

ORIGINAL ARTICLE

A Hospital Based Clinical Study on Corneal Blindness in a Tertiary Eye Care Centre in North Telangana

Raghu Veladanda^{1*}, Sindhu Sulekha Ch¹, Laxmipriya Pallapolu¹, Charul Singh¹, Vasavi Desaraju¹

¹Department of Ophthalmology, Chalmeda Anand Rao Institute of Medical Sciences,

Karimnagar-505405 (Telangana) India

Abstract:

Background: Worldwide there are nearly 2.7 million blind people due to corneal disease which is a major causes of blindness in the world today and remains second only to cataract. **Aim & Objective:** The present hospital based retrospective study was undertaken to estimate the prevalence of corneal blindness in patients attending tertiary eye care center in Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar. **Material and Methods:** A hospital based study was conducted over a period of 1 year from August 2014 to August 2015. Participants were patients attending outpatient department of Chalmeda Anand Rao Institute of Medical Sciences. Detailed history was taken and comprehensive ocular examination including Snellens E-chart for visual acuity, slit lamp bio microscopy, contact tonometry, posterior segment evaluation through B-scan and dilated retinal evaluation when indicated was performed at outpatient department. **Results:** Overall, 33,566 patients were examined. Proportion of corneal blindness was 3.9% (CI-95% 3.6% - 4.3%). The proportion increased with age in elderly patients (5.7%) and was higher among the females (5.2%) compared to males (2.8%). The most common cause of corneal blindness in our study was ocular trauma which was 59.5%. **Conclusion:** The study findings demonstrate that currently ocular trauma, corneal ulceration, infectious keratitis, post-surgical bullous keratopathy, and corneal degenerations are responsible for the major burden of corneal blindness among the patients attending outpatient department.

Keywords: Cornea, Prevalence, Blindness, Hospital based study

Introduction:

Corneal blindness, including corneal opacity and trachoma, contributes to 7% of the blindness burden globally [1, 2]. This translates to nearly 2.7 million blind people worldwide due to corneal diseases [2]. The global burden of corneal blindness is concentrated in emerging and developing countries. The major causes of corneal blindness include corneal ulceration, ocular trauma, trachoma, bullous keratopathy, corneal degenerations and vitamin A deficiency. It has been reported that nearly 90% of the global cases of ocular trauma and corneal ulceration leading to corneal blindness occur in developing countries [3]. Being a developing country with a predominantly rural population, India faces a significant challenge in eliminating corneal blindness. A meta-analysis of various population-based blindness studies conducted in India demonstrated that the prevalence of corneal blindness has been 0.45% (95% CI 0.27% to 0.64%) in adults [4]. Corneal blindness differs from other causes of blindness especially from cataract because it is preventable and curable to a large extent. The corneal disease as a major causes of blindness in the world today is important and remains second only to cataract. The prevalence of corneal blindness varies from country to country and even from one population to another, depending on many factors such as availability, general standards of eye care and use of traditional

eye medicines. This study is to evaluate the prevalence of corneal blindness among patients attending Outpatient Department (OPD) from rural areas in the districts of Karimnagar, Nizamabad, Warangal and Adilabad.

Material and Methods:

This was a hospital based observational study conducted on patients attending OPD of Chalmeda Anand Rao Institute of Medical Sciences, from August 2014 to August 2015. A total of 33,566 patients between the age group of 20-70 years were examined. Paediatric patients and patients with diabetes mellitus, hypertension were excluded. The study protocol received ethical approval from the Institutional Ethics Committee, Chalmeda Anand Rao Institute of Medical Sciences in July 2014. Written and informed consent for examination was obtained from all the OPD patients. The comprehensive ocular examination of patients included visual acuity estimation with the Snellen E chart for distance and near, non-cycloplegic refraction and prescription, contact tonometry, lens examination and cataract assessment by the Lens Opacity Classification System III, slit lamp biomicroscopy with fluorescein staining, and detailed retinal evaluation. In the present study, blindness was defined as visual acuity $<6/60$ in the better eye with available correction. Quality assurance and standardisation of all study procedures and equipment was maintained throughout the period of the study. The items of ophthalmic equipment were calibrated and standardised at regular intervals. Any potential observer or measurement bias was thus reduced.

Statistical Analysis:

Qualitative data has been described as number (%) and quantitative data has been described as mean \pm SD and median (range) as appropriate.

