Original Article

To Estimate Prevalence and Risk Factors of Corneal Blindness among Patients visiting a District Hospital in Southern Andhra Pradesh: A Cross Sectional Study -A Note on Prevention Strategies

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ABSTRACT

Background: After the cataract, corneal blindness is considered as second leading cause of blindness in most of the developing countries of the world population. It is estimated that 4.92 million people suffer with corneal blindness worldwide who could be restored vision through corneal transplant surgeries.

Aim and Objectives: 1). To estimate the prevalence of corneal blindness among patients visiting outpatient department of a district level teaching hospital in southern Andhra Pradesh. 2).To determine the demographic& clinical factors associated with corneal blindness among outpatients visiting the hospital.

Materials and Methods: This is a hospital based descriptive cross sectional study conducted in a district level teaching hospital in southern Andhra Pradesh for about 8 months. This includes patients from both rural& urban areas with all age groups. After screening for visual acuity, anterior segment examination and fundoscopy findings, related factors of corneal blindness of age, gender, and occupation are considered.

Results: The most frequent causes of unilateral corneal blindness includes childhood keratitis (26.7%), trauma (18.6%), keratitis during adulthood (15.75%). The most vulnerable group is older age people occupied in agriculture & outdoor work. Bilateral corneal blindness is more common in rural people. In most cases trauma is the cause of unilateral corneal blindness where as infective & immunological reactions leads to bilateral corneal blindness.

Conclusion: About 94% of all causes of corneal blindness was due to avoidable factors. Improvement of eye health promotion strategies and rising awareness about the causes and prevention methods regarding corneal blindness is a great concern.

Keywords: Trauma, keratitis, xerophthlmia, keratoplasty, optical rehabilitation

INTRODUCTION

Corneal blindness is considered as one of the major public health problem in developing countries after cataract and Glaucoma.[1, 2] In India there is an annual incidence of around 30,000 cases every year.[3] According to world health organization, corneal diseases are major causes of vision loss in the world.[4]

MATERIALS AND METHODS

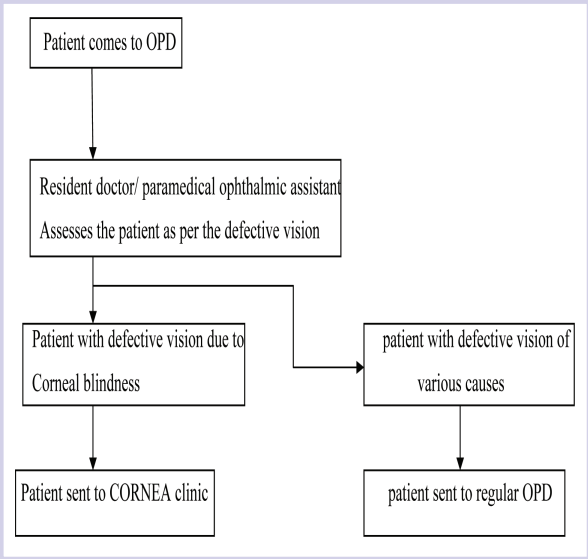
This study designed as a hospital based cross sectional study over a period of 8 months conducted in a district level hospital in the state of Andhra Pradesh and caters patients from all over the district population of 21, 05,927 including rural and urban areas.

On an average, ophthalmology OPD receives 150 patients per day and about 30 inpatients with various causes of blindness. All the eligible patients with corneal blindness including children who attend the OPD of the district hospital are included in the data collection throughout the week.

Corneal blindness was considered to have visual acuity in that eye was less than 20/200 as a result of corneal disease. The corneal disease were defined based on history and clinical examination of slit lamp anterior segment evaluvation. If corneal disease is coexisting with any other disorder causing blindness in one eye and cure of that disorder can restore vision, the cause of blindness was considered due to corneal blindness.

