CHAPTER 1

INTRODUCTION

“Light to See” – “Let there be Light”

Dr. APJ Abdul Kalam (2008)

1.1 GENERAL

Education is for absolute development of children and it makes them potential in the world. Research is an excellent activity to discover the truth which are hidden and has not been found yet. Research must be carried out in all areas of education to produce eminent, competitive and talented students. Each and every research should be started with precise objectives. At the end of the research the goal must be attained. To achieve the goal, researchers have to take this process as a challenge even though they face problems in carrying out this activity.

Good health is valuable for human beings. It brings us happiness and wealth. It is not merely absence of disease. Sound health is a great asset for people to lead their life successfully. Therefore, it is very much essential for our students to acquire knowledge about diseases, its causes, prevention of diseases and hygiene. Hence, the educational institutions should impart knowledge of health sense, health attitude and values. The National Physical Efficiency Tests (NPET) should be administered to all the students to assess the knowledge of health values. The welfare of the individual and the Nation depends basically upon the physical and mental efficiency of our children. Organizing health and cleanliness program in the schools is an imperative one. School going children suffers a lot because of undernourishment. This may lead to defects in vision. Hence periodical inspection is absolutely required for all the students. Proper vision is essential for child to his succeed in all school activities. Vision problems are universal among school aged children. If the problem is not identified and treated earlier, it will affect their learning ability, personality and adjustment. Good vision is required for School aged children to spend time in all recreational activities.
1.2 DEFINITIONS FOR LOW VISION

“A defect in the eye that prevents light from being brought to a single focus exact on the retina” [1].

“The inability of the lens of the eye to focus on an image correctly, such as occurs in far- and near-sightedness” [2].

“Condition where light entering the eye is not clearly focused on the retina, resulting in blurred vision” [3].

In 1992, the World Health Organization (WHO) published a working definition of low vision: “A person with low vision is one who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity of less than 6/18 to light perception, or a visual field of less than 10 degrees from the point of fixation, but who uses, or is potentially able to use, vision for the planning and/or execution of a task for which vision is essential” [4].

1.3 ANATOMY OF THE EYE

The eyeball is the peripheral organ of vision. It is suspended in the orbit by extraocular muscles and their facial sheaths. Eyeball is not typically spherical but an oblate spheroid due to flattening from above downwards.

Anteroposterior diameter:
17.5 mm at birth
20-21 mm at puberty
24 mm in adults

Horizontal Diameter: 23.5 mm
Vertical diameter: 23 mm
Circumference: 75 mm
Volume: 6 ml
Weight: 7 gms.
Eye ball has 3 concentric tunics (coats)

1. **Outer fibrous coat**: Anterior 1/6 th cornea which is clear and transparent. Posterior 5/6 th sclera – fibrous, opaque coat.

2. **Middle Vascular coat**: Anterior to posterior, Iris, ciliarybody, choroid.

3. **Inner nervous coat**: Retina.

The eyeball is divided into two segments.

1. **Anterior segment**: Structure interior to iris lens diaphragm. It is divided into two chambers.
   a. Anterior chamber: Space between cornea anteriorly and iris posteriorly. It contains 0.25 ml aqueous humor.
   b. Posterior chamber: A triangular space between posterior surface of iris anteriorly, lens posteriorly and ciliary body laterally. It contains 0.06 ml of aqueous humour.

2. **Posterior segment**: Structures posterior to the lens. It contains vitreous, choroid, retina and optic disc [5].

1.4 **PHYSIOLOGY OF VISION**

Light is the stimulus for rods and cones in the retina. It brings about two types of reactions-photochemical and electrical. The photochemical changes are due to pigments present in the rods and cones. The electrical changes occurring in the retina can be recorded clinically in the electroretinogram, which is of diagnostic value to detect retinal disease.

**Physiology of the Lens**: The lens performs the important function of refraction of light to produce clear retinal image. The lens contributes 35% of refracting power of eye. 80% of light between 4000nm and 1400nm is transmitted [5].
1.5 FACTORS CAUSING POOR EDUCATIONAL PERFORMANCE

Students are often classified as fast, average and slow learners. Some students are very slow at grasping what is taught, because of a number of physiological as well as psychological problems. Decline of a child’s performance may be due to the following reasons:

- Poor eye sight,
- Poor hearing
- Problems at home
- High expectations and undue pressure from parents
- Lack of motivation
- Peer Pressure
- Physical factors and changes in the body related to adolescence.

