilization of residual vision of low vision children should be stressed.
- Makes the class room visually attractive
- The school should maintain a case study containing
    - Eye report
    - Referral reports
- Just having sight does not mean that we all use our eyes well. We have to train our brains to interpret what our eyes see. A person with low vision does not automatically try to make himself see unless he is extremely motivated to do so. He needs to be helped to interpret what he sees. He can develop good functional vision.
- Visual functioning relates to how well a child is able to use his or her remaining vision for his or her everyday tasks. According to Barraga (1980), visual functioning is a learnt behaviour, primarily developmental, the more visual experiences the child has, the more the pathway to the brain is stimulated, which leads to a greater accumulation of a variety of visual images and memories.
- It is the role of the special educators and parents to participate in the assessment of the low vision child. Assessment should address the implications of the child's visual, social, emotional, and cognitive development. It is particularly important that functional vision assessment and observation should be done in the child's everyday environment.
- In the area of education, the resource teacher, itinerant teacher often function as a low vision instructor responsible for assessment. This allows for more communication between a regular teacher and the resource teacher which helps the low vision child to function well in the classroom. The modification needed should be based on the implication of the visual loss. The accessor's cooperation and interaction, the school personnel and their understanding of low vision are the factors to be considered for effective learning.
- The effectiveness with which a student is learning to use vision can be predictor of future success with aids. Some students compensate so well with visual skills that they may consider optical aids to be "too much trouble". Some students hardly use their vision because they have encountered psychological difficulties or never have learned certain visual skills. They rely on other modalities from sighted helpers.

- The development of visual ability is not an inert overcome reflex but one aspect of the total behaviour of a person in the specific environment. Visual acuity is a misleading quality in estimating a person's seeing ability. Visual ability is not necessarily related to the kind of degree of impairment or loss of vision. It is a sequentially learned skill.
- Even though the basic conditions of the eye remains unchanged, training and experience have been contributing factors in improving development of visual process, especially the degree of visual efficiency. The visual efficiency is essential to plan more precise programme for the use of how he/she is using vision and increases the students' efficiency.
- There are a few research studies done on visual efficiency in relation to visual behaviour and the involvement of the resource teachers and special educators in developing the visual efficiency.
- Implement the low vision stimulation programme for the integrated and the special school programme and improve the visual efficiency of the low vision children
- Many of the programmes that have already started special training for the low vision have wound back due to the feeling expressed by their totally blind students that they are given less importance compared to the low vision students. Efforts have to be made to make the totally blind students understand that it is the need of the low vision students and not a factor of importance for them.
- The low vision students have to be developed as a compliment to totally blind students.
- Follow up result information related to the low vision child.

4.5 Tools for functional assessment of vision and skills: Functional Skills Inventory for the Blind (FSIB), Low Vision Assessment by Jill Keeffe, Lea Tests, and Portfolio Assessment.

4.5.1 Functional Skills Inventory for the Blind (FSIB)

The success of an assessment depends on the object chosen. So use objects which are familiar to and interesting for the child being assessed. The size, distance, contrast,

colour, position and light on an around object are factors needed to be considered while testing.

*** The Visual skills used for Testing Functional Vision**

1. The Visual skills used for testing

Whether the child has functional vision are listed here in the order in which they should be assessed. The order of the skills follows the sequence of normal visual development.

A child with low vision may be able to progress through all the steps without special training. Some skills may not be achieved but the child can still progress on to later steps.

The areas of skills to be assessed are explained and examples are given of how the skills are used. These visual skills are used to carryout everyday activities. The methods of assessing the visual skills are described in the following section.

2. Awareness of Attention to objects

The aim of this test is to find out the ability of the child to attend to an object.

Choose a bright or shiny object like toys or balls about the size of your hand. Hold the object at the child's eye-level, standing one metre away from the child. Let the child look at the object. Ask him to reach for it and touch it. If the child doesn't show any response to the object (because he cannot see the object from a distance of one meter) the same procedure is followed by standing half a meter away from the child.

If the object cannot be seen at less than half a meter, try to attract the child's attention with sound or movement.

3. Control of Eye Movements

Tracking – Following a moving object.

Activity:

A bright ball can be rolled towards side of the child in a well lighted area. Stand beside the person and show him the object. Tell him to watch the object as you roll it and ask him to walk to it where it has stopped.

You need to watch the child to see how far he was able to follow the object with his eyes. Note the distance he was able to track. Activities are provided to the child's

central and peripheral (Side) field of vision. When the child is able to track the ball, as next activity, a ball which is smaller in size or has less brightness can be used. When the child's performance is not appropriate, training is given to achieve the activity. Repeat the activity using shorter or longer distance depending on the result and record the distance till which the child was able to track the object.

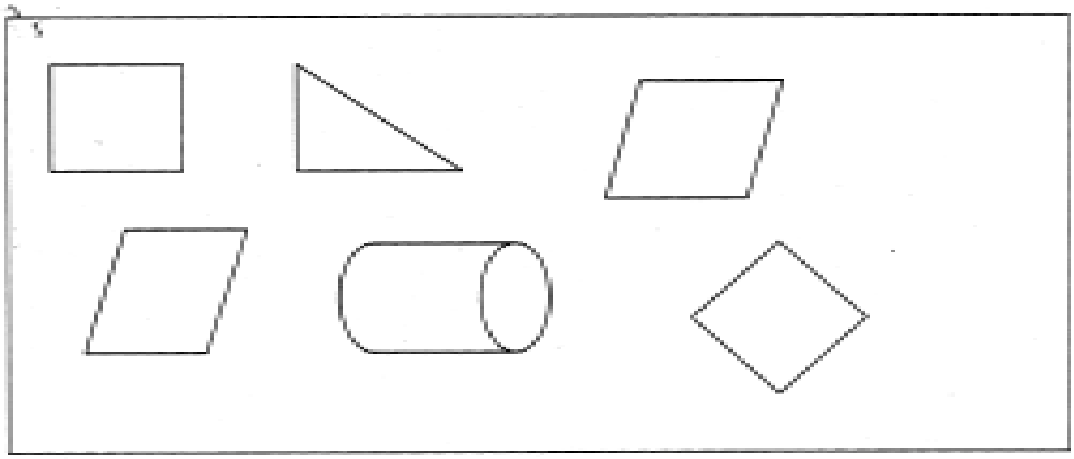
4. Scanning –searching for a particular stimulus Among Other Visual Stimuli.

Use two different objects about the size of your hand. Stand one metre from the child. Hold the objects in outstretched hands at your sides and front of the child at eye level.

Name the object held in each hand. Let the child look at one object and then to the other object in turn. Show one object and then the other. Repeat this at least once. Example, look at the fruit, now look at the tumbler, back to fruit and to the tumbler.

Activity

Search for different shapes in the given shape card.



There should be distinct horizontal eye and head movements from one object to the other. If the object cannot be seen from a distance of one metre move closer and record the distance at which the child could scan both the objects.

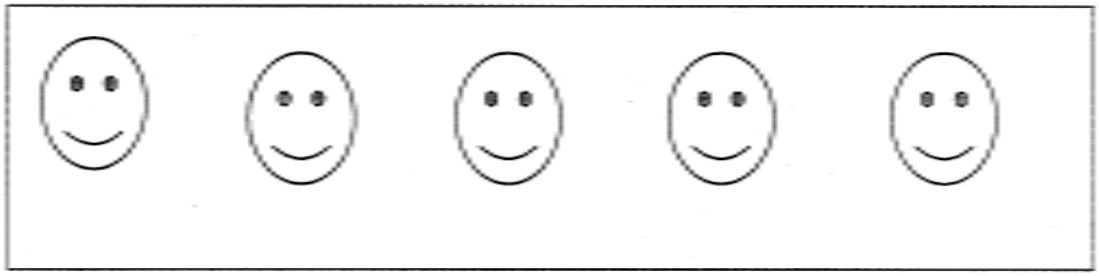
5. Visual Discrimination:

It is the ability of the child to distinguish between near distant object. Choose objects which are familiar to child (coin, piece of food, spoon or plate).

The objects have to be recognized by looking at them without touching them. Record the distance needed to recognize near objects.

Activity

An activity for two dimensional items (Picture card) is given Discriminate the one which is deferent from the four figures given. Take the child to outside place where a variety of a activities are happening and where there are variety of objects.



Note if the child recognizes objects, people and activities, record the distance for recognizing objects, people and activities.

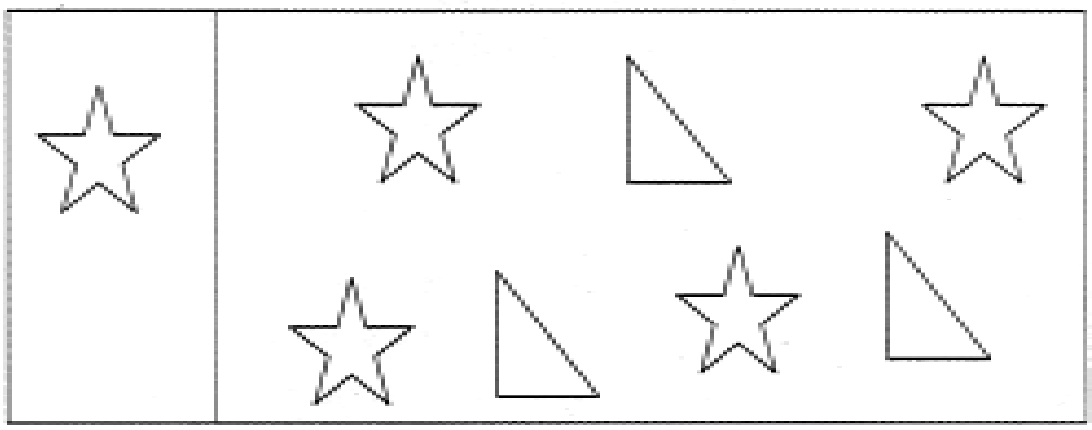
6. *Visual Figure-Ground Discrimination*

This refers to the ability of the child to isolate a particular picture/ object from the background, i.e. seeing the distinctive feature of an object.

Ask the child to locate a particular spot on the picture. The child can be asked to identify buttons, belt, and shoes and also recognize actions in the picture.

Activities

Identifv the stars which are similar to one in the smaller box



If the answers are not correct, ask the child to describe what he sees in the pictures. Record the answers and the distance of the eyes from the page.

7. Visual Memory

This refers to the child's ability to store and recall past experiences and integrates those with new ones.

Hide the objects the child has seen in the environment and ask him/ her to describe them. Present object/ pictures (like play activity e.g., Cricket or picture of zoo etc.) of an activity sequence on flash cards in a particular order and then remove them. Ask the child to recall the sequence in which the cards were presented. Give diagram of activity sequence on flash cards. Record the child's answer.

Activity

This type of informative picture can be given for a few minutes say one or two minute to observe. Get back the picture. Ask the child to describe what she has seen in the picture.

8. Visual Closure

It is the ability of child to perceive a total picture or object when only a part is visible/ available. Ask the child to identify the missing part in an object/ figure. Note whether the child is able to do so or not. E.g. picture of animals, jug or a chair in part.

Activity

Provide a part of picture and ask the child to identify what they are:

From Constancy

It is the ability of a child to perceive the same object at different angles.

Objects like comb, fruit can be held at different angles for identification.

Picture of a tree, bucket, chair, spoon etc, can be pasted at different angles and the child should be asked to identify the object. Record the result.

Activity

Pictures are examples of tree in different position. Ask the child to identify picture :

9. Eye-Hand Coordination

It is the ability of a child to perform a task using hands and eyes in harmony.

Ask the child to put a particular coloured bead in the thread provided.

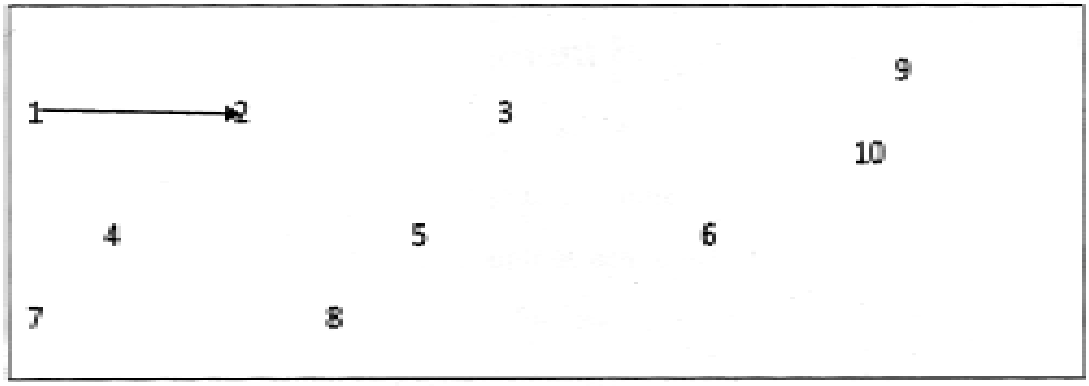
Ask the child to tear waste paper along the lines that you have marked

Ask the child to colour a particular object in a picture

Ask the child to throw the ball below the net

Activity

Ask the child to join the numbers in order and record the result



10. Eye- Foot Coordination

It is the ability of a child to perform a task using eyes and foot in harmony.

