Course: Special Education for the Visually Handicapped (678)

Level: M.Ed in Special Education **Semester: Spring, 2021**

ASSIGNMENT No. 1

Q.1 What is blindness? How does it effect on child's intellectual and social development?

Answer:-Blindness is a lack of vision. It may also refer to a loss of vision that cannot be corrected with glasses or contact lenses.

- Partial blindness means you have very limited vision.
- Complete blindness means you cannot see anything and DO NOT see light. (Most people who use the term "blindness" mean complete blindness.)

People with vision that is worse than 20/200 with glasses or contact lenses are considered legally blind in most states in the United States.

Vision loss refers to the partial or complete loss of vision. This vision loss may happen suddenly or over a period of time.

Some types of vision loss never lead to complete blindness.

Causes

Vision loss has many causes. In the United States, the leading causes are:

- Accidents or injuries to the surface of the eye (chemical burnsor sports injuries)

- Diabetes
- Glaucoma
- Macular degeneration

The type of partial vision loss may differ, depending on the cause:

- With cataracts, vision may be cloudy or fuzzy, and bright light may cause glare
- With diabetes, vision may be blurred, there may be shadows or missing areas of vision, and difficulty seeing at night
- With glaucoma, there may be tunnel vision and missing areas of vision
- With macular degeneration, the side vision is normal, but the central vision is slowly lost

Other causes of vision loss include:

- Blocked blood vessels
- Complications of premature birth (retrolental fibroplasia)
- Complications of eye surgery
- Lazy eye
- Optic neuritis
- Stroke
- Retinitis pigmentosa
- Tumors, such as retinoblastomaand optic glioma

Total blindness (no light perception) is often due to:

- Severe trauma or injury
- Complete retinal detachment
- End-stage glaucoma
- End stage diabetic retinopathy
- Severe internal eye infection (endophthalmitis)
- Vascular occlusion (stroke in the eye)

For students with visual impairments, testing for visual loss must begin as early as detection of visual problems are noticed in the classroom. For example, if a student is squinting or needing to be seated closer to the board or puts reading material directly

in front of his/her face to see the print, testing can provide confirmation of a visual concern. Students may also exhibit noticeable vision problems during oral reading or when asked to complete in-class assignments. Visual problems may force students to feel limitations in their ability to fully participate in group collaborative work and classroom contributions.

Pakistan, a developing country situated in the World Health Organization's (WHO) Eastern Mediterranean Region, is bordered by India, China, Iran, and Afghanistan. In 1998 the national population was approximately 132 million, making it the sixth most populous country in the world. 1 The four provinces are Punjab, Sindh, North West Frontier Province (NWFP), and Baluchistan. The geography and climate of Pakistan are diverse, consisting of hot arid areas, fertile regions, and the cold, snow-covered Himalayas.

Few studies on blindness and visual impairment had been conducted in Pakistan before this survey. One study (1987–1990), consisting of numerous subsurveys in different areas of the country, estimated the all-age prevalence of blindness to be 1.8%. 2 After this initial study, a National Committee for the Prevention of Blindness (NCPB) was formed, which produced a Five-Year National Plan for the Prevention of Blindness (1994–1999). The purpose of this second survey was to provide more detailed information on the prevalence and causes of visual impairment and blindness, particularly that due to posterior segment disorders, which become increasingly important as life expectancy increases and cataract blindness declines as a result of improved service delivery. The survey reported in this article used a diagnostically rigorous methodology, as was used in the recent prevalence surveys in Bangladesh 3 and India. 4

Pakistan is the sixth most populous country in the world with a population exceeding 207 million [1]. Still a developing country, Pakistan is listed in the category of "low-middle" income country according to World Bank income classification 2018 [2]. Consistent with World Bank development indicators, Pakistan has considerably improved in the healthcare sector over the past few decades. Life expectancy at birth was 60.1 years in 1990, which has increased to 66.5 in 2016. Similarly, under-5 mortality rate (per 1,000 live births) was 139 in the year 1990, which has reduced to

74.9 in 2017 [3]. However, more needs to be done to further improve the quality of life in Pakistan.

