AN EPIDEMIOLOGICAL STUDY OF VISUALLY DISABLED PATIENTS LESS THAN 40 YEARS OF AGE.

Dissertation submitted to

THE TAMILNADU Dr.M.G.R MEDICAL UNIVERSITY

In partial fulfilment of the

regulations for the award of the degree of

M.S.OPHTHALMOLOGY

BRANCH – III

Thanjavur Medical College and Hospital

The Tamilnadu Dr. M.G.R Medical University

Chennai,India

APRIL 2015

CERTIFICATE

This is to certify that this Dissertation entitled "**An epidemiological study of visually disabled patients less than 40 years of age"** is a bonafied work done by **Dr.R.THENMOZHI SELVI**, under my guidance and supervision in the Department of ophthalmology, Thanjavur Medical College, Thanjavur doing her Postgraduate course from 2012 -2015.

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DECLARATION

I solemnly declare that this Dissertation "**An epidemiological study of visually disabled patients less than 40 years of age"** was done by me in the Department of Ophthalmology, Thanjavur Medical College, and Hospital, Thanjavur under the Guidance and Supervision of my Professor **Dr.P.NALLAMUTHU M.S.,D.O.,** Department of Ophthalmology, Thanjavur Medical College, Thanjavur between 2012 and 2015.

This Dissertation is submitted to The Tamilnadu Dr. M.G.R Medical University , Chennai in partial fulfilment of University requirements for the award of M.S Degree (Branch – III) in Ophthalmology.

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INSTITUTIONAL ETHICAL COMMITTEE

CERTIFICATE

Approval No. : 009

This is to certify that The Research Proposal / Project titled

AN EPIDEMIOLOGICAL STUDY OF VISUALLY DISABLED PATIENTS LESS THAN 40 YEARS OF AGE

submitted by Dr. R. THENMOZHISELVI **of**

Dept. of OPHTHALMOLOGY **Thanjavur Medical College, Thanjavur**

was approved by the Ethical Committee.

Thanjavur

Dated : 06.12.2013

THANJAVUR MEDICAL COLLEGE THANJAVUR-4

Secretary

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TMC, Thanjavur.

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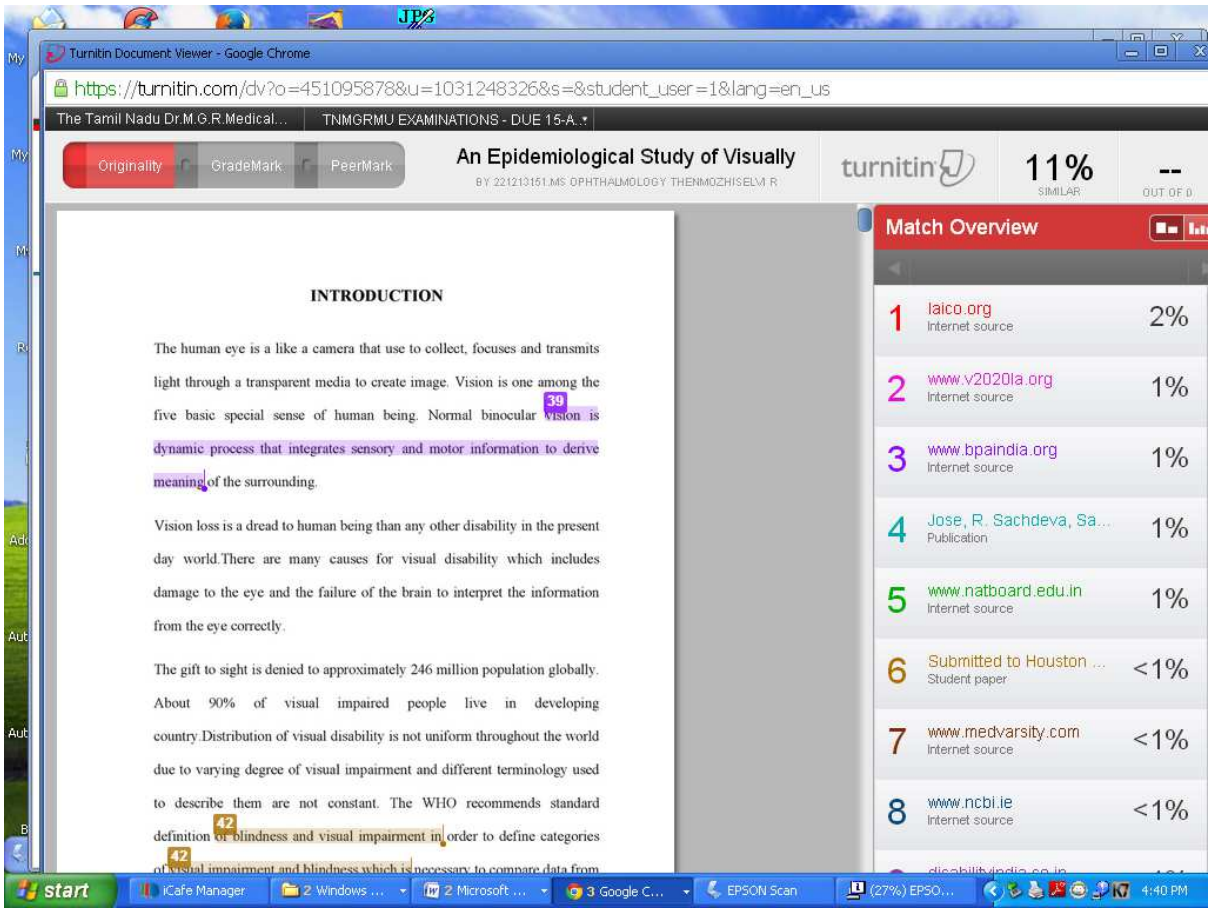

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ABSTRACT

Title: An epidemiological study of visually disabled patient in less than 40 years of age.

Aim:

Visual disability may be due to many possible causes, but it is catastrophe beyond compare. It adversely affects the quality of life and emotional well being of the individual and their families. This impairs the productivity of the country.

The aim of this study is to assess the magnitude, causes, percentage/ categories of visual disability and their rehabilitative measures available.

Materials & methods:

Individuals who came to thanjavur medical college, thanjavur for visual disability certificate from june 2013 to September 2014 were chosen as subjects in this study.

This is a retrospective study done in 156 patients who satisfy the inclusion criteria.

All patients were subjected to complete ocular examination including visual acuity, torch light examination, slit lamp examination, ophthalmoscopic examination, IOP measurement, gonioscopy, pachymetry and b-scan.

Results:

In this study of 156 patients, 31.41% were in the age group of 31- 40 years, 63.46% were found to be males and 42.94% were having 100% visual disability. Retinitis pigmentosa found to be major cause of visual disability in this study group.

Conclusion:

Visual disability may be of varying degree and with the higher prevalence among men in the age group 31 – 40 years due to retinitis pigmentosa. Therefore , early intervention is imperative for rapid acceptance, better compliance with rehabilitation programmes and higher standard of living.

Keywords: Visual disability, category/percentage of disability and rehabilitation.

INTRODUCTION

The human eye is a like a camera that use to collect, focuses and transmits light through a transparent media to create image. Vision is one among the five basic special senses of human being. Normal binocular vision is a dynamic process that integrates sensory and motor information to derive meaning of the surrounding.

Vision loss is a dread to human being than any other disability in the present day world.There are many causes for visual disability which includes damage to the eye and the failure of the brain to interpret the information from the eye correctly.

The gift to sight is denied to approximately 246 million population globally. About 90% of visual impaired people live in developing country.Distribution of visual disability is not uniform throughout the world due to varying etiological factors and different terminology used to describe them are not constant. The WHO recommends standard definition of blindness and visual impairment in order to define categories of visual impairment and blindness which is necessary to compare data from different countries.

Visual disability can occur at any point of time, but more common in elderly. Inherited visual impairment are often associated with developmental delay and struggle with day t o day activities. According to studies, female have more risk of visual impairment compared to males.

Reduction in visual impairment from avoidable cause(avoidable blindness)

due to increased availability of eye care services and awareness among general population. Despite, there is an increase in visual impairment due to condition related to ageing like age related macular degeneration, diabetic retinopathy and glaucoma.

Visual disability remains a key barrier to socio-economic development so it is necessary to alleviate the functional consequences of impaired vision.

Visual rehabilitation is not a domain limited to improving sight but rather than it comprises number of assistive technology , supportive devices and training pertaining to fulfil every part of a person's life and work in demanding roles. It is important to register in government authority so that it can entitle visually disabled people to a range of benefits and concessions.

The problem is not visual disability but the public perception of it.

DEFINITION

Vision is defined as the act of power of sensing with the eyes, sight. Its an interpretation of color , light , line , form, clarity ,proportion ,depth and dimension.

Epidemiology is the study of the disturbution, determinants and control of disease in human population. For ophthalmology , it mainly concerns about identification, management and prevention of ocular diseases globally, thereby preventing blindness and visual impairment, and to preserve ocular health.

Visual disability is a public health problem and it has a great impact on the productivity of populations.

Concept of disability:

The sequence of events leading to visual disability and handicap is as follows,

Disorder $\rightarrow$ Impairment $\rightarrow$ Disability $\rightarrow$ Handicap

According to International Classification of Impairment,Disability and Handicap introduced by the WHO in 1980(ICIDH-2)

Disorder has been defined the impact of the disease or injury on the anatomical structure of visual function within the organ or a component of the visual pathway.

Example ; retinitis pigmentosa

Impairment , usually used to describe the consequences ,in terms of measurable loss or departure from functional capacity, to the bodily organ, affected by disorder or disease, of an anatomical or physiological function.

Example :impaired night vision , reduced contrast sensitivity and contracted visual field.

Disability is a consequence occurs as a result of impairment, the affected person may be unable to carry out certain activities considered normal for his age, sex.

Example:mobility problems.

Handicap occurs as a result of disability make the person unable to discharge the obligation required of him and to the society.

Example:limitiation to unaccompanied travel and resulting social isolation.

According to WHO (1975)**,blindness** has been defined as visual acuity of less than 3/ 60 or visual field loss to less than 10 degree in the better eye with best possible correction.

The national programme of control of blindness in india defines blindness as visual acuity of less than 6/60 in the better eye with the possible correctionor limitiation of central field of vision to 20 degree or worse.

The WHO defined **low vision** in 1992 as an impairment of visual functioning even after treatment and /or standard refractive correction, and has a visual acuity of less than 6/ 18 to perception of light or a visual field of less than 10 degree from the point of fixation.

The varying connotations of the term blindness and its accessories are, [1]

1.**Economic blindness:** The inability to count fingers from a distance of six meters with the better eye , with the best correction. At this level of blindness,prevents an individual from earning it is also referred as **work vision.**

2.**Legal blindness:** Best corrected visual acuity of 6/ 60 or worse in the better eye or a visual field of 20 degree or worse in the better eye. This level of blindness necessitates welfare measures and legal protection.

3.**Social blindness**: The inability to count fingers at a distance of 3 meters in the better eye with best possible correction is used.This degree of disability hampers the mobility of an individual and the social interactions in a satisfactory manner.

4.Manifest blindness: The visual acuity of 1/ 60 in the better eye is used for categorizing manifest blindness. This seriouly constraints the accomplishment of task for daily living.

5.Absolute blindness: The inability to perceive light source in any eye, it signifies that irreversible damage has already occurred.

6.Curable blindness: At this stage of blindness where the damage is reversible by prompt management.cataract is an example of curable blindness.

7. Preventable blindness: This level of blindness can been completely prevented by effective preventive and prophylactic measures.Glaucoma is an example of preventable blindness.

8.Avoidable blindness: It is nothing but sum of preventable or curable blindness.Mostly 85-90% of all blindness in india are avoidable.

The WHO study Group emphasizes that each country must define blindness according to its own socio-economic condition and for all international comparions standard definitions should be followed to it.

COMPARISON BETWEEN WHO AND NPCB BLINDNESS

WHO – ICD CLASSIFICATION OF VISUAL IMPAIRMENT AND BLINDNESS	VISUAL ACUITY	NPCB CATEGORISATION OF VISUAL IMPAIRMENT AND BLINDNESS
LOW VISION		
CATEGORY 1	<6/18 – 6/60 IN BETTER EYE	LOW VISION
CATEGORY 2	<6/60 – 3/60 IN BETTER EYE	ECONOMIC BLINDNESS
BLINDNESS		
CATEGORY 3	<3/60 – 1/60 IN BETTER EYE	SOCIAL BLINDNESS
CATEGORY 4	<1/60 IN BETTER EYE – PERCEPTION OF LIGHT	MANIFEST BLINDNESS
CATEGORY 5	NO PERCEPTION OF LIGHT	ABSOLUTE BLINDNESS

MAGNITUDE OF VISUAL DISABILITY

The world observed 3rd December as the international day of people with disability. Around 15% of the world's population are living with disability.According to WHO 2011, globally 246 million people are visually impaired. Among them 7% are between 15-44 years of age and 4% are less than 14 years of age.

According to national census 2011, totally 26 million population were having disability. Next to locomotor disability , visual disability has highest form of disability roughly around 5 million population in india. Arunachal Pradesh has the highest prevalence of visually disabled people.

CAUSES OF VISUAL DISABILITY

Major cause of visual disability vary from region to region and are determined by the level of development of health services in a particular country, economic status and the life style of population.

Visual disability in different age group:

AGE – GROUPS	CAUSES
1.Infants & pre-school age	• Congenital cataract • Congenital glaucoma • Xerophthalmia • Retinoblastoma • Optic atrophy • Congenital anomalies • Trauma • ROP
2.School –age	• Developmental anomalies • Trauma • Optic nerve diseases
3.Adult life	• Uncorrected refractive error • Optic nerve disease • Occupational injuries • Infectious diseases • Diabetic eye disease.

Childhood blindness:

The aim is to eliminate avoidable causes of childhood blindness. Controlling of childhood blindness gained highest priorities in VISION 2020 strategies. An estimation of 1.5 million children are blind in the world, of which 1 million live in india.

The main causes of childhood blindness are

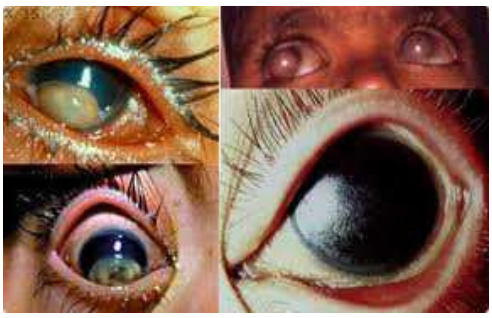
- Vitamin A deficiency
- Measles
- Conjunctivitis of the newborn
- Congential cataract
- Retinopathy of prematurity
- Retinoblastoma
- Congenital glaucoma

Vitamin A deficiency and measles

Xerophthalmia was once a major cause of childhood blindness but because of improved dietaries have reduced the burden of blindness due to xerophthalmia. Blindness due to vitA deficiency common among children below 6 years of age.[13]

The occurrence of vitaminA deficiency and corneal scarring indicate that parents have failed to feed their children properly and the health infrastructure has failed to provide basic health services.

Figure no. 01 Keratomalacia.



The classical sign of vitamin A deficiency is cheesy or foamy white material seen in the temporal conjunctiva along with dull cornea. Treatment includes 3 doses of 2 lakh i.u of vitamin on the day of diagnosis, next day and 3rd dose on 14th day.

Prophylaxis with mega doses of vitamin A(2 lakh i.u) once every six months should be given between six months to three years of age to prevent vitaminA deficiency. Encouraging public distribution of vitamin A rich foods.

Measles is closely associated with vitamin A deficiency and large –scale immunization against measles is useful to reduce malnutrition related blindness.

Congenital cataract:

A child can be born with cataract(congenital) or cataract can develop during childhood(developmental cataract). Cataract is becoming a relatively important cause of avoidable blindness.

Cataract in children differ from adults in two aspects, firstly why they develop and secondly, how they are managed. Cataract are usually not preventable, but early recognization and treating at right time can help to restore vision.[14]

Figure no. 02 Congenital Cataract.

Visually significant cataract in children need prompt surgical intervention to provide focused retinal image and thereby preventing lazy or amblyopic eye. .Surgeries in pediatric cataract needs a special stragery because of greater elasticity of capsule , higher incidence of inflammation, low scleral rigidity, small growing eye and higher incidence of posterior capsular opacification.

In case of dense unilateral cataract surgeon can wait upto 6 weeks of age to prevent anaesthesia related complications. For bilateral cataract good visual outcome can achieved if operated before ten weeks of age.Many pediatric ophthalmologist insert small, high power IOLs suitable for them as early as 12months of age.

The timing of surgery and long term follow-up is crucial to visual development and to ensure the child with optimal optical correction and low vision , if needed.

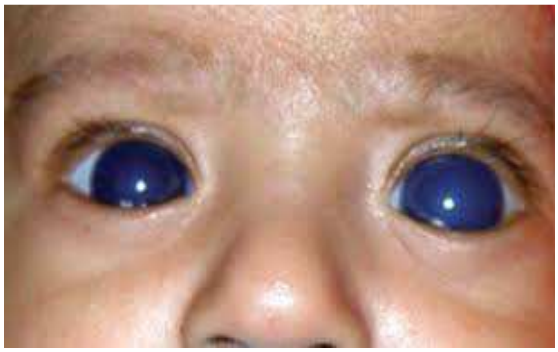
Congenital glaucoma:

It occurs between birth and 3-4 years of age. May occur without any ocular association(primary) or in association with syndromes or occurs after any inflammation, injury or tumors.(secondary)

Child’s eye are more elastic than adult, as the intraocular pressure increases it results in stretching of the ocular tissues and the eyeball enlarges. This condition is called as buphthalmos. Main pathogenesis is due to the maldevelopment of the trabecular meshwork.

In early cases , signs are corneal oedema with watery eyes and photophobia. At a later stage develops haab striae and the entire globe enlarges with elevated IOP.

Figure no. 03 Congenital Glaucoma.



Examination under anaesthesia required for measuring IOP and assessing the cupping of optic nerve head. Medical therapy are not effective, but surgical (goniotomy or trabeculotomy) intervention is the only effective treatment.[14]

Long term follow is essential for adequate control of IOP and good visual prognosis. Despite proper control of IOP, poor visual outcome is due to optic nerve damage, corneal opacity due to descement's break or stromal haze and irregular astigmatism.

Retinopathy of prematurity:

Retinopathy of prematurity is a unique potentially blinding disease primarily affects preterm infants less than 32 weeks and low birth weight babies less than 1500 gms at birth. The current epidemic of ROP is observed in middle income group countries and in many industrialized countries.

Figure no.04 Retinopathy of Prematurity.

Pathophysiology is development of retinal neovascularisation in response to retinal ischemia when preterm infants exposed to unmonitored poorly controlled supplemental oxygen. Usually begins 6-7weeks after birth irrespective of how premature the baby and is characterized by the development of abnormal blood vessels between vascularised ,central retina and unvascularised peripheral retina.[2]

Screening should be done in 4-7weeks postnatally and subsequent visit at 1-2 weeks intervals depending on the severity of the disease and continue until retinal vascularisation reaches zone 3.