The teacher should be alert and check whether the students are able to see the board clearly and take down notes. Problems relating to the vision of students should be identified and passed on to their parents for quick remedial action.

1.6 THEORIES OF MYOPIA

Everyone knows that watching television for longer period or reading a book over night will create stress and irritation in the eyes. There are two different views has been explained as theories.

The biological theory of myopia views myopia as the result of genetically determined characteristics of eye tissues, whereas the use-abuse theory views myopia as the result of habitual use of the eye at a near focal length, near-
work. The use-abuse theory implies that myopia is preventable whereas the biological theory does not. Myopia varies over age, gender, race and ethnicity, level of education, social class and degree of urbanization. The explanation of the epidemiology of myopia in the use-abuse theory is that some types of people do more near-work than others [6].

1.7 IDENTIFICATION OF STUDENTS WITH PROBLEMS OF VISION

Refractive Error is the most common problem related to vision among children. Parents as well as teachers should be aware of the signs and symptoms in order to detect the problems at the earliest. Some of the signs include:

1. Sitting too close to the TV
2. Holding a book too close
3. Losing the place while reading
4. Using a finger when reading
5. Tilting the head for better sight
6. Rubbing of the eyes
7. Sensitivity to brightness
8. Unusual tearing
9. Closing one eye to watch TV or to read books
10. Avoiding reading or doing any homework,
11. Keeping away from participation in sports and other activities
12. Complaining of headaches
13. Tiredness in the eyes

Parents must take their wards to the ophthalmologist for eye examination if their child shows any of the above symptoms. The ophthalmologist might suggest eye glasses or contact lenses to correct their Refractive Error.
1.8 EYE FOCUSING

Eye Focusing, also called Accommodation, allows a person to maintain clear focus during near work activities. It also performs rapid and accurate focus changes with instantaneous clarity from one distance to another, such as that from a desk to the chalkboard.

Problems with the ability to maintain or change focus are called Accommodative Dysfunction and are quite prevalent among school-aged children. Accommodative dysfunction may interfere with a child's school performance, prevent an athlete from performing at his or her highest level of ability, or impair one's ability to function efficiently at work.

When people who lack appropriate accommodative abilities try to accomplish near vision tasks, they may develop ocular discomfort or become fatigued, further reducing visual performance. Due to the visual discomfort, children may not be able to complete reading or homework assignments and may be easily distracted or inattentive. Such children may not report any visual symptoms because they do not realize that they should be able to read comfortably.

Some signs and symptoms associated with Accommodative dysfunction may include the following:

- Vision that is clear and then gets blurry
- Inconsistent work product
- Diminished performance with time on a task and difficulty sustaining near visual function
- Difficulty in shifting focus from near to far, like from the board at school to the desk
- Headaches
- Words that move on the page
1.9 EYE TEAMING

Eye teaming, or Binocular vision, is the ability of both eyes to work together. Each of your eyes sees a slightly different image and your brain, by a process called fusion, blends these two images into one three-dimensional picture. Good eye coordination keeps the eyes in proper alignment. A common eye-teaming problem occurs when the eyes have a “tendency” to turn in, out, up, or down and the ability to compensate for this tendency is inadequate. Poor eye coordination results from a lack of adequate vision development or improperly developed eye muscle control. Although rare, an injury or disease can cause poor eye coordination.

Some signs and symptoms associated with a Binocular vision problems may include the following:

- Eye strain
- Headaches
- Double vision
- Reduced reading efficiency
- Loss of place when reading
- Decreased reading comprehension
- Motion sickness when reading in a moving vehicle
- Inability to appreciate 3D movies
- Avoidance of a visually demanding tasks
- Incoordination/clumsiness

Children with binocular vision dysfunction are more likely to show a very short attention span at desk work and may attempt to compensate by covering or closing one eye when reading and reading very slowly or re-reading everything so they can understand what they read. Poor binocular vision may also inhibit athletic performance in sports that require accurate depth perception, including basketball, baseball, and tennis [7].
1.10 EYE TRACKING

Eye tracking, or Oculomotor skills, is the ability to track a moving target or switch fixation from one target to another. This skill permits easy shifting of the eyes along the line of print in a book, a rapid and accurate return to the next line, and quick and accurate shifts from one distance to another, such as between desk and chalkboard.

