

Original Research Article

Prevalence and Causes of Visual Impairment Associated with Corneal Disease Presenting to Eye OPD at GMC, Jammu

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Abstract: Background: Cornea is the transparent, avascular structure that forms the outer layer of the eyeball through which light enters the eye. According to National programme for control of blindness, India has more than 12 million people with visual impairment and corneal blindness accounts for 0.9% [1]. A large number of diseases affect the cornea. These include infectious causes-bacterial, fungal and viral causes; trauma, dystrophies, nutritional deficiency etc. So, this study aims to find the prevalence of visual impairment due to corneal diseases and its causes so appropriate steps can be taken in managing these conditions. **Methods:** It is a prospective, cross sectional, observational study conducted in Department of ophthalmology, GMC, Jammu for a period of 6 months from October 2023 to March 2024. All patients presenting to the eye opd with visual impairment were included in the study (vision <6/18). Detailed history and examination were done to find prevalence of corneal disease and its cause. **Results:** A total of 3276 patients were included in the study. Of these 108 patients had visual impairment due to corneal diseases. 57.4 % patients were males and 42.59% were females. The age distribution was as follows, 7 patients were in the age group of 0-10 years, 11 in group 10-20 years, 20 were of 20-30 years, 18 were 30-40 years, 23 in age group of 40- 50 and 29 were of age more than 50 years. Infectious causes (bacterial-24.07%, fungal-21.29% and viral keratitis-17.59% were the leading cause, followed by trauma (15.74%) and dry eye syndrome (8.33%). **Conclusions:** Corneal illnesses account one of the major cause of vision impairment, and their epidemiological patterns and etiology are varied. Many of the causes are preventable, so appropriate steps need to be taken to decrease the burden of corneal visual impairment.

Keywords: Corneal disease, visual impairment.

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INTRODUCTION

Cornea is the transparent, avascular structure that forms the outer layer of the eyeball through which light enters the eye. Three fourth of the total refractive power of eye is due to cornea [2]. It also acts as the protective barrier against infections entering the eye. Corneal diseases alter the transparency of the cornea and cause scarring and decreased visual acuity. According to a recent survey 5.5 million people are estimated to be bilaterally blind or have severe visual impairment resulting from corneal diseases worldwide, and about 6.2 million are unilaterally blind due to corneal diseases [3]. According to National programme for control of blindness, India has more than 12 million people with visual impairment and corneal blindness accounts for 0.9% [1]. Corneal diseases are among the leading causes of blindness worldwide.

Corneal diseases encompass a broad spectrum of conditions which includes disorders such as dry eye syndrome, infectious causes like bacterial, fungal and viral keratitis, trachoma, corneal dystrophies and degenerations, corneal ectasias like keratoconus, trauma, nutritional deficiency causing keratomalacia, post-surgical bullous keratopathy [4].

Corneal diseases have multifactorial etiopathogenesis which include genetic predisposition, environmental influences, systemic diseases, and ocular trauma. Demographic factors such as age, gender, and geographical location, occupation, exposure to uv light, also influence disease prevalence and severity [5].

Corneal diseases can result in various degrees of visual impairment, ranging from mild discomfort and blurred vision to severe vision loss and blindness.

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According to ICD-11 visual impairment is defines as visual acuity <6/18 [6]. These disorders can have a significant negative influence on quality of life and visual function in people of all ages and socioeconomic backgrounds. Moreover, corneal disorders that cause vision impairment have a substantial negative impact on the economy and society since the affected persons may have lower productivity, and higher healthcare utilization [7].

So, millions of people worldwide are impacted by corneal illnesses, which constitute a major public health concern and provide considerable challenges to healthcare systems and society at large. By elucidating the prevalence and causes of these conditions, this study aims to inform clinical practice, guide public health interventions, and inspire further research efforts aimed at preserving and restoring vision in those affected by corneal diseases.

METHODS

It is a prospective, cross sectional observational, study conducted in Department of ophthalmology, GMC, Jammu for a period of 6 months from October 2023 to March 2024. All patient presenting to the eye opd with visual impairment (best corrected visual acuity <6/18) were included in the study. A total of 3276 patients were included in the study.

Inclusion criteria

All patients presenting to the eye opd during the duration of study with visual acuity <6/18 in either eye.

Exclusion criteria

- 1) Non consenting patients
- 2) Patients with incomplete records

Complete history including history of present illness, ocular history, social history was taken and ocular examination of all patients was done. Ocular examination included visual acuity testing including best-corrected visual acuity tested with Snellen’s chart and slit lamp examination with fluorescein staining. Culture and sensitivity testing were done in infective cases. All necessary test to make the clinical diagnosis in various diseases were performed. Written informed consent were taken from all patients.

STASTICAL ANALYSIS

All data was collected and entered into excel sheets and calculated using SPSS 28.0.1 version.

RESULTS

A total of 3276 patients were included in the study who had visual impairment. Of the total 3276 patients, 108 (3.29%) had corneal diseases as the cause of visual impairment.