Visual acuity impairment severely degrades the quality of life and have more pronounced negative effects on people suffering from various other chronic health issues [4–6]. Globally, it has transformed into a major health problem. According to the statistics of the Global Burden of Disease (GBD) 2017 report, the third leading impairment was blindness and vision impairment that affected the greatest number of people, with 1·34 billion [95% UI 1·29–1·39] cases worldwide [7]. Globally as of 2017, 48.2 million people were blind, an additional 39.6 million had severe vision impairment, 279 million had moderate vision impairment, and 969 million had near vision impairment [8]. However, the burden of vision loss in Pakistan in the last one decade remained unclear.

In this study, we have comprehensively analyzed the vision loss burden due to numerous eye diseases in Pakistan from 1990 to 2017. Using the findings, we estimated the vision loss burden in 2025. We also quantified all causes leading to blindness and vision impairment in Pakistan and compared them with other South Asian countries and 42 low-middle income countries [2] using the GBD 2017 study.

National studies on blindness and its causes in Pakistan prior to this study are extremely limited. Until 1980, there was no data available to determine the prevalence and causes of blindness and visual impairment. First national survey was conducted between 1987–1990 by M. S. Memon [9] to estimate the prevalence and causes of blindness. They examined a total of 29157 subjects all over Pakistan and reported total blind prevalence as 9.03%. Among the various conditions responsible for blindness, cataract (66.7%) was found to be the major cause of blindness. Another national survey was conducted between 2002–2004 and the findings were reported in the form of two articles by B. Dineen et al. in [10] and M. Z. Jadoon et al. in [11]. They determined the causes and prevalence of blindness and visual impairment in adults aged 30 years and older in Pakistan, respectively. They examined 16507 subjects in total. Cataract was reported as the most common cause of blindness (<3/60) and second most common cause of moderate visual impairment (<6/18 to ≥6/60) after refractive error. The crude prevalence of blindness was 3.4% and severe vision

impairment (<6/60) was 4.9%. 14.3% of the subjects presented a visual acuity <6/18 but ≥3/60 in the better eye. In 2005, R. Bourne et al. examined a total of 22600 subjects; including children aged 10 to 15 years and adults aged ≥30 years to determine prevalence rates and causes of blindness and low vision in Pakistan. They reported refractive error as the main cause of <6/12 and <6/18 visual acuity followed by cataract [12].

In addition, few regional/ local studies were also conducted on blindness and its causes. K. Ahmad et al. examined 1106 subjects, aged ≥40 years to determine the prevalence and causes of blindness and visual impairment in [13]. The study was conducted in the region of Budni, Peshawar, Pakistan. Out of total 1106 subjects, 21 were blind, 27 had severe visual impairment (<6/60–3/60) and 62 had visual impairment (<6/18–6/60). Men, as compared to women, had a higher prevalence of blindness, but they had a lower prevalence of severe visual impairment and visual impairment. Moreover, cataract was found to be the leading cause of blindness and low vision. In [14], K. M. Anjum et al. examined 1600 subjects, aged >50 years in Orakzai Agency, Pakistan, to estimate the rate, coverage and visual outcome of cataract surgery. The authors concluded that cataract was the leading cause of blindness in 82.4% of all blind cases and women, when compared with men, had a higher prevalence of cataract. S. Haider et al. [15] examined 1600 subjects aged ≥50 years to conduct rapid assessment of cataract surgery in Chakwal District, Pakistan. They concluded cataract being the major cause of bilateral blindness (VA < 3/60) in 46.5% of the total cases. S. P. Shaikh et al. [16] investigated the eye diseases pattern and prevalence in children aged 5 to 15 years. They examined a total of 5110 subjects at Bazzertaline Area, South Karachi, Pakistan in 2003. They reported 0.27% prevalence of bilateral blindness, with cataract being the major cause and 2.2% prevalence of low vision, with uncorrected refractive error being the leading cause. Moreover, they reported 1.72% higher visual impairment in girls as compared to boys.