Accurate oculomotor control is important for beginning reading. Phonic analysis requires careful viewing to properly match the sound to the letter and precise oculomotor control is needed to accomplish accurate decoding when
learning to read. Oculomotor control is also related to attention. A dominant characteristic of children who fail to learn to read in the early grades is the inability to sustain attention. Often the major complaint reported by the classroom teacher is distractibility when faced with visually demanding tasks. Reading comprehension can be adversely affected by poor oculomotor skills.

Symptoms associated with oculomotor deficiencies include:

- Loss of place
- Omitting words when reading
- Skipping or repeating lines
- Errors when copying from a book or from the board.

Oculomotor difficulty attributes to “careless” errors such as miscopying, shifting over one number when adding columns, or misplacing answers on Scantron or bubbled marked tests. Compensations that a child may use include reading with finger pointing, reduced reading speed to a word-by-word rate to avoid errors, and head movement when reading [7].

1.11 VISUAL PERCEPTUAL PROCESSING

Perception is an active process of locating and extracting information from the environment and learning is the process of acquiring information through experience and storing information. Thinking is the manipulation of information to solve problems.

Visual information processing refers to the visual cognitive skills that allow us to process and interpret meaning from the visual information that we gain through our eye sight. Visual perception plays an important role in spelling, mathematics, and reading. Visual perceptual deficits may lead to difficulties in learning, recognizing, and remembering letters and words, learning basic mathematical concepts of size, magnitude, and position, confusing likeness and minor differences, mistaking words with similar beginnings, distinguishing the main idea from insignificant details, and poor handwriting.
Visual perceptual processing is subdivided into categories including visual discrimination, visual figure ground, visual closure, visual memory, visual sequential memory, visual form constancy, visual spatial relationships, and visual-motor integration.

**Visual discrimination** is the ability of the child to be aware of the distinctive features of forms including shape, orientation, size, and color. Visual discrimination, figure ground, and closure problems may result in a person confusing words with similar beginnings or endings and even entire words.

**Visual figure ground** is the ability to distinguish an object from irrelevant background information.

**Visual closure** is the ability to recognize a complete feature from fragmented information.

**Visual memory** is the ability to retain information over an adequate period of time. Obtaining maximum information in the shortest possible time provides for optimal performance and is essential for reading comprehension and spelling. Dysfunctions in visual memory may cause prolonged time in copying assignments, difficulty recognizing the same word on the next page, and difficulty retaining what is seen or heard.

**Visual sequential memory** is the ability to perceive and remember a sequence of objects, letters, words, and other symbols in the same order as originally seen.

**Visual form constancy** is the ability to recognize objects as they change size, shape, or orientation.

**Visual spatial skills** refer to the ability to understand directional concepts that organize external visual space. These skills allow an individual to develop spatial concepts, such as right and left, front and back, and up and down as they relate to their body and to objects in space. A visual spatial deficit may
contribute to poor athletic performance, difficulties with rhythmic activities, lack of coordination and balance, clumsiness, reversals of forms and letters, such as ‘b’ and ‘d’ and words such as ‘on’ and ‘no’ and ‘was’ and ‘saw,’ and a tendency to work with one side of body while the other side does not participate [7].

1.12 VISION AND LEARNING

1.12.1 Reading Comprehension

In order to gain comprehension throughout the reading process, we are constantly taking in the visual information and decoding it from the written word into a mental image. Many different aspects of vision are needed to allow for efficient reading. Accurate oculomotor control is important for beginning reading because it is related to the ability to maintain attention. Accommodation, binocular vision, and visual perception are also related to reading.

Reading requires aiming both eyes at the same point simultaneously, moving both eyes continually as a coordinated team across the line of print, and maintaining focus with both eyes to make the reading material clear. Each time we move our eyes to the next line of print, we continue with the process.

Memory and visualization are used to constantly relate the information to what is already known and to help make sense of what is being read. There are two distinct types of visual memory that is related to reading: Visual sequential memory and visual spatial memory (see Visual Perception). Visual sequential memory is the ability to perceive and remember a sequence of objects, letters, words, and other symbols in the same order as originally seen. Visual spatial memory is the ability to remember the spatial location of the stimuli or to remember, identify, or reproduce a design or form. Visual sequential memory is strongly tied to the use of language to label the stimuli. The labels help in organization, storing, rehearsing, and recalling the visual information. This labeling process is called “verbal mediation”.