DATA COLLECTION PROCEDURE

Figure 1: Data collection procedure



Quality Assurance

Those involved in data collection / entry are well trained qualified personnel. The interview process is standardized by training all those who are involved in data collection/ entry with the help of a question by question guide. All clinical examinations done by standard and calibrated instruments.

Bias and Limitations

A certain level of selection bias will operate in the study due to convenient sampling and hospital based nature of the study.

Following data collection, we examined this bias by comparing the socio-demographic characteristics with that of the general population and the distribution of other clinically relevant variables.

Benefits to Participants

No monetary benefit is given to the participants. If they are diagnosed to have corneal blindness, they are facilitated with appropriate treatment in the referral hospitals.

Table 1: Time line of the study

Activities	Months									
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Literature review										
Protocol development										
Data collection										
Data entry and analysis										
Report writing										

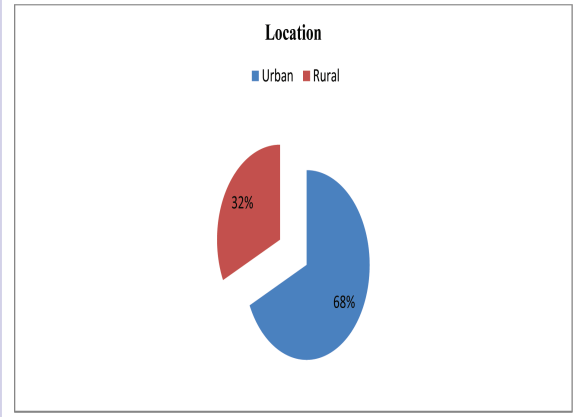


Figure 2: Location

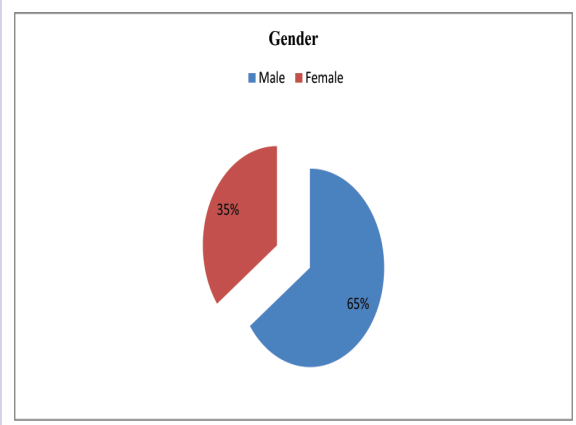


Figure 3: Gender

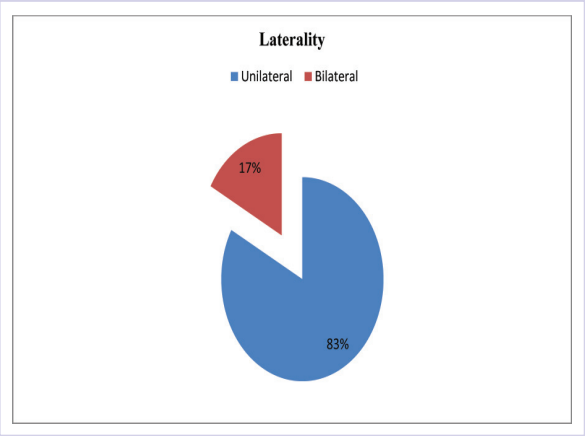


Figure 4: Laterality

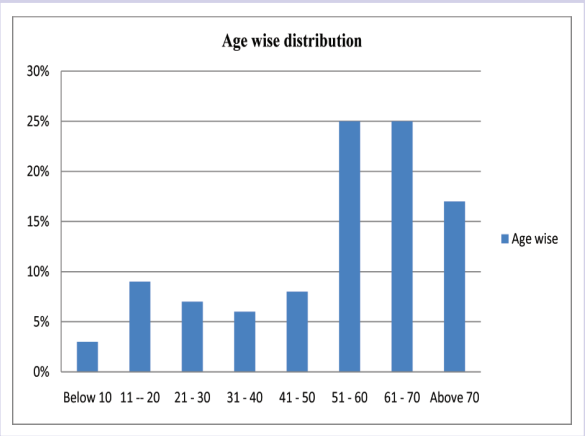


Figure 5: Age wise distribution

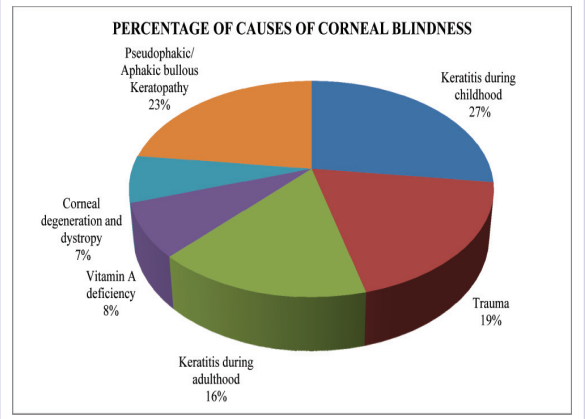


Figure 6: Percentage of causes of corneal blindness

Table 2: Percentage of causes of corneal blindness

Sl. No	Causes of Corneal blindness	Per-centage	Num-bers
1	Keratitis during childhood	27%	134
2	Trauma	19%	93
3	Keratitis during adulthood	16%	79
4	Vitamin A deficiency	8%	41
5	Corneal degeneration and dystrophy	7%	37
6	Pseudophakic/ Aphakic bullous keratopathy	23%	117
	Total	100%	500

DISCUSSION

