

Visual Impairment: Blind School Survey at Gurugram Haryana India

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Abstract:

Introduction: The estimated number for visually disabled individuals of all ages is 253 million, of which 36 million are blind. It is also estimated that 82% of individuals with blindness are 50 and over. **Aim:** This study seeks to exclude the actual cause of vision impairment in blind school Gurugram Haryana. **Methodology:** A random, cross-sectional survey was done in the blind school at Gurugram between December 2019 to March 2020 to examine the most effective eye disorders/ diseases and visual output. Total 74 cases were selected randomly in the study. **Result:** This study was conducted under two sub-groups of age (male and female), first is 21 to 30, and the second is 31 to 40. There were 45 (60.81%) male and 29 (39.19%) female. The total disorders/diseases are categorized in 5 main heads, the corneal disorder was 15 (20.27%), among them 9 (60.0%) were male and 6 (40.0%) were female, the cataract was 13 (17.57%), including 8 (61.54%) male and 5 (38.47%) females, the posterior segment concludes 38 (51.35%), among them 24 (63.15%) male and 14 (36.85%) female, the orbit disease concludes 12 (16.21%) further for 7 (58.33%) was male and 5 (41.67%) was female and others disorders was 9 (12.16%) issues, among them there were 6 (66.67%) male and 3 (33.33%) female. **Conclusion:** This study reveals that the eye disorders were more prominent in male, and the main leading cause of visual impairment was the posterior segment disorders 38 (51.35%) and male patient count was 23 (31.08%) for 31-40 years of the age groups. **Discussion:** It has been observed that visual impairment is a leading cause of blindness and this may lead many other effects over eyes like as low vision etc. There is a need to do proper and regular examinations, whose eyes already have less or poor vision. It has also been observed that low vision devices can play a major role for improving the sight and rehabilitation in specially in low vision patients.

Keyword: Low Vision, Vision impairment, ocular disorders, Blind school.

INTRODUCTION

Visual impairment is a decreased ability to see and it could be corrected by the glasses, contact lenses or low vision devices.^[1, 2] Visual impairment is often defined as a best-corrected visual acuity of worse than either 20/40 or 20/60.^[3] The term blindness is used for complete or nearly complete vision loss.^[3] Visual impairment may cause difficulties with normal daily activities such as driving, reading, socializing, and walking.^[2] The most common causes of visual impairment globally are uncorrected refractive errors (43%), cataracts (33%), and glaucoma (2%).^[4] A cataract is the most common cause of blindness.^[4] Other disorders are age-related macular degeneration, diabetic retinopathy, corneal clouding, childhood blindness, and a number of infections.^[5] Problems in the brain can also cause visual

impairment due to stroke, premature birth, or trauma, among others.^[6] These cases are known as cortical visual impairment.^[6] Screening for vision problems in children may improve future vision and educational achievement.^[7] Screening adults without symptoms is of uncertain benefit.^[8] Diagnosis is by an eye exam.^[2] The World Health Organization uses the following classifications of visual impairment. When the vision in the better eye with the best possible glasses' correction is:

1. 20/30 to 20/60 (almost 6/9 to 6/18): is considered mild vision loss, or near-normal vision.
2. 20/70 to 20/160 (almost 6/24 to 6/36): is considered a moderate visual impairment, or moderate low vision.
3. 20/200 to 20/400 (almost 6/60 to 3/60): is considered a severe visual impairment, or severe low vision.
4. 20/500 to 20/1,000 (almost 2/60 to 1/60): is considered a profound visual impairment, or profound low vision.
5. More than 20/1,000 9less then 3/60): is considered a near-total visual impairment, or near-total blindness.
6. No light perception (NLP/ PL-Ve): is considered a total visual impairment, or total blindness

Blindness is defined by the World Health Organization as a vision in a person's best eye with the best correction of less than 20/500 or a visual field of less than 10 degrees.^[7] This definition was set in 1972, and there is an ongoing discussion as to whether it should be altered to include uncorrected refractive errors officially.^[1] Cataracts are remaining a global problem ^[9] and are the leading cause of child and adult blindness that doubles in prevalence with every ten years after the age of 40.^[10] The congenital and pediatric pathology of cataract describes the greying or opacity of the crystalline lens commonly caused by intrauterine infections, metabolic disorders, and genetically transmitted syndromes.^[9] Glaucoma is a congenital and pediatric eye disease characterized by increased intraocular pressure (IOP) within the eye,^[12] visual field loss and the damage to the nerve.^[13] Glaucoma is influenced with the four causes: 1) inflammatory ocular hypertension syndrome (IOHS); 2) severe uveitis angle closure; 3) corticosteroid-induced; and 4) a heterogonous mechanism associated with structural change and chronic inflammation.^[12]