There is a specific relationship between phonological awareness and learning to read. Children begin to attend to the beginning and end of letters in
words. Visual spatial memory helps the child to memorize the graphic information that corresponds to the phonological markers [7].

1.12.2 Hand-Eye Coordination

Good hand eye coordination, or visual motor integration, is essential for the accurate production of written language symbols. To accurately reproduce a visual stimulus a person must be able to see that the pattern is made up of a finite number of parts and that these parts interrelate in a very specific manner: These abilities are referred as “analytical skills.” To reproduce the pattern the child must call upon these analytical skill, integrate this information with other systems, and generate a motor response.

Hand eye coordination is used in many activities such as block building, handwriting, and catching a ball. A visual motor dysfunction can have characteristic signs and symptoms of difficulty copying from the board, sloppy handwriting, or writing skills, poor space and inability to stay on lines, erases excessively, can respond orally but not produce answers in writing, difficulty completing written assignments in allotted period of time, seems to know the material but does poorly on tests, and difficulty writing numbers in columns for mathematical problems [7].

1.12.3 Writing Skill

Writing is similar, but almost works in the reverse order to reading. We start with an image in our mind and code it into words. At the same time, we control the movement of the pencil while continually working to keep the written material making sense. Throughout all this, we focus our eyes and move them together just as in the reading process.

Handwriting is greatly influenced by visual-motor development. Visual-motor integration is the general ability to coordinate visual information processing skill with motor skills. Improvements in visual perception and eye-hand coordination skills when the child is still actively and consciously controlling hand movements (grades K-3) leads to immediate improvement in writing skill. Later,
however, writing becomes increasingly dependent on motor memory and is no longer directly controlled utilizing visual steering when forming letters. Older children have to make a systematic effort to relearn writing.

Complicated visual procedures are involved in developing good handwriting. A problem with any or all of the visual procedures can present difficulties in some way with writing. Sometimes a visual difficulty that affects writing is easy to recognize, and other times it can be quite difficult to detect [7].

1.13 VISION CARE

According to the Journal of Behavioral Optometry healthy vision is critical to a child’s educational success and learning ability. Studies indicate that 80 per cent of all learning during a child’s first 12 years is obtained through vision. Undetected vision disorders can cause serious problems in a child’s mental and social development. Several studies examining the link between learning disabilities, delinquency, and vision have found that significant numbers of juvenile offenders had one or more visual deficiencies.

Research indicates that among the 20 per cent of school age children who have a learning disability in reading, 70 per cent of them have some form of visual impairment, such as ocular motor, perceptual or binocular dysfunction, that may be interfering with their reading skills.

A report by the National Eye Institutes indicates that in children, visual impairment is associated with developmental delays and the need for special educational, vocational and social services, often beyond childhood and into adulthood.

Studies have shown that prevention, diagnosing vision disorders in children at an early age, allows intervention at a time when these disorders are highly responsive to treatment. Eye exams can help prevent long-term medical expenditures arising from undiagnosed eye disorders, can reduce unnecessary
placement of children in special education programs, and could also reduce social welfare spending by improving a child's ability to learn and succeed in life. Functionally, low vision is characterized by irreversible visual loss and a reduced ability to perform many daily activities, such as recognizing people in the street, reading blackboards, writing at the same speed as peers, and playing with friends [8].

1.14 EYE EXAMINATIONS: HOW OFTEN?

According to the American Optometric Association, children should have an eye examination by no later than 6 months old, then again by age 3, and just before starting school. After that school-age children need an eye examination in every two years, if they have no visual problems. But if your child requires eyeglasses or contact lenses, schedule visits need for every 12 months.

Frequent eye examinations are important because during the school years your child's eyeglasses prescription can change frequently. Your eye care practitioner also will ensure that your child has the visual skills required for success in school and sports, such as accurate and comfortable eye teaming, peripheral vision, ease of focusing from distance to near and hand-eye coordination [9].

1.15 ERRORS OF REFRACTION

Emmetropia is the refractive state of the eye in which, with accommodation at rest, parallel rays from a distant object are brought to a focus on the retina. Any variation from this state constitutes ametropia in which parallel rays are not accurately focused on the retina. Consequently, the image that is formed on the retina appears blurred. Ametropia includes myopia, hypermetropia and astigmatism.
Figure 1.2 Normal Refraction

**Myopia:** Myopia or short-sightedness is a form of refractive error in which parallel rays from a distant object are brought to a focus in front of the retina when accommodation is at rest. In a majority of causes, myopia is axial in nature, that is, due to a lengthening of the antero-posterior axis of the eye.