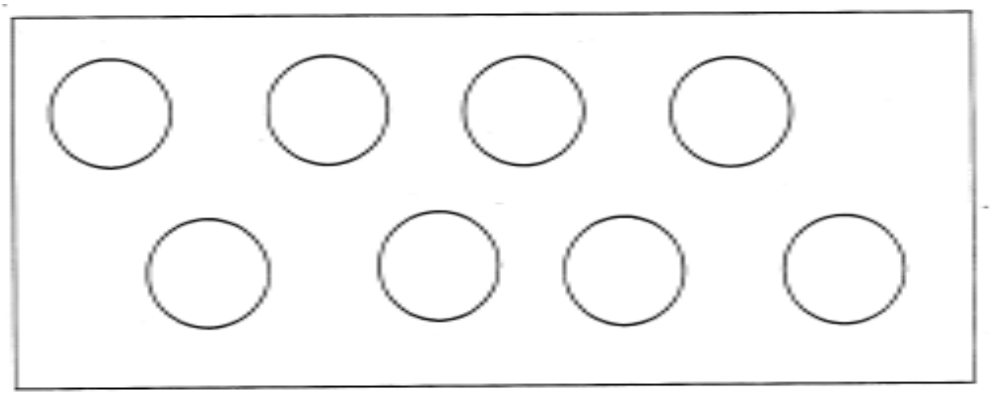
Choose an outdoor pathway. It could be a path from one building to another building or through the bush. The pathway should contrast with the ground on either side.

Ask the child to walk in front of you. Follow closely to keep the child from coming to harm by falling or bumping.

Observe if the child is aware of the sides of the path to follow. Check if he can see turns in the path and does not trip over rocks or hit over hanging branches.

Activity

A circle with white chalk can be drawn on the floor like cited below and ask the child to step on the markings.



The results give an understanding of the effects of the Low Vision for each child and how residual vision can be used. The results show the importance of factors such as distance, size, contrast and light for each child. The result should be discussed with the child with Low Vision, his family and other such as teachers and community based workers. It can be used to plan and execute a vision training programme.

4.5.2 : Low Vision Assessment by Jill Keeffe

Simple but effective tests have been developed by Dr. Jill Keeffe for the WHO annual –Programme for the Prevention of Blindness. These tests of distance and near vision based on E - test have been field tested in 32 countries and found to be appropriate for developing countries and their effectiveness for screening for low vision has been confirmed. The tests are simple to learn to use. The result can be easily interpreted and the test materials are portable. This screening helps to detect people with impaired and those with potentially normal or low vision.

Testing the Distance Visual Acuity.

The first step is to test distance visual acuity. It does not matter if a person cannot read for this assessment using the E test card.

The test distance is 6 metres (20 feet) for distance vision. The person must stand at 6 metres from the assessor. Six metre distance must be measured using 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 may measure 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 an 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.

Visual acuity is represented as a fraction.

Acuities	
First Line	6/60
Second Line	6/36
Third Line	6/24
Fourth Line	6/18
Fifth Line	6/12
Sixth Line	6/9
Seventh Line	6/6

The numerator indicates the distance from the chart at which the test is conducted. The denominator means the smallest line of letters that the child can read from the testing distance.

Procedure for Assessment

- Test eye separately
- Always begin with the right eye.

- Occlude or close one eye. In the case if right is being assessed, left eye is occluded. After testing each eye separately, test both eyes. If the child wears corrective lenses (spectacles) test child with lenses. Begin testing the visual acuity without spectacles and then test with the correcting lenses. The measurement of visual acuity while wearing spectacles should be considered.
- The child should identify characters by pointing when using E chart.
- Record the last line the child read and that is the visual acuity of the child. For example, if the child reads the third line and could not identify the characters in the nest line (fourth), the child's visual acuity recorded as 6/24. If 3 responses out of 4 are correct no further testing of distance vision is needed. Record the visual acuity.

In case where the child is unable to read the uppermost letter on the chart, he/she should walk one metre.

After one metre forward, until the child can see the top line or symbol. The distance between child and chart becomes the numerator and vision is recorded as such 5/60, 4/60, 3/60. Test visual acuity with the large E at 2 or 1 metre. If the child does not recognize the top letter from a distance of less than one metre from test whether the child identifies finger counting or only hand movement or able to perceive only light or total absence of light. The child may have usable vision and it is important to discover the amount and quality of vision even though it is limited.

If the vision is being tested, the World Health Organisation (WHO) categories should be used.

- Normal vision is acuity of 6/18 or better
- Low vision is acuity less than 6/18
- Blindness is acuity less than 3/60

For functional description low vision is considered vision up to light perception because the child with light perception can use the vision to identify doorways, discriminate day and night, for direction concept, mobility etc.

For child with low vision, spectacles may improve the vision but not correct it to normal.

The Assessment Form :

ANNEXURE- 1

Screening of Impaired Vision

Name of the child :

Standard :

Cause of Visual Impairment :

I. Visual Acuity (Distance Vision)

	Without correction	With correction
R.E	_____	_____
L.E	_____	_____
Both Eyes	_____	_____

II. Near Vision

N 48

N 20

N 8

III Visual Field

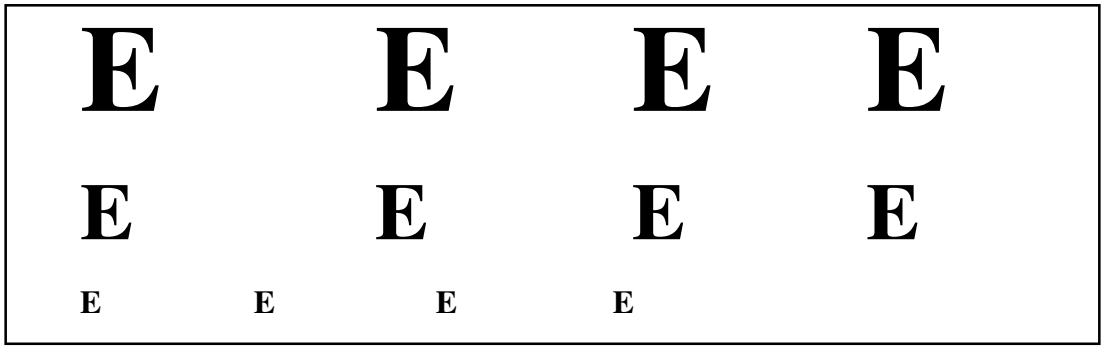
Normal/ Restricted/Severely Restricted

Date : Signature of the Assessor

Testing near vision

The purpose of testing near vision is to determine whether the child can perform near vision task like reading or what changes the child needs to perform the task or modification in the environment require 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 reading. Near and distance vision is 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 –I. The largest size of Es is N48 which are similar to headings in books and newspaper.



Testing procedure

- No standard distance is required.
- The test card is held at the distance preferred by the person.
- The light should come from behind and to one side of the window. Make sure that the person is not looking towards the sun or other bright light.
- Start with large Es. If the child cannot see these, tell him to hold the card closer to eyes.
- Record the smallest the child is size the child is able to read correctly. For example if the child reads the smallest size of the letters in the card, record the near visual acuity as N8.

4.5.3 : LEA Vision Test System

For Assessment and Screening

The International Classification of Functioning, Disability, and Health (ICF 2001, ICF-CY2007) is the basis for assessing functioning and disabilities and requires consideration of all impairment and disabilities. The ICD- based measurement of visual acuity and visual field is adequate for reporting visual impairment in surveys, where visual acuities are reported for both distance and vision (WHO/PBL/03.91,http:// whqlibdoc.who.int/ hq/2003/WHO_PBL_03.91.pdf).

Visual acuity test is the test most frequently used to assess visual functioning. These tests are designed so that geometric progression is the same at all visual acuity levels and spacing is proportional, i.e. on each line it is equal to the width of the optotypes on the line. Only a limited number of tests have the required structure. They include test based on Sloan letters like the ETDRS test (Ferris et al 1982), on British letters (Bailey and Lovie1976, Salt et al 2007), and on LEA symbols and LEA Numbers (Vaidhyan et al 2007). These tests have been calibrated against the reference optotype, the Landlot Ring,and provide similar visual acuity values. The small differences found in visual acuity values in several studies depend on the structure of the cohorts. Some studies included extrafoveal measurements, which affect the values specifically for each set of optotypes. In an ideal test, the optotypes blur equally at threshold (LEA test). If differences exist with optotype recognition, optotypes are selected to include a certain number of easy and difficult optotype on each line (Sloan letters).

Visual Acuity

The LEA test require recognition optotype. This requirement differs from resolving the direction of lines in the E-test or the gap in the C-test. In the assessment of visual acuity the goal is to measure the ability to recognise pictures of common objects, as well as characters and numbers.

Children's visual functions and communication during the assessment vary. Therefore, several tests have been designed to assess visual acuity in difficult test situations. Visual acuity test includes:

- Test with single symbols for measurement at distance and near
- Line test for measurement at distance and near
- Test with tightly spaced optotypes
- Test at low contrast 25%, 10%, 2.5% and 1.2%

Near and distance test based on the same optotype reveal difference in visual acuity between distance and near vision and are, thus, an improvement compared with the present situation in many countries where near vision is measured with text tests only.

LEA symbols visual acuity tests are single optotype test, standard line test, and line test with tightly grouped optotype. Single symbols test from near (40cm) and distance (3m) are the easiest optotype tests because there is no interference by surrounding visual information. LEA Numbers visual acuity tests are fewer in number than the symbols test because there are less often difficulties in communication in the assessment of school children and adults. The visual acuity line tests have 100% spacing between

optotypes. Near test includes spacing of 50%, 25% , and 12% to assess vision for reading and detect difficulties with other crowded information.

To achieve accuracy in measuring visual acuity, the tester should not point to individual optotypes. Pointing gives a visual reference, which improves fixation and visual acuity. Pointing to individual optotypes is likely to reduce amblyopia detection. The tester can cover the line above the line to be read that the tester and the child are reading the same line.

If a child's oculomotor functions are irregular, the screening test with more space between the lines in the near test and only one line visible on each page in the distance test facilitate testing. If fixation is stable but the saccades are irregular, the LEA puzzle can be used as the key card, which will allow child to feel the optotype forms without having to look at them. Many Young Children need a training period with the LEA Puzzle to learn matching or naming. While the child is playing with the LEA Puzzle, the test may observe the child's eye-hand coordination and visual and motor spatial memory by the turning the Puzzle board without the child noticing. The detailed instructions for testing are on the homepage www.lea-test.fn.

Grating Acuity

Grating acuity is measured either as *detection acuity* with LEA Grating in a preferential looking situation or as *discrimination acuity* using LEA Grating Acuity Test, which requires the ability to define and show or describe the orientation of the line.

Contrast Sensitivity

Contrast Sensitivity is measured with optotype and grating test. If the result from the measurements of contrast sensitivity, visual acuity value, and grating acuity value are marked on the recording form, the type of visual information transfer at different contrast level is clearly depicted.

Colour Vision

"Colour vision Testing Made Easy", created by Terrance Waggoner, OD, works well in testing young children's colour vision. Quantitative measurements are possible with the Panel 16 colour vision test. The test can be trained at www.lea-test.fi section Games.

Motion Perception

Detection and discrimination of slow movement can be tested with the pepi test, which can be copied from www.lea-test.fi. This test can be used to assess the vision of infants by observing the following movements. Older children can describe whether or what

they see. Johansson's " Walking Man" can be used to test perception of biological movements.

Visual Adaptation

Visual adaptation changes early in many retinal disorders. The functionally important cone adaptation can be observed during the CONE adaptation test game. This test requires a room where the illumination can be changed quickly from photopic to mesopic luminance to measure cone adaptation time.

Direction and Length of Lines

These two basic structures of pictures may be falsely encoded when entering the brain or distorted in the higher visual functions. This can be tested using the LEA Mailbox and LEA Rectangles.

Heidi Expressions

Children may have specific loss of perception of facial expressions. To discuss facial expressions with young children, the Heidi Expressions cards can be used as a matching game.

If you have not used the test before, practice with normally sighted infants and children with age appropriate behaviour. When you feel comfortable holding the test and can concentrate on observing child's way of answering, you are ready to set children with disabilities.

4.5.4 Portfolio Assessment

Historically, the traditional school examinations consisted of a set of questions to be answered orally or in writing. In either case, the examinee composed and formulated the response. The term "essay question" come to be used broadly to cover all free-response question, including not only those demanding a lengthy essay but also those requiring the examinee to produce a short answer or to work out the solution for a mathematical problem. "Objective question," by contrast, were those that called for the choice of a correct answer out of the alternatives provided for each question. Although there are several kinds of items that require examinees to select a response, such as true-false and matching, the multiple-choice question has been, by far, the most widely used, the most thoroughly studied, and, also, the most frequently criticized type of test item.

Critics of the multiple –choice format argue that it promotes rote memorization and learning of isolated facts rather than development of problem-solving skills and conceptual understanding. In addition, many uniformed people within the educational and political establishments equate multiple –choice items with standardized testing and disparage both of these elements of assessment methodology at once. In an ironic turn of events, the same standardized testing programmes used to chart educational progress often have been seen as contributing to the educational deficits they have uncovered. Unfortunately, the criticism about excessive and inappropriate use of standardized test as been thoroughly justified in some cases. At any rate, charges that testing drives the curriculum and that both are in urgent need of reform have emanated from educators at all levels and have grown increasingly stronger in the past two decades. Advocates of educational reform believe that a major overhaul is needed in curricular goals and instructional method, as well as in the tools of assessment, and they perceive all of these areas as inextricably tied.