In our study, the major contributors of corneal blindness are found to be Trauma & Infections. More over bilateral corneal blindness corresponded to infections due to exanthematous fevers in childhood. In preschool children, incomplete immunization is major culprit associated with microbial keratitis. Agricultural labourers with poor education status are found with exposed risk of unilateral corneal blindness. Urban participants who are exposed to industrial work apt to suffer from trauma, which leads to unilateral corneal blindness. Especially rural participants with low socioeconomic status and with increasing age are more susceptible to infectious keratitis leading to bilateral corneal blindness.

Major risk factors of corneal blindness in children:

In paediatric population, keratitis was the major cause of corneal blindness. Another important predisposing factor being malnourishment leading to vitamin A deficiency with xerophthalmia. Apart from infectious keratitis, ocular trauma with corneal scars contributes significantly to paediatric ocular morbidity. Other congenital causes include hereditary dystrophies, congenital glaucoma, peters anomaly, other mesenchymal dysgenesis, birth trauma and metabolic disorders.[5]

Major risk factors of corneal blindness in adults:

1. Trauma:

Trauma is recognized as major significant cause of unilateral blindness in adults. Up to 6.2% of all bilateral corneal blind cases is due to corneo-scleral perforation involving direct trauma. Males are supposed to have a higher chance of suffering ocular trauma compared to females. Work place injuries played a major role in direct ocular trauma in urban population where wearing of the protective gear is neglected. It was identified that in 70.88% of patients corneal injury is the predisposing factor of infectious keratitis and in Agricultural labourers 70% of corneal ulceration is due to trauma with organic matter.[6]

In younger age groups, chemical injuries with acids and alkalis played a major role in corneal blindness. In our study 18 out of 52 patients had bilateral injuries and 45% of them had severe grade of burns due to occupational exposure.

Trauma with penetrating injuries is an important cause of acquired corneal scarring in all children suffering with unilateral corneal blindness. In our study most common cause being wooden arrows/ sticks (15.2%) followed by household appliances (14.3%).