Various infections are essential to cause Childhood blindness, the conditions related to pregnancy, such as congenital rubella syndrome, retinopathy of prematurity, Leprosy and onchocerciasis. One of the most popular disease in the last few decades is trachoma has decreased and now have a seventh place on the list of causes of blindness worldwide. Central corneal ulceration is also a significant cause of monocular blindness and considered as the fourth greatest cause of global blindness.^[14] Eye injuries are the leading cause of monocular blindness. Most of the injuries cause corneal opacities, cataract and retinal detachment too. Cortical blindness results from injuries to the occipital lobe of the brain due to discontinuation of the visual signal through the optic nerve. Some of the genetic defects like albinism often have vision loss, though few of them actually cannot see. Lebar congenital amaurosis can cause total blindness or severe sight loss from birth or early childhood. Recent advances in mapping of the human genome have identified other genetic causes of low vision or blindness. One such example is Bardet–Biedl syndrome. Certain chemicals cause blindness like methanol, which can cause blindness, other health complications, and death.^[15] The untreatable refractive error concludes Amblyopia is the world's leading cause of vision loss or visual impairment where a child's visual systems fail to mature normally and have no any relation to the refractive errors or existing ocular diseases.^[16] Such a child either suffers from premature birth, measles, congenital rubella syndrome, vitamin A deficiency, or meningitis.^[17] The posterior segment disorders conclude degenerative myopia is also an important issue where structural changes damage to the retina to form a diabetic crescent and retinal surface changes. Diabetic retinopathy is the microvascular complications of

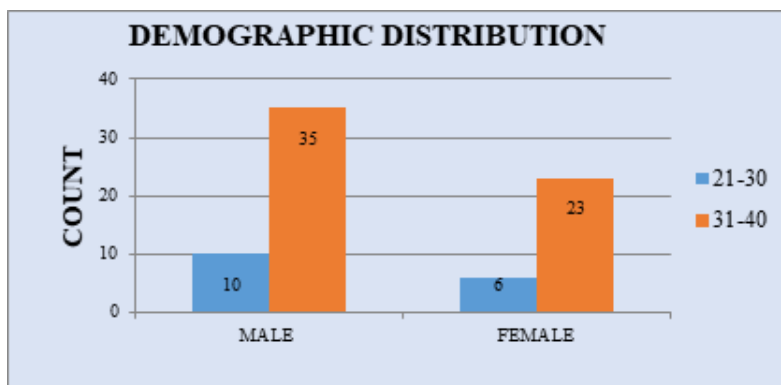
diabetes, characterized by blindness or reduced acuity due to retinal and vitreous haemorrhage or retinal capillary blockage. The statistical values indicate that only 8% of adults of 40 years and older experience vision-threatening.^[18] Retinitis pigmentosa (RP) is a genetic disorder of the eyes that causes loss of vision. Symptoms include trouble seeing at night and decreased peripheral vision. The loss of cone photoreceptor cells generally follows this. Diagnosis is by an examination of the retina finding dark pigment deposits. Another supportive testing may include an electroretinogram, visual field testing, or genetic testing. Retinopathy of prematurity is also a most common cause of blindness in infants, its most severe form, cause retinal detachment, the laser or Avastin therapy treatment is aimed only for prevention.^[19] Stargardt's disease is the most common inherited single-gene retinal disease.^[20] Usually occurs in childhood or adolescence. The main symptom is the loss of visual acuity and uncorrectable with glasses. It includes wavy vision, blind spots, blurriness, loss of depth perception, sensitivity to glare, impaired colour vision,^[21] and delayed dark adaptation. Uveitis caused by infections, systemic diseases, immune-compromised disorders, cancer or trauma.^[22] So the uveitis refers to a complex category of ocular diseases that can cause blindness if either left untreated or improperly diagnosed.^[22] as well as can create complication that can cause cataracts, glaucoma, retinal damage, age-related macular degeneration or diabetic retinopathy.^[22] Xerophthalmia develops due to vitamin A deficiency it produces active corneal involvement, and half of the affected go blind.