Since the philosophical, political, and practical aspects of educational reform are beyond the scope of this book, we shall confine ourselves to discussing some of the proposed alternatives in assessment methodology. These alternatives are described by various rubrics, such as "performance-based" assessment, "authentic" assessment, and "direct" assessment.

The method known ***portfolio assessment*** provides another set of alternatives. This type of evaluation tool is aimed primarily at making the process of educational assessment as meaningful and realistic as possible. Although there are a wide range of procedures to which the term is applied, a portfolio usually consists of a cumulative record- collected over an extended period of time- of samples of students' work in specific areas, such as writing or any other endeavour that involves a process in which progress can be documented. The portfolio method of assessment offers a great deal of flexibility and can be implemented more or less formally and with various degrees of collaboration between the student and the teacher.

The reader will have gathered even from this brief overview that a great deal of attention is being paid to the means by which evaluation of learning and of students' work are conducted. This concern extends not only to what different items measure and how well they measure it, but also to other psychological aspects of test items. For example, Zeidner (1993) has investigated students' attitudes toward item formats and found that they prefer multiple-choice items rather than essays. Lu and Suen's (1995) research indicates that performance based assessment tends to favour field-independent over field dependent students. Other investigators have looked into the relationship between

test anxiety and item type and found that scores on constructed response test seem to be more affected by anxiety than those of selected response tests.

At the same time, the empirical literature concerning the strictly psychometric properties of performance based tasks used in academic settings has been accumulating gradually. Both the pace of the research and the direction of the result differ widely depending on the specific types of items in question. A fairly large number of students have investigated the reliability of the scoring procedures used for constructed response task.

4.6 Tools for psychological assessment of the Visually Impaired

4.6.1 : Vithova Pakinikar Performance Test

It would be worthwhile, at the outset, to describe, in brief, the development of Intelligence Testing from Binet, the pioneer in this field to the present day problems in this field including the work done that is useful in measuring intelligence of the blind.

Measuring intelligence by age Scales is the first stage. Binet's tests were first published in a graded form in 1905. They were again published in 1908 and 1911 in the form of an age scale ranging from year three to adulthood. D. Wechsler's Bellevue Intelligence Scale (1944) both verbal and performance has shown a good way to get over the difficulties referred to above. His method of converting total scores into I.Q's as standard scores is most useful from the practical point of view. The above scale is a point scale as distinguished from age scale. The method of finding I.Q. by this scale is easier than one of finding M.A. and then I.Q. Mr. K.K.Paknikar has followed D. Wechsler's method of finding I.Q's. Apart from the above Wechsler Bellevue Intelligence Scale (WBIS), he has to his credit the following viz. Wechsler Adult Intelligence Scale (WAIS) and Wechsler Intelligence Scale for Children (WISC). All are widely used.

Then comes the stage of performance Test for measuring intelligence. The pioneers in this field were Healy and Fernad (1911). Other prominent names in this field are: Fnox Pintner and Patersen, Gwyn kempf Schmitt, Hall Bruckner and King Gluk, Anderson, Kohs, Woodworth, Wells, Goddard and Alexander. At the beginning single tests were standardized. But to arrive at subject's I.Q.s a scale of scale performance Test was needed. The first of this kind is given by Pintner and Paterson (1917). Individual standardized Performance Tesst were included in the scale to form a battery of performance Test.

A significant point about performance test has not been referred to so far. Originally they were designed for measuring intelligence of the physically handicapped, or of those who had language difficulty. They were also used to supplement the finding arrived at by verbal tests. Whether they will be most suitable for measuring intelligence of the blind will be seen in the discussions that follow.

Obviously, the blind can take verbal test using their auditory power. But then the tests are to be presented orally only. This necessity will certainly put limitations to the presentation of the test. The experiences usually better gained by sight, e.g. forms of objects are out of question in an oral test. Secondly, the oral test will be time consuming. There is another handicap for the blind in having a test with the help of a printed question. It cannot be in the usual script. It must be in Braille and if it is presented in Braille and the test cover all aspects of intelligence. The bulk of paper to be handled will be big and the taking of the teat will be cumbersome and time consuming for the blind.

Earlier the writer has referred to the inherent difficulties in standardizing a verbal test for the blind. Difficulties in administering it are also noted. Individual performance tests, though standardized, will not give true picture of the intellectual potential of the blind unless they form a battery of tests. Secondly, individual performance tests that are now used with the blind are given with suitable modifications in the original tests for the sighted. Comprehensive Performance Scales for the sighted have not as yet been tried on blind population. These Scales also are time consuming and in certain sub-test there is an element of trial and error. Hence the need of comparatively shortrd battery of performance tests for the blind, which are nearly void of any chance element in them. The writer has genuinely tried to give to the blind population such a battery of Performance Tests.

The writer has already referred to the experimental finding that visual impairment does not impair the intellectual potential. Human experience shows that there have been intellectual giants and mental defectives among the blind. The writer knows many blind geniuses. During the testing programme in blind Schools the writer came across mental defectives who were a great strain on teachers' capabilities for handling the handicapped during teaching periods.

Predictive value of intelligence tests is unquestionable now. Problems of the blind have now passed from the social level to the educational. A shorter scale of performance Tests, therefore, is needed to spot out the genius and to weed out the M.D. from the population in schools.

Selection and description of performance tests for the blinds

The tests that are included in the present performance Scale are based on the tactual and kinaesthetic experiences only of the subjects to be tested. Visual experiences though the richest –in-life, are out of question here. The other Performance Scales referred to test of memory, e.g. repetition of digits by tapping blocks in a particular order, number formation by means of dominoes and actual repetition of digits or consonants. The first two tests require visual experiences and the third auditory ones. The first two are out of question with the blind. The third type may be included in a performance Scale for the blind. During the testing programme, we used tests of repeating digits in the same order or the reverse according to the scheme at different age levels as given by Kamat in this revision of Binet's scale. This was continued till more than 150 subjects were tested. The experience was discouraging as in general, the blind subjects did not pass the test at their age levels. When inquired, otherwise intelligent subjects, remarked that they could not easily attend to the repetition of digits by the examiner. This finding goes against the general impression that auditory experiences of the blind are better than those of sighted persons. It would be worth while if we quotes significant observation of Dr. Kamat under 'repetition' tests in this scale. 1) It is difficult to secure attention to the repetition of digits by the examiner. 2) Trial series are, therefore, included in a repetition test. 3) Repetition test should not come first. It should be taken later after the examiner sees that the subject is taking tests easily. 4) Several repetitions of practice series may be required. 5) Three trials are given and the subject should pass at least in one trial. 6) Even with repetition of meaningful syllables a second repetition may be required. If the subject passes, do not count success but go to the next trial. 7) A repetition test puts strain on the mind. Hence it should not be given at the end of the examination. Fatigue is setting in them. 8) Even with the repetition of meaningful syllables the subject's attention may flag. So two trails with one error each may be taken as a success. 9) Practice may begin with a trial at a lower age level. 10) Memory for digits falls off after 16.

The Paknikar has purposely quoted these observations to show that a 'Repetition of Digits' Test seems to be a handicap to a blind subject. Why should another handicap be added to the natural one or one brought by misfortune namely, loss of sight? He has dilated on this point as objection may be raised to his omitting 're petition of digits test in the thus barring the subjects auditory experiences leaving only two types of experience, viz., tactual and kinaesthetic to be used. Secondly, the tests are included in the scale according to the criteria that are generally accepted. The criteria are statistical and other.

1. The nature of the scale, whether age or point, should be next consideration. The Paknikar has discarded the age scale as he thinks that deciding upon the median time for successful performance at each age level, for assigning age to each test is a very laborious process. He has also refer to the drawbacks of an age scale. It is easier to fix points to each test if highest time limit for complete performance at lower age level is considered. This has been strictly followed. Success with in time will earn some points. Success beyond time-limit will earn zero score.
2. The scale should not measure any specialized ability. The test materials is so simple that even manipulative skill is out of question.
3. Maximum scores should not be obtained by most subjects. There has been gradual rise in average score from the lower age level to the higher age level.
4. The tests should discriminate well at all levels of intelligence from the lower to the higher. The results show that subjects at higher ages take less and less time to complete a test as compared to subjects at lower ages.
5. There should be no cases where subjects of higher age fail while subjects of lower age pass. No such cases are found with the exception of M.D's.
6. On actual try out it was found that tests 1 to 5 worked well. There was a short pilot study. At the first stage, these tests were tried by three sighted adults blindfolded to see how they would work with the blind. They had the impression that latter tests would not work well. Then they were tried by a blind pupil from a secondary school. Surprisingly, they worked well with the blind subject. She was successful in even those tests in which the adults failed trying them blind-folded. Later some sighted children also tried these tests blind-folded with interest. These cases are not included in the sample on which norms are based. The usual method of a pilot study could not be adopted as the subject in pilot study cannot be included in the actual data. In the case of blind population this would entail a loss in actual data which is available with great difficulty. Hence the objective in this pilot study was to see how the tests of circle formation would work with the blind.
7. Experience with the test should determine the validity of the scale. Generally correlation with recognize tests and teachers' rating are considered.
8. The test should lend themselves to scoring with relative ease.
9. An average individual with average opportunity should be able to acquit of himself well. It is so with the tests.

10. There should be increasing frequency of success in test with higher intellectual level. It is so found.
11. There should be some order of difficulty in the test. When the nature of test is similar they are arranged according to difficulty-from simple to complex.
12. The test should be interesting to the subject. Mr. Paknikar experience with the blind subjects tested was that their interest did not flag during testing time.

4.6.2 A short scale I.Q. measure for the Visually Impaired based on WISC-R

The intelligence scales developed by David Wechsler include several successive editions of three scales, one designed for adults, one for school age children, and one for preschool children. Besides their use as measures of general intelligence, the Wechsler scales have been investigated as a possible aid in psychiatric diagnosis. Beginning with the observation that brain damage, psychotic deterioration and emotional difficulties may affect some intellectual function more than others, Wechsler and other clinical psychologists argued that an analysis of the individual's relative performance on different subtests should reveal specific psychiatric disorders.

Antecedents and Evolution of the Wechsler Intelligence Scales. : The first form of the Wechsler scales, known as the Wechsler –Bellevue Intelligence Scale, was published in 1939. One of the primary objectives in its preparation was to provide an intelligence test suitable for adults. In first presenting this scale, Wechsler (1939) pointed out that previously available intelligence test had been designed primarily for schoolchildren and had been adapted for adult use by adding more difficult items of the same kinds. The content of such tests was often of little interest to adults. Unless the test items have a certain minimum of face validity, rapport cannot be properly established with adult test takers. Many intelligence test items, written with special reference to the daily activities of the schoolchild, clearly lack face validity for most adults.

It was in order to meet these various objections that the original Wechsler Bellevue was developed. In form and content, this scale set a basic pattern for all the subsequent Wechsler intelligence scale, each of which has, in turn, added some refinements to its immediate predecessor. In 1949, the Wechsler intelligence Scale for Children (WISC) was prepared as a downward extension of the Wechsler Bellevue (Seashore, Wesman, & Doppelt, 1950). Many items were taken directly from the adult test, and easier items of the same type were added to each subject. The Wechsler Bellevue itself was supplanted in 1955 by the Wechsler Adult intelligence Scale (WAIS), which corrected some of the

earlier scale's technical deficiencies with regards to size and representativeness of the normative sample and reliability of the subtests.

The development of the WISC was somewhat paradoxical, since Wechsler embarked upon his original enterprise partly because of the need for an adult scale that would not be a more upward extension of available children's scales. The first edition of the WISC was, in fact, criticized because its content was not sufficiently child-oriented. In the revised edition (WISC-R), published in 1974 and designed for 6 to 16 years- olds, special efforts were made to replace or modify adult oriented items so as to bring their content closer to common childhood experiences. In the Arithmetic subtest, for instance, " cigars" was changed to "candy bars". Other changes included the elimination of items that might be differentially familiar to particular groups of children, and the inclusion of more female and Black persons in the pictorial content of the subjects. Several of the subtests were lengthened in order to increase reliability. Improvements were also introduced in administration and scoring procedures.

Description of the Scale: By now, each of the three Wechsler scales has gone through one or more revisions. The current versions, published under the name of David Wechsler even after his death in 1981, are the Wechsler Adult Intelligence Scale- Revised (WAIS-R-Wechsler,-1981), which covers the age span of 16 to 74 years; the Wechsler Intelligence Scale for Children- Third Edition (WISC-III-Wechsler, 1991), intended for children aged 6 years to 16 years and 11 month; and the Wechsler preschool and primary scale of intelligence revised (WPPSI-R-wechsler, 1989), which now covers the range of 3 yers to 7 years and 3 months. WAIS- III has been revised in 2005 and named WAIS- IV.

WAIS- III has some advantages. Its major advantages are as under:

i) It incorporates the modern multidimensional nature of human intelligence, including fluid intelligence and processing speed.

ii) It incorporates the possibility of pattern analysis.

iii) It is appropriate most suitable for assessing adult human intelligence.

iv) It uses deviation IQ.

v) It has impressive degree of reliability and validity.

vi) It uses a point scale.

vii) It makes provision for index score which provides a support to multidimensional nature of human intelligence.

However, WAIS – III has also some disadvantages as under:

i) It is a poor measure of extreme levels, that is, high or low level of intelligence.

ii) It does not take into consideration the theories of multiple intelligence as enunciated by Gardner(1983).

iii) It has poor reliability for the individual subtests.