Pakistan, the sixth most populous country in the world,[1] is a developing country situated in the World Health Organization's (WHO) Eastern Mediterranean Region. The country ranks 135 in the United Nations Human Development Index,[2] and a recent report has suggested that the country is facing significant hardship; a declining

growth in gross domestic product (GDP) and a near doubling of the proportion of the population living below the poverty line between 1987 and 2003.[3] The geography and climate of Pakistan are extremely diverse; the eastern and southern parts are dominated by the Indus River and its tributaries, the northern parts by the snow-covered Himalayan mountain range. The country's four provinces are Punjab, Sindh, North West Frontier Province (NWFP) and Baluchistan.

The evidence base on national blindness and visual impairment in Pakistan prior to this survey is extremely limited. One study, estimating the main cause of blindness to be cataract (66.7%),[4] led the National Committee for the Prevention of Blindness (NCPB) to develop a Five Year National Plan for the Prevention of Blindness (1994–1999) with a particular focus on large-scale expansion of cataract surgical services.

The aim of this second national survey (conducted between 2002 and 2004) was to apply more rigorous survey methodologies to produce accurate data. Details of the prevalence of blindness among adults (aged ⩾30 years) have been published[5] and we now report on the causes of blindness and visual impairment, providing estimates of the magnitude of the major causes and exploring their demographic associations.

Q.2 Explain common eye defects in people?

Answer:-

Myopia: (nearsightedness) This is a defect of vision in which far objects appear blurred but near objects are seen clearly. The image is focused in front of the retina rather than on it usually because the eyeball is too long or the refractive power of the eye's lens too strong. Myopia can be corrected by wearing glasses/contacts with concave lenses these help to focus the image on the retina.

Hyperopia: (farsightedness) This is a defect of vision in which there is difficulty with near vision but far objects can be seen easily. The image is focused behind the retina rather than upon it. This occurs when the eyeball is too short or the refractive power of the lens is too weak. Hyperopia can be corrected by wearing glasses/contacts that contain convex lenses.

Astigmatism: This defect is when the light rays do not all come to a single focal point on the retina, instead some focus on the retina and some focus in front of or behind it. This is usually caused by a non-uniform curvature of the cornea. A typical symptom of astigmatism is if you are looking at a pattern of lines placed at various angles and the lines running in one direction appear sharp whilst those in other directions appear blurred. Astigmatism can usually be corrected by using a special spherical cylindrical lens; this is placed in the out-of-focus axis.

Cataracts: A cataract is a clouding of the lens, which prevents a clear, sharp image being produced. A cataract forms because the lens is sealed in a capsule and as old cells die they get trapped in the capsule, with time this causes a clouding over of the lens. This clouding results in blurred images.

Age-related macular degeneration (ARMD)

This is a degenerative condition of the macula (the central retina). It is caused by the hardening of the arteries that nourish the retina. This deprives the retinal tissue of the nutrients and oxygen that it needs to function and causes a deterioration in central vision.

Glaucoma: The eye produces a clear fluid (aqueous humor) that fills the space between the cornea and the iris. This fluid filters out through a complex drainage system. It is the balance between the production and drainage of this fluid that determines the eyes intraocular pressure (IOP). Glaucoma is a disease caused by increased IOP usually resulting from a malfunction in the eye's drainage system. Increased IOP can cause irreversible damage to the optic nerve and retinal fibers and if left untreated can result in a permanent loss of vision.

The anatomy of the eye is complex. The main structures of the eye include the following:

- Cornea: clear tissue in the very front of the eye
- Iris: colored part of the eye surrounding the pupil
- Pupil: dark hole in the iris that regulates the amount of light going into the eye
- Lens: small clear disk inside the eye that focuses light rays onto the retina

- Retina: layer that lines the back of the eye, senses light, and creates electrical impulses that travel through the optic nerve to the brain
- Macula: small central area in the retina that allows us to see fine details clearly
- Optic nerve: connects the eye to the brain and carries the electrical impulses formed by the retina to the visual cortex of the brain
- Vitreous: clear, jelly-like substance that fills the middle of the eye

Eye problems can involve any and all of these parts. As you read through this article, you can refer to this illustration for reference.

Glaucoma refers to a group of eye diseases that cause pressure increases within your eye. The increased pressure affects the optic nerve and may cause vision loss. Glaucoma can be classified into two main types. These are open-angle, which is more common and develops more slowly, and angle-closure, which comes on suddenly and is painful. Without treatment, either type can cause vision problems and blindness.

