Section: Ophthalmology

Original Research Article

A CLINICAL STUDY OF CORNEAL BLINDNESS IN YOUNGER AGEGROUP ATTENDING "SADAREM"

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ABSTRACT

Background: Worldwide, blindness of the cornea (5.1%) is the fourth leading cause of blindness as per World Health Organization and one of the leading causes of visual deficiency after cataract, glaucoma, and age-related macular degeneration.

Trachomais one of the most common causes of corneal scarring and leads to blindness. Each year, in rural areas more than 350,000 children are born with or develop infections that cause corneal blindness at a young age.

Materials and Methods: This is an Observational & cross-sectional study. All patients below the age of 30 years with corneal opacities attending SADAREM camp in NTR district.

Results& Conclusion: The present study was done to know the corneal opacity among SADAREM attended patients, and from this study it can be concluded that males were more affected than females. Trauma was the main cause of vision loss, followed by congenital visual loss, and infections. Vitamin A deficiency, most easily preventable cause of blindness was also observed. People resided in rural areas had more corneal opacities than urban residents. Reason behind theseare high risk of ocular trauma for various reasons, negligence, and lack of awareness, delay in seeking treatment by rural people. Vitamin A deficiency is easily preventable by doing regular school health checkups, and supplementing Vitamin 'A' and its deficiency can be treated with therapeutic doses of Vitamin 'A'.

Keywords: SADAREM, Corneal blindness, corneal opacities, Trauma, Vit A deficiency, Trachoma, congenital visual loss, Chemical injury.

INTRODUCTION

Aims and objectives: To study the prevalence and clinical profile of corneal blindness in younger age group attending "SADAREM" (Software for assessment of disabled for access rehabilitation and empowerment).

Definition:WHO definition of blindness: Best corrected visual acuity of 3/60 or worse in the better eye.

Category of Visual Impairment	Best Corrected Visual Acuity (BCVA) In The Better Eye
O 'Normal'	6/6 to 6/18, i.e. can see 6/18 or better
1 ' Visual Impairment	<6/18 to 6/60, i.e. cannot see 6/18, can see 6/60
2 ' Severe Visual impairment	<6/60 to3/60, i.e. cannot see 6/60, can see 3/60
3 'Blind'	<3/60 to 1/60, i.e. cannot see 3/60, can see 1/60
4. 'Blind'	<1/60 to only light perception, i.e. cannot see 3/60, can see light
5.'Blind'	No light perception, i.e. cannot see light
9 'Undetermined or unspecified'	

Adapted from International Statistical Classification of Diseases and Related Health problems, tenth version. Geneva, World Health Organization, 1992.

Corneal Blindness: The cornea, the eye's outermost layer, is extremely sensitive. It is nourished by tears and aqueous humour, and it has to be transparent to refract light. Severe vision loss and blindness can

occur as a result of corneal scarring because of various infectious and inflammatory diseases.

Worldwide, blindness of the cornea (5.1%) is the fourth leading cause of blindness as per World Health Organization and one of the leading causes of visual deficiency after cataract, glaucoma, and age-related macular degeneration.

Trachoma is one of the most common causes of corneal scarring and leads to blindness

Each year, in rural areas more than 350,000 children are born with or develop infections that cause corneal blindness at a young age.

Causes:

- Vitamin A deficiency
- The aftereffects of bacterial, fungal, or viral infections
- Eye trauma
- Congenital disease
- Traditional medicine or home remedies, which often harm the eye rather than relieve pain or improve eyesight.

Review of Literature

Layers of cornea: The cornea is composed of six layers. Those are

1. Epithelium,
2. The Bowmans membrane
3. Stroma
4. The Predescemet membrane called Dua's layer
5. The Descemets membrane
6. Endothelium.

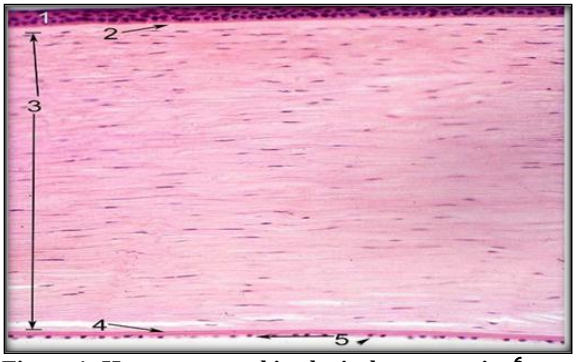


Figure 1: Human cornea histological cross-section[6]

(1) Epithelium. (2) Bowman's layer. (3) Stroma. (4) Descemet's membrane.