The WAIS-R, WISC-III, and WPPSI-R share many features, including their basic organization into Verbal and performance scales each of which consists of a minimum of five subtests (and a maximum of seven) and yields separate deviation IQs. The individual scores on all 10 of the regularly administered subtests (11 for the WAIS-R) are combined into a Full Scale IQ which has a mean of 100 and an SD of 15, as do the Verbal and Performance IQs. Of the 17 different kind of students used in the WAIS-R, the WISC-R, the WISC-III, and the WPPSI-R, eight(5 verbal and 3 performance subtests)are common to all three scales. In administering the scale, the verbal and performance subtests are alternated and given in a predetermined sequence that varies with each scale.

The information subtest is the first verbal subtest to be administered in all three scales and serves as a good rapport builder. Efforts have been made to avoid specialized knowledge. The first items are easy enough to be passed by the vast majority of examinees, unless they are mentally retarded or have reality orientation problems. In such cases the examiner may quickly decide to discontinue the testing. The question in the WAIS-R and WISC-III version of Information cover facts that most person in the United States would have had a chance to learn, such as “What month comes right before December”.

The WPPSI-R has similar questions, albeit at a lower difficult level. The Arithmetic subtest is another verbal measure that illustrates the wide range of difficulty across the Wechsler scale. The easiest WPPSI-R Arithmetic items require pointing to the one object pictured in an array that illustrates a quantitative concept (such as “smallest” or more)

The performance subtest of the Wechsler scale typically require the manipulation of

various objects. Such as puzzles and blocks, or the visual scanning of printed materials, like pictures or symbols. They all place time limits on the test taker, who in most cases is also given bonus points for speed. In the verbal scale, by contrast, only one subtest (Arithmetic) is speeded. Picture Completion is a performance subtest shared by all three Wechsler scales; it requires the examinee to identify what important part is missing from pictures of common objects or scenes. The items for the earlier ages rely on basic visual inspection-for example, by presenting the picture of an animal with a limb missing.

Concluding Remarks on the Wechsler Scales

The successive edition of the three Wechsler scales an increasing level of sophistication and experience in test construction, corresponding to the decades when they were developed. In comparison with order individually administrated tests, their principal strengths stem from the size and representativeness of the standardization samples, particularly for adult and preschool populations, and technical qualities of their test construction procedures. The treatment of reliability and validity in the WISC-III manual is especially commendable. The popularity of the Wechsler scales assures them of a constantly expanding research base for the time being.

However, some critics have noted that even the latest, most improved versions of the Wechsler scales may soon become obsolete in light of the current demands for links between assessment instruments and intervention strategies.

In this regard, the weakest feature of all the Wechsler scales has been their lack of theoretical grounding, which makes it hard to find a coherent basis for interpretation. Furthermore, the composition of the scales seems to presume that the ability domains tapped by their subjects across age levels are the same because of the superficial similarities among test materials and tasks.

4.6.3 Adapted EPQ (Eysenck Personality Questionnaire)

Based on a lifelong programme of factor analytic questionnaire, Eysenck and Eysenck (1975) developed a series of test designed to measure normal and abnormal dimensions of personality. Eysenck identified three major dimensions of personality: psychoticism (P), Extraversion (E), and Neuroticism (N). The Eysenck Personality Questionnaire (EPQ) comprises items that intend to measure these three dimensions of personality. The EPQ consists of 90 statements to be answered in terms of either Yes or No and is specially suited for persons aged 16 and old. It also incorporates a Lie (L) scale to

assess the validity of the testee, or examinee's responses. Also a junior EPQ is available for assessing these dimensions among children aged 7 to 15 and it consists of 81 statements. A brief description of these three scales are as under:

1. **P Scale:** P scale assesses the dimension of psychoticism which is not equivalent to psychosis such as schizophrenia although a schizophrenic is expected to score high on P scale. It assesses traits like poor concentration, poor memory, insensitivity, liking for unusual things, disregard for danger and convention, cruelty, lack of caring for others. Such persons are considered peculiar by others. A high score on P scale indicates impulsivity, aggressive and hostile traits, empathy defect and a preference for liking odd or unusual things. Antisocial personality and schizoid personality often obtain high scores on this dimension. A low score on P scale indicates some derivable characteristics like empathy and interpersonal sensitivity. A few examples of items of P scale are:

   Do you take risk just for fun ?(T)

   Do you often break the rules? (T)

2. **E Scale:** E scale assesses the dimension of extraversion and its polar opposite introversion. High scores on E scale indicates tendency to be outgoing, preference for activities involving contact with other people, desire for novelty. Such persons are fun-loving and gregarious. Low scores on this scale indicate introverted traits such as preference for solitude and quiet activities. Such persons show tender mindedness, introspectiveness and seriousness. A few examples of items of E scale are:

   Do you like plenty of excitement? (T)

   Are you quiet when with other? (T)

3. **N Scale:** N scale assesses the dimension of neuroticism that includes traits like slowness in thoughts and actions, suggestibility, tendency to repress unpleasant fact. Lack of sociability, below –average emotional control, will power and capacity to exert self. A high score indicates that the person is nervous, maladjusted and over emotional and a low score indicates that the person is stable and confident. A few examples of items N scale are:

   Are your feelings easily hurt? (T)

   Do you feel dullness in life? (T)

A major focus of research with the EPQ has been to find out the empirical correlates of extraversion and its opposite introversion and such researches have linked several perceptual and physiological factors to the dimension E-I. Some of the important such linkages are:

(I) Extroverts have a greater need for entertaining external stimulation.

(II) Extroverts are readily conditioned to stimuli associated with sexual arousal.

(III) Extroverts are more suggestible than introverts.

(IV) Introverts are vigilant in watch keeping.

(V) Introverts' performance on signal detection tasks are comparatively more improved

(VI) Introverts are less tolerant of pain but more tolerant of sensory deprivation

The psychometric properties of the EPQ are satisfactory. The one-month test-retest reliabilities were. 78(P), 89 (E),96 (N), and 84 (L). The internal consistency reliabilities were in the 70s. for P and the .80s. for the remaining three scales. The construct validity of EPQ is also well established in several studies using emotional, behavioural, attentional, learning and therapeutic criteria (Eysenck & Eysenck, 1975,1985)

4.6.4 Adapted Blind Learning Aptitude Test

Testing the blind presents a very different set of problems from those encountered with the deaf. Oral tests can be most readily adapted for blind persons, while performance tests are least likely to be applicable. In addition to the usual oral presentation by the examiner, other suitable testing techniques have been utilized, such as tape recordings. Some test, such as the College Board Scholastic Assessment Test (SAT), are also available in large-type formats or in Braille. The latter technique is somewhat limited in its applicability, however, because of: the greater bulkiness of materials printed in Braille compared to those provided in ink; the slower reading rate for Braille; and the number of blind persons who are not facile Braille readers. The test taker's responses may likewise be recorded in Braille or on a keyboard. Specially prepared embossed answer sheets or cards are also available for use with true-false, multiple-choice, other selected response items. In many individually administered Tests, of course Oral or gestural responses can be obtained.

Among the earliest examples of general intelligence test that have been adapted for the blind persons is the Binet. The first Hayes-Binet revision of testing the blind was based on the 1916 Stanford-Binet. The most recent adaptation comparable to the Stanford-Binet from L-M is the Perkins –Binet test of intelligence for the blind.

The Wechsler Scales have also been adapted for the blind test takers. These adaptations consist essentially in using the verbal tests and omitting the performance tests. A few items inappropriate for the blind are replaced by alternates. In general, the studies of children who have poor vision or blindness suggested that these conditions may have a negative impact on their cognitive development, even the verbal area, because of the limitations such condition impose on the range and variety of their experiences.

Very few instruments have been developed specifically for use with visually impaired persons. Possibly the best known example of these is the Blind Learning Aptitude Test. (BLAT). The BLAT is an individually administered test that incorporates items adapted for other tests such as Raven's progressive Matrices, and other nonverbal items, and presents them in an embossed format. Emphasis is placed on the learning process rather than on products of past learning, which might handicap the blind child. Information regarding reliability and validity is scant and requires further research. Nevertheless, the BLAT can be useful component along with verbal tests, in the evaluation of blind children elementary school age.

The Intelligence Test for visually impaired children incorporates haptic or tactile versions of tasks such as Block Design into a Battery that includes several on verbal and verbal subtests. As in this case all the other special conditions discussed, visually Impaired occurs in a wide ranges of gradations and quite often combination with other problems. Thus, the decision of whether to use standard tests, adaptations of them, or specially designed tests for the blind depends on the objectives of the assessment and the unique characteristics of the persons in question. In general, tests users should always remember that modifications tests such as tactile presentations of Visual design or extended time limits, cannot be assume the same constructs as the Original Versions.

4.6.5 Concept Development for blind children

Concepts grow out of the perceptual process and become enriched as the child develops language. The breadth of concept development is dependent in large measure on the breadth of the perceptual experiences. Because the blind child lacks one source of

sensory input, his perceptual processes are deficient. He may never grasp some concepts and need more experience than the sighted child to grasp other.

A concept is a network of significant inferences by which one goes beyond a set of observed criteria properties exhibited by an object or event to the class identity of the object or event in question, and thence to additional inferences about other unobserved properties..... the network of inferences that are may be set into place by an act of categorization.

The developmental theory of Piaget will from the frame reference for identifying mental developmental needs. Piaget's stages of intellectual development are outlined very briefly here. (For more details, see Flavell, 1963; Ginsburg & Opper, 1969; and Maier, 1665)

The first 2 years of life are described as the *sensorimotor stage*. The infant progresses from purely reflex activity to more systematic and organized behaviour. He learns that he has some control over object world and will search for a toy he has lost. He learns that objects are independent for himself. Finally he learns to imitate and to respond to people through imitative behaviour.

At approximately 2 years of age the child enters the *symbolic pre-conceptual phase.* The imitative behaviour of the previous period becomes internal imitation (accommodation) and provides the child with symbols which acquire meaning through assimilation. He will apply his symbols in a playful make-believe fashion to other situations as he tests out their appropriateness. He begins to use language for objects and events that may not be present at the moment.

The child enters the phase of *intuitive thought* at about 4 years of age. This phase and the preceding pre -conceptual phase are sometimes called the preoperational stage. Language now becomes repetition, monologue and collective monologue; it is described by Piaget as egocentric, that is, the child is neither concerned with nor interested in what another is saying. By contrast, communication is based on interaction with others and has as a purpose the relaying or sharing of information. During this period, the child employs imitation more or less consciously in a pre-identification fashion. Further, he broadens his social horizons and interest in the world about him.

From approximately 7 to 11 years of age the child passes through the stage of concrete operations. During these years, the child acquires the ability to order and to relate his experiences into a gestalt, or organized whole. He establishes system of classifications and moves from inductive to deductive thinking. While language is now a tool of

communication, he still employs symbolic speech without true understanding of meanings. He looks beyond his family for models to imitate.

At about the age of 12, the child enters the stage of *formal operations,* the final period of intellectual development. During this stage, the adolescent moves from the concrete to the abstract. He enters the world of ideas. He formulates hypotheses concerning the various results of an action and considers what might occur. He utilizes language as a means of communicating thoughts and ideas. He reaches an understanding of his world and where he fits in that world.

It should be remembered that the ages attached to the stages in this outline are approximate, and that development through the stages may not proceed evenly on all fronts.

In case of blind children abstractions such as a concept of colour may never be formed, since the child has no possibility of acquiring a background of sensory input for this concept. His understanding of this group of concepts will of necessity remain on the verbal level and be based on what others have described to him. Thus, his grasp of such concepts will come only through various experiences and cannot truly be his own. In this area, he may have difficult moving beyond the stage of concrete operations.

The concepts of distance and time illustrate another group which eventually may or may not be grasped, depending on the variety and number of experiences designed to give them meaning. For example, the sighted child may acquire some meaningful concept of distance by visual input, that is, how far he can see, and later through an understanding of relative as shown on a map drawn to scale. While the blind may reach some understanding of distance through his kinesthetic sense, he encounters difficulty in doing so. Walking a specific distance would be the most meaningful procedure, but a walk of sufficient length to give an idea of great distance would not be feasible. Further, his deficiency in grasping what distance is prevents his making maximum use of maps through his tactile sense in order to acquire a concept of relative distance. He needs many concrete experiences through his kinesthetic sense in order to use maps effectively.

Educators need to be aware of potential difficulties of the visually impaired children in the area of concept formation and particularly should emphasize meaningful concrete experiences in order to maximize concepts that have relevance for the child.