Baby with threshold disease treated with laser photocoagulation. Intravitreal anti-VEGF agents tried in many centres for ROP. 80% cases regress spontaneously by the process of involution or evolution into fibrotic phase leaving few residua.

Prevention includes good antenatal care, proper neonatal care of preterm babies, monitoring of blood gases and early detection of ROP and proper management.

Retinoblastoma:

It is the most common primary intraocular malignancy of childhood, may be hereditary or sporadic. The tumor usually present during the first five years of life. It arises from the malignant transformation of primitive retinal cells before final transformation. Though congenital it is not recognized at birth.

Presenting signs are white reflex (leucocoria), squint, secondary glaucoma, spontaneous hyphaema, chronic uveitis, orbital inflammation and invasion. Pattern of tumor spread may be endophytic, exophytic, optic nerve invasion, diffuse infiltration of the retina and metastasic spread.[2]

Figure no. 05 Retinoblastoma.

Successful treatment and survival depends on early recognition of the tumor. Small and medium sized tumors are treated with laser photocoagulation, cryotherapy and chemotherapy. Enucleation indicated for large tumors and for extraocular invasion extended beam radiotherapy. Prognosis for survival is worse when it extended beyond the eye.

Siblings of child with bilateral retinoblastoma with or without affected parents are at risk. They should undergo screening procedure like prenatal ultrasonography and ophthalmoscopic examination soon after birth and then regularly until 5 years of age.

Uncorrected refractive error:

A refractive error is the optical effect of the eye that results when light is not being focused clearly on the retina. The power of refracting rays depends on the axial length, corneal curvature, refractive index of the media and position of the lens. Ametropia (a condition of refractive error) includes myopia, hypermetropia and astigmatism.

WHO set has a goal to eliminate avoidable blindness in the world by 2020 with one of the main priorities being refractive error. To define uncorrected refractive error, visual acuity of 6/18 is chosen as the cut off because it is the WHO criterion for moderate impairment. The uncorrected refractive

error rate ranged from 0.7% to 22.3% being the primary cause of moderate visual impairment.

Myopia prevalence is responsible for the much of the uncorrected refractive in the world. All countries were poorly addressing the burden of uncorrected refractive error. High heritability of refractive error and environmental factors like near work has been an important part in the development of myopia. In asian population myopia has reached the epidemic proportions thereby affecting the global estimates and the ability to meet the vision 2020 goal to eliminate preventable blindness.

The most important cause of vision loss in degenerative myopia are retinal detachment , choroidal neovascularisation and macular degeneration association of glaucoma.[5]

Provision of appropriate glasses is one of the simplest and cost effective strategies to improve vision. Children should be fully corrected and advised to wear the spectacles constantly to avoid developing squint, amblyopia and enchance to develop normal accommodation – convergence reflex.

Contact lens and keratorefractive surgeries helps to correct only the refractive component of myopia but does not arrest the degenerative changes. These surgeries are done to improve the uncorrected refractive errors.

Screening of refractive errors in school children atleast twice at an interval of 4-5 years. School children are the captive audience and they didn't realize the suffering of ocular disability and adjust poor eyesight in different ways. It is easy to identify refractive error and standard guidelines for management is given.Adoption of annual vision screening of elderly also a part of annual physical examinations.

The impact of uncorrected refractive error on the reduction in the quality of life and road traffic accidents should be quantified. These data helps to focus on the implementation of programmes to eliminate visual impairment.

Amblyopia :

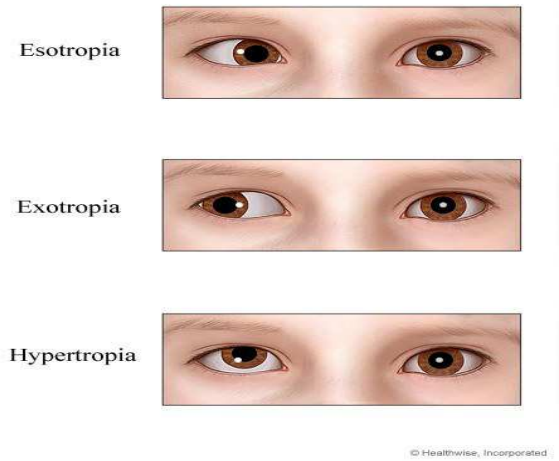
Amblyopia is decrease in best corrected visual acuity caused by form vision deprivation or abnormal binocular interaction without any identificable pathology of the visual pathway or eye.

It is the most common cause of vision loss in childhood but reversible if it is identified and managed appropriately. It is for this reason screening for amblyopia is very important in community based screening programmes.

Amblyopia may be due to strabismus, anisometropic, stimulus deprivation, bilateral ametropia and meridonal amblyopia.

- Strabismic amblyopia: Most common form of amblyopia. It results due to visual axis of the two eyes may not be aligned to the point of regard, that is one eye takes the fixation but the other eye does not. Squint may indicate that the visual acuity of the eye is reduced because of ocular disease. Because of irreversible impaired vision, visual pathway fails to develop resulting in amblyopia or lazy eye.

  Figure no. 06 Strabismus.



- Anisometropic amblyopia: It results due to unequal refractive error between the eyes can accompany any form of refractive error but more common in hypermetropia.
- Stimulus deprivation amblyopia: It is the least common type of amblyopia but it is difficult to treat. It is caused due to interruption of visual axis by media opacity like congenital cataract, corneal opacity, vitreous hemorrhage.

- Ametropic amblyopia: It occurs due to reduced visual acuity due to uncorrected or improperly corrected high refractive error. More in children with high hypermetropia..
- Meridonal amblyopia: High astigmatism involving only one meridian of the eye.

Treatment of amblyopia is not an easy task. The main principle behind treatment of amblyopia is to provide clear image onto fovea of the amblyopic eye. Treatable causes for impaired vision like cataract, refractive error causing amblyopia are treated as early as possible. Other treatment modalities are occlusion therapy, orthopic exercises and surgery.

Earlier the treatment better is the prognosis. Stimulus deprivation amblyopia carries a very poor prognosis than other forms of amblyopia.

Retinal degeneration:

Retinal degeneration is the deterioration of the retina caused by the progressive and eventual death of the retinal cells. Retinitis pigmentosa is a very important degenerative disease of retina.

Retinitis pigmentosa

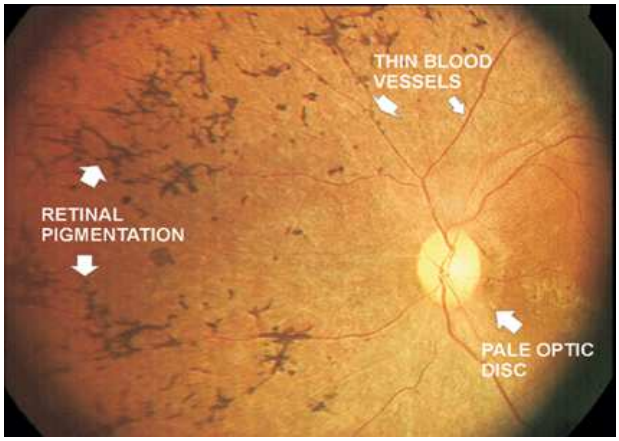
It is a bilateral, inherited slowly progressive degenerative disease of the retina predominantly affecting the rods with subquent degeneration of cones and retinal pigment epithelium. It begins in the childhood and resulting in blindness in the middle age. It follow one of the three genetic pattern of inheritance – autosomal dominant, autosomal recessive or x-linked.

Symptoms are night blindness and progressive constriction of field of vision. Triad of RP are retinal arteriolar attenuation, perivascular bony pigment like corpuscles in the mid periphery of the fundus and waxy pallor of the optic disc(consecutive optic atrophy).

Atypical forms of RP are cone-rod dystrophy, retinitis pigmentosa sine pigmento, retinitis punctata albescens, sectoral RP, inverse RP , pericentric and unilateral RP.

Ocular association of RP are posterior subcapsular cataract, myopia, keratoconus, open angle glaucoma, vitreous changes ,optic disc drusen and cellophane maculopathy.

Figure no.07 Retinitis pigmentosa.



Associated syndromes are refsums disease, Laurence –moon- biedl-bartum-syndrome, usher syndrome, kears sayre syndrome and abetalipoproteinemia.

There is no cure for RP, but treatment like vitamin A supplementation, lutein, zexaxanthin and docosahexaenoic acid have been tried in many cases. Gene therapy includes subretinal injection of adenovirus aided transfection of RPE65 showed improvement in dogs. Retinal and bone marrow derived stem cells is being tried in RP patients.

Low vision aids can be used for patients with at least 6/60 vision and 20 degree field in the better eye. These devices are not useful for patients with cental scotoma.

Genetic counseling and testing may help to prevent the disease.

Optic nerve diseases:

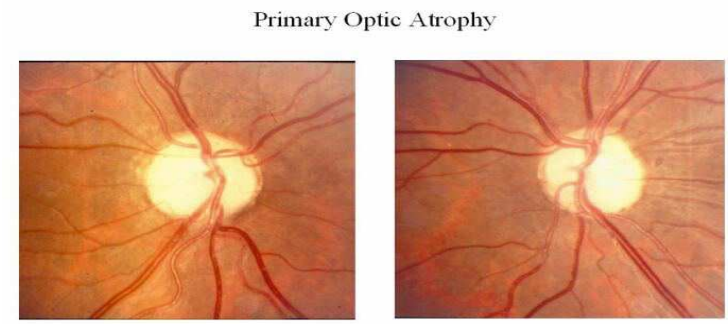
Optic nerve can be affected due to disorders that causes swelling / edema around the nerve, inflammation, ischemia, degeneration, direct or indirect injury following trauma and congenital anomalies.

Optic atrophy is a frequent diagnosis, but it is an ocular sign that could have occurred due to various etiology. It is an endpoint of any disease process that cause damage to the retinal ganglion cells axon in the retinogeniculate pathway. Optic atrophy morphological appear as change in the color and the structure of the disc, functionally as varying degrees of vision loss.

Clinical features of optic atrophy are reduced visual acuity , defective color vision and visual field loss central,paracentral and altitudinal scotoma.

Primary optic atrophy reflects a chronic disease it occurs without any local distribance but associated with central nervous system disease, toxic neuropathy or sometimes without any discoverable condition. Common causes are retrobulbar neuritis, compressive lesions of optic nerve, trauma and demyelinating diseases. Features of optic disc are chalky white disk with well defined margins and surrounding retina, vessels are normal.

Figure no.08 optic atrophy.



Secondary optic atrophy or post- neuritic atrophy occurs due to break in the continuity of the fibres at the disk due to strangulation occurring in papillitis and papilloedema. Features are dirty grey appearance with poorly defined marigns of the disc and perivascular shealthing of arteries and tortorus veins.

Consecutive optic atrophy occurs following extensive disease of retina, in pigmentary retinal dystrophy or occlusion of the central retinal artery. Features are waxy pallor with normal disc margins and marked attenuation of arteries with associated retinal pathology can be seen.

Glaucomatous or carvernous (schnabel's) optic atrophy is characterized by axonal degeneration with excavation and enlargement of the optic disc. Features are vertical enlargement, notching of the neuroretinal rim, bayoneting and nasalization retinal vessels, laminar dot sign, baring circumlinear vessels and nerve fibre layer defect.

Optic nerve damage is irreversible so there is no cure for optic atrophy but it is necessary to prevent further damage by early control of casual factor.

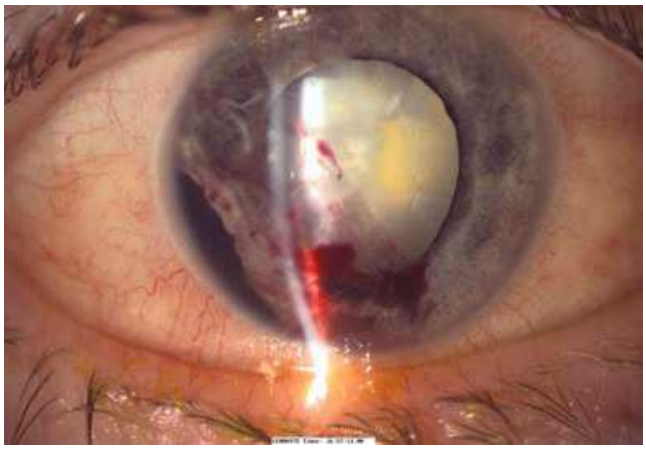
Low vision aids help to restore vision for occupational rehabilitation. Genetic counseling for familial diseases. Stem-cell theraphy is in trial.

Ocular injuries:

Ocular injuries are increasing its importance as a cause of blindness particularly in one eye. Ocular trauma earlier described as the 'neglected disorder' recently gained importance as a major cause of visual morbidity.

Injuries can occur at any age and the causes may vary from one age group to another group. In case of children , injuries are due to dangerous games and sharp pointed toys more commonly, while in adults they are mostly industrial injuries. In farmers, agriculture related injuries are quite common. Men are more likely to sustain an eye injury than women.

Figure no.09 Ocular injury



Effects of ocular injuries:

The type and the extent of damage by a traumatized eye depends on the mechanism of injury and the force of the injury. The spectrum of

injuries vary from very mild, non-sight threatening to extremely serious blinding consequences.

- Chemical injuries
- Closed globe injury or non-penetrating.
- Penetrating trauma.
- Perforating trauma.
- Blowout fracture of the orbit.
- Muscular entrapment.
- Traumatic optic neuropathy.

The spectrum of injuries vary from very mild, non-sight threatening to extremely serious blinding consequences. Eye injuries are best prevented as well as treated promptly. Primary care generally includes copious saline irrigation in case of chemical injuries, control of raised IOP after blunt trauma thereby preventing optic nerve damage and in penetrating injury shield patch is applied to traumatized eye that protects the eye until the patient gets expert examination.

Incidence of traumatic optic neuropathy is 0.7 to 5 % in facial trauma. The most common site of injury is immobile intracanalicular part of optic nerve. Exact pathophysiology responsible for traumatic optic neuropathy is poorly understood. Damage may be due to direct disruption of nerve fibres and

indirectly by disruption of the blood or compression of the nerve within the optic canal.

Most cases presents with decreased vision, relative afferent papillary defect and field defects. Fundus usually appears normal but typical optic disc pallor or atrophy develops after 3-4 weeks.

High dose of intravenous corticosteroids should be started within 24-48 hrs and oral steroids continued for next 2 weeks. Visual outcome is monitored using visual evoked potential. Surgical intervention needed in case of compression of optic nerve by fracted bony fragments or hemorrhage.

Preventive measures like use of appropriate standard goggles at work, avoid spillage in the eye, avoid children from playing with dangerous toys and sharp instruments should never be used to remove foreign bodies.Occupational injuries among workers are prevented by strict eye examination at the time of employment, periodic check up, visual job analysis for various types of jobs and enforcement of standard protective devices among workers.

The prognosis for severely injured eyes has improved with the recent advances of surgical techniques and better understanding of the tissue reaction to trauma from which new medical and surgical protocols were

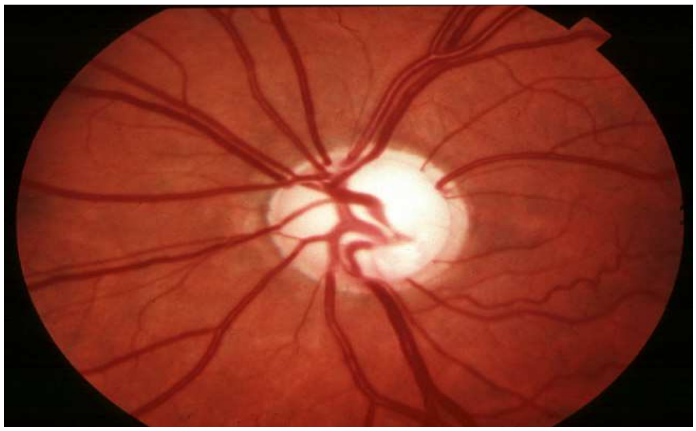
derived. Final visual outcome improved with the better methods of visual rehabilitation.

Eye injury is an emergency which are best prevented and appropriate primary eye care prevent vision threatening conditions.

Glaucoma:

Glaucoma has been called ***the silent thief of sight*** and is one of the commonest cause of blindness among Americans and African. In India, proportion of blindness due to glaucoma has been steadily increasing in recent years.Blindness in glaucoma is due to chronic progressive optic neuropathy resulting in damage to retinal ganglion cells and surrounding tissue structures. It is a multifactorial optic neuropathy with characteristics changes in the optic nerve head and visual field defects. Intraocular pressure is the most common only modifiable risk factor. The triad of glaucoma are raised intraocular pressure, restricted visual field and characteristics changes in the optic nerve head.

Figure no.10 Glaucomatous optic nerve head damage.



Glaucoma can be primary or secondary (due to specific anomaly or disease of the eye) and congenital or developmental. Primary may be open angle glaucoma and angle closure glaucoma.

Primary open angle glaucoma is the most common variety of glaucoma. It is not associated with any other cause and may be hereditary. In this type , angle of anterior chamber is open and normal. The resultant increased resistance to the outflow of aqueous at the trabecular meshwork give rise to increase in intraocular pressure. Usually asympomatic , present with vague symptoms like headache and frequent change of glasses. Because of the silent nature of the disease, patient present with visual complaints in the late stage only.

Acute angle closure / closed angle/ narrow angle glaucoma, there is a rapid loss of vision with halos, ocular pain and nausea/ vomiting. In this disorder, the angle of the anterior chamber is narrow due to apposition of the iris to

the trabecular meshwork or iris lens touch resulting in poor drainage of aqueous humor and rise in IOP. It is an ocular emergency due to its acute presentation, rapid diagnosis and need for immediate intervention prevent glaucomatous optic neuropathy.

Secondary glaucoma form a large proportion in developing countries because of high incidence of ocular infections,complicated cataract surgery, trauma and inflammation. These glaucomas are often undiagnosed lead to substantial loss of vision before it is identified and treated. Treat the primary cause , followed by control of IOP to an individualized target pressure.

Treatment in glaucoma is either medical or surgical. Medical treatment tried in patients who tolerate the therapy and maintain proper compliance thereby enchancing the visual benefit. Surgery is indicated when glaucomatous optic neuropathy sets in. Newer surgical options are deep sclerectomy/viscocanalostomy and 360degree suture canaloplasty.

One of the effective ways of intervening in glaucoma is to promote screening programme. Screening the general population targeted towards the high risk such as all individuals above 35 years of age and family history of glaucoma.

Glaucoma need early detection through screening programme or proper case finding in the community prevent blindness.