Transparency of cornea:

- Anatomical factors:
- Arrangement of stromal lamellae:

Maurice lattice theory

- ➢ Regularly arranges collagenous fibrils in lattice.
- ➢ Less diameter(275-300A)
- ➢ Separated by less than a wave length of light(4000-7000A)

- Physiological factors:

State of relative dehydration

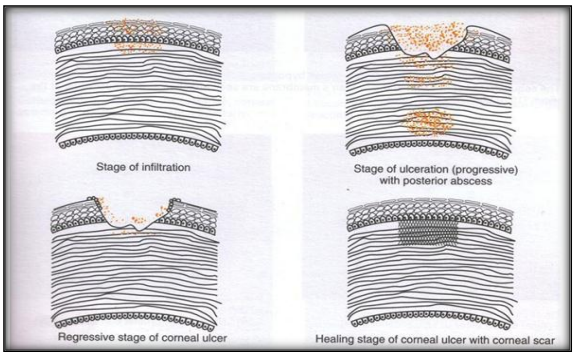
- ➢ Evaporation of H2O from cornea

- Hypertonic tear film (TF) draws H2O from cornea
- By increases in osmolarity

Corneal ulcer: This condition is characterized by stromal infiltration and corneal epithelial loss.

Stages of corneal ulcer:

1. Stage of infiltration
2. Stage of active ulceration
3. Stage of regression
4. Stage of cicatrisation



MATERIALS AND METHODS

Study design: Observational and cross sectional.

Source of the data: All patients with corneal opacity, attending to SADAREM camp in NTR district.

Sample Size: 100

Inclusion criteria:

1. Patients below the age of 30 years.
2. Patients with any type of corneal blindness.
3. Patients willing to participate.

Exclusion criteria:

1. Patients above the age of 30 years.
2. Patients associated with other ocular conditions like Nystagmus, other congenital anomalies and retinal diseases.

Method of study: An observational and cross-sectional study was conducted. All patients' undergone clinical examination and all ophthalmic investigations required, incidence and prevalence of corneal blindness in younger population noted. Informed consent was taken from the patients. Institutional ethics committee approval was taken. The baseline data was collected using a pre-structured case proforma. Complete clinical and ophthalmic examination was done. Essential routine investigations as required was done.

Investigations:

- Routine eye examination with slit lamp bio-microscopy
- Keratometry
- A-scan
- B-scan ultrasound
- Fundus examination.
- Anterior segment Optical Coherence Tomography.

RESULTS

The present study was conducted with 100 cases in Government General Hospital, Vijayawada on the patients with corneal opacity attending to "SADAREM" camp in NTR district.

Table 1: Age distribution (in years):

Age distribution (in years)	Frequency	Percentage
11-15	21	21
16-20	27	27
21-25	22	22
26-30	30	30
Total	100	100

In the present study, majority of the patients were in the age group of 26-30 years (30%), followed by 16-20 years (27%), 21-25 years (22%), and 11-15 years (21%). Mean age of the cases was 21.17±5.7 years.

Table 2: Gender distribution

Gender	Frequency	Percentage
Male	52	52
Female	48	48
Total	100	100

In this study, males were 52% and females were 48%.

Table 3: Residence:

Residence	Frequency	Percentage
Rural	64	64
Urban	36	36
Total	100	100

Most of the cases were from rural areas (64%), and remaining was from urban (36%).

Table 4: Cause of corneal opacity

Cause of corneal opacity	Frequency	Percentage
Trauma	76	76
Congenital	7	7
Infection	7	7
Chemical injury	4	4
Birth injury	3	3
Dystrophy	1	1
Vitamin A deficiency	1	1
Burns	1	1
Total	100	100

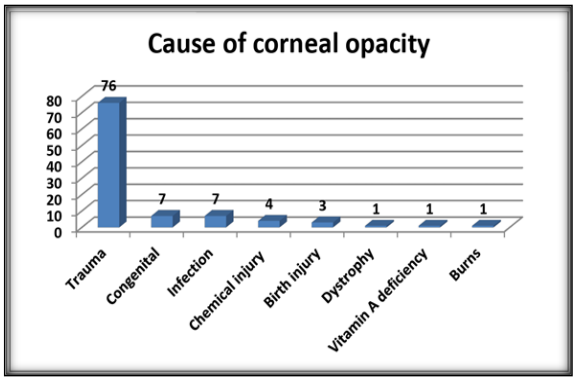


Figure 2: Cause of corneal opacity

In this study, regarding cause of corneal opacity, majority had trauma (76%) as a cause, followed by congenital etiology and infection in 7% of cases, chemical injury in 4% of cases, birth injury in 3% of cases, and dystrophy, vitamin A deficiency, and burns were cause in each 1% of cases.