Figure 1.3 Myopia
**Hypermetropia:** Hypermetropia or far-sightedness is an error of refraction in which with the accommodation completely relaxed, parallel rays of the light from a distant object are brought to a focus behind the retina. Divergent rays from a near object are focused still further back. In a majority of causes, hypermetropia is axial, that is due to a shortening of the antero-posterior length of the eye.

![Hypermetropia Diagram](Image)

Source: occhicago.com

**Figure 1.4 Hypermetropia**

**Astigmatism:** It is a condition in which the refraction varies in the different meridians of the eye and so a point focus on the retina is not possible [10].

**1.16 OPTICAL TREATMENT**

**Optical Treatment of Myopia:** Optical treatment of myopia constitutes prescription of appropriate concave (minus) lenses, so that clear image is formed on the retina.

**Optical Treatment of Hypermetropia:** Basic principle of treatment is to prescribe convex (plus) lenses, so that the light rays are brought to focus on the retina.
Optical Treatment of Regular Astigmatism: Optical treatment of regular astigmatism prescribing the appropriate cylindrical lens, discovered after accurate refraction. The cylindrical lenses may be prescribed in the form of spectacles [11].

1.17 BODY MASS INDEX (BMI)

Body Mass index can be calculated from height, weight and age of the child. Weight of the child should be appropriate to the height and age of the child. The following BMI calculator can be used to calculate the BMI of children which is available in the website quoted here.

Sex: female

Age (years): 12 years

Age (months): 5 months

Enter your height (in metres):

Enter your weight (in kilograms):


Figure 1.5 BMI calculator for children

Under weight – BMI <18.5
Normal – BMI 18.5– 22.9
Overweight – BMI 23.0 – 24.9
Obese – BMI 25.0 and above

(As per revised values by the Health Ministry in India 2008)
Outdoor games and sports are an enjoyable and important part of most children's lives. Whether playing catch in the back yard or participating in team sports at school, vision plays an important role in how well a child performs.

Specific visual skills needed for sports include:

- Clear distance vision
- Good depth perception
- Wide field of vision
- Effective eye-hand coordination

A child who consistently underperforms a certain skill in a sport, such as always hitting the front of the rim in basketball or swinging late at a pitched ball in baseball, may have a vision problem. If visual skills are not adequate, the child may continue to perform poorly. Correction of vision problems with eyeglasses or contact lenses, or a program of eye exercises called vision therapy can correct many vision problems, enhance vision skills, and improve sports vision performance.

Eye protection should also be a major concern to all student athletes, especially in certain high-risk sports. Thousands of children suffer sports-related eye injuries each year and nearly all can be prevented by using the proper protective eyewear. That is why it is essential that all children wear appropriate, protective eyewear whenever playing sports. Eye protection should also be worn for other risky activities such as lawn mowing and trimming.

Regular prescription eyeglasses or contact lenses are not a substitute for appropriate, well-fitted protective eyewear. Athletes need to use sports eyewear that is tailored to protect the eyes while playing the specific sport. Your doctor of optometry can recommend specific sports eyewear to provide the level of protection needed.
It is also important for all children to protect their eyes from damage caused by ultraviolet radiation in sunlight. Sunglasses are needed to protect the eyes outdoors and some sport-specific designs may even help improve sports performance [12].

1.19 COMPUTER USE AND RISKS FOR CHILDREN

Almost all the children are using the computer every day, either at home or at school and hence they are inseparable. When computers are becoming a part of children’s everyday life, parents and teachers must know the effects of computer use on children’s vision. Children and computers are inseparable. Extensive computer use may cause problems such as fatigue, blurred vision, dry eyes, back pain, headache, etc., Among children, prolonged computer use also cause myopia. Hence, before using computers, every child should have an eye examination and also they should visit Ophthalmologist periodically. Ignoring the visit for eye examination may make the children’s life an unpleasant one.