PREVENTION OF BLINDNESS

Concept of avoidable blindness (curable or preventable blindness) has gained early recognition due to advances in medical field during recent years.There are various components of action in national programmes for prevention. They are

Initial assessment:

First step is to assess the magnitude, distribution and etiology for blindness within the country using prevalence surveys. Using this knowledge, set priorities and organize intervention programmes.

Methods of intervention:

Primary eye care:

A wide range of conditions that can be treated and prevented by locally trained primary health workers. For this they are provided with list of essential drugs such as topical tetracycline, vitamin A supplements, antibiotic eye drops. They are also trained to refer difficult cases to nearby PHC or higher centre for further management.

Establishment of national programmes:

Another important development in connection with prevention of blindness has been the establishment of national programmes

THE NATIONAL PROGRAMME FOR CONTROL OF BLINDNESS

As per recommendation from central council of india, the national program for control of blindness and prevention of visual impairment was launched in 1976. It was launched as a 100% centrally sponsored program with the aim of reducing the prevalence of blindness from 1.4 % to 0.3% of population. The major component activities planned are;

1. Strengthening and intensification of eye health education activities through IEC activities.
2. Creating an infrastructure and extensive eye care facilities for cataract surgical and supportive services.
3. School eye screening and refractive services.
4. Control of corneal blindness and establishment of eye banks

Goals and objectives of NPCB (xii plan)

1. Reduce the backlog of blindness through identification and treatment at primary, secondary and tertiary levels based on the assessment of the burden of visual impairment in the country.
2. Develop and strengthen eye care facilities and prevention of visual impairment through providing quality services.

3. Strengthen and upgradation of RIOs in various sub-specialities of ophthalmology.
4. Strengthening the existing and developing new infrastructure facilities for providing comprehensive eye care in all districts in the country.
5. Enchance community awareness and participation of voluntary organization in eye care and preventive measures.
6. Increase and expand research work for prevention of blindness and visual impairment.

Newer initiatives :

Newer initiatives were incorporated into the programme to improve the functioning of the programme. These includes,

District blindness control society:

This is an new initiative to decentralize the blindness control activities and given more autonomy to the districts to plan their own programmes. The main objective is to achieve the maximum reduction in avoidable blindness through utilization of the available resources in the district.

Major component activities are [1]

- Assess the magnitude of blindness and the resources available, how the needs can be met.
- Prepare an annual plan of action for the entire district with the main focus on the restoration of sight among the cataract blind.
- Coordinated participation of all the government agencies, NGOs and the private ophthalmic surgeons in all activities in the district.
- Organization of vision screening programmes in schools.
- Providing spectacles for operated cataract patients and school children/ occupational categories with refractive errors.
- Motivating for eye donation.
- To ensure vitamin A supplementation are implemented in the district.
- Collection compilation and reporting eye care information to the NPCB.
- Arrange monthly meetings of medical officers and PHCs for coordinated activities in the district.

VISUAL DISABILITY ACCESSED AS PER THE CHART GIVEN BY GOVERNMENT OF INDIA

CATEGORIES	VISION IN BETTER EYE (BEST CORRECTED)	VISION IN WORSE EYE	PERCENTAGE IMPAIRMENT
CATEGORY 0	6/9 – 6/24	6/24 – 6/36	20%
CATEGORY I	6/18 - 6/36	6/60 - NIL	40%
CATEGORY II	6/60 - 4/60 0R FIELD OF VISION 10 – 20 DEGREE	3/60 - NIL	75%
CATEGORY III	3/60 - 1/60 OR FIELD OF VISION <10 DEGREE	CFCF - NIL	100%
CATEGORY IV	CFCF TO NIL OR FIELD OF VISION <10 DEGREE	CFCF - NIL OR FIELD OF VISION <10 DEGREE	100%
ONE EYED PERSONS	6/6	CFCF - NIL	30%

Role of other national programmes:

Many national programmes either directly or indirectly helps in reducing blindness in the country. They are

- Universal immunization programme (measles) and reproductive & child health programme prevent vitamin A related blindness.
- Diarrheal disease control programme – since diarrhea is associated with vitamin A deficiency.
- Water supply and sanitation programme prevent trachoma and vitamin A deficiency.
- National leprosy eradication programme – early multi drug therapy prevent sight threatening lesion in leprosy.
- National diabetes control programme – early detection and control of diabetes helps in prolonging the retinopathy free period.
- ICDS scheme components directly beneficial to NPCB.

Thus, many programmes directly or indirectly help in reducing and preventing blindness in the country.

VISION 2020: The Right to Sight

It is a global initiative launched by the WHO in 1999 to eliminate avoidable blindness. This program is a partnership between all international, nongovernment organization and private organization along with WHO in the prevention of blindness.

The aim is to eliminate avoidable blindness worldwide by the year 2020. The WHO provides technical cooperation either to launch or redefine the existing national programs to member countries to achieve the set goal.

The five conditions were identified for priority action globally were;

- Cataract
- Refractive error/ low vision
- Trachoma
- Onchocerciasis
- Vitamin A deficiency and other related causes of childhood blindness

Regions or countries were free to add other conditions which may be relevant to their context and plan accordingly.

VISION 2020 : National perspective

Vision 2020 was launched by the government of india in 2001. The following conditions were identified for priority action

- Cataract
- Childhood blindness
- Refractive errors and low vision
- Corneal blindness
- Glaucoma
- Diabetic retinopathy
- Trachoma (focal)

There are three core elements of VISION 2020. They are

- Cost effective disease control strategies.
- Human resource development for eye care.
- Infrastructure development

VISION 2020 does not mean a parallel system but it strives for excellence in eye care system through strengthening and integration of the existing health care system of individual countries.

Screening programmes in practice:

The active search for unrecognized disease among apparently healthy individuals by means of rapidly applied tests,examinations or other procedures is a fundamental aspect of prevention.

Value of screening programme is determined by its effect on morbidity and disability.

Screening for refractive error in school children:

Refractive errors are a major cause of ocular morbidity in india. Myopia is the commonest form of refractive errors in younger age group. Children who acquire myopia in early age develop visual handicap to a great extent due to progression of myopia. The justification for a programme targeted for the school children comes from the fact that children are the important resource for the future.

School vision screening programme is one of the major component under NPCB. This programme will be undertaken by the DBCS.School teachers are the first line of personnel.One teacher from each school is selected and they are trained to detect abnormal vision among middle schools using specially designed ‘E’ card. Children with abnormal vision (< 6/9) are referred to paramedical ophthalmic assistants for refraction and spectacles are provided through government authority.

Diabetic retinopathy screening programme

Diabetes mellitus is now a major problem in many developing countries also. Diabetic patient are 10-20 times more likely blind when compared to non- diabetic individuals. Since 80% of diabetics have retinopathy after 20 years so its prudent to think of screening programme for preventing blindness from retinopathy.

Screening strategies depend on the rate of appearance and progression of retinopathy and its risk factors that alter the rates. Dilated fundus examination may be the only method to screen populations above the age of 12 years for diabetes. But it is an highly insensitive procedure.

Certain guidelines by American College of Physician, American Diabetes Association and American Academy of ophthalmology includes

1. Type I diabetes should be screened 5 years after the onset of diabetes once in a year.
2. Type II diabetes should be screened for retinopathy shortly after the diagnosis is made and repeated annually.
3. Diabetes women who become pregnant should have a comprehensive eye examination in each trimester and have a close follow up throughout pregnancy. Gestational diabetes doesn't need screening.

Glaucoma screening programme:

Glaucoma **“ lurking thief ”** is the most important cause of irreversible blindness , which instituted screening programme for glaucoma.

Glaucoma is not a single disease entity ,but a composite of different pathologies hence establishing uniform case definition is difficult.

In order to yield better results screening programme is limited to individuals above 40years of age and high risk groups like family of glaucoma , those with myopia, hypertension , diabetes , central venous occlusion and with thyroid disease.

Two initial tests like IOP(>21mmhg) and the vertical cup-disc ratio(>0.5) are measured, if an individual shows abnormal values then the visual fields should be taken using hand-held perimeter. In order to screen angle closure glaucoma or to differentiate between the two gonioscopy should be done.

Exclusive reliance on the actual diagnostic criteria for the diagnosis of any of the glaucoma is not possible since every individual is subjected to two or three diagnostic tests, making patients unnecessary anxiety. There are many problems related to diagnosis, treatment and lack of infrastructural needs points towards pessimistic view of instituting glaucoma screening programme.

Screening programme for amblyopia and strabismus:

The prevalence of amblyopia and strabismus is less of a problem in india compared to west. Early screening programmes and effective treatment modalities are available at an early age but there are no agreed policy on guidelines for treatment resultinsg in blindness like complication.

Random dot stereogram (RDS) and cover test are found to be effective tests for screening strabismus and amblyopia. Lack of cooperation of preschool children, disagreement among the professionals regarding the methodology adopted for diagnosis and the difficulties encountered by nonprofessionals while performing these tests are the reasons for not having attractive proposition. Even regular refraction and spectacle correction are not easily available.

The issue of under-referrals and over-referrals, lack of infrastructure and logistics of treating the screened children compromises the effectiveness and credibility of the system.

VISUAL REHABILITATION

Visual rehabilitation is the combined and co ordinated process of medical, social educational and vocational measures for training visually handicappaed persons to their best possible level of functional ability

Rehabilitation measures depends on the factors like degree of visual handicap, support from the family members , emotional status and the available facilities.

The main stratergies for rehabilitation are institution based, out reach and community based.

In general, rehabilitation includes the following

- Early diagnosis and intervention.
- Improve ,facilitate and provide services for visually disabled persons.
- Medical rehabilitation includes the management of curable disability and possibly lessening the disability.
- Social psychological counseling and assistance.
- Training themselves in self care activities like mobility, communication and daily living skills with special provision as needed.
- Specialized education services.

- Vocational rehabilitation services like vocational guidance,training and self employment.
- Certification of category of disability and provision of available concession/benefits.
- Community awareness, advocacy, empowerment.
- Follow-up.

The process of visual rehabilitation are,

1.Medical rehabilitation:

It includes early diagnosis to establish the cause and the extent of the visual handicap, thereby referring such patients from peripheral centres to the ophthalmic surgeons. The visually handicapped persons should be medically certified and told about the status of the handicap. If necessary low vision aids should be provided accordingly.

Low vision aids:

Low vision aid refer to devices that improves the residual vision by magnifying the image of the object at the level of retina.

Principle of low vision aids is based on the fact that with sufficient magnification normal retina surrounding the damaged retina can be used for central vision.The non foveal retina is less sensitive than the

foveal and the parafoveal region so only some useful vision can be obtained.

Low vision aids can be divided into two categories: non optical and optical devices. Optical devices that improves or enchances residual vision by magnifying the image of the object at the level of retina by using devices like prisms, lenses, telescopes or electronic magnifiers. Non-optical devices improves the visual performance.[10]

Types of optical low vision aids

Currently available low vision aids are

1.Magnifying spectacles

2. Hand held magnifiers

3. stand magnifiers

4. Telescopes

5. Electronic magnifiers like closed circuit(CCTV), low vision imaging system(LVIS), and v-max.

Basic features of optical LVAs depend on patient's visual status and daily needs are

- Power in dioptres is variable.
- Focus may be fixed or variable.
- Illumination may be self-illuminated or non illuminated
- Monocular or binocular LVA.
- May be unified, bifocal or trifocal LVA.

Magnifying spectacles:

Magnifying spectacles are the most commonly prescribed LVA for near and intermediate distance. Among the most common reading spectacles, half- eye glasses are preferable because they are lighter lenses and can look over the top for distant vision.

Advantages are being less expensive, comfortable, both hands are free larger field of vision and can used for both near and distant vision. Spherical aberration are more with high plus lenses which can be decreased with aspheric lenses and another problem being illumination on the reading surface is reduced.

Hand-held magnifiers:

Hand-held magnifiers help patients with near vision problems and can be used along with distance and reading glasses or with a bifocal reading addition. Advantages are easy to manipulate for viewing eccentrically and relatively inexpensive. Disadvantages are reduced field of vision as compared to spectacles and inconvenient in patient with hand tremors.

Figure no.11 Hand-held magnifier

Stand-held magnifiers:

Stand magnifiers are attached to a stand that holds them at a fixed distance from the page. These are available in two forms prefocused and focusable stand magnifiers. The advantages are simple to use because the object-lens distance is fixed and are useful for patients with hand tremors. Small field of vision and difficult to use , if surface is not flat.

Telescopes:

Telescopes are the optical aids used to magnify distant objects lying beyond 4.5m.The two basic types are Galilean telescopes and the astronomical or kepler's telescope.

Galilean telescope consist of a convex objective lens and concave ocular lens separated by difference of focal length, produces an upright magnified virtual image. The astronomical telescope consist of two convex lens separated by sum of their focal lengths. This produces a magnified inverted real image.

Limitations of telescopes are reduction in field of vision, ring sscotomas, parallaxand decrease in depth of focus. Use of telescopic spectacles for driving is controversial due to constricted field of vision.

Figure no.12 Telescopes.

Visual field enchancement devices:

These devices are used in patients with defects in the peripheral field of vision. They are

- Fresnel prism
- Gottliebfield expanders
- Reverse telescopes
- Hemianopic mirrors

Figure no.13 Fresnel Prism.

Non optical devices:

The various types of optical methods are

Approach magnification [5]

- Contrast enchancement
- Lighting
- Auditory aids

- Electronic magnifiers

Figure no.14 Electronic magnifiers.

These includes

- **Closed circuit television**

In case of CCTV , the camera picks up the reading material, magnifies and display that on the TV screen. It provides excellent contrast , magnification and reverse contrast polarity.

It is advantage over other optical system by providing distortion free, brighter , magnified image with enchanced contrast. Limitations are like expensive and difficult to mobilize

- **Low vision imaging system**

LVIS, is mains/battery operated video head-mounted device equipped with image processing capability and autofocus camera. Since head-mounted design frees user's hands. Magnification , contrast and brightness are under user's control.

v-max(enchanced vision system)

It is battery-powered head-mounted unit. Image processing like edge enchancement technology and contrast reversal is available. It differs in that from LVIS it uses colour camera and liquid crystal displays. Comparatively smaller and simpler control box than LVIS.

Newer technology LVA's

New advances in consumer electronics provide options for improving the quality of life for people with low vision. They are

- E-readers(kindle, i-pad).
- Smart phones and tablets.

Guidelines for prescribing LVA's

The practitioner should follow certain things while prescribing an LVA:

- The main aim is to provide maximum vision, but as the magnification increases both the working distance and field of vision decrease.
- The conventional spectacles with a high plus powers are preferable and the aid should be simple ,light weight ,flexible and portable.
- LVA needed may vary from person to person it depend on the patient's visual status and need.
- All the devices with similar magnification should be tried before prescribing a particular aid.
- Single-eyed person may accept a telescope or high plus. Both eyes to be corrected if difference in magnification is insignificant.

2. SOCIAL REHABILITATION:

First of all they should be assured and feel good that they are equally capable and not inferior to sighted persons. Acceptance of the visually handicapped persons by their family members and active support by members of the society helps to prevent psychological stress among the handicapped. They should be trained to do their daily activities and encouraged to participate in various socio – cultural activities. Hobby development in their leisure time helps to keep them occupied is an other useful method for social rehabilitation.

3. EDUCATIONAL REHABILITATION:

Early rehabilitation services for the child and the family should begin as soon as visual impairment is diagnosed. Interventional programs for infants,toddlers, and preschoolers should begin from an ophthalmologist, he lays the groundwork for developing the best possible plan for individualized educational needs. They are

- Cognitive development opportunities.
- Communication skills intruction.
- Gross and motor training
- Low –vision training
- Parent education and family support
- Recreational opportunities
- Sensory training
- Social skills instruction
- Daily living skills

Itinerant teaching :

Itinerant teachers are specially trained to work with visually disabled students, who travel from school to school to provide instruction using Braille, low vision aids and computer with voice output.

Teacher consultant models:

This program covers a large area than the itinerant teacher provides a consultative services relating to educational needs of the visually impaired student in the local schools. The professionals included are the classroom teacher, occupational therapists, physical therapists, low vision specialists and orientation and mobility instructors.

Special schools:

These school serves only disabled students but not all the students are visually disabled. An itinerant teacher provides the special services necessary for them.

Residential schools :

These school provide on -campus instruction, residential facilities, direct itinerant services, out reach services and early intervention services,diagnostic services and technical assistance to groups.

Self-contained classroom:

These classroom serve students with severe multiple disabilities. There service are often nonacademic , with extensive training in daily living skills and self care.

Resource rooms:

Students are enrolled in a regular class,but the resource room teacher provide unique educational support to visually disabled students during a relatively small portion of each day.

Braille education:

It is a form of written communication for the blind people based on the six-dot method. A system of raised dots on paper read by touching with the ends of the fingers.

The Braille alphabet consist of combinations of one or more raised dots in a six-dot square with 63 combinations are possible known as the Braille cell. Braille signs are used for punctuation, codes , music and mathematics. Braille can be written with the aid of a slate, writer or a computer system employing a Braille printer. Reading and writing of Braille are taught in the early years for blind children.

Braille libraries are available from which they can obtain books.some blind people find it difficult to read Braille, for them these books are recorded on a cassette called as talking book machine.

Figure no.15 Braille alphabet based on six-dot system.