4.6.6 Reading Preference Test for Children with Low Vision

A research on “Development of Low-Cost Functional Assessment Kit and studying the Relationship Between Visual Acuity and Visual Efficiency of Low Vision Children “ was conducted by the Dr. M.N.G. Mani from 1994-1997. This research work was

supported by the Educational Research Innovations committee of the National Council of Educational Research and Training, New Delhi. The study was conducted with 321 low vision children in the state of Tamil Nadu, India. It reveals that majority of low vision children do not have formal visual efficiency training. Moreover, there is empirical evidence that the higher visual acuity of the child does not mean that the visual efficiency too is better. The research reveals that visual efficiency skills of low vision children improve only through systematic visual efficiency training. Large print materials should be prescribed for some low vision children and not for all. While deciding about print reading, certain components such as prior familiarity of print letters, print size required, distance at which reading task is performed, fatigue, etc., have to be considered. Research reveals that a low vision student may use his vision for reading large print for a brief time may not be able to use it for a prolonged time. Similarly another student may use 30 points print size comfortably but all books cannot be presented such a magnified manner. Even use of magnifiers may reduce the field of vision. Still in some other cases, the vision in the low vision students may be deteriorating. Therefore all low vision students may not be benefited by large print materials or magnifiers. They require Braille for reading purposes while the residual vision can be used for mobility, reading news headline, etc. Therefore it is most essential to know the reading preference of a low vision child before prescribing large print or Braille. The Reading Preference Test (REPT) has emerged out of a through research and helps any practitioner to determine the print of Braille reading preference of a low vision child. The areas, which are considered as vital, in the assessment of the reading preference of a low vision child are:

1. *Light perception: sunlight/Dim light difference*
2. *Light perception: Good light/ poor light difference in a class.*
3. *Light tracking*
4. *Detecting hand movement*
5. *Distance of detecting hand movement*
6. *Finger counting : Fingers raised one at a time*
7. *Finger counting: Fingers spread apart*
8. *Finger counting- (general): Fingers closed together*

9. *Finger counting inside the classroom with good lighting condition*
10. *Finger counting inside the classroom with poor lighting condition*
11. *Visual background*
12. *Colour detection*
13. *Visual Closure*
14. *Form constancy*
15. *Eye/hand coordination*
16. *Eye/ foot coordination*
17. *Print size preference without magnifiers*
18. *Print size preference with magnifiers*
19. *Time taken to read a passage (Mother tongue/ English)*
20. *Skill in reading both print and Braille*
21. *Ability to write*
22. *Writing speed.*

The REPT is not accompanied by a TESTING KIT. A testing kit was deliberately avoided to improve the usage of the test even in rural areas. Through some concepts like 'lighting condition' can be tested better under controlled and laboratory conditions, the test does not envisage children being tested so. The description of 'good' and 'bad' lighting condition is viewed in the context of the available lighting condition in the school or locality where the child with low vision is identified. Whatever condition perceived by majority of seeing children as 'bad' and 'good' lighting condition should be used with low vision children too. A contrived situation for testing not created. *We are fully aware of the fact that such testing may not be accurate. However, it would be definite beindicators about the reading preferences of the vast majority of* low *vision children.* Experiments with the most of the low vision children reveal that the environmental conditions created in REPT are appropriate. However, the reading preference of 2-3% of low vision children may not be detected by REPT. As the objective of REPT *is to make reading preference assessment a mass movement for all low vision children in the rural areas, the expected benefits for low vision children far outweigh the forced limitation of the Test.* Therefore, the limitation of the test is not by its construct by its concept.

The assessment items and the accompanying self- instructional guidelines are enumerated as follows:

1. Can the child distinguish between the light Perception in sunlight and the same under Cloudy Conditions? **How to Test?** If the child has light perception, he should Detect It when the sun comes out of the cloud. Therefore, the testing Should be done in such a natural condition. If the child succeeds, proceed to item 2. If no, the assessee is a child without light perception he is certainly a Braille reader.	**Yes:** **No:** **Remarks:**
2. Can the child localise the light source? **How to test?** For testing this, move a Torchlight in front of the child and see Whether or not he/ she is able to track The light source. If the child succeeds, he/she can involved in various educational experiments in science which involve light (for example, light rays pass in a line) but Still the child may be a braille reader. In Such a condition more difficult conditions may be tested. If no, light perception of the Child has only a very limited use in education.	**Yes:** **No:** **Remarks:**
3. Can the child detect hand movement in front? **How to Test?** For testing this, move your hand from left to right and vice versa in front of the child If yes processed to item 4. If no, the child will certainly be a Braille reader, but the residual vision is useful for mobility and other purposes.	**Yes:** **No:** **Remarks:**

4. Can the child count fingers when they are Kept together? **How to test?** Show the palm with fingers with put together and ask the child to count fingers. If the child succeeds, see whether the child can perform the task under different lighting condition. If no, the child cannot succeed in print reading. Teach Braille but orient the child to scrip letters too. He can read large print with difficulty.	**Yes:** **No:** **Remarks:**

4.6.7 Cornell Medical Index for Visually Handicapped Children

The Cornell Medical Index (CMI) was created in 1949 and its purpose as stated in the original manuals was: to meet the need for an instrument suitable for collecting a large body of pertinent medical and psychiatric data at a minimal expenditure of the physician's time. It serves as a standardized medical history and as a guide to subsequent interview: The original CMI was validated through several studies on populations of varying sizes.(See: Lowe, DJ. The Cqrnell indices: A bibliography of Health questionnaires. 1975 :

The Cornell University Medical College Library, New York, NY.([PDF copy available]) form Its inception through the 1970s, the CMI was widely used both at new York Hospital(Now New York-Presbyterian Hospital) and throughout the country. It was considered valid, reliable, and reputable particularly since it bore the name of Cornell. The CMI had been copyrighted by Cornell University Medical College (now the Joan and Sanford I. Weill Medical of Cornell University) so individuals wishing to use the CMI purchased the questionnaire forms and the manual from the medical college.

By 1980 the situation had changed. The questionnaire was becoming out of date, particularly in the language that was used. The supply of questionnaires was depleted and a reprinting was required. There was a concern about reprinting the CMI without some revision so the questionnaire was revised but only at the level of the wording. No substantive revision was made in the nature of the data collected by the questionnaire. The revised questionnaire was completed and copy righted in 1986 and a new printing was completed. This revised version was sold until 1990. Cornell

Medical Index is a medical subject Heading and this linked Pub Med/ Medline search will bring up a bibliography of the Index's use.

Also in 1986, the issue of the future of the CMI was raised. Sales were declining and the college wanted to investigate the options available for marketing the CMI. Since it bore Cornell's name, there was concern with the product. A committee to study the CMI Was formed with members appointed by the Chairs of Medicine, Neurology, and Psychiatry. The committee examined the issues concerning The CMI, did a survey of post customers, investigated other instruments available for similar uses, and looked at the content of the CMI. These investigations found that there were many uses of the CMI. These investigations found there were many uses of the CMI but the predominant use was by private practice physicians. Many of the comments the committee received indicated a need for revision although there were users who are satisfied with it as is. The committee also found the CMI was no longer being used in the New York Hospital because it was not felt to be particularly useful. There also did not appear to be any enthusiasm by the individuals on the committee for revising and revalidating the questionnaire, something that would need to be done if it were to continue to be actively marketed. As a result of this review, the committee concluded that the CMI was no longer a viable product and should be phased out. They believed that the CMI was a product that no longer served a useful purpose and that is continuance had been related more to its historical position then to its contribution to health screening.

As a result of this review, the CMI was phased out over period, July 1990 - June 1991. Since that time, requesters were told that the CMI was out-of- print. The college still retains the copyright, however, so it could reinitiate the CMI in the future if there were clinicians interested in doing a revision and revalidation. Since 1991, requesters have been informed that they could receive a sample copy and could reproduce it for their own non - commercial use that they must take Cornell's name of the forms. This approach has allowed the College to respond to requests but at the same time inform the requester of the problems associated with using the CMI.

As of July 2001, this practice has ceased and now the CMI is available only for historical purposes and for research not involving human subjects. Individuals interested in receiving a copy of the CMI for these purposes should contract the Medical Centre Archives of New York- Presbyterian/ weill Cornell at (212) 746- 6072 or at email-archives@med.comell.edu.

4.7 Report Writing

We will examine some of the broad issues involved in the communication of test results with particular reference to ethical and social implications. For the clinician, such communication usually includes the preparation of a written test report or case report that is often followed by discussion or consultation with the client parents, teachers, or other professionals. Even in those situations that do not require a written report, it is a good idea to prepare one as a record for future reference. The preparation of a report also helps to organize and clarify the clinician's own thinking about the case and to sharpen her or his interpretations. Report writing represents the final stage in the clinician's synthesizing function. In its content, the report should draw upon all the data sources (test and non test) available to the clinician.

veral books provide guidelines for report writing. Without duplicating the many lists of suggestions that can be found in such sources. We shall focus on some of the major points. **First,** there is no one standard form or outline for all reports. Both content and style should and do vary with the purpose of the assessment, the context in which it is conducted, the persons to whom the report is addressed, and the theoretical orientation and professional background of the clinician. It is especially important to adapt the report to the needs, interest, and background of those who will receive it. For example, a report addressed to a lawyer needs to be quite different from one address to a psychotherapist. Nevertheless for both of them, the clinician should select what is relevant to answering the questions raised at the outset from the mass of data he or she has gathered.

The report also should concentrate on each individual's differentiating characteristic – the high and low pints- rather than on traits in which the individual's standing is close to the average. A test of the effectiveness of a report is to see whether it is unique to the individual or whether it applies equally well to other persons. It is a relatively easy task to prepare a pseudo-report from general, stereotyped statements that apply to most people. A considerable body of research has demonstrated that such reports are readily accepted as "remarkably accurate" self descriptions by a large majority of persons (Goodyear, 1990; Klopfer, 1983; sny –der & Larson, 1972; Tallent, 1992, pp. 236-238). This pseudo validation has been called the " Barnum effect", after phineas T. Barnum, the famous showman who is credited with the remark that there's a sucker born every minute. Reliance on such generally applicable personality descriptions is a favourite device of fortune tellers and other charlatans.

The primary focus of the report should be on interpretations and conclusions, although

test records and other detailed data may be separately appended in some cases. Specific data, such as individual responses and subject scores, should ordinarily be cited only to illustrate or clarify a point. Reports should be carefully organized and integrated. Books on the preparation of assessment reports usually contain helpful hints for good writing as well as references to standard manuals of style. One particularly entertaining little books that should make writing less painful for both writer and reader is the Elements of Style by Strunk and White (1979)

4.8 Check your progress

1) Write down the importance of early identification and intervention programme for children with low vision.

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2) Briefly explain the clinical evaluation of low vision using the equipment in Clinic.

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3) Explain the procedure for screening of impaired vision with the commonly adapted test.

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4) What is functional vision? How do you assess the visual skills?

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5) Describe the method of selecting items/materials for the functional assessment and enumerate the points to be borne in mind while administering the test.

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6) What is vision stimulation?

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7) Common areas of difficulty in functional vision assessment is an area to be identified by the teachers- comment.

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8) What is visual tracking? Explain with an example.

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9) Write down the use of aspheric lens for vision training.

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10) Describe the concept development of the Visually Impaired Child.

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4.9 Let us sum up

- Early intervention services have significant impact on the visually impaired infants and toddlers. Early intervention plays a significant role in preventing and reducing the extent of developmental delays. It is important to identify children who have impaired vision. The children with visual problem can be identified within some eye conditions. Vision may be improved with spectacles, treatment or operation.
- A clinical low vision evaluation assesses whether or not a child will benefit from optical devices such as monocular telescopes and or magnifiers. An optometrist or ophthalmologist who specializes in low vision and the prescription of optical devices performs the clinical low vision evaluation.
- Simple but effective tests have been developed for vision screening.
- Functional vision is the used of vision for particular activities. Functional visual skills are required to carry out every day activities.
- This assessment provides information regarding a student's ability to use his vision within the learning environment. It includes acuity, colour, fields, and environmental accommodations.
- A child with low vision may be able to progress through sequential training of visual skills.
- Children who have very little vision or have not used vision need to know that they can use their vision. They may also need encouragement to do so.
- Visual efficiency is the processing ability of the brain. It is unique to each child.
- At this efficiency level those with low vision learn to distinguish patterns of visual stimuli, differentiate outlines, inner detail of objects and transfer this learning into two dimensional pictures and symbols.
- The visual efficiency can be developed by training but cannot be measured clinically.
- The visual skills to be trained are visual attention and awareness, control of eye movements, scanning. Tracking visual discriminations, visual figure-ground discrimination, visual closure, visual memory, recognition of action, form constancy, eye hand and eye foot coordination.

  Normally students with low vision may have additional visual fluctuations,

such floaters in the visual field, light sensitive, eye fatigue, degenerative condition etc. Parents and teachers must continue to provide creative and meaningful visual stimulation in order to foster the presentence. It is essential that the student understanding his or her functional vision and the best techniques for sight utilization. Assessment of the student's functional vision in the initial step in teaching or rehabilitating student how, when and under what conditions vision can be used efficiently. Assessment will provide all physical data on the eye report obtained from the eye care specialist. Secondly the information collected should be presented to each student in a vocabulary appropriated for him or her level of understanding. From this data information in the area of low vision is formulated for the student. Teachers and parents can never know what children see, only how they function. Collecting functional data over a period of years serves two important purpose. It helps students reach maturity with objective knowledge about their visual abilities and disabilities. in addition it provides a continuous record of change in their visual status.

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Unit 5 ❑ Assessment of Learning Needs of Children with VIMD

Structure :

5.1 Introduction

When a child has several different disabilities, he/ she has multiple disabilities. The group of multiply disabled visually impaired children is a heterogeneous group. The effect of multiple disabilities can be more than the combination of two individual disabilities. The problem is that these children do not seem to suit the schools where they are placed. Because children with multiple disabilities have problems with all muscle movement, with understanding and often with seeing and hearing as well, communication is very difficult for them. The status of education of visually impaired with multiple disabilities is in the low priority. Intervention at earliest possible stages will definitely improve their developmental skills, optimize abilities and build a foundation for future learning.