METHODOLOGY:

This study was conducted at Ahuja eye and dental institute gurugram after obtaining written permission from the hospital. The verbal consent for conducting this study was obtained from the concerned blind schools and from the respondents. Patients who were diagnosed with low vision or vision impairment and fulfilling the following inclusion and exclusion criteria will be selected for the study. The study was designed for a random, observational cross-sectional type. The sample size concludes 74 Subjects and selected at blind school in a random manner then brought to hospital (Ahojja Eye and Dental Institute, Guru Gram) for further management. Over the consent, demographic history, medical history, history of their present illness and disability were recorded. Full Optometric/Ophthalmological workup was done, including proper vision assessment by Snellen's acuity chart, Extraocular motility examination, papillary examination, Confrontation, dilated refraction, was performed. The ophthalmologist did the detailed Slit-lamp Examination and dilated fundus examination. Low vision assessment and trial was performed. The World Health Organization estimates that 80% of visual loss is either preventable or curable with treatment.^[4] This includes cataracts, onchocerciasis, trachoma, glaucoma, diabetic retinopathy, uncorrected refractive errors, and some cases of childhood blindness.^[11] All the subjects are observed under three sub-categories by the Snellen's visual acuity chart. The observed visual acuity of 6/9 to 6/18 is considered for mild visual loss. The patients who have visual acuity of 6/24 to 6/36 are considered for moderate visual impairment or moderate low vision. In the same sequence, the patients who have visual acuity of 6/60 to 3/60 are considered for severe visual impairment or severe low vision.

RESULTS:

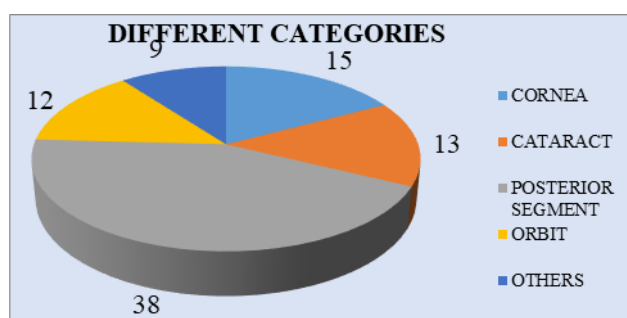
The total sample size 74, studied under two subgroups of age 21-30 years and 31-40 years. The demographic distribution concludes 10 (62.50%) male and 6 (37.50%) female in the first group of age while 35 (60.34%) male and 23 (39.66%) female in the second group of age. Overall, there were 45 (60.81%) male and 29 (39.19%) female. (Table-1)



AGE GROUPS	MALE	FEMALE	TOTAL
21-30 yrs	10 (62.50%)	6 (37.50%)	16 (100%)
31-40 yrs	35 (60.34%)	23 (39.66%)	58 (100%)
TOTAL	45 (60.81%)	29 (39.19%)	74 (100%)

Table.1 Division of Age Groups

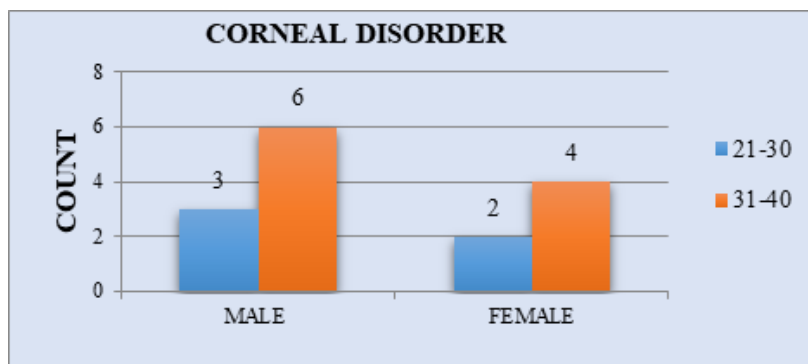
Overall subjects are categorized for corneal disorder related issues are 15 (20.27%), cataract related 13 (17.57%), posterior segment related 38 (51.35%), orbit related 12 (16.21%) and others related are 9 (12.16%) issues from the total subjects.(Table-2)