Table 5: Right eye visual acuity

Right eye visual acuity	Frequency	Percentage
Totally blind	59	59
Low vision	12	12
Normal	29	29
Total	100	100

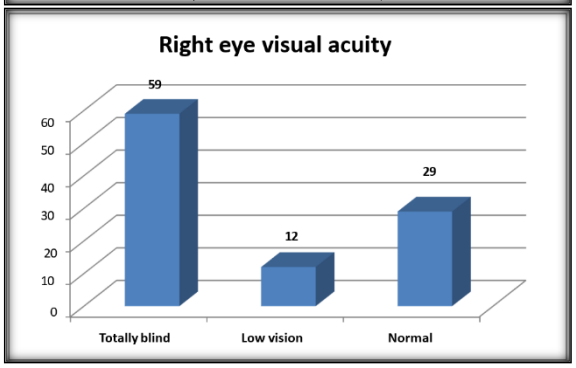


Figure 3: Right Eye Visual acuity

Regarding right eye visual acuity, among 59% of cases right eye was totally blind, in 12% of cases low vision was noticed, and only in 29% of cases right eye was normal.

Table 6: Severity of Blindness in Right Eye

Severity of blindness in right eye	Frequency	Percentage
Moderately visually impaired	6	6
Severely visually impaired	6	6
Legally blind	21	21
Totally blind	38	38
Normal vision	29	29
Total	100	100

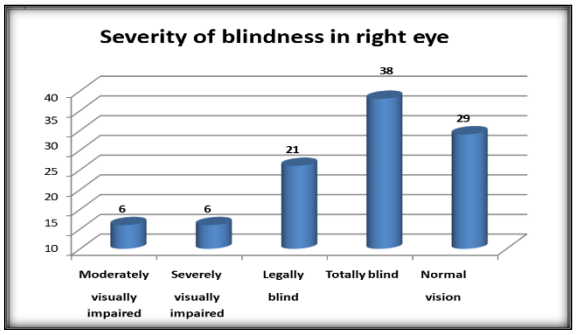


Figure 4: Severity of blindness in right eye

Regarding severity of blindness in right eye, each 6% of cases were moderately visually impaired, and severely visually impaired, 21% of cases were legally blind, 38% of cases were totally blind, and only 29% of cases had normal vision in the right eye.

Table 7: Left Eye Visual Acuity

Left eye visual acuity	Frequency	Percentage
Totally blind	50	50
Low vision	8	8
Normal	42	42
Total	100	100

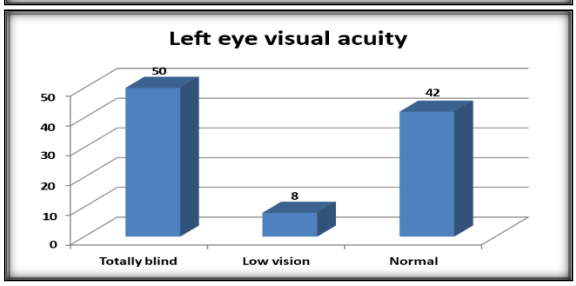


Figure 5: Left Eye Visual Acuity

Regarding visual acuity in left eye, 50% of cases had left eye total blindness, 8% of cases had low vision, and 42% of cases had normal vision.