In the early phases of glaucoma there are often no symptoms. By the time vision is affected, the damage is permanent. Progression of glaucoma can be slowed or halted with eye drops, laser treatments, or surgery. So, early diagnosis is key.

People with a family history of glaucoma, the elderly, and African-Americans are at increased risk of the disease.

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Q.3 Define visual acuity how is it measured? What does it knowledge contribute in the teaching of VHC?

Visual acuity is a measure of the finest detail that can be resolved or recognized by the visual system. Visual acuity can be reduced by the optical blur produced by imperfect optics of the eye (refractive error), which can be corrected by spectacle or contact lens correction, or it can be reduced by neural deficits, which cannot be corrected optically. Because visual acuity deficits due to refractive error are correctable and therefore do not result in a disability, visual acuity assessment should be conducted with the individual wearing best optical correction. For adults, best

correction is typically evaluated by manifest refraction, in which the adult judges which lenses produce optimal ability to read an eye chart. For infants, very young children, and multiply handicapped individuals with whom manifest refraction cannot be performed, the estimate of best correction must be made using objective techniques, such as autorefraction or retinoscopy.

The visual acuity of school-age children can usually be tested using standard letter acuity tests that are designed for use with adults. Testing of preschool-age children often requires modified visual acuity tests, composed of a limited subset of letters or symbols that can be identified or matched to a card that is held by the child. Infants and children younger than 3 years usually cannot identify letters or symbols verbally or by matching. The most successful way to assess their visual acuity is through observation of their visual system's electrophysiological responses or eye movement responses to repetitive grating (striped) or checkerboard patterns. This strategy of assessing an infant's resolution acuity rather than his or her recognition acuity may underestimate the depth of some visual acuity deficits (e.g., amblyopia or lazy eye), but it currently provides the best method for assessing a young child's visual capability.

The visual evoked potential (VEP, also called the visual evoked response or VER) is an electrical signal generated by the occipital cortex of the brain in response to visual stimulation. It is recorded through one or more electrodes placed on the scalp over the visual cortex. Visual acuity can be estimated by recording VEP responses to patterned stimuli, such as phase-alternating, black and white gratings, in which the overall luminance of the target remains constant but the spatial configuration of the pattern changes. Typically, as the size of the pattern elements decreases, the amplitude of the VEP decreases, with the result that the visual acuity threshold can be estimated as the finest grating or the smallest check size that results in a measurable VEP (for details of recording and scoring techniques, see Norcia, 1994). Normative data are available for VEP acuity for infants between birth and age 1 year (McCulloch et al., 1999; Norcia & Tyler, 1985). However, use of the VEP for measurement of visual acuity in individual infants has been limited to a relatively small number of clinical sites,

undoubtedly due to the expense of the equipment and the technical expertise required to conduct the test.

The advantages of using the pattern VEP for measurement of visual acuity in infants are several: (1) measurements can be made quickly, within a time span over which most infants will remain cooperative and will fixate on the stimulus; (2) the procedure requires minimal response from the infant; (3) the VEP can be a good indicator of macular function, since it is generated primarily by the area of visual cortex that receives input from the macular region; and (4) data on the distribution of acuity results in normal infants of different ages are available, making it possible to interpret an infant's visual acuity score in terms of number of standard deviations below normal, as suggested in the current SSA regulations.

There are limitations on the pattern VEP for assessment of visual acuity in infants: (1) the testing equipment is expensive and not widely available; (2) technical expertise is required for conducting the procedure and interpreting the responses; (3) it can be difficult to obtain a measurable response from infants with such oculomotor abnormalities as nystagmus and such neuromotor abnormalities as cerebral palsy, which may cause muscle artifacts that obscure the visual signal; and (4) infants older than 9 months may resist having electrodes attached.

The visual field is typically assessed using small spots of light that are illuminated briefly at various peripheral locations (static perimetry) or are moved inward from the periphery (kinetic perimetry) while the subject fixates on a central target. However, standard static perimetry techniques are difficult to use with children younger than about 8 years of age, and adult kinetic perimetry procedures typically cannot be used with children younger than 5 or 6 years of age.