CAUSE	COUNT	%
CORNEA	15	20.27 %
CATARACT	13	17.57 %
POSTERIOR SEGMENT	38	51.35 %
ORBIT	12	16.21 %
OTHERS	9	12.16 %

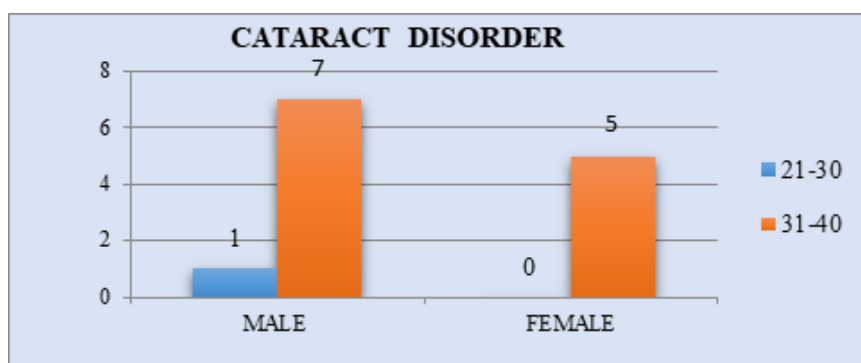
Table-2 Divisions of disorders

Further, the corneal disorders are consisting of corneal scars, megalocornea, microcornea, Adherent Leucoma, Failed Graft, trauma etc. The observation is made on two different age groups with both the gender. Total 15 cases are recorded, among them, 9 (60.0%) are male, and 6 (40.0%) are female. The prevalence is recorded for male in both age groups, although male of first age group 21-30 was dominating. (Table-3) Cataract followed by subluxation and drop of the nucleus. This observation is made on two different age groups with both the gender. Total 13 cases are there, including 8 (61.54%) male and 5 (38.47%) females. Male are dominating here with the second age group 31-40 years. (Table-4)



CORNEAL DISORDER			
AGE GROUPS	MALE	FEMALE	TOTAL
21-30	3 (20.0%)	2 (13.33%)	5 (33.33%)
31-40	6 (40.0%)	4 (26.66%)	10 (66.66%)
TOTAL	9 (60.0%)	6 (40.0%)	15 (100%)

Table-3 Corneal disorders



CATARACT DISORDER			
AGE GROUPS	MALE	FEMALE	TOTAL
21-30	1 (7.69%)	0	1 (7.69%)
31-40	7 (53.85%)	5 (38.47%)	12 (92.31%)
TOTAL	8 (61.54%)	5 (38.47%)	13 (100%)

Table-4 Cataract disorder

The posterior segment followed by retinal Pigmentosa, retinal degeneration, macular scar and Optic Atrophy, retinoblastoma etc. In this category of disorder, total involvement was 38, including 24 (63.15%) male and 14 (36.85%) female. The prevalence shows towards /the male, for the age group of 31-40 years with a count of 19 (50.0%). (Table-5)

POSTERIOR SEGMENT DISORDER			
AGE GROUPS	MALE	FEMALE	TOTAL
21-30	5 (13.15%)	3 (7.90%)	8 (21.05%)
31-40	19 (50.0%)	11 (28.95%)	30 (78.94%)
TOTAL	24 (63.15%)	14 (36.85%)	38 (100%)

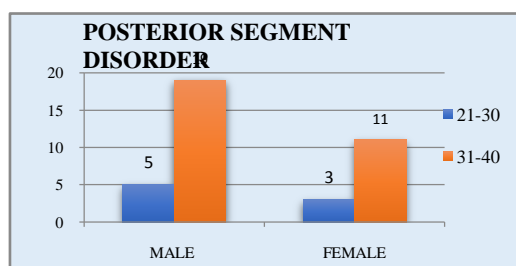


Table-5 Posterior segment disorder

ORBIT DISORDER			
AGE GROUPS	MALE	FEMALE	TOTAL
21-30	1 (8.33%)	2 (16.67%)	3 (25.0%)
31-40	6 (50.0%)	3 (25.0%)	9 (75.0%)
TOTAL	7 (58.33%)	5 (41.67%)	12 (100%)

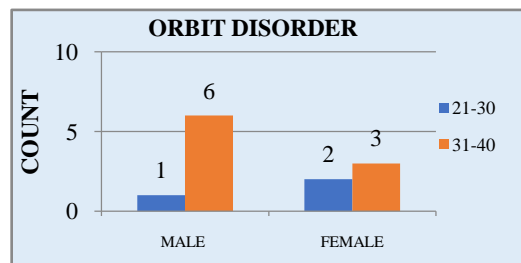


Table-6 Orbital disorder

Orbit disorders followed by Pthysis Bulbi and anaphthalmos etc. In the total count of 12 for the orbital disorder, 7 (58.33%) for male and 5 (41.67%) are for female. Male is dominating with the count of 7 (58.33%) with the prevalence of second age group of 31-40 years, on the count of 6 (50.0%). (Table-6)

OTHER DISORDER			
AGE GROUPS	MALE	FEMALE	TOTAL
21-30	1 (11.11%)	0	1 (11.11%)
31-40	5 (55.55%)	3 (33.33%)	8 (88.89%)
TOTAL	6 (66.67%)	3 (33.33%)	9 (100%)