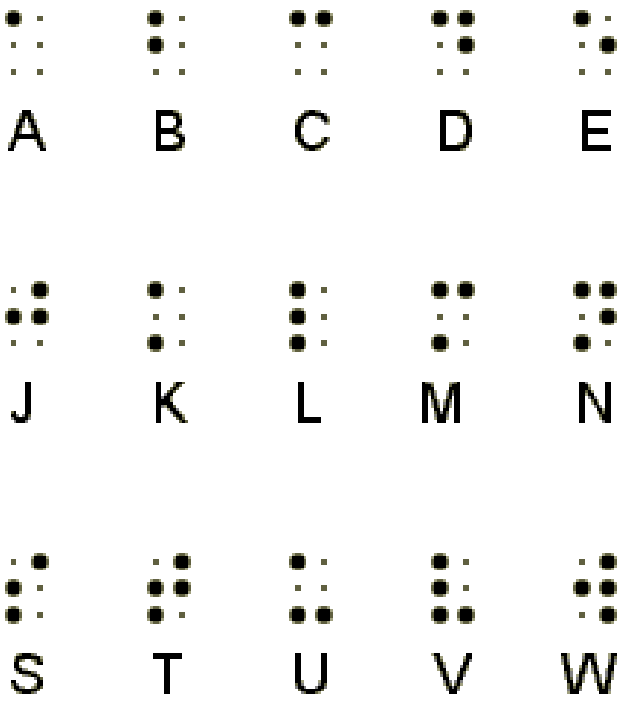
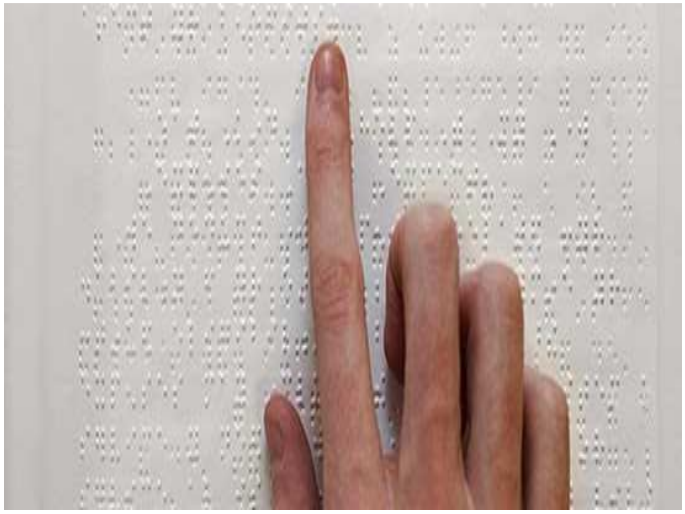


Figure no.16 Braille Book



4. PHYSICAL REHABILITATION:

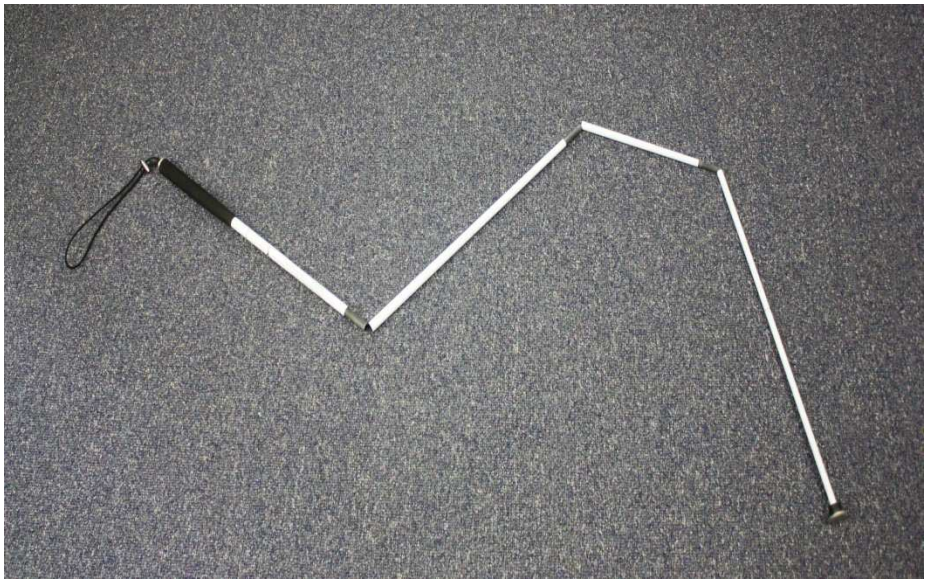
1.Orientation and mobility:

Different canes are used for training the blind person for this purpose,

Long canes : made of aluminum and measures about 45 inches in length.

White canes : made of wood, measures in 3 different lengths – 38, 40 and 42 inches.

Figure no.17 White Canes



Telescopic type long canes : consist of 2 pieces made of aluminium tubes with a length of 75 cms.

Blind people are properly trained in using canes. One end of the cane should rest on the sternum moved and held firmly, with the other end fixed on the ground close to body and moved around to scan the ground in front.

Family members are trained as a guide by proper training technique whenever canes are not available.

2. Activities of daily living:

Totally or incurably blind people are trained about the art of daily living so that they can perform their routine day to day activities like bathing , dressing thereby reducing the dependence on others.

5.VOCATIONAL REHABILITATION:

Most vocational rehabilitation programs helps to develop self – confidence and thereby reducing family tensions.The blind can be trained to earn money with the skills acquired by them.

The various skills includes Braille , telephone board operation, chair caning, computer operations, tailoring,music, basket weaving, incense stick making etc. job placement of blind persons within the sighted community and the output of the blind person is equal in both quantity and quality to that of sighted persons if the job is correctly chosen. Only limited industries have special facilities for blind people, so they prefer working under these conditions because of the protection afforded by them psychologically and physically.

The utilization of rehabilitation for blind persons depends on individual factors like aptitudes, skills and training.Blind people have gone to a level to attain advanced degress and hold higher positions of management, with the advancement of information technology enable them to access to the internet as their sighted peer groups.

Vocational teaching:

Rehabilitation teacher is the key figure in the rehabilitation of the blind. They are builder of confidence and self esteem and try to make them to utilize the opportunities available.

As these teachers are blind by themselves are real inspirational figures to an individuals who lost their sight recently.

Rehabilitation teachers teach them Braille reading and computer skills thereby make them realize that they can still learn and acquire skills despite his handicap.

6. C0MMUNITY BASED REHABILITATION:

According to WHO definition for community based rehabilitation, it involves measures taken at the community level to enchance the quality of life for disabled persons, to use and build on the resources of the community , including the impaired, disabled and visually handicapped persons themselves, and their families , communities as a whole.

For developing countries, the definition of CBR includes,

- It must be cost effective, individual based and result oriented.
- Complete integration of the individual into the community.

Need for CBR:

- Rehabilitation centers are few and are urban based.

- Majority of the visually impaired are in the age group of 45 years and above but the schools and the training centers cover in the age group of 5 to 35years.

- 85% of the blind are in rural areas.

- CBR is the cheaper alternative.

- Enables extensive coverage of the blind.

B. Features of CBR

- Exclusively for visually handicapped

- Cover persons of all age groups and cover both rural and urban blind.

- It must be cost –effective and result – oriented.

- Realistic and need – based.

Components of CBR

1.Prevention and cure of avoidable blindness

2.Certification of the incurably blind

3. Social integration

4. Economic rehabilitation

5.Integrated education

6. Support services and concessions

7.Advocacy for the right of the blind

8.Acting as a pressure group for influencing state policies for the blind.

SCOPE OF SERVICE DELIVERY:

General community:

Eye examination

Refraction and prescription of spectacles

Screening of school and pre-school children for refractive errors.

Public awareness and health care.

In case of curably blind persons, early diagnosis appropriate treatment and operative procedures.

For incurably blind persons, identifying them and providing certification, concessions and supportive services.

Welfare programmes and schemes in india

National scheme of assistance for the rehabilitation of the disabled:

This scheme is available for the promotion of comprehensive rehabilitation of disabled persons , with more preference for rural areas.This is operated through ministry of welfare and administered by state social welfare department.

Central scheme of assistance for the integrated education of disabled children:

This scheme provides aid for promoting integrated education of disabled children.

Non government funding agencies

Following are the funding agencies:

1.Sight Savers - Royal commonwealth Society for the Blind.

2.Christoffel Blindenmission.

3.DANIDA Assisted National Programme for Control of Blindness.

4.OXFAM.

5.National Association for the Blind.

6.Helpage India.

Concessions in india:

According to ministry of social justice and Empowerment in india, most concessions or benefits are eligible only to individuals having 100% visual impairment. Aids and appliances are available to individuals with minimum degree of 40 % disability.

State government also provides various concessions for visually impaired people. Some states gives recognition and awards to employers who encourages visually impaired personnel.

Specific certification are required for these concessions and this is issued by a qualified government ophthalmologist and district eye surgeon.

CONCESSIONS AVAILABLE FOR VISUALLY IMPAIRED INDIVIDUALS IN INDIA

Concessions – all over in india	Additional concessions in some states
➢ 50% discount on air travel to totally blind .	➢ Free travel by public road transport.
➢ 75% discount on rail travel to total blind.	➢ Incentives for marriage with blind.
➢ Income tax discounts.	➢ Reservation in housing schemes and loans.
➢ Free postage for blind literature.	➢ Unemployment allowance.
➢ Customs duty exemption on appliances.	➢ Self employment schemes – free shops.
➢ Lower interest rates on bank loans.	➢ Awards for employers of blind persons.
➢ Job reservations.	➢ Age relaxation for jobs.

AIM OF THE STUDY

i. To assess the magnitude of visual disability in less than 40 years of age.

ii. To determine the major cause of vision loss and visual disability.

iii. To categorise and assess the percentage of visual disability.

iv. To aid visually disabled people through training programs for life skills and assistive devices based on the individual's nature of impairment and available supportive facilities to lead an independent life.

MATERIALS AND METHODS

Patients in the age group less than 40 years of age who came for visual disability certificate at thanjavur medical college, thanjavur from 1st june 2013 to September 2014.

This is retrospective study done in 156 patients who came to our department for visual disability certificate. Informed consent obtained from all the patients.

Patients were subjected to detailed clinical history and complete ocular examination before issuing visual disability certificate.

Case sheet profroma was drawn up and patients details were recorded for each patient. Complete ocular examination includes

- A thorough ocular examination using torch light
- Visual acuity by snellen's visual acuity chart.
- Anterior segment examination findings were confirmed by slit lamp biomicroscopy.
- Corneal curvature measurement and retinoscopy /automated refractometer, central corneal thickness using pachymetry.
- Axial length measurement by ultrasound A-scan.

- Intraocular pressure measurement with Schiotz tonometer and Goldmann applanation tonometer.
- Gonioscopy by Goldmann three mirror.
- Dilated fundus examination using direct ophthalmoscopy, biomicroscopic examination with + 90 dioptre lens and indirect ophthalmoscopy.
- Ultrasound B-scan in selected cases.
- Visual field examination using octopus automated perimeter in selected cases.
- Radiological imaging like plain X-ray, CT and MRI scan.

Complete ocular examination and measurement were done by single person to avoid interobserver variations.

INCLUSION CRITERIA

- All patients with vision less than 3/ 60 in the better eye with best corrected visual acuity.
- Patient less than 40 years of age.
- One eyed with visual acuity 6/6 in the better eye.
- Both males and females were included in the study.

EXCLUSION CRITERIA

- Patients aged more than 40 years of age.
- Vision loss due to curable and senile causes were excluded from the this study.

OBSERVATIONS AND RESULTS

This study includes 156 cases of visually disabled patient came to Thanjavur Medical College , Thanjavur for visual disability certificate. 156 cases, both males and females less than 40 years of age were included in this study.

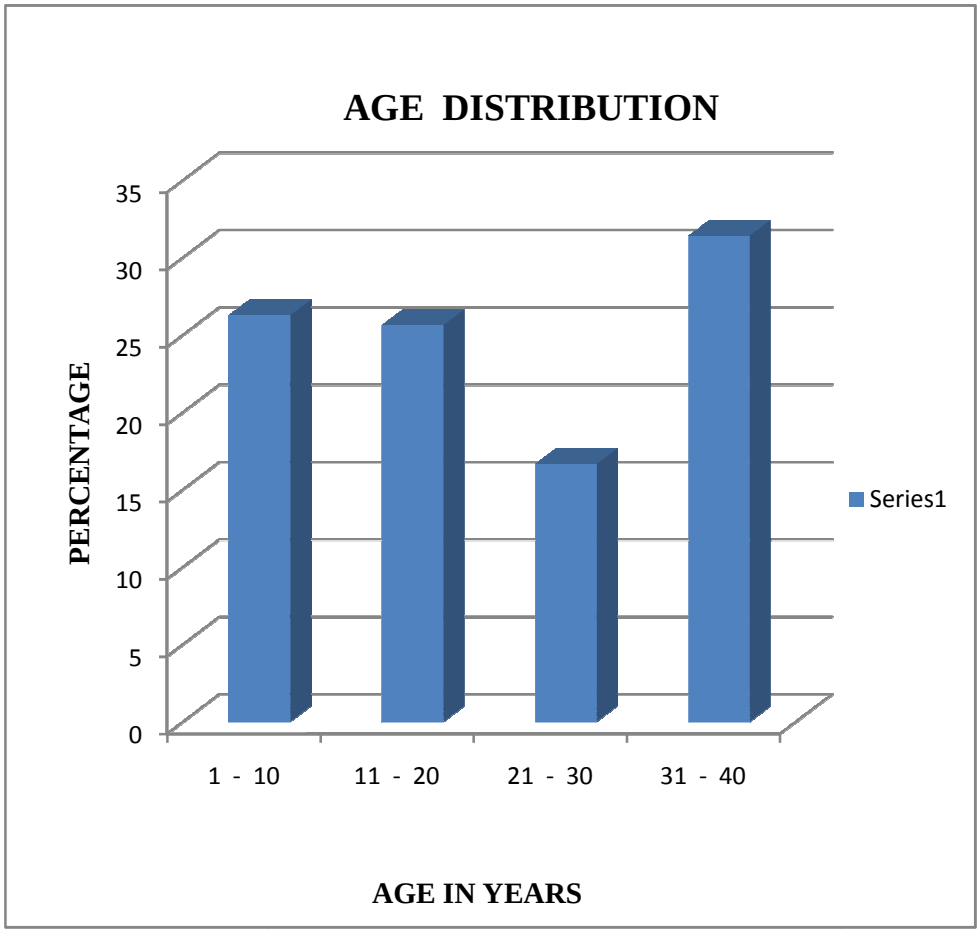
AGE DISTRIBUTION

Table no: 1 Age distribution Wise Distribution.

AGE IN YEARS	NO. OF CASES	PERCENTAGE(%)
1 - 10	41	26.28%
11 - 20	40	25.64%
21 - 30	26	16.66%
31 - 40	49	31.41%

In this study of 156 cases, maximum distribution of 49 cases were seen in 31 – 40 age group accounting about 31.41% followed by 41 cases (26.28%) among 1 – 10 age group, 40 cases (25.645%) in 11 – 20 age group and 26 cases (16.66%) in 21 – 30 age group.

Figure no. 18 Age Wise Distribution.



In our study, 31.41% was found to be between 31 – 40 years of age and they were in economically productive age group. Maximium prevalence in higher age group indicate that certain disease occur or manifest at a particular age group.

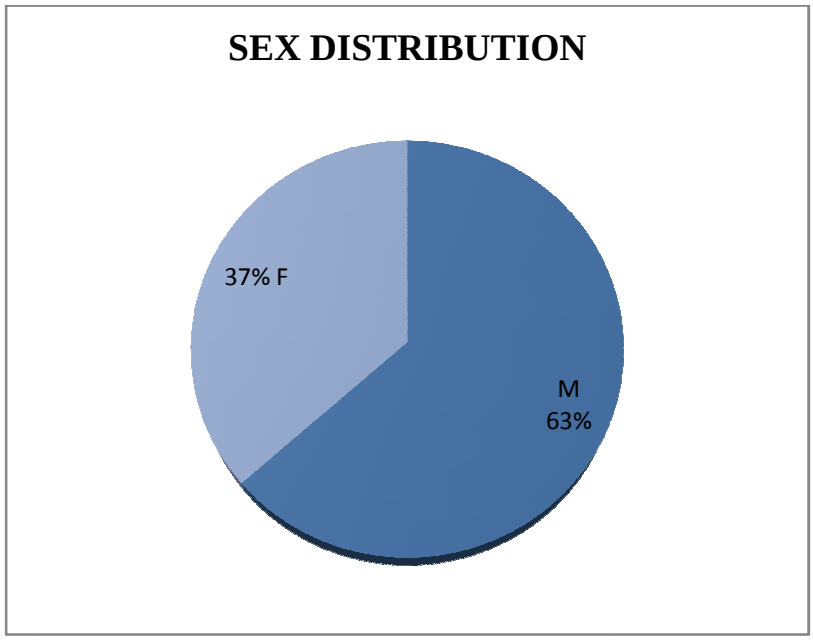
About 26.69% were found to be in the age group less than 10 years. Due to long duration of life span, childhood disability causes a significant problem.

SEX DISTRIBUTION:

Table no. 2 Sex Distribution

SEX	NO.OF CASES	PERCENTAGE
MALE	99	63.46%
FEMALE	57	36.53%

Figure no.19 : Sex Distribution.



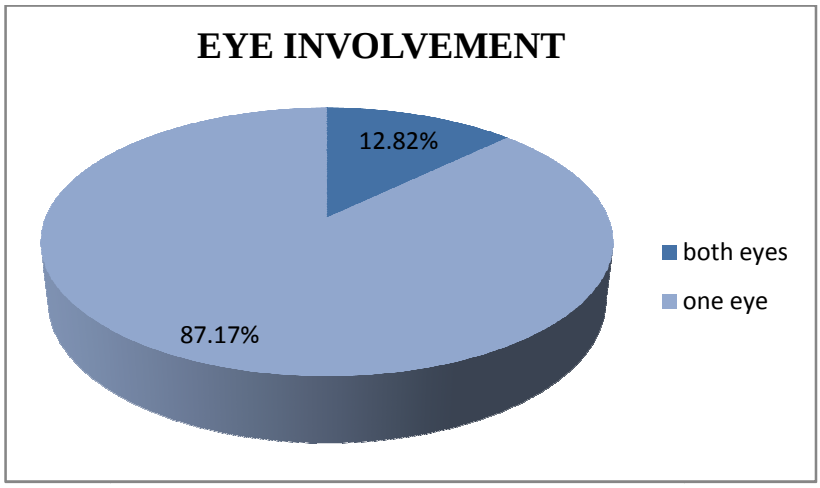
Out of 156 cases, gender difference in visual disability prevalence affects the males 63.46% as against 36.53% in females.Difference in gender because male being the earning member in our society they do come for medical advice earlier when compared to females.

EYE INVOLVEMENT :

Table no. 3 Eye Involvement

EYE INVOLVED	NO. OF CASES	PERCENTAGE
ONE EYED	20	12.82%
BOTH EYES	136	87.17%

Figure no.20 Eye Involvement.



Out of 156 cases, bilateral involvement in 136 cases(87.17%) and one eyed were 20 cases(12.82%).

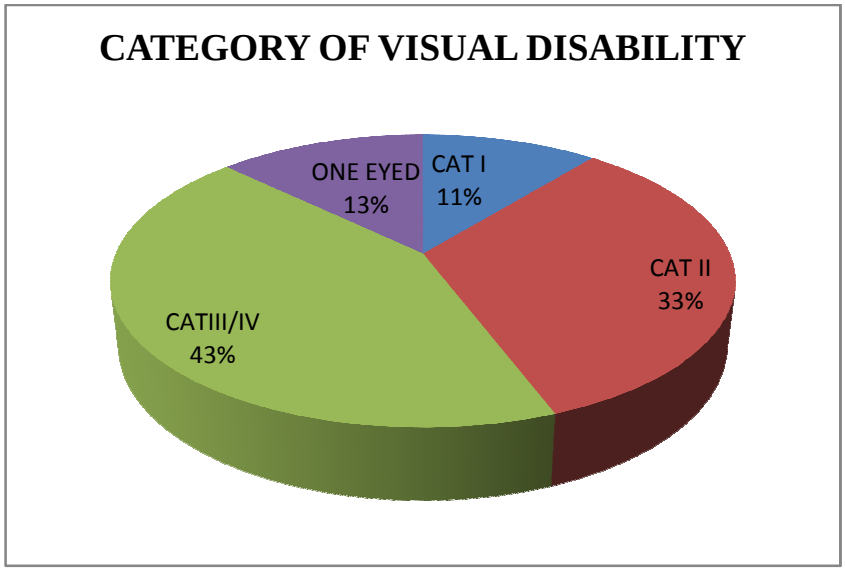
According to ministry of health's notification, one eyed persons will not be eligible for benefits/concessions. At the same time, one eyed certificate is of great help in case of multiple disabilities.