In children, as in adults, severely restricted visual fields can have a detrimental effect on an individual's mobility, ability to read or benefit from visually presented information, and ability to interact socially. There is a long history of using perimetry and visual field testing to evaluate the status of peripheral vision in adults in both clinical and research settings. Automated static perimetry is available in the offices of most eye care practitioners, and the limitations of restricted visual field extent and of

nonseeing areas within the visual field have been widely studied. For children who are old enough cognitively to be tested in a standard adult perimeter, the results of testing can provide an accurate indicator of visual field restrictions. Quantitative techniques for evaluating visual fields in younger children and infants, however, are available only in a small number of research and clinical settings. Thus, at the current time, quantitative evaluation of visual fields in infants and young children is not a practical means of evaluating disability in infants and preschool-age children.

In children whose visual acuity is measurable but below the normal range, it would be beneficial to evaluate their overall spatial vision by assessment of their contrast sensitivity. This is possible in children who have the cognitive skills to be tested with measures of contrast sensitivity developed for use with adults. For children who are too young to be tested with standard adult contrast sensitivity measures, there are no widely available techniques for assessment of contrast sensitivity and therefore no standardized methods for evaluating disability related to deficits in contrast sensitivity.

Q.4 Differentiate between residual and functional vision. Explain the construction and use of checklist for assessment of educational performance of VHC

Answer:-

Functional vision is how your entire visual system — the eyes, the brain, the visual pathways — work together to help you interact with your environment. Functional vision includes the following visual skill areas:

Eye Teaming

Occurs when the eyes align to focus on the same point on an object and work together in a coordinated and precise way. Good eye teaming allows efficient, single, comfortable vision and depth perception.

If the two eyes are not both aligned at the same point, the brain won't be able to correctly combine the image from each eye. When this happens, a person will

experience double vision and lose 3D depth perception. Poor eye teaming may also lead to eyestrain and fatigue.

Eye Focusing

This encompasses your ability to see an object clearly, and your ability to shift focus between objects at different distances.

For example, a person may have difficulty keeping reading material in focus and may experience intermittent or constant blur. Or a student may be able to see the text in a book clearly but have difficulty shifting focus from the book to the board and back.

Eye Movement

This includes your eyes' ability to maintain fixation on a moving object through space, move fixation from one object to another, or sustain fixation on a stationary object.

Following a fly ball into your glove and moving your eyes across this line of text both require accurate and efficient eye movements. Maintaining eye contact when listening is an example of sustaining fixation on a stationary object.

A large percentage of students don't have vision problems, and conducting these tests on every child would be costly. Vision screenings are less costly, but limited in scope. Many of these screenings involve little more than reading letters on a distance eye chart, a test that cannot determine if a child has the visual skills necessary for effective reading and learning.

A Functional Vision Exam generally takes 60 – 90 minutes and includes a series of tests based on the patient's individual needs. The doctor will first review the patient's health and eye history, with emphasis on any visual problems and symptoms. This information is used to tailor the Functional Vision Exam, which includes tests on a wide range of visual skills.

These tests are for the typical learning-related vision problems. Different tests may be required for other types of patients (developmental delay, brain injury, sports vision).

The Functional Vision Exam includes:

- The Pre-Test Assessment
- The Examination Assessment
- The End Visit

Pre-Test Assessment:

- Binocular space perception.
- Color Perception
- Stereopsis
- Visual motor integration
- Developmental eye movement (“tracking”)
- Eye movements while reading

Examination Assessment:

- Visual Acuity
- Pursuits (ability to track a moving target) and Saccades (ability to switch fixation between two targets)
- Ability to converge the eyes
- Alignment of the eyes at distance and near
- Visual Field
- Refractive Condition
- Ability to converge and diverge the eyes when looking at a distance target
- Ability to converge and diverge the eyes when looking at a near target
- Magnitude of focusing ability
- Flexibility of focusing ability
- Function in near tasks with various performance lenses
- Papillary reflexes
- Internal and external ocular health

The Perceptual Testing Assessment is not always required, but the developmental optometrist may recommend it. It includes testing the following skills:

- ✧ Presence or absence of primitive reflexes
- ✧ Bilateral integration
- ✧ Liberality
- ✧ Directional
- ✧ Visual perceptual attention
- ✧ Perceptual speed
- ✧ Visual Memory
- ✧ Visual Motor Integration and Organization
- ✧ Auditory attention
- ✧ Auditory visual integration
- ✧ Auditory Discrimination

This depends on the level of coverage provided in your health insurance policy. We are happy to provide you with a pressurization letter that you can give to your insurance company to determine your level of coverage. In the event you don't have coverage, we have a variety of payment plans that can fit any budget.