The multivariable logistic regression analysis was done to find the association between socio demographic factors and the presence of corneal blindness. The results for the same were reported as OR (95% CI).

Results:

The total OPD patients during the study period were 35786, out of these 33566 completed initial screening procedures including visual acuity and slit lamp examination with a coverage of 93.7%. The synopsis of the study has been summarized in the table below. (Table 1)

Socio-demographic Profile:

The age and gender distribution of the enumerated and the covered population was similar and it matched the national demographic profile of the Indian population. Although 6.3% of the sample population could not be covered, the enumerated population and the covered population had comparable socio-demographic characteristics. Males comprised 55% of the study population.

Magnitude of Corneal Blindness:

During this study 1341 patients were detected with corneal pathology and on comprehensive ocular examination 1309 patients (97.6%) were found to be blind exclusively due to corneal pathology. The magnitude of corneal blindness in this study was 3.9% (95% CI 3.6% - 4.3%) including both unilateral and bilateral cases. The magnitude of bilateral cases was 1.02% and that of unilateral blindness was 2.9%. The magnitude increased with age and was highest for elderly patients (5.7%). The magnitude of corneal blindness was higher among females (5.2%) compared to males (2.8%), the difference being statistically significant. With multivariate analysis, the odds of having corneal blindness increased with age and decreasing literacy status, and were higher for females in Fig.1 and unemployed participants.

Table 1: Socio-demographic Factors

Socio-demographic Factors	N=33566	N=1309	Proportion of corneal blindness
	Total patients screened	Patients with corneal blindness	
Age (years)			
20-39	8391	103	1.2
40-59	11691	424	3.6
>60	13484	782	5.7
Gender			
Male	18461	523	2.8
Female	15105	786	5.2
Education			
Up to Primary	20139	986	4.9
Above Primary	13427	323	2.4
Occupation			
Housework	2349	78	3.3
Agricultural work	18462	654	3.5
Non-Agricultural work	5035	157	3.1
Not working	6713	394	5.8
Students	1007	26	2.5

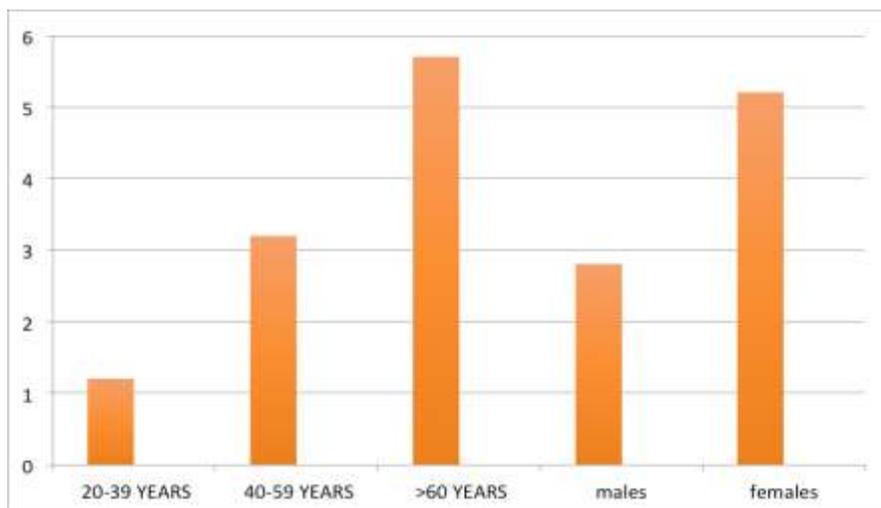


Fig. 1: Magnitude of Corneal Blindness

Causes of Corneal Blindness:

Corneal diseases contributing to blindness were trauma, corneal degenerations, aphakic and pseudophakic bullous keratopathy following cataract surgery. Unilateral corneal blindness was

mostly caused by ocular trauma, infectious keratitis, and post-surgical bullous keratopathy (Table 2).