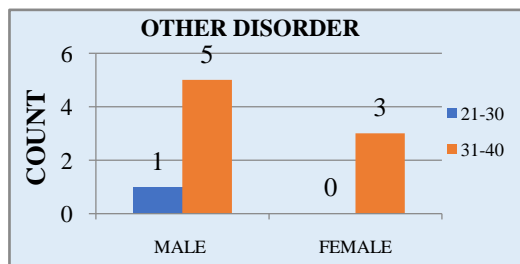


Table-7 Other disorder

The other disorder covers Glaucoma, Nystagmus, and uncorrected refractive errors. The observation is made on two different age groups for both the genders; there are 6 (66.67%) male and 3 (33.33%) female from a total of 9 subjects. Here the male is dominating, and the prevalence is for the age group of 31-40 years. (Table-7) Including the 10 cases are complicated, in the form of association with the other disorders of the eye. They are categorized in corneal disorder with the cataract are 3 (4.05%), cataract with the posterior segment disorder are 4 (5.40%), and cataract with posterior segment and others type of disorders are 3 (4.05%). (Table-8) Further based on gender under all the categories it is found that the corneal and cataract joint disorder 2 (20.0%) and cataract with posterior segment and others 2 (20.0%) for the male are dominating. (Table-9)

COMPLICATIONS		
CORNEAL DISORDER WTH CATARACT	CATARACT WITH POSTERIOR SEGMENT	CATARACT, POSTERIOR SEGMENT AND OTHERS
3 (4.05%)	4 (5.40 %)	3 (4.05%)

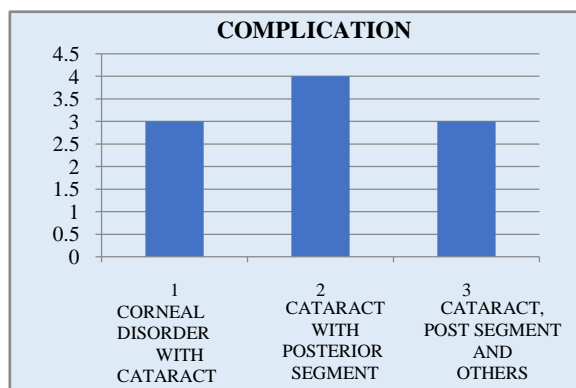


Table-8 Complications

COMPLICATIONS AGE GROUP 21-30					
CORNEAL DISORDER WTH CATARACT		CATARACT WITH POSTERIOR SEGMENT DISORDER		CATARACT, POSTERIOR SEGMENT AND OTHERS	
MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
1 (10.0 %)	0	0	0	0	0

COMPLICATIONS AGE GROUP 31-40					
CORNEAL DISORDER WTH CATARACT		CATARACT WITH POSTERIOR SEGMENT DISORDER		CATARACT, POSTERIOR SEGMENT AND OTHERS	
MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
2 (20.0 %)	0	2 (20.0 %)	2 (20.0 %)	2 (20.0 %)	1 (10.0 %)

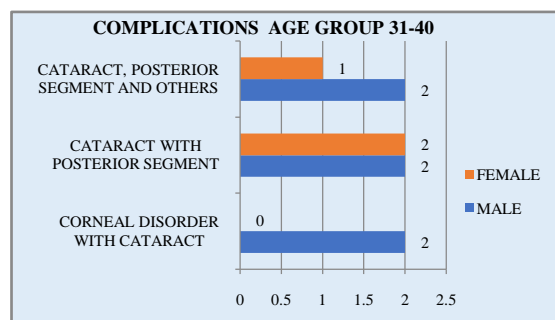
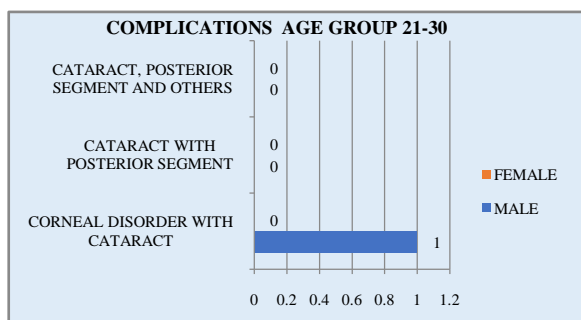


Table-9 Complications at different age groups

The visual impairment is considered fewer than three sub-categories depending on the visual output in the relation of appropriate treatment. The absolute cases conclude the mild status is entitled to those who have VA more than 6/60 in the affected eye; such subjects are 11 (14.86 %), the moderate having VA range greater than 3/60 to 6/60 and their count is 15 (20.28%). Finally, the Severe having VA range of 3/60 to PL + Ve, concludes 48 (64.86%) subjects.(Table-10)

VISUAL IMPAIRMENT		
CATEGORY	VISUAL ACUITY	COUNT
MILD	(>6/60)	11 (14.87%)
MODRATE	(>3/60 to 6/60)	15 (20.27%)
SEVERE	(PL +Ve to 3/60)	48 (64.86%)
TOTAL		74 (100%)