Q.5 Write notes on the following:

1. Educational implications of blindness

For students with visual impairments, testing for visual loss must begin as early as detection of visual problems are noticed in the classroom. For example, if a student is squinting or needing to be seated closer to the board or puts reading material directly in front of his/her face to see the print, testing can provide confirmation of a visual concern. Students may also exhibit noticeable vision problems during oral reading or when asked to complete in-class assignments. Visual problems may force students to feel limitations in their ability to fully participate in group collaborative work and classroom contributions.

Assistive technology and lesson or room modifications may be indicated in a student's IEP (Individualized Education Plan). Students with visual impairments may need help with mobility around the classroom or with enhancing both visual and hearing skills. Students with limited vision may need access to visual enhancement technology or written text materials. Those who are legally blind may need Braille

technology and assistance with implementation in understanding subejct content materials. Additional accommodations may include computer-assisted software that provides auditory learning and visual enhancement of reading materials. Providing accommodations and assistive technological access to students with visual impairments will provide educational access and equity in learning. Additional information on children with visual impairment disabilities can be found right here on Bright Hub Education in this Guide for Teaching Students With Visual Impairments. You'll find over 20 articles and resources for your use in the classroom. When a visual impairment is present from birth (congenital) it will have a more significant impact on development and learning that if the visual impairment is acquired later in life (adventitious). Loss of vision can affect all areas of development. Social development is affected as children are not able to pick up on non-verbal clues or if they are unable to make eye contact they may appear disinterested and can reduce sustained social interactions. Loss of vision impacts motor development as a child may not be motivated to move toward that which can't be seen or causes inhibition to move for fear of the unknown. Exploration of the environment and materials is critical in cognitive development, therefore movement is important not only for motor development but for the development of concepts. Language acquisition can also be affected by the loss of vision as active interaction with people and the environment is important in language development. Delays in the area of independence in activities of daily living are impacted as incidental learning through observation is not possible for those with significant visual impairments. This impact can be magnified when caregivers, in an effort to help or to rush through activities, complete tasks for the child which creates learned helplessness in the child.

1. **Colour vision and field vision**

Color vision is an ability of animals to perceive differences between light composed of different wavelengths (i.e., different spectral power distributions) independently of light intensity. Color perception is a part of the larger visual system and is mediated by a complex process between neurons that begins with differential stimulation of different types of photoreceptors by light entering the eye. Those photoreceptors then emit outputs that are propagated through many layers of neurons and then ultimately

to the brain. Color vision is found in many animals and is mediated by similar underlying mechanisms with common types of biological molecules and a complex history of evolution in different animal taxa. In primates, color vision may have evolved under selective pressure for a variety of visual tasks including the foraging for nutritious young leaves, ripe fruit, and flowers, as well as detecting predator camouflage and emotional states in other primates The **visual field** is the "spatial array of visual sensations available to observation in introspectionist psychological experiments".[1] Or simply, visual field can be defined as the entire area that can be seen when an eye is fixed straight at a point. The equivalent concept for optical instruments and image sensors is the field of view. In optometry, ophthalmology, and neurology, a visual field test is used to determine whether the visual field is affected by diseases that cause local scotoma or a more extensive loss of vision or a reduction in sensitivity (increase in threshold).

REFRENCES:

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- These centers provided services such as assessment and diagnostics, education up to Primary, Middle, Secondary and Higher Secondary levels, pre vocational and vocational training, early intervention , physiotherapy, speech therapy , occupational therapy, indoor and outdoor recreation facilities and parents' counselling.
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The End