Table 8: Severity of blindness in left eye

Severity of blindness in left eye	Frequency	Percentage
Moderately visually impaired	5	5
Severely visually impaired	3	3
Legally blind	17	17
Totally blind	33	33
Normal	42	42
Total	100	100

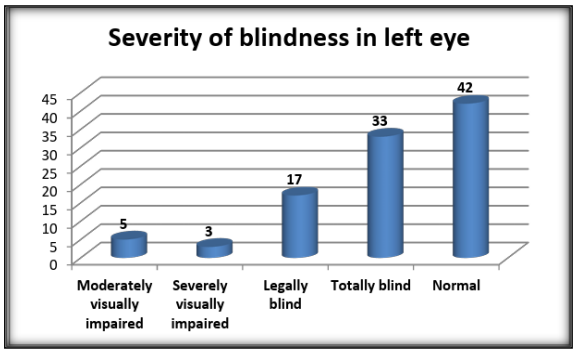


Figure 6: Severity of blindness in left eye

Regarding severity of blindness in left eye, 5% of cases were moderately visually impaired, 3% of cases were severely visually impaired, 17% of cases were legally blind, 33% of cases were totally blind, and 42% of cases had normal vision.

Table 9: Right eye posterior segment changes in B scan

Right eye posterior segment changes in B scan	Frequency	Percentage
Shrunken eyeball with calcified walls	2	2
Vitreous echogenicities	2	2
Total leucomatous corneal opacity	1	1
Normal	95	95
Total	100	100

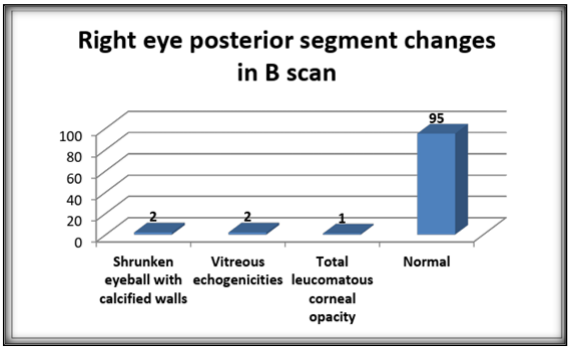


Figure 7: Right eye posterior segment changes in B scan

Regarding right eye posterior segment changes in B scan, shrunken eyeball with calcified walls, and vitreous echogenicities were seen in 2% of cases, total leucomatous corneal opacity was observed in 1% of cases, and normal vision was noticed in 95% of cases.

Table 10: Left eye posterior segment changes in B scan

Left eye posterior segment changes in B scan	Frequency	Percentage
Retinal detachment	6	6
Shrunken eyeball with calcified walls	2	2
Vitreous echogenicities	3	3
Normal	89	89
Total	100	100

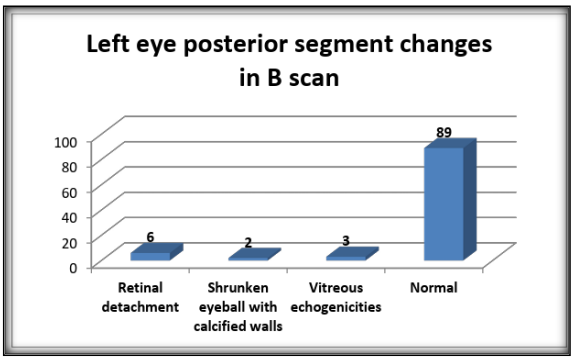


Figure 8: Left eye posterior segment changes in B scan

Regarding left eye posterior segment changes in B scan, Retinal detachment was observed in each 6% of cases, shrunken eye ball with calcified walls was seen in 2% of cases, vitreous echogenicities was seen in3% of cases, and normal vision was noticed in 89% of cases.

DISCUSSION

The present study was conducted with 100 cases in Government General Hospital, Vijayawada, on the patients with corneal opacity attending to SADAREM camp in NTR district.[1-4]

Age distribution (in years): In the present study, majority of the patients were in the age group of 26-30 years (30%), followed by 16-20 years (27%), 21-25 years (22%), and 11-15 years (21%). Mean age of the cases was 21.17±5.7 years.[5-7]

Cause of vision loss: In this study, regarding vision loss, majority had trauma (76%) as a cause, followed by congenital visual loss, and infection in each 7% of cases, chemical injury in 4% of cases, birth injury in 3% of cases, and dystrophy, vitamin A deficiency, and burns were cause in each 1% of cases.[8-11]

1) Trauma: In this study, trauma was the cause for vision loss in 76% of cases,

2) Congenital visual loss: In the present study, congenital visual loss was the cause of blindness in 7% of cases.

3) Dystrophy: Dystrophy was present in 1% of cases in this study,

4) Vitamin A deficiency: In the present study, vitamin A deficiency was seen in this study.

5) Chemical injury: In this study, chemical injury was seen in 4% of cases.