Out of the 108 patients 62 (57.4 %) were males and 46 (42.59%) were females. [FIGURE 1] The age distribution was as follows, 7 patients were in the age group of 0-10 years, 11 in group 10-20 years, 20 were of 20-30 years, 18 were 30-40 years, 23 in age group of 40-50 and 29 were of age more than 50 years [FIGURE 2]. 60.1 % patients i.e. 65 patients belong to rural areas and 39.81 % patients i.e. 43 patients lived in urban areas [FIGURE 3].

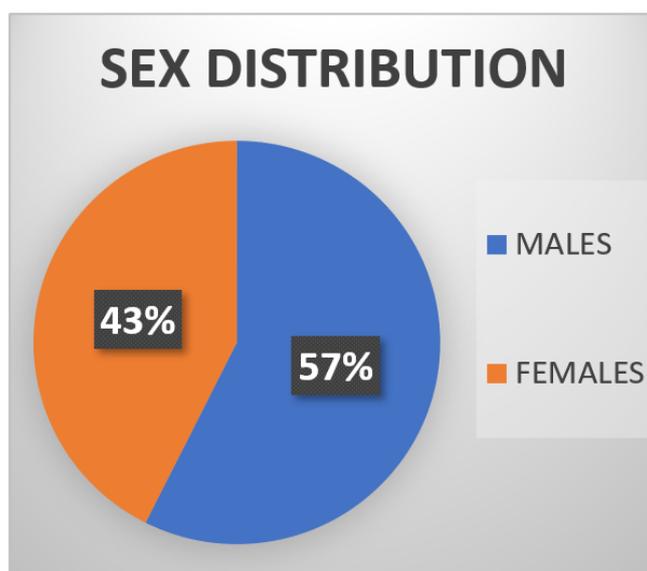


Figure 1-Sex Distribution

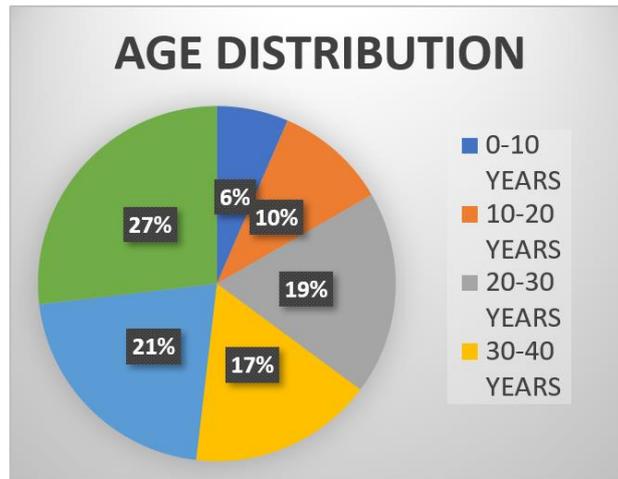


Figure 2-Age Distribution

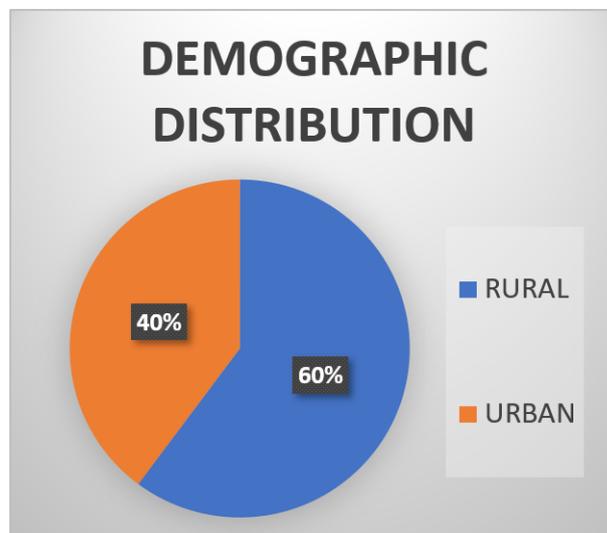


Figure 3-Demographic Distribution

Among the causes of visual impairment due to corneal diseases, bacterial corneal ulcer 24.07% (26 patients) and fungal corneal ulcer 21.29% (23 patients) were found to be the leading causes. Other causes included viral corneal ulcer in 19 patients (17.59%), trauma including corneal perforation in 17 patients

(15.74%), dry eye syndrome was the cause in 7 patients (6.48%), pseudophakic bullous keratopathy was found in 7 (6.48%). In 3 patients each (2.77%) had keratoconus or corneal dystrophy. 2 (1.85%) patients had shield ulcer due to VKC, 1 patient (0.92%) had vitamin A deficiency and presented with keratomalacia [FIGURE 4-9].