1.20 TELEVISION AND CHILDREN

Nowadays communication between parents and children is gradually declining because of television and other electronic gadgets. When the children are watching television, they are unable to give responses to their parent’s questions. Some parents, who are busy with their own work, don’t want to be disturbed by their wards and hence they permit them to watch TV. If such a situation prevails in all households, a large number of children may end up with eye defects which in turn will affect their academic performance. Watching TV, makes our life style sedative and also children will eat junk food without knowing the quantity. This also leads to some health problems among children such as obesity, digestive problems etc., Some of the TV programs that are telecasted may contain violence and this may lead to aggression among children and also they will become a juvenile delinquent. Intensive use of TV leads to problems in vision too. While a child is watching a good educational program, elders have to be present by their side to clarify the doubts of children if any. This will help them to watch more programs related to education which in turn enhances the knowledge of the children. Children sitting in
front of TV for a longer period of time may result in defects eye. Hence, watching TV for a prolonged time must be minimized and any other activities must be motivated.

1.21 VISION 2020: THE RIGHT TO SIGHT – INDIA

Vision 2020: The Right to Sight – INDIA is a membership organization of 66 Eye Care Institutions. It had its 19th Board Meeting and 4th Annual General Body Meeting (AGBM) on the 10th and 11th July 2008 at Jodhpur, Rajasthan.

His Excellency, ex-President of India, Dr APJ Abdul Kalam was the Chief Guest at the AGBM. He shared his ideas about providing ‘Light to See’: A beautiful Mission – “Let there be Light”.

“Vision 2020: The Right to Sight – INDIA” to sensitize the Government of India and the State Governments to include eye care as a priority health care in our country which is an essential requirement of transformation towards knowledge society. He concluded his address by mentioning the “Defect Free Vision for All” should be our National mission. The eye problems of the children can be corrected, if diagnosed early. Such programs should aim at screening all the children. Research is required to pinpoint the causes and provide appropriate guidelines to the parents, so that they can facilitate the children to preserve quality eye sight [13].

1.22 A STORY OF LUCY JOHNSON NUGENT

(The following story was written by Luci Johnson Nugent and appeared in "Family Circle" Magazine. The Optometric Extension Foundation has generously given permission to reprint it - ©1995 - 2004 The Center for New Discoveries in Learning, Inc).

When President Lyndon Johnson was in office, his daughter, Luci Johnson, suffered from poor grades and learning difficulties due to learning related vision problems. Her story shows us that anyone, regardless of status or income, may struggle with visual or perceptual dysfunction. Due to poor vision screenings,
most of these problems are missed in childhood, and continue through adulthood. At 16, I was an underachiever in school and had been most of my life. I had been told-as the result of every kind of test imaginable- that I was a relatively bright child. There were times when I actually believed it and would go home and spend hours writing a paper I thought so brilliant a special assembly would be called to have it read- only to have my teacher tell me, “Oh, Luci can't you see where you made mistakes?” (But that was the crux of the problem. I couldn't really see).

The fact that we use the word “see” to mean understand indicates just how important vision is to our learning process. Here I was, the younger daughter of the man who was then Vice President - and a few months later became President- of the United States. My father certainly had the desire and the means to have my health problems diagnosed and treated. And yet, I had a major visual problem that went undetected for many years. I came from a family of achievers and worked diligently at school, but no matter how hard I tried, I found it impossible to rise from C to even a C+. Not only were my academic abilities affected, but because my eyes did not work well together, my total coordination was poor. And because I was physically uncoordinated, I was inevitably the last choice for team games throughout my childhood. And so, at 16, I was on my way to dropping out. You can't face the frustration of not being able to succeed indefinitely without wanting to run from the scene of you failure. Fortunately for me, my problem became so acute that I started blacking out during tests. Finally, as a last-ditch effort, Dr. Janet Travell, then White House physician and a lovely lady, suggested that I visit a local optometrist, Dr. Robert A. Kraskin. We had never considered going this route before because I apparently had no acuity problem (in fact, the Snellen eye chart indicated that I had 20/20 vision).

Dr. Kraskin told me that my eye coordination was poor. Dysfunction in the coordination of both eyes which reduces and lessens the ability to derive meaning from that which is seen. Not only is reading efficiency restricted, but there is also difficulty in general coordination activities, such as sports, which are highly dependent upon the use of visual information. Thus, hand-eye activities are limited. More frequently than not, there are no measureable ocular defects (such as
nearsightedness) and 20/20 visual acuity usually is measured. “Fortunately, this type of visual problem can be alleviated. Generally, glasses alone will not solve the problem, although the use of proper glasses for close work is an essential aspect of the proper therapy. To alleviate the problem, a program of activities and exercises is recommended”.