CATEGORIES OF VISUAL DISABILITY:

Table no. 5 Category of visual disability.

CATEGORY	NO.OF CASES	PERCENTAGE
CATEGORY I(40%)	17	10.89%
CATEGORY II(75%)	52	33.33%
CATEGORYIII/IV(100%)	67	42.94%
ONE EYED(30%)	20	12.82%

Figure no. 21 Category of visual disability



In this study of 156 patients, 67 patients (42.94%) were found to be 100% visual disabled eligible to all benefits and concessions. Nearly 12.82% were one eyed.

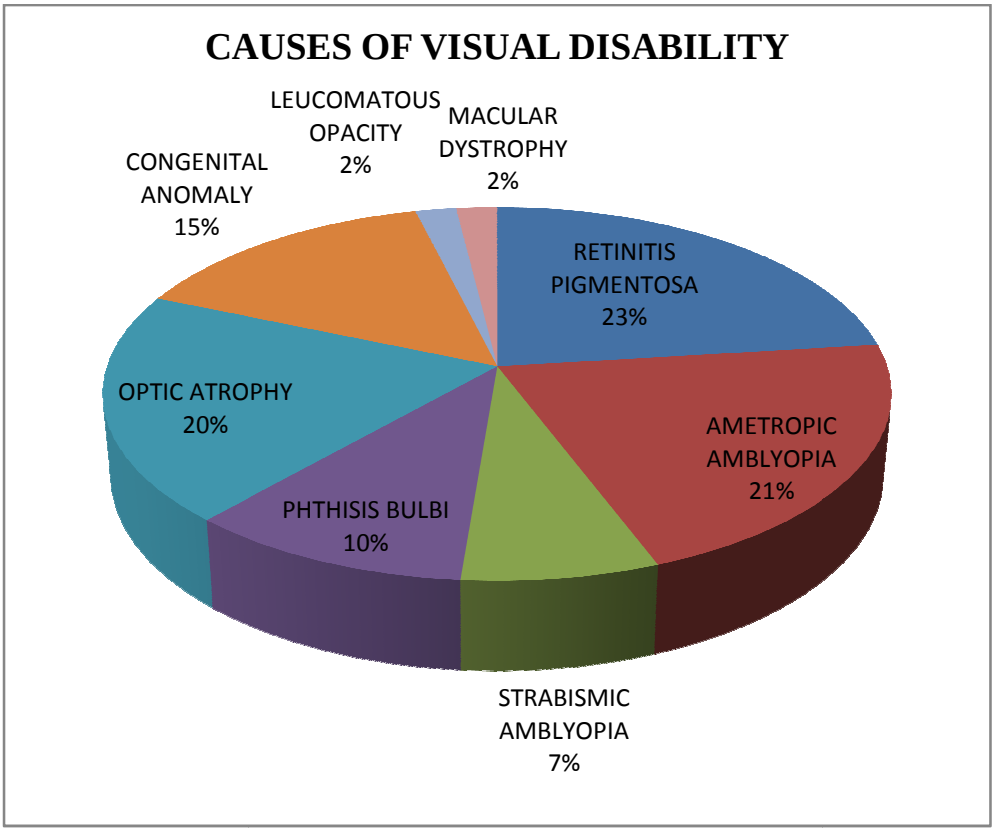
DISEASE WISE DISTRIBUTION FOR VISUAL DISABILITY.

Table no.4 Causes of visual disability in 156 patients

CAUSES	NO. OF CASES	PERCENTAGE
RETINITIS PIGMENTOSA	36	23.07%
AMETROPIC AMBLYOPIA	33	21.15%
OPTIC ATROPHY	31	19.87%
CONGENITAL ANOMALY	23	14.74%
PHTHISIS BULBI	16	10.25%
STRABISMIC AMBLYOPIA	11	7.05%
VASCULARISED OPACITY	3	1.92%
MACULAR DYSTROPHY	3	1.92%

Out of 156 cases, 36 patients (23.07%) were having retinitis pigmentosa, 33 patients (21.15%) having ametropic amblyopia, phthisis bulbi found in 16 patients(10.25%),23 patients(14.74%) having congenital anomaly,optic atrophy in 31 patients(19.87%), strabismic amblyopia in 11 patients(7.05%) and vascularised corneal opacity and macular dystrophy found in 3 patients(1.92%).

Figure no.22 Disease wise distribution:



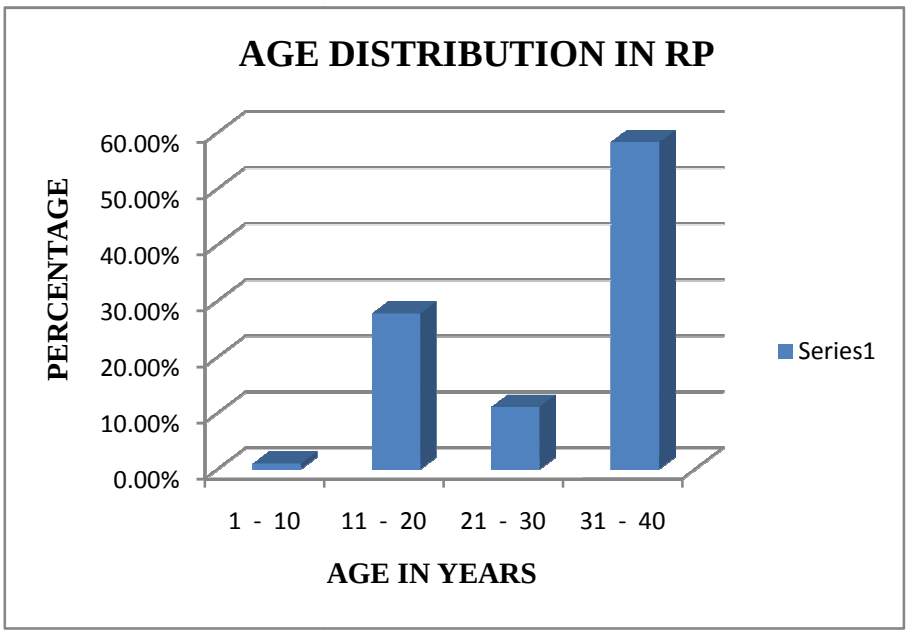
RETINITIS PIGMENTOSA DISTRIBUTION:

Table no. 6 Age Distribution in Retinitis Pigmentosa.

AGE IN YEARS	NO.OF CASES	PERCENTAGE
1 - 10	1	2.77%
11 - 20	10	27.77%
21 - 30	4	11.11%
31 - 40	21	58.33%

Out of 156 cases, retinitis pigmentosa were found to be major cause of visual disability in our study contributing 36 cases(23.07%) and maximum in the age group 31 – 40 years(58.33%). [38 39 40]

Figure no.23 Age distribution in RP

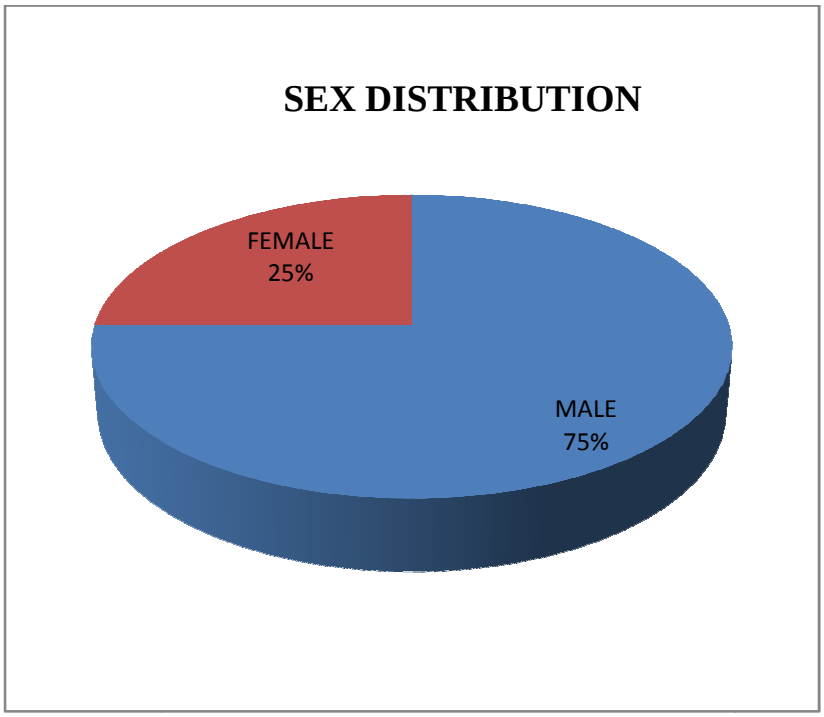


SEX DISTRIBUTION:

Table no.7 Sex Distribution in Retinitis Pigmentosa

SEX	NO. OF CASES	PERCENTAGE
MALE	27	75%
FEMALE	9	25%

Figure no.24 Sex Distribution in Retinitis Pigmentosa.



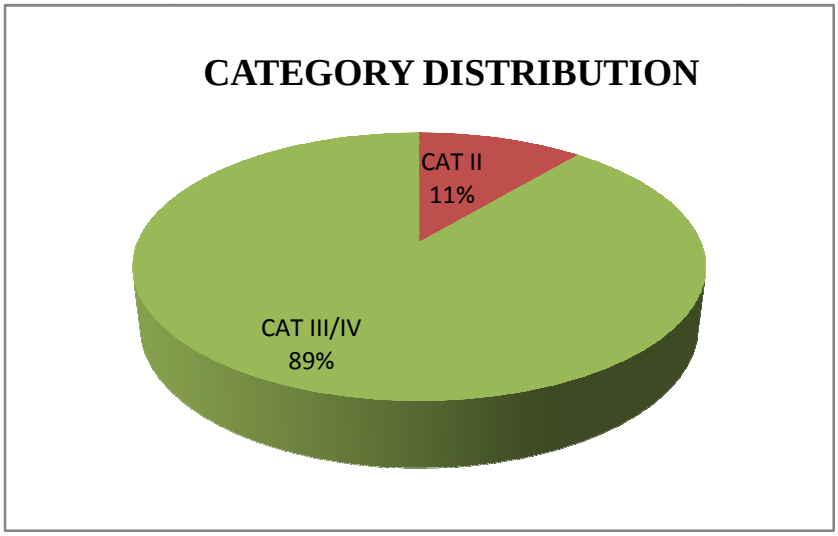
Out of 36 RP patients, 27 patients(75%) were males and 9 patients (25%) were found to be females. Usually, there is no sex predilection. But X-linked varieties expressed only in males, so men may be more commonly affected then women.[40]

CATEGORIES OF VISUAL DISABILITY:

Table no. 8 Category of visual disability in Retinitis Pigmentosa.

CATEGORY(depending on VA & fields)	NO.OF CASES	PERCENTAGE
CATEGORY I(40%)	NIL	NIL
CATEGORY II(75%)	4	11.11%
CATEGORYIII/IV((100%)	32	88.88%
ONE EYED(30%)	NIL	NIL

Figure no. 25 Category of visual disability in Retinitis Pigmentosa



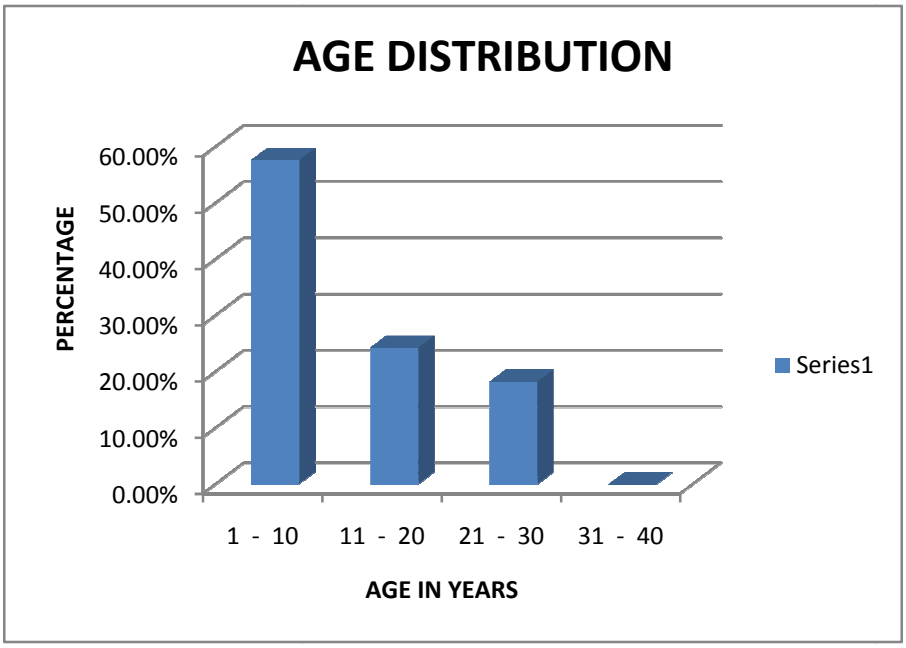
Out of 36 cases of RP, 32 patients (88.88%) were having 100% disability and 11.11% having 75% visual disability. According to grover S et al study, the extent of visual impairment depend on subtype of the disease.[38 39 40]

AMETROPIC AMBLYOPIA:

Table no. 9 Age distribution in Ametropic Amblyopia.

AGE IN YEARS	NO. OF CASES	PERCENTAGE
1 - 10	19	57.57%
11 - 20	8	24.24%
21 - 30	6	18.18%
31 - 40	NIL	NIL

Figure no. 26 Age distribution in Ametropic Amblyopia.



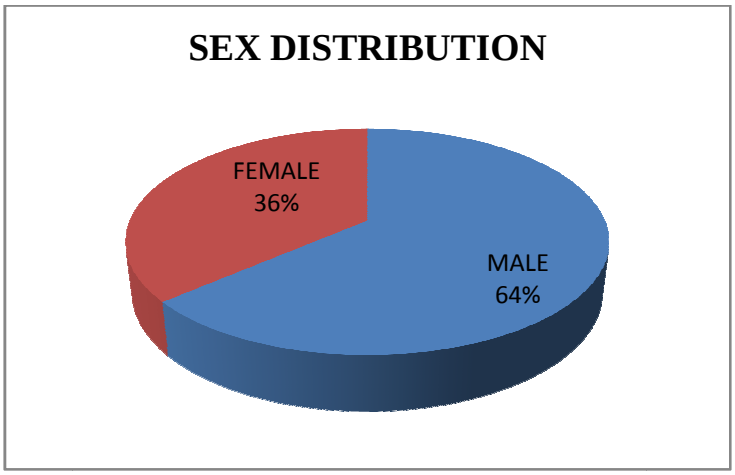
Out of 33 patients , maximum distribution is in the age group 1- 10 years which is similar to dandona L et al and other studies. Since the critical period of visual maturation is the first 6-9 years of age and correcting the underlying problem can reduce the degree of amblyopia and improve BCVA[21 28 29]

SEX DISTRIBUTION IN AMETROPIC AMBLYOPIA:

Table no. 10 Sex distribution in Ametropic Amblyopia.

SEX	NO. OF CASES	PERCENTAGE
MALE	21	63.63%
FEMALE	12	36.36%

Figure no.27 Sex distribution in Ametropic Amblyopia.



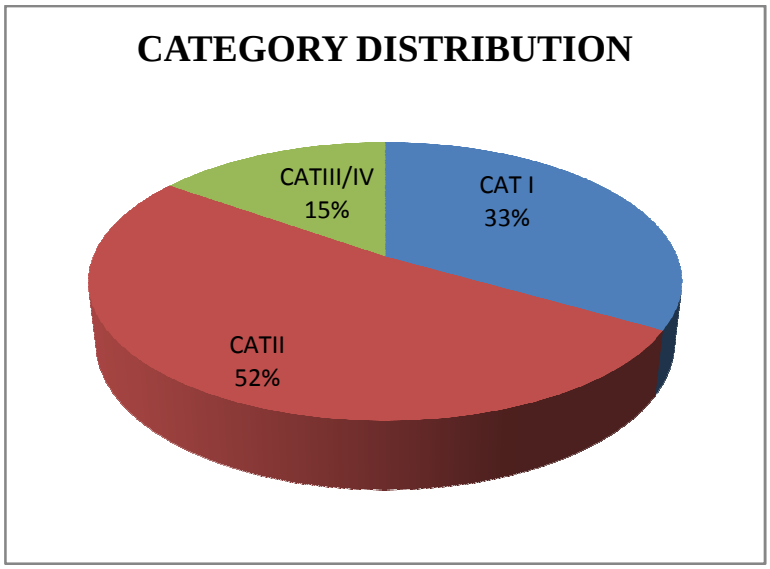
Out of 33 patients, 21 patients (63.63%) were found to be males and 12 patients (36.36%) were females.

CATEGORIES OF VISUAL DISABILITY:

Table no.11 Category of visual disability.

CATEGORY	NO. OF CASES	PERCENTAGE
CATEGORY I(40%)	11	33.33%
CATEGORY II(75%)	17	51.51%
CATEGORYIII/IV(100%)	5	15.15%
ONE EYED(30%)	NIL	NIL

Figure no.28 Category of visual disability.



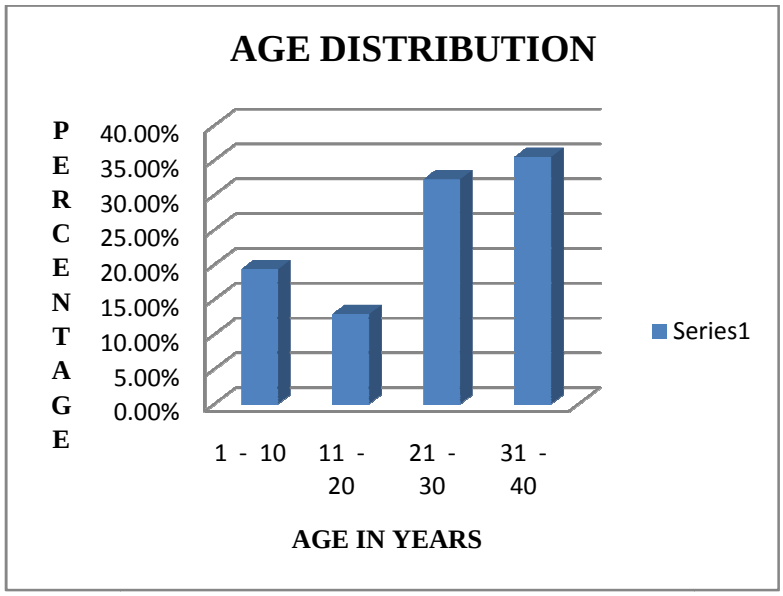
Out of 33 patients, 17 patients (51.51%) were found to be having 75%visual disability, 11patients(33.33%) having 40% disability and 5 patients were 100%.