5.2 Objectives

After going through this unit the learners will be able to :

- Define the concept of multiple disability .
- State the current status of education of children with multiple disability .
- Describe the challenges in teaching the multiply disabled
- Highlight the importance of early intervention for visually impaired children with multiple Concept and Definition of VIMD

5.3 Concept and Definition of VIMD

5.3.1 Concept

When a child has several different disabilities we say, that he/she has multiple disabilities. For example, a child may have difficulties in learning, along with controlling her movements and / or with hearing and vision. The effect of multiple disabilities can be more than the combination of two individual disabilities. Provision of educational services are needed for those children with multiple disabilities whose cognitive functions are intact whereas only rehabilitation services can be planned for those whose cognitive functions are poor. Individual assessment is imperative for planning the educational programmes for these children.

These children and youngsters are excluded from formal education due to their multiple disabilities. Sometime "exclusion" is as hard and cruel as it sounds: the school simply closes its doors for these children. However, more times the school does not know about the child before the school could get involved, others consider the situation too complicated or can not expect that the child might profit from formal education.

5.3.2 Definition

A visually impaired child who has two or more disabilities concurrently that together constitute the so-called multiply disabled. There are many visually impaired children with one or more additional! associated disabilities.

Characteristics

The main characteristics of multiply disabled visually impaired children are:

a) They are different from others and need special programmes.

b) They face more problems than others and need some help and can be included in regular school programmes with assistance and supportive devices.

5.3.3 Types of Additional Disabilities

In order to develop programmes for the multi- disabled visually impaired children we classify them into four categories on the basis of their disabling conditions:

1. Deaf blind (Visual impairment+ hearing impairment)
2. Visual impairment + hearing impairment + mental retardation
3. Visual impairment + mental retardation.
4. Visual impairment + cerebral palsy + mental retardation/ hearing/ speech problems.

5.3.4 Current status of Education of Visually Impaired Children with Multiple Disabilities.

The concept of specialized services to- children with multiple disabilities is relatively new in our country. The few services, which we can count on our fingertips, are located mostly in urban areas and can accommodate at the most a few hundred children. Services to young babies (0-6 years) are hardly available at present. Apart from non- availability of services, there are a number of areas of concern of such children, namely:

- A large population lives in remote rural areas where even the available basic health and education services are negligible.
- While the services for such children with multiple disabilities are almost non-existent, number of such children is consistently increasing due to the advancement of medical science.
- Moreover, most of such children do not reach these centres in time as parents are pursuing curative optionsiin the crucial six years of the child's life. So a lot of learning that could have taken place gets delayed.
- Our policy makers, administrators and planners, adopted a pragmatic approach for the meaningful education of disabled persons. Nevertheless, as compared to the western countries, we are still lagging behind in the field of education

of multiply disabled children owing to a number of problems and limited resources. Some of the reasons for lack of tangible services to these children are cited below:

- Since the visually impaired child with additional disabilities requires a specialized training which is highly individualized and need based, this necessitates a right approach and availability of highly trained, skilled and dedicated professionals in different disciplines. The availability of such manpower in India at present is inadequate due to lack of proper training facilities for educators and other supportive staff.
- The teacher preparation in the area of disability at present is mostly focusing on the single disability area. As a result there are large number of single special teachers who can teach single disability but very few of them can teach children with additional disabilities. Because of the absence of trained teachers for teaching visually impaired children with additional disabilities, this area remained low priority area for many years in our country.
- The scattered population of visually impaired children with additional disabilities is another reason for not getting services timely. The residential facilities are inevitable for these children. But such facilities are hardly available to serve these children under education.
- Another problem is that these children do not seem to suit the schools where they are placed. Often parents of visually impaired child with additional disabilities are not able to identify which disability among the disabilities present in the child is more dominant. For example, the parents are perplexed whether the visually impaired mentally retarded child can be placed in a class with sighted mentally retarded or in a school for visually impaired. Because of the confusion the parents of these children do not bring them to the educational programmes. The principle that should be followed in case of such children is that a child with a dominant condition of visual impairment should be placed in a setting suitable for visually impaired children, while where the dominant disability is Mental Retardation; he/ she should be placed in the schools for mentally retarded children.

5.4 Etiology of VIMD

Multiple disabilities are quite multiple and diverse in nature and are found to possess more dissimilarities than the similarities or commonness observed among

them. Each of them has a different story of its causation, symptoms and challenges provided to the sufferer. It is therefore, quite difficult to name certain type of causes or causative factors responsible for the germination and perpetuation of all types of visually impaired with multiple disabilities among the children.

However we can try to have the search for all the possible situations or factors that may be held responsible for bringing some or other types of impairments or disabilities in the mind and body of the children right from the time of their conception in the womb of the mothers in the following manner.

5.4.1 Factors Operating at the time of Conception (Genetic Factors)

There may go many things at the time of conception of the child in the womb of the mother through the transfer of genes and chromosomes to the offspring by the immediate parents that may work as a cause for providing disabilities among the children. A few of them are narrated.

- Chromosomal abnormalities may bring many disabilities and disorders among the children. The most frequent chromosomal abnormality is non-disjunction (unequal division) of chromosomes, and the most common clinical consequence is down syndrome. Children with this condition have 47 chromosomes instead of the normal 46. This extra chromosome may be provided by one of the parents, mother or father. Down syndrome may also be caused by abnormal translocation of chromosome. Hence the child has 46 chromosomes, but a pair of one is broken and the broken part is fused to another chromosome.
- Non -disjunction or unequal division of sex chromosomes may also provide a cause for a number of disabilities or disorders. The most common example is Klinefelter Syndrome. The males with this syndrome are born with an extra X chromosome derived usually from the mother. Many physical and mental abnormalities may be the product of this syndrome.
- Turner's Syndrome which affects girls is caused through the chromosomal loss. Girls with Turner syndrome have only single X chromosome and no second X or Y chromosome making a total of 45 rather than 46 chromosomes. As a consequence of the syndrome, they may have visual-perceptual impairments and sterility.
- Many abnormalities occur during chromosomal deletions. The examples are **Cat Cry Syndrome** (causing the individual to have a high pitched cry and

mental retardation) **William Syndrome** (causing mental impairments and physical deficits) and VCFS (causing mental impairments) Physical defects and language disabilities.)

- In addition to the chromosomal abnormalities (extra or deleted chromosomal material) genetic disorders may also result from an abnormality in a single gene. Human genome (the set of all genes) approximately contains 1,00,000 genes. Out of this vast stock a single gene defect is quite capable of playing a primary role in about 7,000 disorders or disabilities (mckusic, 1986). These abnormalities may be passed down from one generation to the next. Examples of such single gene disorders are the formation of multiple neurofibroma tumors on the body and in the brain, Huntington disease or Fragile X-Syndrome neurological disorder), each capable of generating one or the other types of motor sensory cognitive and learning disabilities.

5.4.2 Factors Operating in the Womb of the Mother (Prenatal factors)

What goes wrong with the child during the embryologic and foetal development in the womb of his mother certainly prove a potent factor for the causation of one or the other disabilities in the child. A few of such major factors working in this direction may be outlined as follows:

i) **Maternal Chronic illness:** It has been found that a number of maternal chronic illnesses (during pregnancy) like thyroid disease, diabetes, hypertension and autoimmune disorders may adversely affect the growth and development of the child in the womb of his mother resulting into one or the other disabilities.

ii) **Maternal infection:** A number of maternal infections like below are known to have devastating impact on the embryologic and foetal development.

- Rubella also called as German measles is a highly contagious virus. If contracted by a mother during the first six weeks of her pregnancy, it may become a cause of havi ng risk to their foetus developing congenital rubella syndrome. The consequences of which may be the outcomes in the form of microcephally, mental retardation, cataract deafness and congenital heart defects.
- Varicella (Chicken pox) caused by a DNA hyper virus is also a fatal maternal disease that adversely affects the developing foetus. Varicella infection, if contracted by a mother during the first 12 weeks of the pregnancy may cause

congenital defects in the developing foetus characterized by limb defects, scars, microcephaly, chorioretinitis and cataracts.

- Sexually Transmitted Diseases (STDs) can cause severe complications for the developing foetus. The term STD stands for more than twenty five infectious organisms that are transmitted through sexual activity.

iii) **Maternal substance abuse:** The intake of many substances by the mothers during pregnancy may cause a number of health hazards to the developing foetus like the following.

- Many of the medications and drugs whether prescribed or non-prescribed may prove fatal to the developing foetus. As example we can name antiepileptic drugs (Used for seizure disorders). Methotrexate (used for treating cancer) and captoprial (used for treating chronic hypertension). More often, they are associated with congenital malformation such as heart defect, hearing, vision and mental retardation.
- The intake of the substances like cocaine, heroin, marijuana and other illicit drugs by the pregnant mothers may cause high risk for the developing foetus causing foetal death, growth restriction, language disorders and emotional behavioural and attentional difficulties.
- Maternal alcohol intake during pregnancy can have serious effect on the developing foetus. Most seriously it can result in Fotel Alcohol syndrome (FAS). The child with FAS has altered facial features, such as small head, widely spelled eyes, upturned nose, large ears and small chin, he or she will also have developmental problem such as oppositional and defiant behaviour, poor judgment and social withdrawal. Alcohol related birth defects make also one of the leading causes of mental retardation among many children.
- Exposure to tobacco in the womb of the mother may prove quite fatal by bringing many respiratory problems, and sensory impairments to the developing foetus.

iv) **Prenatal anoxia (oxygen deprivation):** This is resulted through a number of causes like maternal anemia, cord anomalies and the premature separation of the cord. It may be associated with a number of disability conditions like cerebral palsy, mental retardation, seizures, hearing and visual impairments and behavioural problems.

v) **Prenatal cerebral haemorrhages:** Resulted through a number of reasons like direct trauma, blood conditions of the mother and other causes, haemorrhage may produce a number of birth defects including cerebral palsy and mental retardation.

vi) **Prenatal exposure to radiation:** Exposure to higher does of radiation especially from the X-rays and radioactive substances involves a higher risk of congenital malformations, miscarriage, growth restriction and sensory impairments.

5.4.3 Factors operating at the Time of Birth (perinatal factors):

There may be a number of things that may go wrong at the time of delivery causing a number of deficits and problems to the child like the following:

i) **Anoxia (Oxygen deprivation):** The newborn baby may suffer from oxygen deprivation during prolonged labour or delivery for a variety of reasons like placenta separation from the uterus breech delivery (delivering feet first) etc. it can cause cells in the brain to die resulting in serious neurological impairments and as a consequence, the child may be affected by a number of disability.

ii) **Trauma and haemorrhage:** Trauma and haemorrhage caused to newborn children during prolonged labour, sudden pressure changes, complicated delivery, caesarean delivery and mal positions may result into brain damage and neurological impairments. It may further result in various types of disability conditions.

iii) **Premature birth:** Premature birth can be source of many problems and impairments to the newborn children. Their immature systems may make them quite vulnerable to infection and other chronic diseases. Moreover the underdevelopment of the brain may prove a potent factor for the causation of cerebral palsy, mental retardation and other accompanying sensory impairments.

iv) **Prenatal infection:** The new born infants at the time of their birth may be subjected to a number of infections on account of the unhygienic conditions prevailed during delivery. It may lead to the development of many physical and mental impairments to the child. The most common infection affecting newborn at the stage may be named as varicella (Chicken pox), and cytomegalovirus (CMV). The newborn affected with CMV are found to manifest the symptoms of mental retardation, vision and hearing impairments and learning disabilities at the later stage of their life.

5.4.4 Factors operating after the Birth (Post-natal factors):

There are many factors prevalent in one's environment that may prove a potent

source of causing one or the other impairments of disabilities among the children after their birth. These may be briefly named as follows:

i) **Chronic diseases and infection:** Chronic diseases like serious respiratory problems, heart diseases brain tumors, cysts, juvenile arthritis etc. may cause serious obstacles in the path of the developing children particularly related to their adjustment and education and thus may lead them to many physical emotional, social and learning disabilities. Similarly, there are a number of infections that can cause severe impairments to their physical, mental or learning functioning. The most common are meningitis and encephalitis that may cause damage to the brain resulting into a number of disability conditions like hearing and visual impairments cerebral palsy, mental retardation, epilepsy and learning disabilities.

ii) **Accidents:** Accidents are always uninvited. These can happen to anybody at any time giving serious blows to brain, skull fractures, spinal cord injuries and loss of limbs, hearing and vision.

Thus, accidental injuries may prove a quite big source for the generation of many multiple disabilities to the children at the post-natal stage.

iii) **Radiation and Toxic agents:** Exposure to radiation and radioactive elements as well as toxic chemicals like arsenic, lead, coaltar derivatives and carbon monoxide and carbon dioxide gas may be associated with a number of a disabilities like cerebral palsy, mental retardation, eye and ear problems and learning disabilities etc.

iv) **Malnutrition:** Mothers suffering from inadequate nutrition and starvation, may bring serious difficulties to their breast fed infants and children below the critical age leading to one or the other impairments at the later stage.

v) **Child abuse:** In many cases, child abuse may be found a causative factor for generating one or the other types of disability among the children. Child abuse can result in broken bones, head trauma, spinal cord injuries, oxygen deprivation due to strangulation, severe eye and ear injuries, etc. all leading to one or the other type of physical mental and sensory impairments. Besides this, it can provide a germinating and perpetuating base for the ignition of social, emotional and behavioural problem among the abused children.

vi) **lower socio-economic status or poverty:** Poverty may be associated with a number of disabled conditions in terms of their generation as well as perpetuation. The story may well begin with the malnutrition and almost starving conditions of the pregnant mothers, the most unhygienic and uncared delivery of the children and

inadequate supply of the essentials needed for the children's early development. Lack of medical care and treatment may further aggravate the problems and the child may develop serious limitations and deficiencies in terms of his adequate physical, mental, emotional and social development ultimately making the child retarded and disabled in so many aspects.