When I began my visual training course I was probably the most belligerent patient Dr. Kraskin ever knew. (Since I later worked in his office, I can tell you this attitude is not uncommon among people who are frustrated by visual difficulties.) I complained constantly. I couldn't see the sense of being yanked from my study hall to do seemingly senseless exercises- like drawing circles on chalk boards, or writing down numbers flashed from a tachistoscope onto a screen, or putting pegs in proper holes, or tracing pictures through a machine called a cheiroscope. (Actually Dr. Kraskin was teaching me to use my eyes as a team.) From then on, my grades improved and a year-and-a-half later I had gone from Ds to Bs. During my freshman year at college, I made the honor roll- and for someone who had been on scholastic probation for so long, this achievement was a thrilling one indeed. Also, my physical coordination noticeably improved. I was still far from being an athlete- but I'd come a long way. Then, I had a long way to come. . My only hope is that this simple testing, which only detects gross visual problems, will serve as an impetus to get parent to take their children to a vision specialist of their own choosing. For, just because your child passes a test, he is not necessarily problem free.

Helping someone to see better is a magnificent achievement, particularly since seeing and understanding is considered synonymous in our society. For as I once pointed out in a speech I made a few years ago, if the key to a better society is education, then the key to a better education is better vision. If you don't have that key, you can't open the door to a better life [14].
1.23 FOOD ITEMS FOR GOOD VISION

Health care starts right at the mother’s womb. Pregnant women are supposed to take a balanced and healthy food. This helps them to deliver a healthy baby which takes care of the vision too. After birth, the child must be provided with all types of food items which are essential for maintaining proper vision. From the literature it is understood that the following food habits are required to maintain good health.

**Salmon:** Apart from containing high levels of Omega-3 fatty acids, Salmon is rich in Vitamins A and D, which make it one of the most popular food for improving eyesight and vision. These dietary essentials not only help improve eye health, but also boost your brain power. Just 2-3 servings of fresh salmon in your weekly menu and you would reap the benefits in no time.

**Eggs:** Whether it is just boiled or scrambled, egg inclusion in your diet is valuable for your eyes. The yolk contains several essential nutrients and proteins that keep you healthy. Apart from this, it contains lutein, essential fatty acids, B-vitamins and zinc that are requisites of maintaining the overall health of your eyes.

**Bilberries:** It does not matter whether you enjoy it fresh or in the form of jam or jelly, but bilberry consumption is a must for people who want to avoid the risk of vision loss. These dark purple berries contain anthocyanosides, a compound that may reduce chances of poor vision. Antioxidant-rich berries are another valuable source of nutrition that may also improve your eyesight.

**Dark Chocolate:** If you were of the opinion that only bland eatables help improve eyesight, you are in for a surprise. Eyesight can be improved by including dark chocolate in your regular diet. This is because it contains flavanoids, which help in protecting the blood vessels of the eyes, making the cornea, and lens strong. However, make sure that the dark chocolate is pure in form and contains at least 60% cacao extracts, for obtaining maximum benefits.
**Garlic:** The rich sulfur content in garlic makes it an ideal food that improves eyesight. The high amounts of sulfur help in making the lens strong and resilient. The best part about garlic is that it makes dishes flavorful and healthy.

**Leafy Green Vegetables:** Hundreds of time, you must have heard your mother or nanny inform you of the benefits of green leafy vegetables. Though this might sound repetitive, a list of food that improves eyesight would be incomplete without mentioning leafy green vegetables. They contain high levels of the antioxidants lutein and zeaxanthin, which are essential for protecting the eyes from degeneration.

**Apricots:** Apricots contain nutrients that help in improving the eye sight. It contains vitamin A, which promotes better vision, and it also relieves eyes from the damage done by the free radicals. Apricots also contain carotenoids which also promotes eye sight.

**Carrot:** You must have heard about how carrots improve the eye sight. Carrots actually do help in improving eyesight. Being very rich in vitamin A and beta-carotene, carrots are a powerhouse in protecting vision especially night vision.

**Spinach and Kale:** Spinach and kale contain a substance called as Lutein, which is a carotenoid protective against eye diseases. Cataract and the eyesight problems related to the age problem can be reduced with a regular consumption of spinach and kale.