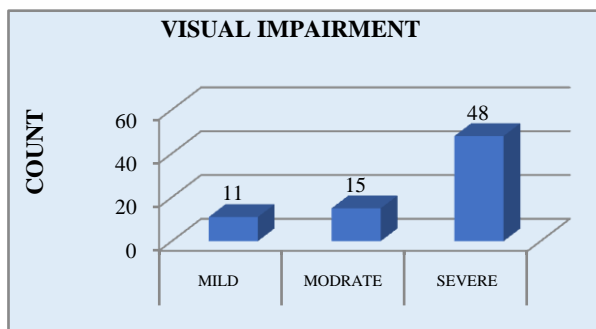
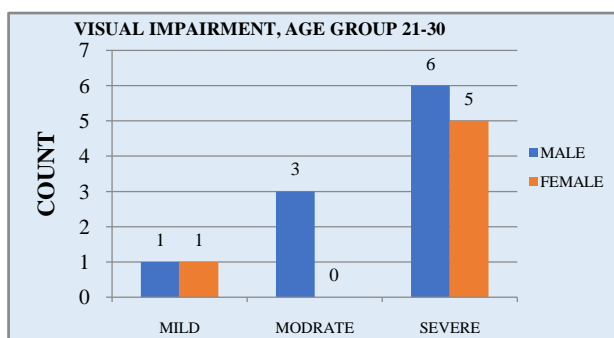


Table-10 Categories of visual impairment

Further, the analysis is subdivided into both the gender and both the age group. The age group of 21 to 30 years shows a total of 16 (21.62%) patient. Males are found much affected with the total count of 10 (13.51%), the dominating category is severe, having a count of 6 (8.11 %). The age group of 31 to 40 years has, 58 (78.38 %) patients. The dominance again goes towards the male 35 (47.30 %), and the severe category for the male is 24 (32.43 %).(Table-11)

VISUAL IMPAIRMENT, AGE GROUP 21-30			
	MALE	FEMALE	TOTAL
MILD	1 (1.35 %)	1 (1.35 %)	2 (2.70 %)
MODERATE	3 (4.05 %)	0	3 (4.05 %)
SEVERE	6 (8.11 %)	5 (6.76 %)	11 (14.86 %)
TOTAL	10 (13.51%)	6 (8.11 %)	16 (21.62 %)



VISUAL IMPAIRMENT, AGE GROUP 31-40			
	MALE	FEMALE	TOTAL
MILD	5 (6.77 %)	4 (5.41 %)	9 (12.18 %)
MODRATE	6 (8.10 %)	6 (8.10 %)	12 (16.20 %)
SEVERE	24 (32.43 %)	13 (17.57 %)	37 (50.0 %)
TOTAL	35 (47.30 %)	23 (31.08 %)	58 (78.38 %)

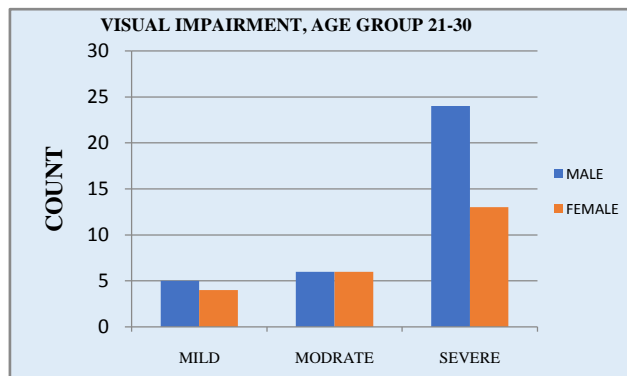


Table-11 Visual impairment at different age groups

The visual outcome after the appropriate treatment under different categories for male and female in both the age group is studied. The dominancy for the cornea related disorder is found for the mild order is achieved by the female, counting 3 (4.05 %). In contrast, moderate and severe visual impairment is achieved by the male, counting 4 (5.40 %) and 3 (4.05 %) for both the age groups, respectively. (Table-12)

CORNEAL RELATED DISORDER						
AGE GROUPS	MILD		MODRATE		SEVERE	
	MAL E	FEMALE	MAL E	FEMALE	MAL E	FEMALE
21-30	0	1 (1.35 %)	3 (4.05 %)	2 (2.70 %)	0	1 (1.35 %)
31-40	1 (1.35 %)	2 (2.70 %)	1 (1.35 %)	0	3 (4.05 %)	1 (1.35 %)
TOTAL	1 (1.35 %)	3 (4.05 %)	4 (5.40 %)	2 (2.70 %)	3 (4.05 %)	2 (2.70 %)
GRAND TOTAL	15 (20.27 %)					