5.5 Impact of VIMD on learning and development

5.5.1 Where should children with VIMD be taught?

While emphasizing the need and importance of education to the children with VIMD Sailor (1991) writes "There is a single process called 'education' and it is delivered through the vehicle of the local school". In this way, in the opinion of many educators, neighbourhood school may prove a better placement alternative for the education of the multiple disabled children. It is least restrictive in all sense besides being quite accessible to all children irrespective of their socio-economic status and geographical location.

Such access to least restrictive environment in terms of integrated settings of the neighbourhood school may prove to the welfare and progress of the children with VIMD. Most of the developed countries have come up with legislative provision to have the education of the multiple disabled in the integrated setting of the normal schools along with their non-disabled peers.

It further states that special classes separate schooling or other removal of children with disabilities from the regular educational environment occurs only if the nature or severity of the disability is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily.

The same also holds quite practicable in the case of the children with all types of disabilities in our country. We cannot achieve the target 'the education of all (Sarv Shiksha) without adopting integration or inclusion as the main philosophy of our placement option for a huge scattered population of our disabled children. It is neither possible nor practicable to have segregated setting or special schools for each category of multiple disabled children. At present, we have some schools for a few special disabled categories like deaf and dumb, mentally retarded, cerebral palsy, and blind in our country. But we have a large number of diverse categories of multiple disabled (e.g. mentally retarded with Visually Impaired, learning, emotional or physical impairments deaf or blind with physical, mental and emotional problems, etc). The

special schools meant for a particular category of disability cannot serve the purpose of the education of the children with multiple disabilities. Moreover, the number of such special schools meant for a few special categories of disabilities are quite meagre and inaccessible to the vast majority of the disabled children population of our country. In such circumstances the integrated set-up of the regular class rooms of the neighbourhood schools is the only proper first alternative available for the educational placement of the disabled children (including multiple disabled) in our country.

A few of such things concerning the adaptation and support are mentioned.

- Adaptations in the classrooms, work situations, drinking and toilet facilities and other learning, playing and recreational places for the needed mobility and positioning of the multiple disabled students.
- Educating and equipping the class teachers with essential knowledge, skills and attitudes (through pre-service or in service education) for teaching and dealing with the multiple disabled children.
- Arranging the aids and devices that are helpful in the teaching of multiple disabled children.
- Making use of the related services like counselling, physiotherapy, medical services, orientation and mobility services, etc.
- Seeking the service of the special education expert and professionals for providing needed assistance and guidance to the class teachers.

5.5.2 Curriculum considerations for Visually Impaired children with Multiple Disabilities VIMD:

After making decisions about the placement alternative for the children with multiple disabilities, it becomes essential to make a decision about the type of experiences to be given to these children in an inclusive set-up of the normal classrooms and regular schools. Since VIMD students represent a quite wide spectrum of disabled conditions, therefore, it is quite a challenging task to seek inclusion of the students with disabilities in the general education curriculum.

Depending upon the nature and severity of their impairments particularly related to the areas of physical and mental development, now it should be decided how a particular multiple disabled student will have access to the general education curriculum. Wehmeyer, has pointed out some or all of the following options for this purpose.

Curriculum adaptation: The students can participate in the general education curriculum, but may need modifications in the presentation of instruction, expected performance, response modes, changes in materials, and the like.

Curriculum augmentation: The students need additional instruction or strategies to participated in the curriculum.

Curriculum alternations: The students need additional content that is not found in the general education curriculum. Students with severe or multiple disabilities may need instruction in basic social communication, daily living, and motor skills that are not found in the general education curriculum.

In view of the above observation, while paying a little more individual attention and use of assistive technology, many of the multiple disabled students may be well adapted to participate in the general education curriculum without further accommodation. There will remain some students who may need special considerations within or beyond the inclusive setting.

The curriculum needs of the children with VIMD, then may be extended to the following beyond the general education curriculum or experiences meant for all the children; non-disabled or disabled.

- Developing communication skills.
- Developing behaviour skills for the improvement of challenging behaviour (like stereotype, self-injurious, aggressive and socially inappropriate behaviour)
- Care skills (like feeding oneself, toilet habits, dressing, making motor movements and postures with or without assistance, grooming and personal hygiene).
- Acquisition of leisure and recreational skills for participating and enjoying such activities.
- Development of essential basic functional academic skills pertaining to reading, writing and arithmetic.
- Development of the skills for using assistive devices, and technology for improving their functioning.

5.5.3 Methods and Techniques for meeting the curriculum needs of the children with VIMD

To teach the children with multiple disabilities in a fully inclusive set-up or

partial and more special set-up is really a quite challenging task. All of them have their unique strengths and limitations and therefore, essentially needs individualized ways to provide instructions to them in an effort to respond to their unique learning characteristics resulting from their multiple disabilities. In general, we can have the following things into our consideration while providing useful learning experiences to them.

1. The beginning in this direction needs to be made by taking care of their seating arrangement in the classroom and other work situation both in the inclusive and partial inclusive settings. The necessary adaptation in this regard should always be made for the multiple disabled children in view of their disabled conditions. As far as possible, they should be seated close to the teaching and supervising places of their teachers and instructors.
2. The next task is related to the communication skills. Any process if instruction and interaction in the classroom requires a process of communication between the teachers and the students. To have such communication link is a bigger problem for the children with multiple disabilities and the biggest for the teacher/ instructors.

Deaf-blindness: A method of total communication approach is now mostly used with the instruction of deaf-blind children. It involves the use of multimedia to teach and learn as per needs of the individual's disability conditions. For example, if a student has some residual vision, he may advised to use a powerful magnifier. Similarly the student with some residual hearing may be advised to make use of a powerful hearing aid besides communicating with finger spelling. In such cases, the use of other senses like touch, taste, smell and kinaesthetic awareness should also be made for supplementing information of his environment and fulfilling his curricular and extracurricular needs. However most of the instruction and communication with the deaf-blind children (especially when no significant residual vision or hearing capacity is available) is usually carried out with the use of tactile techniques involving the sense of touch. That is why, Braille proves a quite stable reading medium for the deaf-blind and the use of a dual communication board can help them properly indiscriminating the reception or expressive functions of responses from a communication partner.

Mental retardation-deafness: On account of their cognitive impairment these children may experience a lot of difficulty in the learning of oral language. The main

focus in their instruction should therefore be on the teaching of sign language. However they should also be taught a bit of functional oral language with the help of total communication approach.

Mental retardation-blindness: Learning Braille (a major source of communication and learning for, the blind) may pose a serious difficulty for these children on account of limited mental capacities. The use of the senses other than visual can be employed for the teaching of these children. It may involve the use of recorded metal activity based teaching, oral instructions, etc, as the way of teaching and guiding method for them.

Blindness-cerebral palsy: Cerebral palsy may make the affected children unable to make use of their gross or finer movement of hands and other limbs for various instructional purposes. In some cases, it may also create problems in their speaking. Depending on their impairment thus the blind cerebral palsy affected children may not be able to make use of Braille. In such cases, they should be helped with the aural modes of learning, e.g. use of tape recorder, radio, speaking machine, etc.

Deafness-cerebral palsy: On account of their problems with motor movements, speech and comprehension, etc., it will not be difficult to make use of gestures of sign language with the group of multiple disabled children. In these cases we have to rely on making use of sight as a mode of their instruction. The help of visual communication board assisted with mechanically operated movement techniques they can prove useful in their instruction.

Thus in many cases of the children with multiple disabilities who are not going in use natural speech or who need an additional mode of communication to communicate effectively. We have to plan necessary for the use of augmentative system of communication (use of aids supplementing the existing vocal communication skills) and alternative system of communication (methods of communication used by a person without vocal ability.) therefore, adequate care should always be taken for teaching the use of these modes of communication to the multiple disabled children.

3. The next serious task is to help the children with multiple disabilities to learn and make use of the necessary other functional skills like daily living skills, social skills, recreational and leisure skills, vocational skills, academic skills, behaviour management skills, etc. Like their non-disabled peers, the children with multiple disabilities may not be capable of learning the above mentioned functional skills through a mere imitation, observation or verbal instruction.
4. Whenever needed, the students with multiple disabilities should be allowed to

have a facilitator who can provide physical support to assist the students who cannot speak or whose speech is limited to typing on a key board or pointing at pictures, words or other systems on a communication board.

5. Students with multiple disabilities should be provided such learning experiences or made to participate in such activities that are provided to the same-age peers without disabilities. The methods and techniques used for providing them necessary learning experiences should be as appropriated as possible.
6. There may be proper provision for incorporating choice making activities into the classroom programmes for providing needed learning experiences to the students with VIMD.

5.6 Screening, identification and assessment of Visually Impaired Children with associated disabilities

5.6.1: Screening

Prenatal Screening: A number of prenatal testing procedures such as testing of maternal serum AFP, Multiple Marker Screening, chorionic villous sampling, Amniocentesis, Ultrasound, and Fetoscopy are available to detect the disorders of the foetus. On the basis of the results of screening appropriate corrective steps to prevent intellectual disability should be taken on the advice of a qualified physician. The following screening should be done:

(i) Blood Tests in the Mothers

Haemoglobin levels (Hb %) to detect anaemia.

- Blood glucose leyels to detect diabetes
- Blood VDRL to detect syphilis
- Blood group and Rh typing for blood group incompatibilities
- Blood antibody titters to detect specific infections
- Alpha foetus-proteins to detect neural tube defects in the foetus

(ii) Ultrasonography (During Pregnancy)

Many types of foetal pathology including those associated with VIMD later one can be indentified during the" trimester of pregnancy by means of ultrasound technique. Some of them are neural tube defects, such as hydrocephaly, microcephaly, and some cerebellar lesions.

(iii) Maternal Serum AFP (Alpha-fetoprotein)

Maternal serum AFP (Alpha-fetoprotein) screening test is used to detect spina-bifida, anencephaly, Down's syndrome and other disorders. It is specifically targeted to women under age 35. The testing, which measures the amount of alpha-fetoprotein from foetal urine, takes place at 16-18 weeks of pregnancy.

(iv) Multiple Marker Screening

Multiple Marker Screening measures alpha-fetoprotein (AFP) and human chorionic gonadotropin (UE3). It enhances the effectiveness of screening for neural tube defects (NTD), Trisomy-21 or Down Syndrome, and Trisomy-18. It is done by a blood test that is offered to women between the is" and zo" week of pregnancy.

(v) Chorionic Villous Sampling

Chorionic Villous Sampling or CVS can be used as early as the seventh to ninth weeks of pregnancy. It identifies Down syndrome and other birth defects. In CVS, a tiny piece of the chorionic villous tissue is removed. This tissue grows from an enveloping membrane that eventually gives rise to the placenta. It will show chromosomal abnormalities carried by the foetus.

(vi) Amniocentesis: Amniocentesis is used to detect certain birth defects during the is" week of pregnancy. Amniocentesis is a test performed on high -risk women. It involves the withdrawal of a sample of fluid surrounding the foetus. This fluid is then tested for possible abnormalities. The test is usually advised to women who have reached 35 years of age. Amniocentesis will detect Down syndrome, Tav-sachs, Sickle cell anaemia, and many other genetic disorders. The test increases slightly the risk of miscarriage.

(vii) Ultrasound: Ultrasound is another pre-natal technique. It uses high frequency sound waves to locate the position and measure the size and structure of the foetus and placenta in the womb. Ultrasound is also used during amniocentesis to help guide the needle insertion. This technique can rule out foetal abnormalities such as faulty structure of the heart.

(viii) Fetoscopy: Fetoscopy is an experimental technique used to observe the foetus. A viewing instrument is inserted into the womb.

Neonatal and Post-natal Screening and Diagnostic Procedures

- APGAR score
- Urine screening for metabolic errors- example, PKU (Pheny)

- Blood biochemistry tests for Cretinism, Rickets, Jaundice etc.
- Blood antibody titers to detect infections
- Chromosomal analysis for Down Syndrome, Deletion syndromes etc.
- Neonatal neuro - behavioural assessments
- EEG (electro-encephalogram) for seizure disorder
- Visual screening for Visual Impairment (Visual acquity, funds examination, retinoscopy etc)
- Auditory screening - hearing impairments (Tympanogram, BERA etc.)
- Ultra Sonogram
- Ct Scan(Computerised tomography)
- MRI (Magnetic Resource Imaging) for intracranial pathology and structural abnormalities.

5.6.2: Identification and Assessment of Multiple Disabilities

The early identification and diagnosis of multiple disabilities among the children always serves the best purpose in the interest of the disabled children. By following the rule, "earlier the better", therefore, beginning should be made for their identification at the prenatal stage. At the "prenatal stage" the developing foetus may be screened for the possible disabilities by making use of the tests like the following:

i. **Alpha-fetoprotein test:** In this test, a blood sample of the mother is taken after sixteen weeks of pregnancy for diagnosing some disabilities in the developing foetus (with an assumption that the foetus will pass sub-stances carrying symptoms of disabilities in the blood stream of the matter). With such a test, we can detect mother who are at risk of having a foetus, with neural tube defect (a defect involving the spinal column or brain), Down Syndrome, or some other birth defects (Batshaw and Perret, 1992).

ii. **Magnetic Resonance Imaging (MRI):** MRI through its ultra fast imaging sequence can prove a valuable asset in the proper diagnosis of defects and impairments. For example, MRI of a central nervous system helps to identify the malformation of the brain seen in spinabifida and the cause of enlarged ventricles (hydrocephalus).