**Broccoli:** Broccoli like most other leafy green vegetable contains potential phytonutrient antioxidants that are lutein and zeaxanthin, which are extremely beneficial for eyes. it is also believed to protect eye cells from free radical stressors.
Other Foods Good for Eyesight:

- Avocados
- Berries
- Black Currants
- Blueberries
- Cabbage
- Can Capers
- Cold-water Fish
- Collard Greens
- Fish Oils
- Fresh Fruits
- Grapefruit
- Grapes
- Lemons
- Milk
- Nuts & Almonds
- Olive oil
- Onions & Shallots
- Plums
- Pumpkins
- Soy
- Squash
- Sweet Potatoes
- Whole Grains
- Wine, in Moderation [15].
1.24 SCOPE OF THIS STUDY

Fact Sheet N°282 (June 2012) released by WHO says that:

- Two hundred and eighty five million people are visually impaired worldwide: 39 million are blind and 246 million have low vision.
- About 90% of the world’s visually impaired live in developing countries.
- Globally, uncorrected refractive errors are the main cause of visual impairment; cataracts remain the leading cause of blindness in middle and low-income groups.
- The number of people visually impaired due to infectious diseases has greatly reduced in the last 20 years.
- About 80% of all visual impairment can be avoided or cured.

An undetected vision problem will obstruct the learning and other activities of children. A survey released by the Vision Council of America (VCA) found that only 6% of parents are able to identify that the vision problems creates so many problems in schools. When a child experiences any problem in school, it is important that a parent considers his or her vision, as there are several reasons why a child may not perform well in academics. Children should be sent to school with all items such as paper, pencils, books, delicious snacks, enriched lunch, and also with proper vision. Parents and teachers must be very careful in identifying the vision problems before any negative impact is visible in their academic performance. A complete eye examination must be given by eye care professionals to diagnose and treat the vision problems at the earliest stage.

Times have changed and children today spend lot of time in watching TV, playing videogames and browsing the net, in contrast to the earlier days when children spent time playing outdoors, riding cycles, climbing trees, playing catch, helping with household work and so on. Researchers’ note that the root cause of the
problems among children is due to their everyday activities which necessitates being very close to glaring screens, whether it be that of the computer or television.

In the field of education, researches related to health, especially vision related ones, will be very useful to build a strong nation. Most parents are unaware about the importance of the vision of their children. This may be due to their non-literacy. But even educated parents do not give enough importance to this issue, either because of poverty or lack of time to take their wards for the regular visit to the hospital. Vision screening for school children could be useful in detecting refractive errors and in minimizing long-term visual disability. Definitely this study will provide awareness to children, parents, teachers and school administrators. And the investigator hopes this study will be a stepping stone for the future researchers to make further inroads into the detection and solution to this problem.

1.25 NEED AND SIGNIFICANCE OF THIS STUDY

All children need to cultivate many competencies to succeed in school. For that they require good vision. Better learning is possible only through their eyes. When there is a problem with a child’s vision, his education and participation in sports also will be affected. The school years are a very important time in every child's life. All parents expect that their child must nurture all their talents in school and most of the parents provide them with all facilities ensuring them the best educational opportunities.

When children go to the higher classes, the size of print in school books becomes smaller and the amount of time spent reading and studying increases considerably. Increased class work and homework may strain the eyes. When the child faces difficulty in vision, he/she will avoid reading, have lowered levels of comprehension, feel fatigued, and suffer from a lack of concentration and so on.

Another major problem that vision defective children might face is that of being wrongly diagnosed as being disabled. Children with undetected and untreated vision problems exhibit the same symptoms of Attention Deficit
Hyperactivity Disorder (ADHD) children. Thus they may be mislabeled as having ADHD because of undetected vision problem. It is imperative that the vision problems are identified as early as possible. Eyeglasses or contact lenses must be provided to correct the vision problems. To know the prevalence of Refractive Error, and to find out the consequences of defective vision on academic performance, the investigator has selected a study area which will be titled “Impact of Refractive Error Correction on Educational Performance of VII standard students in Kanchipuram District.”

1.26 CONCLUSION

Eye sight is very important for children to perform all school related and other activities. Poor sight will retard their abilities in school. If the problem is not recognised by the teachers or parents, it may cause blindness too. If the vision problems are detected and corrected at the initial stages, the academic performance of the children will display enormous improvement. In the field of education, these kinds of researches will play a very important role in creating eminent citizens in India. In the following chapter the review of related literature will be discussed in detail.