OPTIC ATROPHY:

Table no. 15 Age distribution in optic atrophy.

AGE IN YEARS	NO. OF CASES	PERCENTAGE
1 - 10	6	19.35%
11 - 20	4	12.90%
21 - 30	10	32.25%
31 - 40	11	35.48%

Figure no. 29 Age distribution.



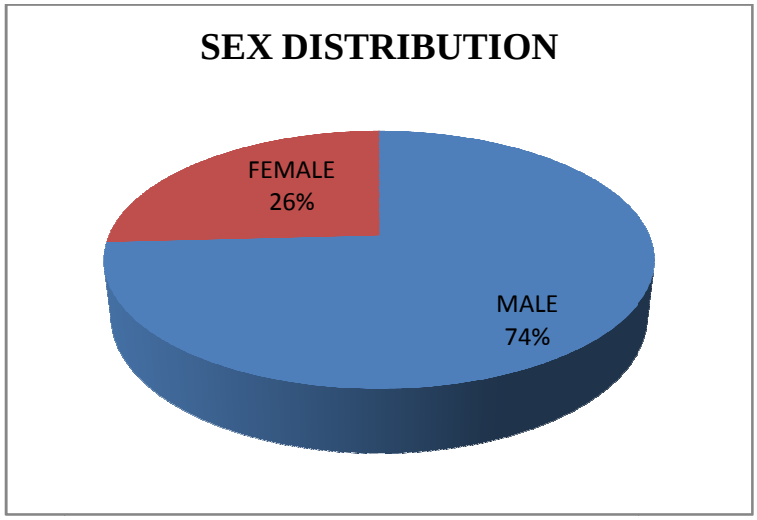
Out of 31 patients, 11 patients (35.48%) were in the age group of 31- 40 years,10 patients(32.25%) were in 21 – 30 years of age,6 patients (19.35%) were in the age group of 1- 10 years and 4 patients(12.90%) in the age group of 11- 20 years. In our study, maximum distribution of cases were in the age group 21 – 40 years of age since there will be progressive loss of retinal ganglion cells followed by degeneration of of the optic nerve.

SEX DISTRIBUTION:

Table no. 16 Sex distribution in Optic Atrophy.

SEX	NO. OF CASES	PERCENTAGE
MALE	23	74.19%
FEMALE	8	25.80%

Figure no. 30 Sex distribution in Optic Atrophy.



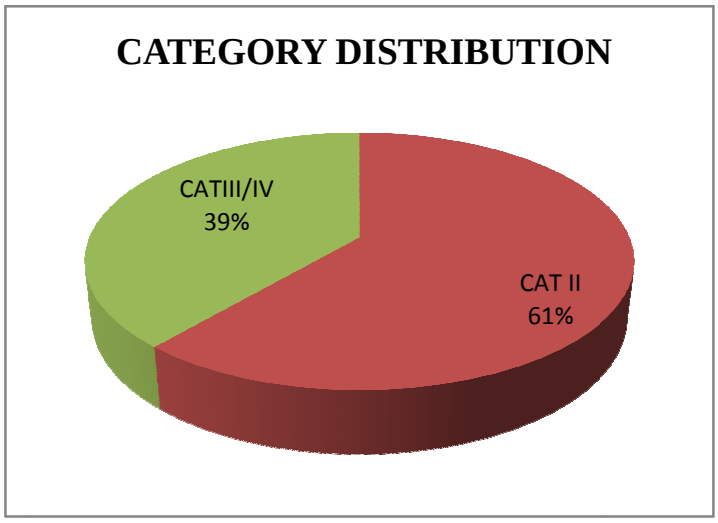
Out of 31 patients, 23 patients(74.18%) were males and 8 patients (25.80%) were females.

CATEGORY OF VISUAL DISABILITY:

Table no. 17 Category of visual disability.

CATEGORY	NO. OF CASES	PERCENTAGE
CATEGORY I(40%)	**NIL**	**NIL**
CATEGORY II(75%)	19	61.29%
CATEGORYIII/IV(100%)	12	38.70%
ONE EYED(30%)	NIL	NIL

Figure no. 31 Category of visual disability.



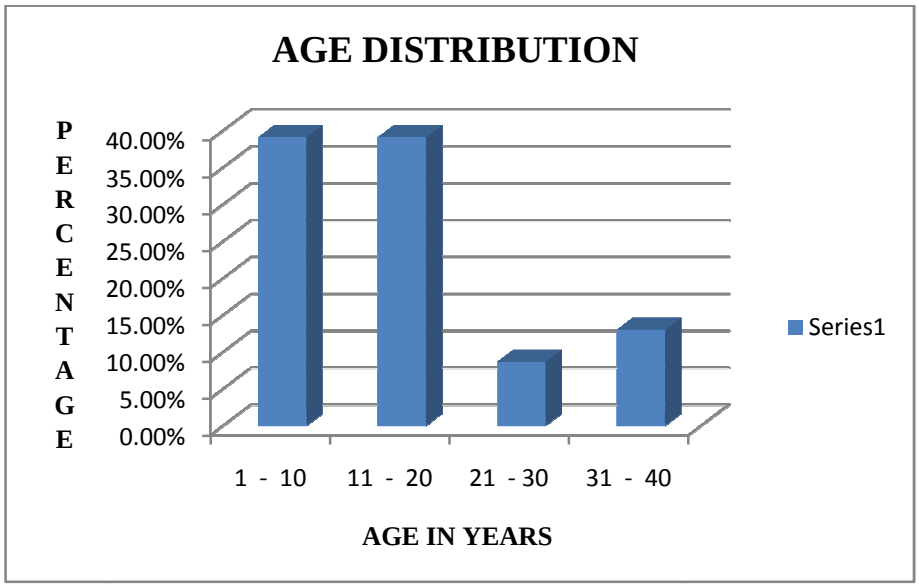
Out of 31 patients, 19 patients(61.29%) having 75% visual disability and 12(38.70%) patients having 100 % disability. Due to progressive nature of the disease, individuals with 75% visual disability will end up in 100% visual disability in future.[26 27]

CONGENITAL ANOMALY:

Table no. 21 Age distribution in Congenital Anomaly.

AGE IN YEARS	NO. OF CASES	PERCENTAGE
1 - 10	9	39.13%
11 - 20	9	39.13%
21 - 30	2	8.69%
31 - 40	3	13.04%

Figure no. 32 Age distribution in Congential Anomaly.



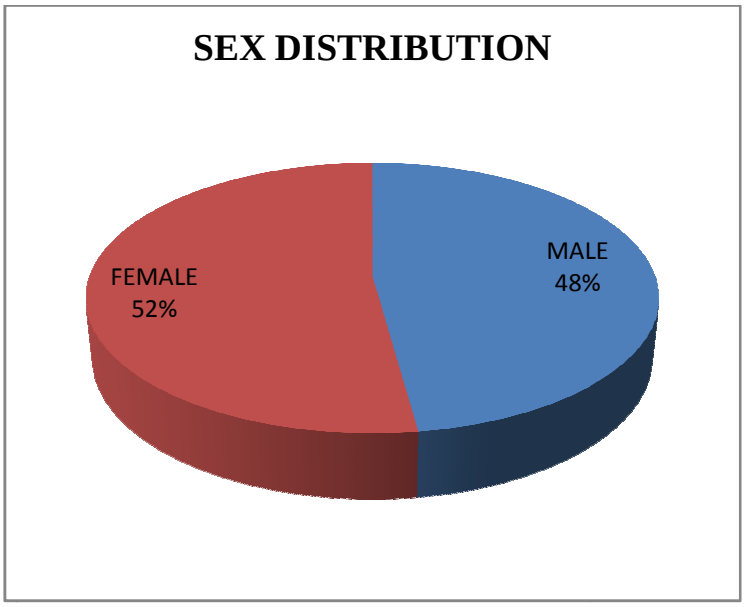
Out of 23patients, 9 patients(39.13%) each were in the age group of 1 – 10 years and 11 – 20 years. 3 patients(13.04%) were in the age group of 31 – 40 years and 2 patients were in the age group of 21 – 30 years.

SEX DISTRIBUTION:

Table no. 22 Sex distribution in Congenital Anomaly.

SEX	NO. OF CASES	PERCENTAGE
MALE	11	47.82%
FEMALE	12	52.17%

Figure no.33 Sex Distribution in Congenital Anomaly.



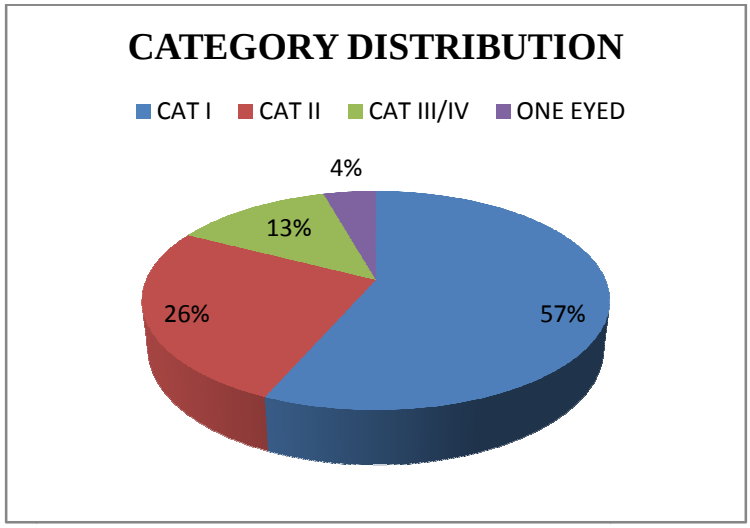
Out of 23 patients, females were found to be 52.17% and males were 47.82%.

CATEGORY OF VISUAL DISABILITY:

Table no. 23 Category of visual disability.

CATEGORY	NO. OF CASES	PERCENTAGE
CATEGORY I(40%)	3	13.04%
CATEGORY II(75%)	6	26.08%
CATEGORYIII/IV(100%)	13	56.52%
ONE EYED(30%)	1	4.34%

Figure no.34 Category of visual disability.



In this study, 13 patients(56.52%) having 100% visual disability, 6 patients (26.08%) were with 75% disability, 3 patients(13.04%) are eligible for 40% disability and 1 patient (4.34%) having 30% disability. This show that bilateral involvement of congenital anomalies.[35]

PHTHISIS BULBI:

Table no. 18 Age distribution in phthisis bulbi.

AGE IN YEARS	NO.OF CASES	PERCENTAGE
1 - 10	3	18.75%
11 - 20	3	18.75%
21 - 30	2	12.50%
31 - 40	8	50%

Figure no. 35 Age Distribution in Phthisis Bulbi.

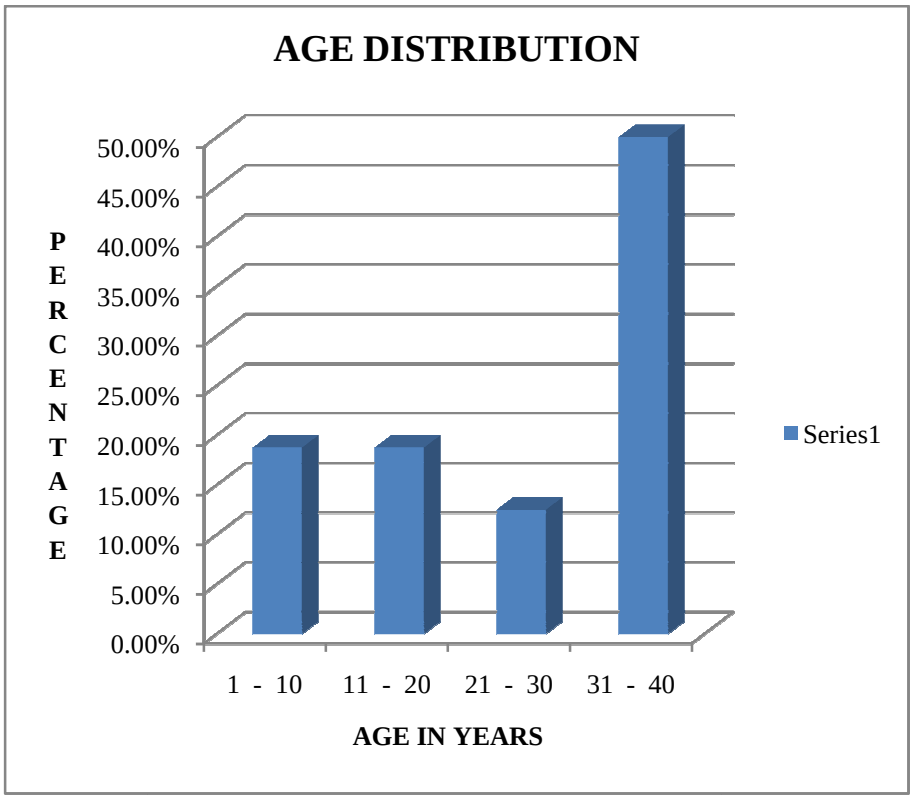
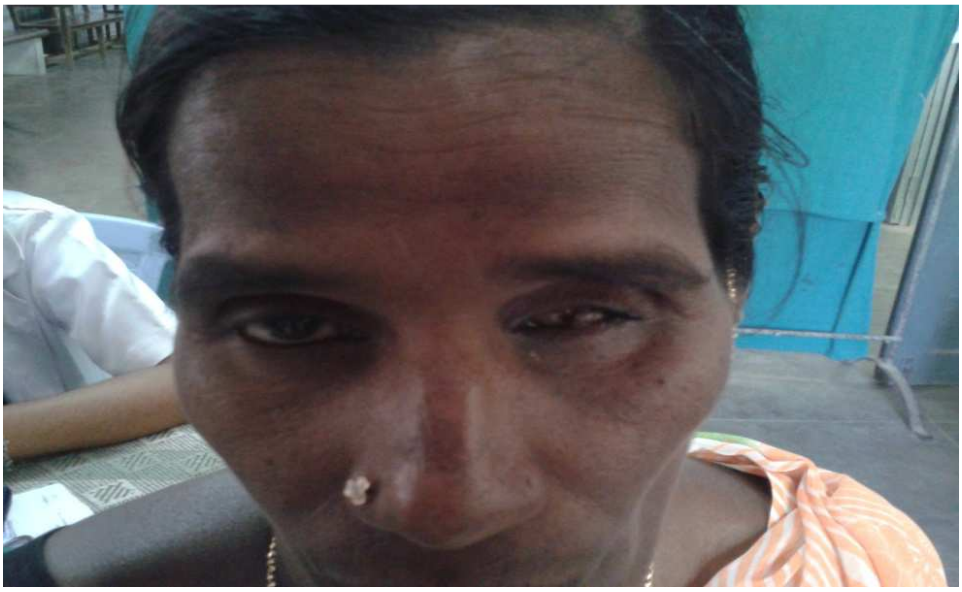


Figure no.36 Phthisis Bulbi



Out of 16 patients,8 patients (50%) were in the age group of 31 – 40 years, 3 patients (18.75%) were in the age group of 1 – 10 and 11 – 20 years. 2 patient in the age group of 21 – 30 years.

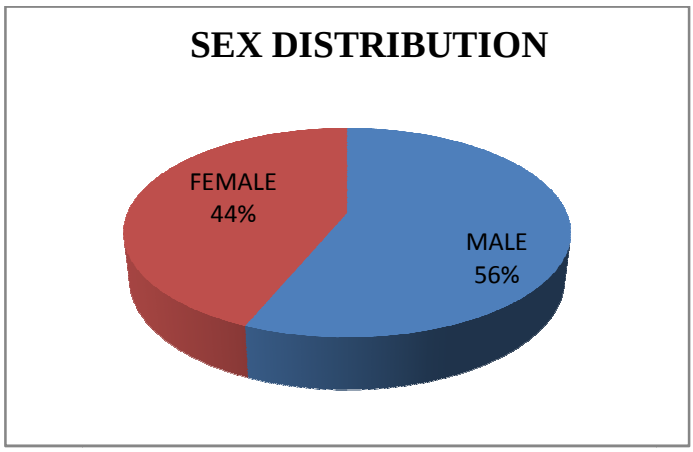
In our study, out of 16 cases of phthisis bulbi 5 were following trauma and 11 were following infection which is similar to Lee T. Tan et study.[43]

SEX DISTRIBUTION:

Table no. 19 Sex Distribution in Phthisis Bulbi.

SEX	NO. OF CASES	PERCENTAGE
MALE	9	56.25%
FEMALE	7	43.75%

Figure no.37 Sex Distribution in Phthisis Bulbi.



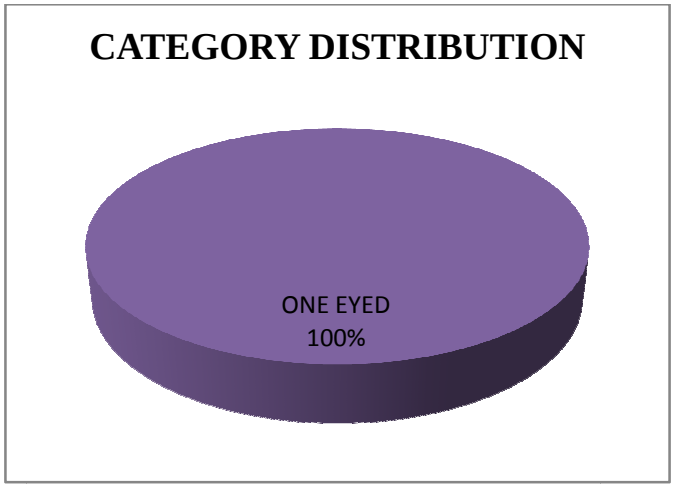
In this study, 56% were found to be males and 44% were females.

CATEGORY OF VISUAL DISABILITY:

Table no. 20 Category of visual disability.

CATEGORY	NO. OF CASES	PERCENTAGE
CATEGORY I(40%)	NIL	NIL
CATEGORY II(75%)	NIL	NIL
CATEGORYIII/IV(100%)	NIL	NIL
ONE EYED(30%)	16	100%

Figure no.38 Category of visual disability.