2. Infectious Keratitis

Agricultural based activities or laborers involved in agricultural work were 1.33 times greater risk of developing microbial keratitis.[7] Patients with ocular trauma were 5.33 times more prone to infectious keratitis. In most of the traumatic cases involving organic matter at wound site is the major risk factor of infectious keratitis. Although Trachoma is a rare manifestation in our district, malnourishment with underlying chronic metabolic disorders are major risk factors in development of microbial keratitis after minimal traumatic exposure in adult population Diabetes mellitus with poor control of blood sugar levels, chronic steroid exposure and gross malnourishment are found to be the associated factors in most of the adults with infectitious keratitis.[8]

3. Vitamin a Deficiency

Compared to urban localities, in rural population Vitamin A deficiency disorders with associated malnutrition & Measles are 20% more in occurance leading to xerophthalmia in children. Out of childhood blindness corneal disorders account for 17%, half of (8.5%) which attributed to Vitamin A deficiency. An urban-rural gradient varying from 8% to 27% observed regarding to this magnitude. More association of xerophthalmia is observed with measles epidemics.

4. Bullous Keratopathy

With an increase in cataract surgical rate and intraocular lens implantation in view of reducing avoidable blindness, there is a rise in cases of pseudophakic bullous keratopathy which depends mostly on surgical technique used for cataract extraction. In cases of corneal edema due to cataract surgery, Aphakic bullous keratopathy due to vitreous loss accounts for (7.27%) compared to pseudophakic bullous keratopathy (6.18%).

5. Congenital Corneal Dystrophies

These are heterogenous group of inherited corneal disorders causing corneal blindness. The main disorders encountered are Macular corneal dystrophy, congenital hereditary endothelial dystrophy, Lattice dystrophy & Fuchs dystrophy.

Prevention strategies

As nearly 80% of all corneal blindness is avoidable, prevention strategies play a major role in marked improvement of life expectancy in corneal blind population.[9]

1. Primary eye care Health Programmes for Prevention of Xerophthalmia

Primary prevention programmes are employed in conditions like Vitamin A deficiency, by proper immunization methods & Vitamin A supplementation, by community health providers. Particularly attention should be paid to most vulnerable children at risk due to malnutrition. Regular follow up of these cases with family education and vitamin A fortification is mandatory.

2. Prevention strategies for Ophthalmia Neonatorum

Regular Antenatal check- ups of pregnant mothers with encouraging hospital deliveries is the primary step. Screening of sexually transmitted diseases with appropriate treatment, Identification with early diagnosis of cases & ocular prophylaxis with antibiotics will reduce the risk of ophthalmia neonatorum in neonates.

3. Prevention of trauma at work places

Work place injuries can be prevented by following safety precautions like wearing of protective eye glasses in factories. When exposed to chemical injuries at work places, proper guidelines of thorough eye wash and first aid measures with reference to an ophthalmologist should be employed. Community health workers at village level can educate people working in agricultural farms & outdoor work about the consequences regarding vegetative eye trauma and importance of early reference to an ophthalmologist.

4. Prevention of usage of self traditional eye medicines

As Traditional eye medicines can directly harm the eye due to their toxic effects and indirectly by acting like culture media facilitating the growth of microbes at the site of eye injury. Contamination caused due to the usage of traditional medicines following trauma eventually lead to delay in proper therapy. Hence health education plays a major role in creating awareness regarding the necessity of proper effective treatment following eye trauma.[10]

5. Role of eye banks and cornea donation programmes

Optical rehabilitation & corneal transplantations are feasible only by upgrading the facilities and infrastructure of Eye banks.[11] Various community health awareness programmes should be linked with awareness and

importance of Eye Donation.[12, 13] Hospital corneal retrieval programme is implemented at all community level hospitals to meet the demand for corneal tissue for transplant surgeries. Ophthalmologists in District level hospitals need to be trained in penetrating keratoplasty procedures. Tertiary eye care hospitals are utilized for lamellar keratoplasty procedures for potential visual outcomes, reduced number of follow ups and less suture related and steroid related complications.

CONFLICT OF INTEREST:

The authors declared no conflict of interest.

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