6) Right eye visual acuity: Regarding right eye visual acuity, among 59% of cases right eye was totally blind, in 12% of cases low vision was noticed, and only in 29% of cases right eye was normal.

In this study, 72% of cases right eye was affected.

7) Left eye visual acuity: Regarding visual acuity in left eye, 50% of cases had left eye total blindness, 8% of cases had low vision, and 42% of cases had normal vision.

In this study, 59% of cases left eye was affected,

Severity of blindness: Regarding severity of blindness in right eye, each 6% of cases were moderately visually impaired, and severely visually impaired, 21% of cases were legally blind, 38% of cases were totally blind, and only 29% of cases had normal vision in the right eye.

Regarding severity of blindness in left eye, 5% of cases were moderately visually impaired, 3% of cases were severely visually impaired, 17% of cases were legally blind, 33% of cases were totally blind, and 42% of cases had normal vision.[12-16]

Right eye posterior segment changes in B scan: Regarding right eye posterior segment changes in B scan, shrunken eyeball with calcified walls, and vitreous echogenicities were seen in 2% of cases, total leucomatous corneal opacity was observed in 1% of cases, and normal vision was noticed in 95% of cases.[17-19]

Left eye posterior segment changes in B scan: Regarding left eye posterior segment changes in B scan, Retinal detachment was observed in each 6% of cases, shrunken eye ball with calcified walls was seen in 2% of cases, vitreous echogenicities was seen in3% of cases, and normal vision was noticed in 89% of cases.[20,21]

Table 11: Posterior segment changes in B scan comparison

	Posterior segment changes in B scan	
	Right eye	Left eye
Shrunken eyeball with calcified walls	2%	2%
Retinal detachment	0%	6%
Vitreous echogenicities	2%	3%
Total leucomatous corneal opacity	1%	0%
Normal vision	95%	89%

CONCLUSION

In the present study, 30% of cases were in the age group of 26-30 years, followed by 16-20 years (27%), 21-25 years (22%), and 11-15 years (21%).

Mean age of the cases was 21.17±5.7 years.

With 52% of males affected, male preponderance was noted.

In this study, 64% of the cases were from rural area, and 36% were from urban areas.

Regarding vision loss, majority had trauma (76%) as a cause, followed by congenital visual loss (7%), and infection (7%), chemical injury in 4% of cases, birth injury in 3% of cases, and dystrophy, vitamin A deficiency, and burns were cause in each 1% of cases.

Regarding right eye visual acuity, among 59% of cases right eye was totally blind, in 12% of cases low vision was noticed, and only in 29% of cases right eye was normal.

Regarding visual acuity in left eye, 50% of cases had left eye total blindness, 8% of cases had low vision, and 42% of cases had normal vision.

Regarding severity of blindness in right eye, each 6% of cases were moderately visually impaired, and severely visually impaired, 21% of cases were legally blind, 38% of cases were totally blind, and only 29% of cases had normal vision in the right eye.

Regarding severity of blindness in left eye, 5% of cases were moderately visually impaired, 3% of cases were severely visually impaired, 17% of cases were legally blind, 33% of cases were totally blind, and 42% of cases had normal vision.

Regarding right eye posterior segment changes in B scan, shrunken eyeball with calcified walls, and vitreous echogenicities were seen in 2% of cases,

total leucomatous corneal opacity was observed in 1% of cases, and normal vision was noticed in 95% of cases.

Regarding left eye posterior segment changes in B scan, Retinal detachment was observed in each 6% of cases, shrunken eye ball with calcified walls was seen in 2% of cases, vitreous echogenicities was seen in 3% of cases, and normal vision was noticed in 89% of cases.

The present study was done to know the corneal opacity among SADAREM attended patients, and from this study it can be concluded that males were more 76 affected than females. Trauma was the main cause of vision loss, followed by congenital visual loss, and infections. Vitamin A deficiency, most easily preventable cause of blindness was also observed. People resided in rural areas had more corneal opacities than urban residents. Reason behind these are high risk of ocular trauma for various reasons, negligence, and lack of awareness, delay in seeking treatment by rural people. Vitamin A deficiency is easily preventable by doing regular school health checkups, and supplementing Vitamin 'A' and its deficiency can be treated with therapeutic doses of Vitamin 'A'. From this study it is recommended that integrated approach is required to deal with corneal opacities.

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