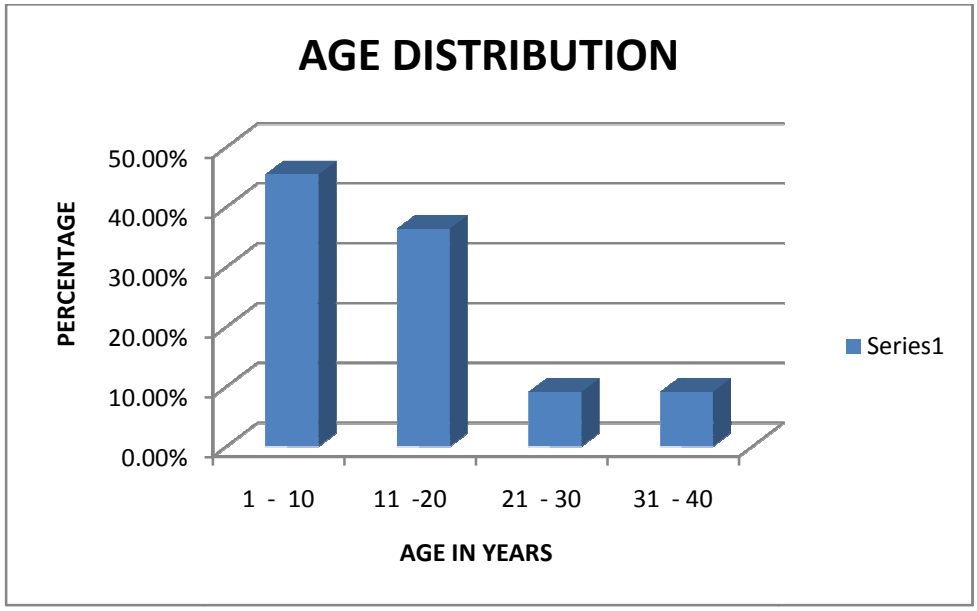
In this study, 16 patients having phthisis bulbi are eligible for one eyed status (30%)

STRABISMIC AMBLYOPIA:

Table no. 12 Age Distribution in Strabismic Amblyopia.

AGE IN YEARS	NO.OF CASES	PERCENTAGE
1 - 10	5	45.45%
11 - 20	4	36.36%
21 - 30	1	9.09%
31 - 40	1	9.09%

Figure no. 39 Age distribution in Strabismic Amblyopia.



Out of 11 patients, 5 patients (45.45%) were in the age group of 1- 10 years, 4 patients (36.36%) in the age group of 11- 20 years and 9.09% in 21 – 40 years. Since binocular single vision is formed in 3-4 years of age and well established in 6-7 years. Therefore, development of strbismic amblyopia more common in 1- 10 years of age. [31 34 35]

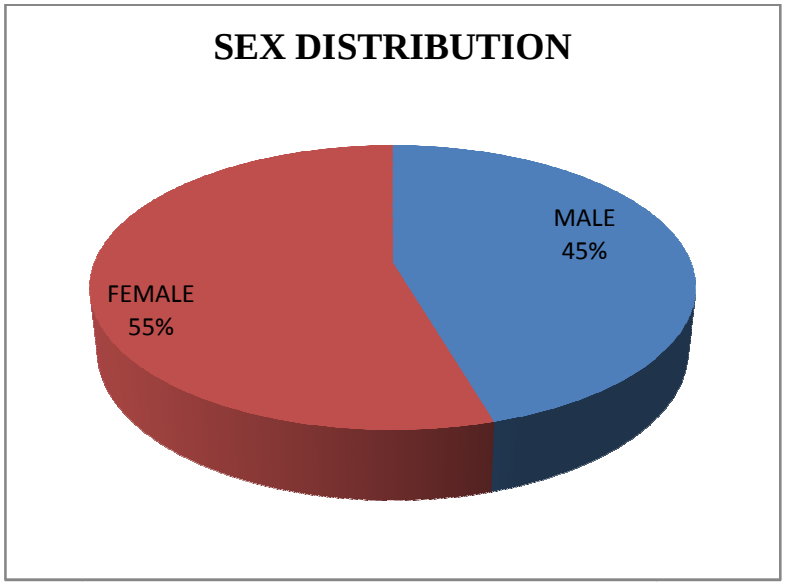
SEX DISTRUBUTION:

Table no. 13 Sex Distribution in Strabismic Amblyopia.

SEX	NO. OF CASES	PERCENTAGE
MALE	5	45.45%
FEMALE	6	54.54%

Figure no.40 Strabismic Amblyopia.

Figure no. 13 sex distribution in Strabismic Amblyopia.



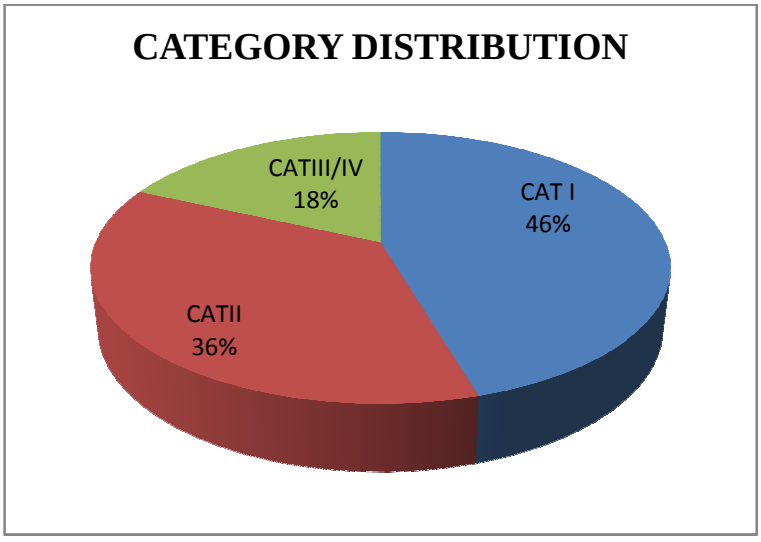
Out of 11 patients, 54.54% were females and 45.45% were found to be males.

CATEGORY OF VISUAL DISAILITY

Table no. 14 Category Distribution.

CATEGORY	NO. OF CASES	PERCENTAGE
CATEGORY I(40%)	5	45.45%
CATEGORY II(75%)	4	36.36%
CATEGORYIII/IV(100%)	2	18.18%
ONE EYED(30%)	NIL	NIL

Figure no. 41 Category Distribution.



Out of 11 patients, 5 patients (45.45%) having 40% disability, 36.36% having 75% disability and 18.18 % with 100% disability.

VASCULARISED CORNEAL OPACITY:

Table no. 24 Age distribution in Vascularised Corneal Opacity.

AGE IN YEARS	NO. OF CASES	PERCENTAGE
1 - 10	1	33.33%
11 - 20	NIL	NIL
21 - 30	1	33.33%
31 - 40	1	33.33%

Figure no. 42 Age distribution in Vascularised Corneal Opacity.

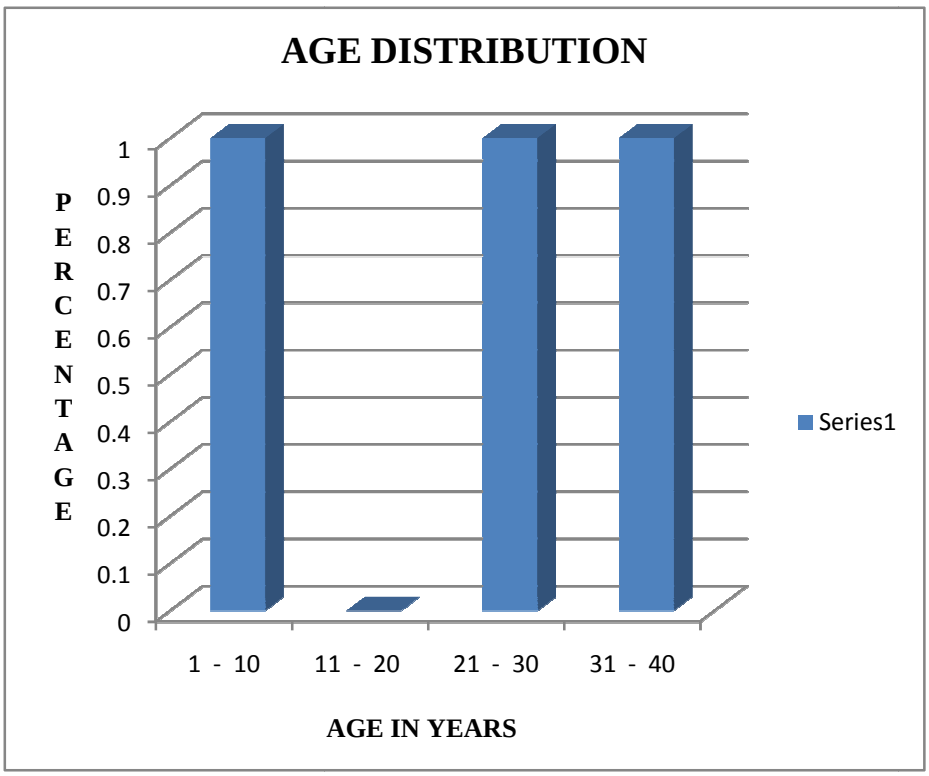


Figure no.43 Vascularised Corneal Opacity.

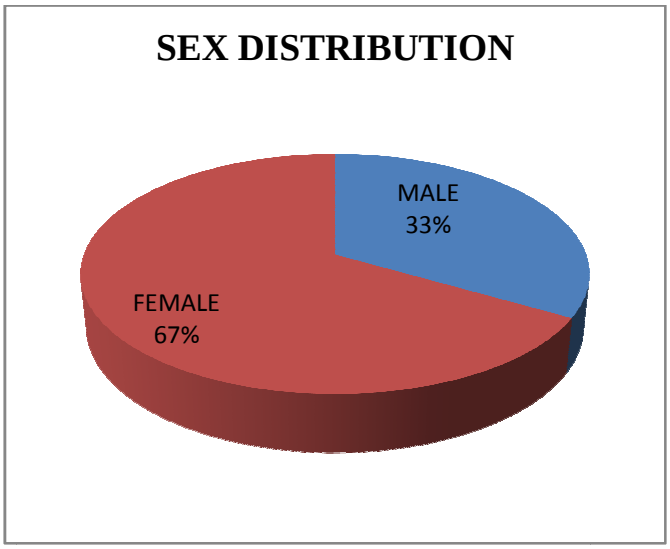
Out of 3 patients, 1 patient(33.33%)in each age group of 1- 10, 21 – 30 and 31 – 40 years.

SEX DISTRIBUTION:

Table no. 25 Sex distribution in Vascularised Corneal Opacity.

SEX	NO. OF CASES	PERCENTAGE
MALE	1	33.33%
FEMALE	2	66.66%

Figure no. 44 Sex Distribution in Vascularised Corneal Opacity.



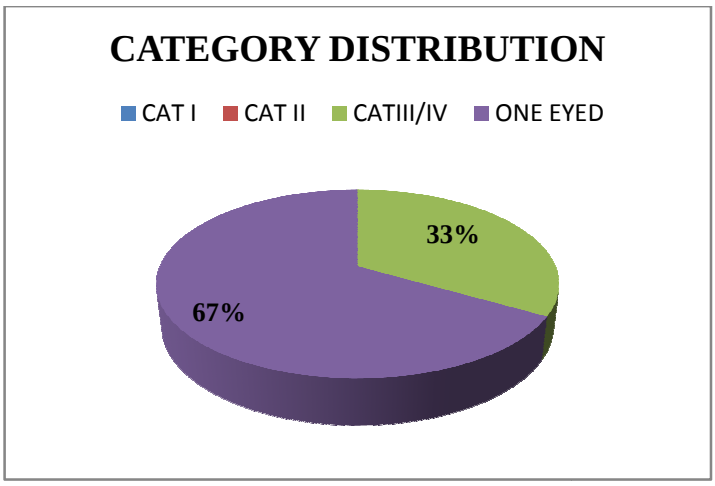
In this study, vascularised corneal opacity distribution in the ratio of 1: 2 among males and females.

CATEGORY OF VISUAL DISABILITY:

Table no. 26 Category of visual disability.

CATEGORY	NO.OF CASES	PERCENTAGE
CATEGORY I(40%)	NIL	NIL
CATEGORY II(75%)	NIL	NIL
CATEGORYIII/IV(100%)	1	33.33%
ONE EYED(30%)	2	66.66%

Figure no.45 Category of visual disability.



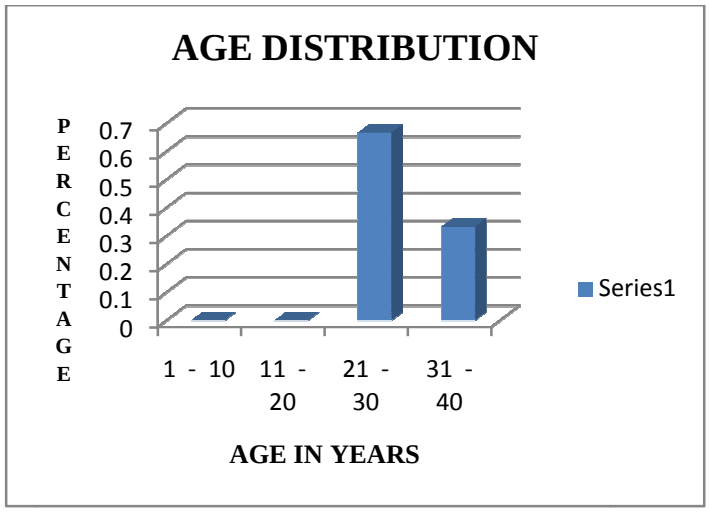
Out of 3 patients, 1 patient(33.33%) is having bilateral vsacularied bilateral corneal opacity eligible for 100% disability and 2 patient (66.66%) are under one eyed status.

MACULAR DYSTROPHY:

Table no. 27 Age Distribution in Macular Dystrophy.

AGE IN YEARS	NO. OF CASES	PERCENTAGE
1 - 10	NIL	NIL
11 - 20	NIL	NIL
21 - 30	2	66.66%
31 - 40	1	33.33%

Figure no. 46 Age Distribution in Macular Dystrophy.



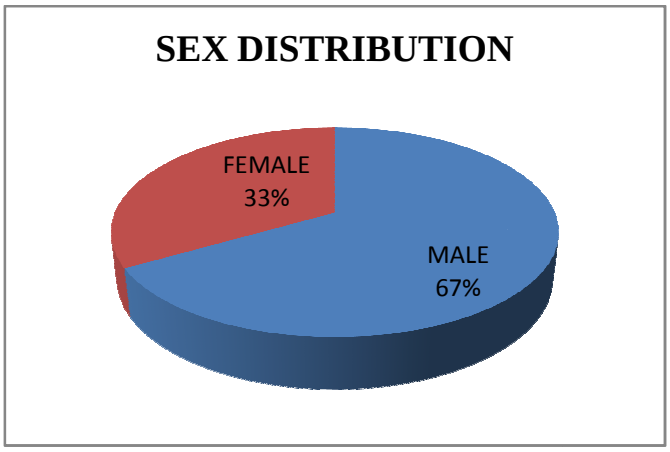
Out of 3 patients, 2 patients (66.66%) were in the age group of 21- 30 years and 1 patient (33.33%) in the age group of 31 – 40 years. According to clinical studies, visual impairment common after 3rd decade of life similar to our study.

SEX DISTRIBUTION:

Table no. 28 Sex Distribution in Macular Dystrophy.

SEX	NO. OF CASES	PERCENTAGE
MALE	2	66.66%
FEMALE	1	33.33%

Figure no. 47 Sex Distribution in Macular Dystrophy.



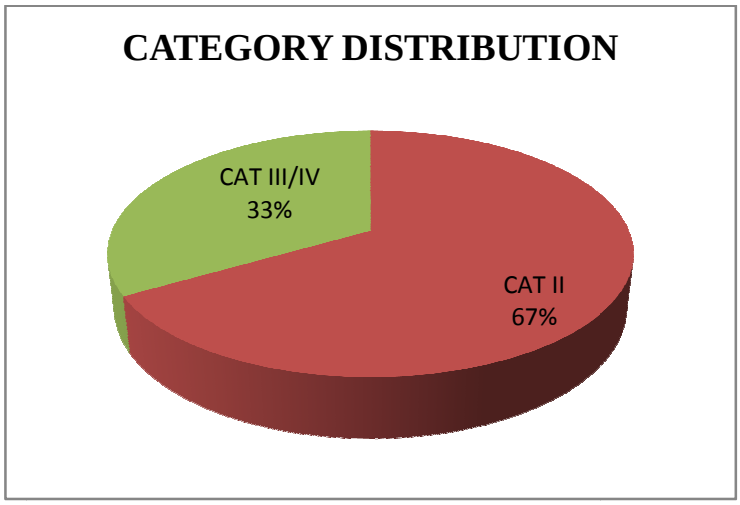
In this study, 3 patients were having macular dystrophy out of which 2 males and 1 females.

CATEGORY OF VISUAL DISABILITY:

Table no. 29 Category of visual disability.

CATEGORY	NO. OF CASES	PERCENTAGE
CATEGORY (40%)	NIL	NIL
CATEGORY II(75%)	2	66.66%
CATEGORYIII/IV(100%)	1	33.33%
ONE EYED(30%)	NIL	NIL

Figure no.48 Category of visual disability.



Out of 3 cases, 2 patients (66.66%) having 75% disability and 1 patient having 100% disability.

DISCUSSION:

Visual disability at any age has a great impact on the individual and his family. About 2.1 % of the total population were living with disability. According to the data collected among the five types of disability, visual disability emerges next to locomotor disability.

Visual disability does not mean blindness,with the available rehabilitation services that can help an individual to lead an independent and higher quality of life.

In this study of 156 patients with visual disability analyzed about the pattern of visual disability by age, gender, category and causes in less than 40 years of age.

In our study, more evenly distribution among various age group but more prevalent in 31- 40 years of age is comparable to Dandona et al studies.[37] Hence over all burden of visual disability is more in younger age in developing countries due to high birth rate and mortality rate.

In our study, males were 63.46% and females were 36.53%, while in the study done by Abou-Gareeb I et al [29 30] females were found to be higher than than males due to higher life expectancy and low utilization of eye care services.

In our study, 12.82% belong to one-eyed status and 50% were in the age group of 31- 40 years which is comparable to Dandona et al [28] study in 2000.

In our study, retinitis pigmentosa constitute 23.07% and more predominant in the age group between 31- 40 years of age.[38 39 40]

In our study, uncorrected refractive error were found to be 21.15% and 57.57% were among 1- 10 years of age which is similar to Rajiv et al study (2005), Gupta et al study (2007), chie EM et al study and Dandona et al study.[31 32 33 34]

In our study, optic atrophy causing visual disability is 19.87% of them 74.19% were males in the age group between 21 – 40 years which is similar to Levin L.A et al, international optic nerve trauma study (1999).[26]

In our study, congenital anomaly found in 14.74% and more predominant cause of visual disability between 11- 20 years of age which is similar to Sao don, sao Paulo university study (2006) [35] and Bhattarcharjee et al study.[32]

CONCLUSION

To conclude the study, it was found that visual disability due to retinitis pigmentosa is more common among males in the age group between 31 – 40 years. It is very important to make early diagnosis so that patient can make use of low vision aids to maximize his visual potential. Genetic counseling and testing help to determine individuals at risk.