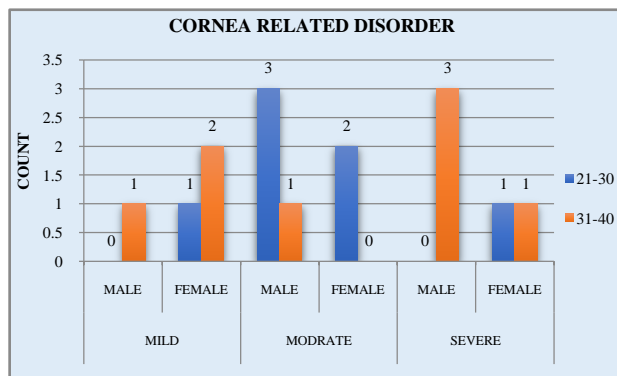


Table-12 Corneal related disorder

CATARACT RELATED DISORDER						
AGE GROUPS	MILD		MODRAT E		SEVERE	
	MAL E	FEMA LE	MAL E	FEMA LE	MAL E	FEMA LE
21-30	0	0	1 (1.35 %)	0	0	0
31-40	1 (1.35 %)	2 (2.70 %)	1 (1.35 %)	1 (1.35 %)	5 (6.76 %)	2 (2.70 %)
TOTAL	1 (1.35 %)	2 (2.70 %)	2 (2.70 %)	1 (1.35 %)	5 (6.76 %)	2 (2.70 %)
GRAN D TOTAL	13 (17.57 %)					

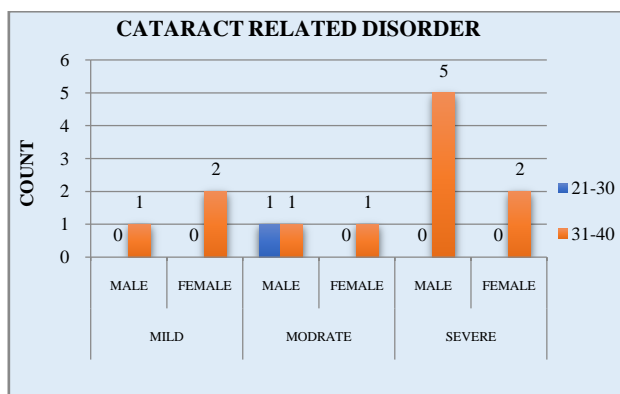
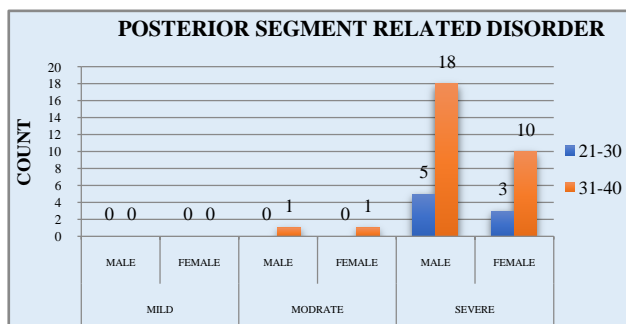


Table-13 cataract related disorder

The dominancy for the cataract related disorder is found for the severe visual impairment is achieved by the male counting 5 (6.76 %) for the age group of 31-40 years. For the posterior segment related disorder, the dominancy is observed for the severe category of male, total counting 23 (31.08 %) for 31-40 years of the age groups. (Table-13) ,(Table-14)

POSTERIOR SEGMENT RELATED DISORDER						
AGE GROUPS	MILD		MODERATE		SEVERE	
	MA LE	FEMA LE	MA LE	FEMA LE	MA LE	FEMA LE
21-30	0	0	0	0	5 (6.76 %)	3 (4.05 %)
31-40	0	0	1 (1.35 %)	1 (1.35 %)	18 (24.32 %)	10 (13.51 %)
TOTAL	0	0	1	1	23	13



L			(1.35 %)	(1.35 %)	(31.08 %)	(17.57 %)
GRAND TOTAL	38 (51.36 %)					

Table-14 Posterior Segment Disorder

ORBIT RELATED DISORDER						
AGE GROUPS	MILD		MODERATE		SEVERE	
	MAL E	FEMALE	MAL E	FEMALE	MAL E	FEMALE
21-30	1 (1.35 %)	0	0	0	0	1 (1.35 %)
31-40	2 (2.70 %)	1 (1.35 %)	3 (4.05 %)	2 (2.70 %)	1 (1.35 %)	1 (1.35 %)
TOTAL	3 (4.05 %)	1 (1.35 %)	3 (4.05 %)	2 (2.70 %)	1 (1.35 %)	2 (2.70 %)
GRAND TOTAL	12 (16.21 %)					