At the "post-natal stage" the newborn infants may be subjected to some specific tests like the following for the identification for the possible disabilities.

1. **APGAR Scoring System:** Known as APGAR test, it is the first screening that can be done to the newborn after their birth between one and five minutes. It takes into account the infant's heart rate, respiratory effort muscle tone, reflex irritability and skin color. Each of these five components of the Apgar test is scored between 0 and 2, with a maximum total score of 10. The below average score (less than 5) may provide an alert for something wrong with the child. The perception of the colour of the skin may also provide a vital clue such as Jaundice may be detected by a yellow caste to the skin and eyes.
2. **Other Medical Examination and Observations:** The other useful medical test and observations can be properly administered to the newborns and infants for the detection and diagnosis of a number of disabled conditions like the following.

- Phenylketonuria (PKU) causing toxic accumulations of phenylanine in the brain (a major cause of multiple disabilities) can be detected by a simple blood test of an infant preferably of one or two weeks old.
- Blood and urine test can be carried out for the detection of hypothyroidism (the failure of the thyroid gland to function) which is known to cause cretinism an irreversible condition of severe mental retardation.
- The blood test of the mother and the newborn can help in detecting Rh incompatibility known to cause a number of disabilities including cerebral palsy and mental retardation.
- Help of EEGs combined with either videotape or direct observation may be taken for the identification of seizures in the infants at their neonatal and post-natal stages.
- Similar to the Apgar score another scoring system exists for the detection of hypoxic ischemic encephalopathy. It is known as the Sarnat scoring system which can be followed by a (T or MRI scan (neuro imaging procedures) for accurate diagnosis. Hypoxicischemic encephalopathy if undetected and untreated earlier may give birth to a number of disabilities and health hazards like strokes, generalized atrophy in the brain, dyskinetic cerebral palsy, mental retardation and learning disabilities.
- The direct clinical observation of the infants may prove helpful in the

identification of a number of disabled conditions. Most of the hearing and visual defects, motor deficits, mobility and physical impairments can be diagnosed early by observing the infant's lack of normal reflex and body movement. The other major defects and deformities like spinabifida (known for causing a number of multiple disabilities) can also be detected with the help of a close clinical examination).

3. **Use of additional testing and collection of Data:** After suspecting one or the other disabilities in the growing child, efforts are made to have surety of the suspected screening along with its full assessment by adopting the measures like the following:

- Use of intelligence tests.
- Use of adaptive behaviour scales
- Use of interesting inventories, attitude scales, aptitude tests and personality interviews
- Use of case history and medical report of the mother and the child
- Use of the techniques and measures for the assessment of motor, communication, language, self-help, social and emotional abilities of the children.
- Use of observation, rating scale and situational tests
- Seeking interviews with the parents and teacher about their experiences with the child's inabilities and strengths.

5.7 Multidisciplinary assessment of visually Impaired Children with Associated Disabilities

5.7.1 What is Multidisciplinary Assessment?

The individuals with Disabilities Education Act (IDEA) requires that children with developmental delay or disabilities receive a timely, comprehensive, multidisciplinary evaluation and assessment. **The purpose of the assessment is to find out :**

The nature of your child's strengths delays, or difficulties, and

Whether or not the child is eligible for early intervention services.

Multidisciplinary means that the evaluation group is made up of qualified people who have different areas of training and experience. Together, they know about children's speech and language skills, physical abilities, hearing and vision, and other important areas of development. They know how to work with children, even very young ones, to discover if a child has a problem or is developing within normal ranges. Group members may evaluate the child together or individually.

Assessment refers to the procedures used by these professionals to find out if the child is eligible for early intervention services. As part of the Assessment, the team will observe the child, ask the child to things, talk to the parents and the child, and use other methods to gather information. These procedures will help the team find out how the child functions in five areas of development: cognitive development, physical development, communication, social-emotional development, and adaptive development.

Following the child's assessment, the parents and a team of professionals will meet and review all of the data, results, and reports. The people on the team will talk with the parents about whether their child meets the criteria under IDEA and sate policy for having development delay, a diagnosed physical or mental condition, or being at risk for having a substantial delay. The purpose of these on going procedure are to identify the child's unique strengths and needs, and determine what services are necessary to meet needs.

Hence, assessment in general is a process of collection of information about an individual or a group and taking a decision for that particular individual or group for future course of action.

Assessment refers to the process of gathering and analysing information in order to make instructional, administrative and/or guidance decision about or for an individuai (Wallace, Larsen and Elksnin, 1992)

Definition of assessment focuses on three aspects:

1. Collection of information

2. Analysis of information

3. Making decision for instructional, administrative steps and guidance

Collection of information: Collection of information regarding the students includes information regarding his personal history, the past achievement, the environment he is living, the resources available within his reach and current performance in different skills. These information could be collected by: (a) taking

personal history, (b) administering test, (c) observation of the students and (d) interview with the student, parents and caretakers etc.

Analysis of information: Information collected has to be analysed by the special educator or the professionals related to the student from different angles. A student's performance in specific areas may be due to deprivation of exposure or cultural factors. This factor has to be carefully understood by the special educator for decision-making for educational intervention.

Making Decision for Instructional, Administrative Intervention and Guidance: Assessment is being used for making a decision for placement in a particular class and for availing Government facilities and programming educational intervention for the student. Special Educators help in guiding the parents for future course of action to be taken for the student.

Special Educational Assessment is the systematic process of gathering educationally relevant information about children with special needs to make legal and instructional decisions about the provision of special services. The special educator pursues information that relates to everyday concerns of the classroom. However, educational intervention is also part of an interdisciplinary effort to understand the handicapped student's learning problems. It is performed in conjunction with the work of the professionals, such as physicians, speech-Ianguage,and physical therapists.

Educational assessment focus mainly on many areas of learning school, as well as any other factor affecting school achievement, Academic, language, and social skills are examined. Environmental factors may also be considered, along with analyzing the student's observable and measurable learning behaviour and learning strategies.

Training the mentally retarded children needs detailed psychological and educational assessment. There have been efforts in developing many psychological test and educational test for conducting assessment for development of systematic intervention programme for the children with mental retardation.

5.7.2: Purpose of Assessment:

Assessment is carried out for a specific purpose. Generally, assessment helps in either decision-making for administrative purpose or for remedial purpose. Especially, in special education services, there are a few purposes to be met through assessment. The purpose of assessment determines the types of assessment tools to be used, the method of assessment to be selected and the process of collection of information to

be conducted. Some of the purpose of assessment are listed below:

1. Initial screening and identification.
2. Determining eligibility.
3. Determination of current performance level and educational need.
4. Decision about classification and programme placement.
5. Determination and evaluation of teaching programmes and strategies.
6. Development of educational programme (Individual or group).
7. Monitoring student progress.
8. Evaluating the effectives of educational intervention programme.

5.7.3: Types of Assessment:

Special Education Assessment involves collection of information relevant to educational need of the children. This includes personal data, educational performance, the resources, the family involvement in training and voluntary supports that could be gained for training mentally retarded student. For all these information, it is essential to collect information through different methods. These methods may be:

(a) Formal

(b) Informal

Formal: In this method, the information is collected by administering test/ behavioural scales/ checklist, interview or administering questionnaire. The information is collected through very structured situation. It needs lots of preparation for the tester or observer.

Informal: In this method, the information is collected through natural interaction between the subject and observer. As because the information is being collected in a natural situation, there is a chance of getting appropriate response from the subject.

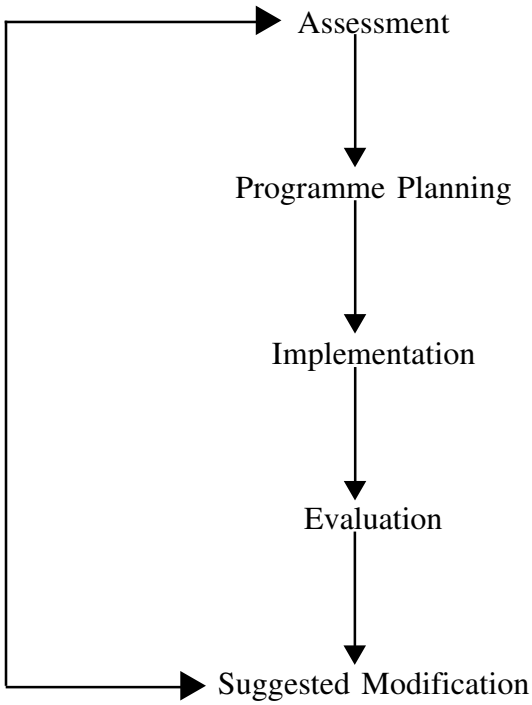
Different tests are constructed for assessment. Constructed tests also vary as per the process of construction. There are two types of tests. These are Norm Referenced Test and Criterion Reference Test. Norm Reference assessment and Criterion reference assessment are named on the basis of the test used in the assessment process. The details of these-assessment processes are given below:

Norm Referenced Assessment: Norm referenced assessment is the more traditional approach to assessment. These tests and measurement procedures involve test materials that are standardized on a sample population and are used to identify the test takers ability relative to other. It is also known as formal assessment.

Norm referenced assessment is defined as a procedure for collecting data using a device that has been standardized on a large sample population for a specific purpose. Every standardized assessment instrument will, have certain directions that must be followed. These direction specify the procedure for administering the test and ways to analyse and interpret the results and reporting them.

Criterion Referenced Assessment: Criterion referenced assessment is concerned with whether a student is able to perform a skill as per the criteria set, or not. In contrast to norm -referenced assessment, which compares one person's performance to other's, criterion referenced assessment compares the performance of an individual to the pre-established criteria. In criterion referenced test, the skills within a subject are hierarchically arranged so that those that must be learned first are tested first.

Continuous Assessment: Assessment is an ongoing process. In the process of special Education to the children with VIMD, their abilities are assessed periodically to plan the future training programme. Flow diagram of which is given below:



In the above diagram, evaluation is carried out after implementation of the programme to see the level of achievement compared to set criteria. Evaluation is restricted to the programme planned for the child. Assessment covers the other non-

planned area for training. Assessment after each year or after a particular period of training is inevitable for decision-making about the child.

5.8 Check your Progress

1) What do you mean by Screening?

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2) What is Identification?

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3) List out the general characteristics of VIMD

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4) Enumerate the types ofVIMD?

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5) What are the roles of caregiver in early intervention programme?

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6) Write different screening stools used to Identify VIMD?

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7) Discuss the causes of VIMD

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8) Explain the purpose of assessment?

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9) Why is continuous assessment necessary?

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10) Enlist the pre-natal causes of VIMD?

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11) Describe the current educational status of Visually Impaired Children with additional disabilities?

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12) Brief the teaching strategies for VIMD.

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13) compare the current Educational status of Visually Impaired Children with Multi Disabiled Children?

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14) What are the purposes of assessment you find in your case of assessment for IP?

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15) How do you classify the etiological factors of VIMD.

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5.9 Let us Sum up

The effect of multiple disabilities can be more than the combination of two individual disabilities. Such kind of children face problem with all types of muscle movement as well as seeing and hearing. There may go many things during conception in the womb through gene and chromosome transfer by the parents to the offspring, that may cause such disabilities among the children. With this back drop, it is seen that the status of education of these children is in the least priority. Hence provisions of intervention will do some extent improve their developmental skills, direct abilities and create a firm ground for future learning. The concept of specialized services to children with multiple disabilities is more or less new in India. This service are localised to urban areas only. Nevertheless, as compared to the western countries parts, we are still lagging behind in the field of education of these children. Apart of this one of the most pertinent issue hovering is often parents of such children are not able to identify.Which disability among the multiple disabilities present in the child is dominant? These confusion cause hindrances in path of their educational programmes.

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Notes

Notes

মানুষের জ্ঞান ও ভাবকে বইয়ের মধ্যে সঞ্চিত করিবার যে একটা প্রচুর সুবিধা আছে, সে কথা কেহই অস্বীকার করিতে পারে না। কিন্তু সেই সুবিধার দ্বারা মনের স্বাভাবিক শক্তিকে একেবারে আচ্ছন্ন করিয়া ফেলিলে বুদ্ধিকে বাবু করিয়া তোলা হয়।

— রবীন্দ্রনাথ ঠাকুর

ভারতের একটা mission আছে, একটা গৌরবময় ভবিষ্যৎ আছে, সেই ভবিষ্যৎ ভারতের উত্তরাধিকারী আমরাই। নূতন ভারতের মুক্তির ইতিহাস আমরাই রচনা করছি এবং করব। এই বিশ্বাস আছে বলেই আমরা সব দুঃখ কষ্ট সহ্য করতে পারি, অন্ধকারময় বর্তমানকে অগ্রাহ্য করতে পারি, বাস্তবের নিষ্ঠুর সত্যগুলি আদর্শের কঠিন আঘাতে ধূলিসাৎ করতে পারি।

— সুভাষচন্দ্র বসু

Any system of education which ignores Indian conditions, requirements, history and sociology is too unscientific to commend itself to any rational support.

— Subhas Chandra Bose

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