In our study,amblyopia is the commonest cause for visual disability in childhood(1 – 10 years). Hence if it is detected early and managed appropriately, vision disability due to amblyopia can be reduced. Vision screening of school children should serve a useful purpose in early detection of correctable cause of reduced vision and thereby preventing them from visual disability. Children with family history of amblyopia and strabismus are at risk and should undergo vision screening.

In our study, 12.82% were one eyed, eventhough there are not eligible for benefits/concessions, in case of multiple disability, these one-eyed status could make a difference in the final certification.

We need binocular single vision for depth perception, but one eyed people have poor depth perception. In addition to best corrected visual acuity and fields, binocular single vision should be also included as a criteria for

certification of visual disability in future. This make them eligible for benefits and concessions.

All patients with visual disability should undergo low vision evaluation, training and supportive counseling, so that they can benefit from optical and non-optical devices.

Visual disability is a tragedy rather than abandoning those population it is better to provide low vision care or referring them to rehabilitation services. Public and government policy makers must understand that loss of independence related to visual disability is as real as that resulting from physical impairment.

Visual rehabilitation services can continue to evolve through continues efforts of education and outreach programmes to secure a higher quality of life for visually disabled people.

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ABBREVIATIONS:

- **NPCB** : NATIONAL PROGRAMME FOR CONTROL OF BLINDNESS.
- **ICD** : INTERNATIONAL CLASSIFICATION OF DISEASE.
- **ICDS** : INTEGRATED CHILD DEVELOPMENT SERVICES.
- **WHO** : WORLD HEALTH ORGANISATION.
- **IOP** : INTRAOCULAR PRESSURE.
- **RP** : RETINITIS PIGMENTOSA.
- **ROP** : RETINOPATHY OF PREMATURITY.
- **DBCS** : DISTRICT BLINDNESS CONTROL SOCIETY.
- **LVA** : LOW VISION AIDS.
- **K value**: KERATOMETRY VALUE.
- **AXL** : AXIAL LENGTH.
- **S/L** : SLIT LAMP.

INFORMED CONSENT

Dr. R.Thenmozhi selvi, post graduate student in Department of Ophthalmology, Thanjavur Medical College, Thanjavur is doing the study entitled " An Epidemiological Study of Visually Disabled Patients less than 40 Years of Age".

The procedure of this study is clearly explained to me in my own language. I understand that, this is an entirely a non-invasive procedure and there is no risk involved in this procedure. I hereby give my consent for participation in this study. The data obtained may be used for research and publication.

Station: Signature of the patient:

Date: Signature of the Investigator:

AN EPIDEMIOLOGICAL STUDY OF VISUALLY DISABLED PATIENTS LESS THAN 40 YEARS OF AGE

CASE SHEET PROFOMA

NAME:

AGE/ SEX:

HOSPITAL NUMBER:

OCCUPATION:

ADDRESS:

CLINICAL HISTORY:

Diminished vision/loss of vision:

Onset/progression

h/o trauma

h/o drug intake

h/o any ocular disease

PAST HISTORY:

Diabetes

Hypertension

Any other systemic illness

PERSONAL HISTORY:

a.Diet

b.h/o alcohol intake

c.h/o tobacco intake

BIRTH HISTORY:

Any congenital anomaly

Any other disabilty

FAMILY HISTORY:

TREATMENT HISTORY:

Medical/surgical

GENERAL EXAMINATION:

CVS:

RS:

ABDOMEN:

CNS:

OCULAR EXAMINATION:

	OD	OS
Vision without glasses		
Vision with glasses		
BCVA:		
Adnexa		
Conjunctiva		
Cornea		
Sclera		
Iris		
Pupil		
Lens		
EOM		

FUNDUS:

S/L EXAMINATION

IOP:

GONIOSCOPY:

PACHYMETRY:

REFRACTION:

K Value

Axial length

B Scan:

Fields:

CLINICAL IMPRESSION:

PERCENTAGE / CATEGORY OF DISABILITY:

KEY TO MASTER CHART

SL.NO	SERIAL NUMBER
M	MALE
F	FEMALE
BCVA	BEST CORRECTED VISUAL ACUITY
RE	RIGHT EYE
LE	LEFT EYE
CFCF	COUNTING FINGERS CLOSE TO FACE
HM	HAND MOVEMENTS
PL	PERCEPTION OF LIGHT
DIS%	PERCENTAGE OF DISABILITY
RP	RETINITIS PIGMENTOSA
OA	OPTIC ATROPY
N	NORMAL

SL.NO	NAME	AGE	SEX	BCVA/RE	BCVA/ LE	FIELDS /RE	FIELDS/LE	DIAGNOSIS	DIS %
1	Pichaikannu	38	M	5/60	2/60	N	N	RP	75%
2	Abirami	16	F	6/36	6/60	N	N	STRABISMIC AMBLYOPIA	40%
3	Samuvel devasagayam	39	M	CFCF	PL	_	_	OA	100%
4	Megala	40	F	3/60	HM	<10°	_	RP	100%
5	Subramaniyan	40	M	1/60	HM	_	_	RP	100%
6	Natarajan	40	M	CFCF	CFCF	_	_	RP	100%
7	Suganya	22	F	1/60	6/60	N	N	STRABISMIC AMBLYOPIA	75%
8	Gowthami	23	F	PL	HM	_	_	CONGENITAL ANOMALY	100%
9	Amudha	39	F	2/60	CFCF	< 10°	_	RP	100%
10	Vasantha	40	F	HM	HM	_	_	RP	100%
11	Chandra	34	F	NO PL	6/6	_	N	RE VASCULARISED LEUCOMATOUS OPACITY	30%
12	Thilagavathy	35	F	HM	3/60	_	< 10°	AMETROPIC AMBLYOPIA	100%
13	Pothumponnu	31	F	6/6	NO PL	N	_	RE PHTHISIS BULBI	30%

14	Purni	40	F	CFCF	CFCF	_	_	RP	100%
15	Ramesh	35	M	PL	CFCF	_	_	RP	100%
16	Manikandan	27	M	4/60	1/60	N	N	AMETROPIC AMBLYOPIA	75%
17	Murugan	40	M	CFCF	2/60	_	< 10°	RP	100%
18	Kalyanam	40	M	1/60	HM	N	_	OA	100%
19	Povarasan	8	M	6/24	2/60	N	N	STRABISMIC AMBLYOPIA	40%
20	Sivasakthi	12	F	CFCF	HM	_	_	CONGENITAL ANOMALY	100%
21	Ravi	40	M	1/60	6/60	N	N	RP	75%
22	Naveen	9	M	6/9	NO PL	N	_	LE ENUCLEATION EYE	30%
23	Vignesh	7	M	6/60	3/60	N	N	AMETROPIC AMBLYOPIA	75%
24	Maharaajan	40	M	3/60	HM	< 10°	_	RP	100%
25	Nithya	9	F	6/24	5/60	N	N	AMETROPIC AMBLYOPIA	40%
26	Chellakannu	40	F	1/60	PL	_	_	OA	100%
27	Tamilselvan	8	M	6/18	6/60	N	N	AMETROPIC AMBLYOPIA	40%
28	Durgadevi	12	F	6/24	1/60	N	N	STRABISMIC AMBLYOPIA	40%

29	Anushri	2	F	NO PL	NO PL	_	_	BEVASCUALARISED LEUCOMATOUS OPACITY	100%
30	Thirumanathan	9	M	6/36	HM	N	_	CONGENITAL ANOMALY	40%
31	Kumaresan	25	M	PL	PL	_	_	CONGENITAL ANOMALY	100%
32	Kowsalya	10	F	5/60	HM	N	_	CONGENITAL ANOMALY	75%
33	Sathya	8	F	6/9	NO PL	N	_	LE PHTHISIS BULBI	30%
34	Vadivazhaki	13	F	6/24	CFCF	N	_	STRABISMIC AMBLYOPIA	40%
35	Deepika	11	F	HM	CFCF	_	_	CONGENITAL ANOMALY	100%
36	Mangayarkarasi	26	F	PL	6/60	_	N	OA	75%
37	Venkatesan	40	M	6/6	NO PL	N	_	LEVASCULARISED LEUCOMATOUS OPACITY	30%
38	Rajan	40	M	3/60	PL	< 10°	_	RP	100%
39	Palanisami	40	M	HM	HM	_	_	RP	100%
40	Arun prasad	22	M	3/60	CFCF	N	_	AMETROPIC AMBLYOPIA	100%
41	Manoj	15	M	1/60	6/60	N	N	AMETROPIC AMBLYOPIA	75%
42	Rajendran	40	M	CFCF	NO PL	_	_	OA	100%
43	Vinoth kumar	9	M	NO PL	6/6	_	N	RE PHTHISIS BULBI	30%

44	Selvi	26	F	CFCF	HM	_	_	RP	100%
45	Abinaya	8	F	HM	6/60	_	N	CONGENITAL ANOMALY	75%
46	Raja	11	M	4/60	CFCF	N	_	CONGENITAL ANOMALY	75%
47	Thayalan	6	M	HM	2/60	_	N	AMETROPIC AMBLYOPIA	100%
48	Prabakaran	8	M	5/60	2/60	N	N	AMETROPIC AMBLYOPIA	75%
49	Anajalai	40	F	NO PL	6/6	_	N	RE PHTHISIS BULBI	30%
50	Vijayalakshmi	7	F	6/60	1/60	N	N	AMETROPIC AMBLYOPIA	75%
51	Ravi kumar	40	M	2/60	CFCF	N	_	RP	100%
52	Papathi	32	F	5/60	HM	N	_	STRABISMIC AMBLYOPIA	75%
53	Arulraj	30	M	3/60	PL	N	_	RP	100%
54	Santhosh	8	M	CFCF	CFCF	_	_	RP	100%
55	Sanjana	8	F	5/60	PL	N	_	CONGENITAL ANOMALY	75%
56	Ajay	10	M	HM	1/60	_	N	STRABISMIC AMBLYOPIA	100%
57	Arun kumar	12	M	3/60	PL	N	_	OA	100%
58	Sabesthiyan	1	M	6/60	1/60	N	N	AMETROPIC AMBLYOPIA	75%

59	Fazil	30	M	HM	HM	_	_	RP	100%
60	Amudha	19	F	4/60	CFCF	_	_	CONGENITAL ANOMALY	75%
61	Kumaresan	11	M	3/60	HM	N	_	AMETROPIC AMBLYOPIA	100%
62	Pichaiammal	38	F	CFCF	3/60	_	< 10°	RP	100%
63	Mohammed farook	11	M	PL	PL	_	_	CONGENITAL ANOMALY	100%
64	Santhosh	15	M	HM	HM	_	_	RP	100%
65	Chitra	34	F	NO PL	6/6	_	N	RE PHTHISIS BULBI	30%
66	Anushri	12	F	6/60	6/18	N	N	AMETROPIC AMBLYOPIA	40%
67	Chandrasekar	16	M	CFCF	HM	_	_	CONGENITAL ANOMALY	100%
68	Govindaraj	35	M	1/60	PL	N	_	RP	100%
69	Sanmugam	40	M	2/60	HM	N	_	RP	100%
70	Sozha pandiyan	40	M	6/6	NO PL	N	_	LE PHTHISIS BULBI	30%
71	Kalaiselvi	7	F	1/60	6/36	N	N	AMETROPIC AMBLYOPIA	40%
72	Ambika	23	F	5/60	1/60	N	N	AMETROPIC AMBLYOPIA	75%
73	Sridhar	18	M	CFCF	3/60	_	< 10°	RP	100%

74	Saroja	40	F	1/60	PL	N	_	RP	100%
75	Uma	25	F	CFCF	CFCF	_	_	OA	100%
76	Sumitha	30	F	1/60	PL	< 10°	_	RP	100%
77	Kmamaraj	35	M	CFCF	CFCF	_	_	RP	100%
78	Karupusammy	28	M	3/60	HM	N	_	AMETROPIC AMBLYOPIA	100%
79	Nagalingam	30	M	1/60	5/60	N	N	MACULAR DYSTROPY	75%
80	Suseela	40	F	CFCF	CFCF	_	_	OA	100%
81	Thanarajan	40	M	3/60	CFCF	N	_	OA	100%
82	Sri ajal nirmal	23	M	6/60	6/24	N	N	AMETROPIC AMBLYOPIA	40%
83	Venkataraman	33	M	CFCF	CFCF	_	_	RP	100%
84	Murugesan	40	M	NO PL	6/60	_	N	OA	75%
85	Jeyasri	10	F	6/36	6/60	N	N	AMETROPIC AMBLYOPIA	40%
86	Ponmani	35	F	2/60	HM	N	_	CONGENITAL ANOMALY	100%
87	Sunil kumar	18	M	CFCF	CFCF	_	_	RP	100%
88	Sathish kumar	20	M	4/60	1/60	N	N	AMETROPIC AMBLYOPIA	75%

89	Krishna kumar	3	M	CFCF	CFCF	_	_	CONGENITAL ANOMALY	100%
90	Chandrasekar	24	M	5/60	2/60	N	N	AMETROPIC AMBLYOPIA	75%
91	Jeyasri	7	F	3/60	CFCF	N	_	OA	100%
92	Vaishnavi	8	F	CFCF	6/60	_	N	AMETROPIC AMBLYOPIA	75%
93	Sundari	27	F	NO PL	6/6	_	N	RE PHTHISIS BULBI	30%
94	Kalaiselvan	40	M	2/60	PL	N	_	OA	100%
95	Venkatesa murthy	9	M	4/60	3/60	N	N	STRABISMIC AMBLYOPIA	75%
96	Harini	3	F	1/60	6/36	_	N	CONGENITAL ANOMALY	40%
97	Arivazhagan	13	M	4/60	6/18	N	N	AMETROPIC AMBLYOPIA	40%
98	Bharani	5	M	1/60	HM	_	_	OA	100%
99	Sakthipriya	13	F	4/60	6/18	N	N	AMETROPIC AMBLYOPIA	40%
100	Poojashri	8	F	2/60	HM	N	_	OA	100%
101	Banumathy	8	F	1/60	6/60	N	N	AMETROPIC AMBLYOPIA	75%
102	Rajesh	11	M	5/60	3/60	N	N	STRABISMIC AMBLYOPIA	75%
103	Saroja	7	F	1/60	PL	_	_	CONGENITAL ANOMALY	100%

104	Suganya	12	F	3/60	CFCF	N	_	AMETROPIC AMBLYOPIA	100%
105	Akilan	9	M	5/60	1/60	N	N	AMETROPIC AMBLYOPIA	75%
106	Vignesh manikandan	17	M	CFCF	6/60	_	N	RP	75%
107	Harini	7	F	5/60	1/60	N	N	AMETROPIC AMBLYOPIA	75%
108	Kesavan	40	M	2/60	4/60	N	N	RP	75%
109	Buvaneshwar	13	M	1/60	HM	_	_	CONGENITAL ANOMALY	100%
110	Senkunvan	16	M	3/60	CFCF	< 10°	_	RP	100%
111	Bharathan	12	M	NO PL	6/6	_	N	RE PHTHISIS BULBI	30%
112	Fazil	14	M	1/60	HM	_	_	CONGENITAL ANOMALY	100%
113	Sundhar singh	15	M	1/60	PL	_	_	CONGENITAL ANOMALY	100%
114	Basha	14	M	1/60	CFCF	_	_	RP	100%
115	Lawrence	14	M	3/60	PL	< 10°	_	RP	100%
116	Gayathri	15	F	1/60	HM	N	_	RP	100%
117	Guna	17	M	1/60	6/60	N	N	AMETROPIC AMBLYOPIA	75%
118	Nisha	9	F	6/60	1/60	N	N	OA	75%

119	Dharanidharan	10	M	1/60	CFCF	N	_	STRABISMIC AMBLYOPIA	100%
120	Muthulakshmi	10	F	NO PL	6/6	_	N	RE PHTHISIS BULBI	30%
121	Kaleeshwaran	10	M	6/36	6/60	N	N	AMETROPIC AMBLYOPIA	40%
122	Shanmugam	8	M	5/60	6/18	N	N	AMETROPIC AMBLYOPIA	40%
123	Natarajan	40	M	6/6	NO PL	N	_	LE EXENTRATION	30%
124	Vaishnavi	10	F	6/18	1/60	N	N	STRABISMIC AMBLYOPIA	40%
125	Jeyakumar	11	M	6/6	NO PL	N	_	LE PHTHISIS BULBI	30%
126	Iyyapan	18	M	2/60	HM	N	_	RP	100%
127	Vishan	8	M	4/60	CFCF	N	_	OA	75%
128	Ragavi	12	F	5/60	1/60	N	N	OA	75%
129	Maheshwaran	7	M	CFCF	5/60	_	N	AMETROPIC AMBLYOPIA	75%
130	Saravanan	19	M	NO PL	6/6	_	N	RE PHTHISIS BULBI	30%
131	Keerthana	8	F	4/60	2/60	_	_	CONGENITAL ANOMALY	75%
132	Sakthianandan	17	M	3/60	CFCF	< 10°	_	RP	100%
133	Vishal	11	M	6/60	3/60	N	N	AMETROPIC AMBLYOPIA	75%

134	Veera kumar	9	M	6/60	3/60	N	N	AMETROPIC AMBLYOPIA	75%
135	Mahalakshmi	37	F	2/60	CFCF	N	_	CONGENITAL ANOMALY	100%
136	Marimuthu	40	M	5/60	PL	N	_	OA	75%
137	Sugumar	40	M	HM	6/60	_	N	OA	75%
138	Sasisekar	19	M	4/60	HM	N	_	OA	75%
139	Senthil	24	M	NO PL	5/60	_	N	OA	75%
140	Asaithambi	40	M	6/6	NO PL	N	_	LE PHTHISIS BULBI	30%
141	Pandithurai	28	M	4/60	NO PL	N	_	OA	75%
142	Jeyaraman	23	M	6/60	3/60	N	N	OA	75%
143	Perarasu	28	M	4/60	3/60	N	N	OA	75%
144	Ramesh	22	M	HM	4/60	_	N	OA	75%
145	Manikandan	29	M	NO PL	6/6	_	N	RE PHTHISIS BULBI	30%
146	Mohammed azar	27	M	5/60	PL	N	_	OA	75%
147	Paneerselvam	32	M	NO PL	6/6	_	N	RE PHTHISIS BULBI	30%
148	Parthiban	17	M	HM	5/60	_	N	OA	75%

149	Thirupathi	31	M	PL	5/60	_	N	OA	75%
150	Nanda kumar	20	M	4/60	NO PL	N	_	OA	75%
151	Veeramani	32	M	NO PL	6/60	_	N	OA	75%
152	Gunasekar	40	M	6/6	NO PL	N	_	LE PHTHISIS BULBI	30%
153	Anand	25	M	6/60	CFCF	N	_	OA	75%
154	Janarthan	40	M	4/60	2/60	N	N	MACULAR DYSTROPY	75%
155	Uma	25	F	6/60	1/60	N	N	MACULAR DYSTROPY	100%
156	Gandhimathi	40	F	NO PL	6/6	_	N	RE PHTHISIS BULBI	30%