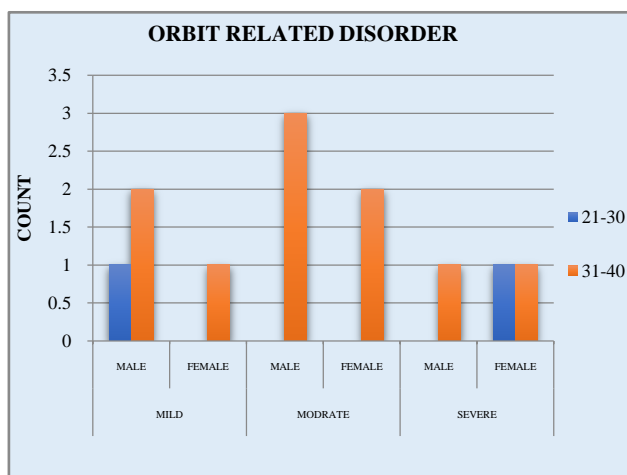


Table-15 orbit related disorder

The dominancy for the orbit related disorder is found for the mild and moderate category of visual impairment is achieved by the male counting 3 (4.05%) for both the age group.(Table-15)

OTHER DISORDER						
AGE GROUPS	MILD		MODERATE		SEVERE	
	MAL E	FEMALE	MAL E	FEMALE	MAL E	FEMALE
21-30	0	0	0	0	1 (1.35 %)	0
31-40	1 (1.35 %)	0	1 (1.35 %)	2 (2.70 %)	3 (4.05 %)	1 (1.35 %)
TOTAL	1 (1.35 %)	0	1 (1.35 %)	2 (2.70 %)	4 (5.40 %)	1 (1.35 %)
GRAND TOTAL	9 (12.16 %)					

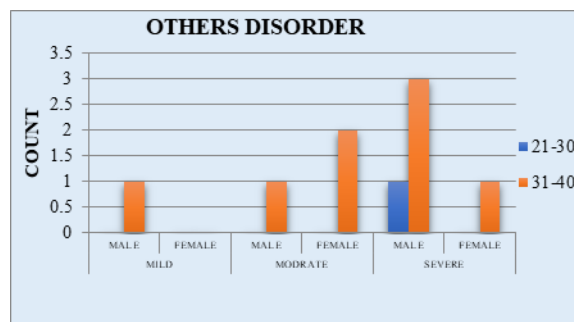


Table-16 Other disorder

The dominancy for the other category related disorder is found for the severe type of visual impairment is achieved by the total male counting 4 (5.40 %) for the age group of 31-40 years.

DISCUSSION AND CONCLUSION:

Visual impairment is itself a challenge to the issue bearer and how it can be solved a measure issue for optometrist and other eye care professionals. The significant disorders which make impaired vision are studied here, to make awareness over them. The 74 cases are screened in blind school and are studied under two subgroups of age; overall, there were 45 (60.81%) male and 29 (39.19%) female. All the samples are categorized for the reason of visual impairment as corneal disorder 15 (20.27 %) includes corneal scars, megalocornea, microcornea, Adherent Leucoma, Failed Graft, trauma etc., cataract related 13 (17.57 %) includes subluxation and drop of the nucleus, posterior segment related 38 (51.35 %) includes Posterior segment followed by retinal Pigmentosa, retinal degeneration, macular scar, Optic Atrophy, retinoblastoma etc., orbit related 12 (16.21 %) includes Pthisis Bulbi and anaphthalmos etc. and others related are 9 (12.16 %) includes Glaucoma, Nystagmus and uncorrected refractive errors. Besides it, 10 cases have concern either two or more categories of visual impairment. The count of corneal disorder with the cataract are 3 (4.05%), cataract with the posterior segment disorder are 4 (5.40%) and cataract with posterior segment and others type of disorders are 3 (4.05%). This study grossly shows posterior segment disorder in male 24 (63.15%) has more accountability for visual impairment. After the appropriate treatment, the visual output is considered fewer than three sub-categories the mild 11 (14.86%) status is defined as VA more than 6/60 in the affected eye, the moderate 15 (20.28%) having VA range between 3/60 to 6/60 and finally the Severe 48 (64.86%) having VA range of 3/60 to PL + Ve. Overall visual impairment in the age group of 21 to 30 shows 6 (8.11 %) cases prominent for male patients, and the second age group shows 24 (32.43 %) cases prominent

for male patients. So, the final important outcome for visual impairment is the posterior segment related issues, and the male is found more prone. For the visually impaired persons and their related centers should be under the protocol of the regular medical visit by the government. It is essential if the object is focused since birth for medical care or to overcome by the issue, otherwise in last, the process of rehabilitation should be mandatory for such objects. Although various NGOs and non-government agencies doing work in the same field, the output does not seem up to the mark. Further analysis needs to be conducted under these conditions to evaluate the extent of the problem and the resources needed to address the problem of these conditions^[23].

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