Table 2: Corneal Blindness Causes and Patients Affected

Causes of Blindness	Number	Percent
Trauma	776	59.3
Infectious keratitis	304	23.2
Corneal degenerations	157	12.0
Pseudophakic bullous keratopathy	72	05.5
Total	1309	100.0

Discussion:

This study provides reliable epidemiological data on the prevalence and risk factors of corneal blindness and morbidity across specified age groups in a rural Telangana hospital based population. The magnitude of corneal blindness among the OPD patients was 3.9%, and 2.9% of patients were unilaterally blind due to corneal disease. This amounts to a significant burden on the health system in general, and the blindness programme in particular. In another Indian study, the prevalence of corneal blindness (defined as presenting visual acuity <6/60 in the better eye in this study) has been reported to be 0.10% and that of unilateral corneal blindness has been 0.56% [5]. A Chinese study also reported a similar prevalence of corneal blindness of 0.1% [6]. The CORE study which was a population based study done in north Indian rural population reported prevalence of 0.55% [7]. The main aetiological diseases responsible for corneal blindness in our study population have been trauma (59.3%), infectious keratitis (23.2%), corneal degenerations (12%) and post-surgical bullous keratopathy (5.5%). In one study in the South Indian population, corneal blindness has been predominantly due to infectious keratitis (59.5%) and trauma (23.2%) [5]. Studies from Thailand and Gambia also have reported the common causes of corneal blindness [8, 9]. In Thailand, these were infections (35.6%), surgical bullous keratopathy (27.8%), and trauma (14%) [8]. In Gambia, vitamin A deficiency (7.8%) has been an important cause of corneal blindness in addition to infectious keratitis (22.7%) and trauma (14.3%) [9].

The study highlights the changing trends in the pattern of corneal diseases in the rural Indian population. The success of prevention programmes related to keratomalacia and trachoma have led to a marked reductions in their prevalence, as exemplified in the present study.

We need to be cautious about the increasing prevalence and occurrence of corneal complications due to high-volume cataract surgery, which is shifting the burden from cataract blindness to corneal blindness in a developing country like India.

It is important to interpret the results of our study keeping in view the few limitations. Posterior segment was evaluated using B-scan only. Blindness resulting from abnormalities of posterior segment such as age related macular degeneration, central retinal artery occlusion, central retinal vein occlusion, branched retinal vein occlusion, optic neuritis and macular causes could not be excluded.

Conclusion:

The magnitude of the corneal blindness among the OPD patients was (3.9%), and (2.9%) of patients were unilaterally blind due to corneal disease. The study findings demonstrate that currently ocular trauma (59.3%), infectious keratitis (23.2%), corneal degenerations (12%) and post-surgical bullous keratopathy (5.5%) are responsible for the major burden of corneal blindness among the patients attending OPD. The major strength of this study is a high response rate (93.7%). This study will prove useful in planning blindness programme initiatives and estimating resources required to provide comprehensive corneal services for the community, thereby helping to eliminate the causes of avoidable corneal blindness and visual impairment.

Acknowledgement:

Sincere gratitude is here by extended to the following who never ceased in helping until this paper is structured: Medical Superintendent: Asim Ali, Study Advisor: Dr. J. V. Narasimha Reddy, Statistician: Asst. Prof. Sujatha.

References

1. World Health Organization - Prevention of blindness and visual impairment. Priority eye diseases-corneal opacities. <http://www.who.int/blindness/causes/priority/en/index9.html> (accessed Jul 2014).
2. Pascolini D, Mariotti SP. Global estimates of visual impairment: 2010. *Br J Ophthalmol* 2012; 96:614–18.
3. Whitcher JP, Srinivasan M, Upadhyay MP. Corneal blindness: a global perspective. *Bull World Health Organ* 2001; 79:214–21.
4. Gupta N, Tandon R, Gupta SK, et al. Burden of corneal blindness in India. *Indian J Community Med* 2013; 38:198–206.
5. Dandona R, Dandona L. Corneal blindness in a southern Indian population: need for health promotion strategies. *Br J Ophthalmol* 2003; 87:133–41.
6. Wang H, Zhang Y, Li Z, et al. Prevalence and causes of corneal blindness. *Clin Experiment Ophthalmol* 2014; 42:249–53.
7. Noopur Gupta, Praveen Vashist, Radhika Tandon, et al. CORE Study. *Br J Ophthalmol* 2015; 99:147-152.
8. Prabhasawat P, Trethipwanit KO, Prakairungthong N, et al. Causes of Corneal blindness: a multi-center retrospective review. *J Med Assoc Thai* 2007; 90:2651–7.
9. Bowman RJ, Faal H, Dolin P, et al. Non-trachomatous corneal opacities in the Gambia—etiology and visual burden. *Eye (Lond)* 2002; 16:27–32.

***Author for Correspondence:** Dr. Raghu Veladanda, Department of Ophthalmology, Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar-505405 Telangana, India Email: veladandaraghu@gmail.com Cell:09849277563