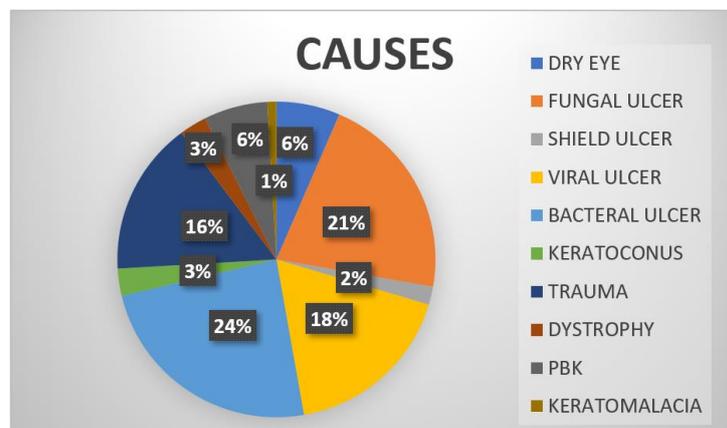


Figure 4- Corneal diseases causing visual impairment



Figure 5- Keratoco4nus



Figure 6- Corneal dystrophy



Figure 7- Bacterial corneal ulcer



Figure 8- Viral corneal ulcer



Figure 9-Trauma

DISCUSSION

The cornea is the outermost structure of the eye ball which makes it vulnerable to a variety of insults which can endanger vision. Diseases affecting the cornea are a major cause of blindness worldwide [8]. Trachoma, corneal ulceration, xerophthalmia, ophthalmia neonatorum and ocular trauma are the leading causes of corneal blindness worldwide [9].

Epidemiological factors play a significant role in the prevalence, and distribution of corneal blindness. In our study we found out that males were more commonly affected than females. This could be attributed to the males doing more work in industrial areas and agricultural fields.

Sheng *et al.*, conducted a similar study and found out the males are more affected than female due to more occupational hazard to males [10].

Old age was found to be risk factor in developing corneal visual impairment. The cause of this increased susceptibility to corneal blindness is due to age-related corneal degenerations, diminished regenerative capacity, and comorbid health issues. Barriers to accessing health care also exacerbate the risk. Xu *et al.*, found that older age (OR =5.08, $P=0.048$), male sex (OR =3.37, $P=0.035$) were a risk factor. This is in conjunction with our study [11].

Because of inadequate sanitation, a higher concentration of industrial and agricultural vocations, and restricted access to eye care services, corneal blindness is more common in rural areas. Delays in diagnosis and treatment are caused by poor infrastructure, socioeconomic imbalances, and a lack of knowledge. Dust, trauma, and unsanitary behaviors are examples of environmental factors that increase the risk. In our study 61.1% patients lived in rural areas. Gupta *et al.*, conducted a study in rural India to find cause of increased prevalence of corneal blindness and found illiteracy to be a major cause [12].

In our study we found that infectious causes are the leading cause of visual impairment, most common being bacterial keratitis followed by fungal and viral keratitis. Poor hygiene, contact lens misuse, and ocular trauma increase susceptibility. Prompt recognition, appropriate antimicrobial therapy, and close monitoring are crucial for preventing severe complications and preserving visual function in cases of infectious keratitis. Panjiyar *et al.*, conducted a study to recognise the causes of corneal visual impairment and found of 20,250 patients examined in the pediatric department over a one year period, 1911(9.4%) presented with isolated corneal problems and corneal ulcer were found in 47.8% [13].

Trauma was found to be second most common cause. Trauma can be caused by chemical injuries or mechanical injuries. Occupations involve handling chemicals or working in environments where chemical splashes are common or industrial area are at increased risk. In previous studies Trauma has been reported to be one of the most important causes of unilateral vision loss in developing countries [14]. Males have been reported to have a higher chance of suffering ocular trauma compared with females [15]. Other causes include dry eye syndrome, bullous keratopathy, keratoconus, corneal dystrophy.

Xu *et al.*, conducted a study and found infectious disease the most common cause in which viral keratitis was found in 57.8%, followed by fungal. Other causes include trauma 16%, abrasion 18%. Neurotrophic ulcer, filamentary keratitis, keratoconus, transplant rejection, exposure keratitis were other causes [11].

Visual impairment resulting from corneal diseases significantly impacts individuals' quality of life, functional independence, and socio-economic well-being. Loss of visual acuity affects daily activities, productivity, and social interactions, leading to reduced employment opportunities and increased healthcare expenditure [15].

So, effective prevention and management of corneal disease-related visual impairment require a

multi-faceted approach. Preventive strategies include promoting ocular hygiene, implementing eye safety measures, and raising awareness about the importance of early diagnosis and treatment. Treatment interventions include medical, surgical, and therapeutic modalities.

CONCLUSION

Corneal diseases represent a significant cause of visual impairment, with diverse etiological factors and epidemiological trends. Understanding the prevalence, causes, and impact of corneal disease-related visual impairment is essential for developing targeted interventions, improving access to eye care services, and mitigating the burden of blindness and visual morbidity.

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REFERENCES

1. Directorate General of Health Services [Internet]. dghs.gov.in. Available from: https://dghs.gov.in/content/1354_3_NationalProgrammeforControlofBlindnessVisual.aspx
2. Khurana, A., Khurana, A., & Khurana, B. (2015). *Comprehensive ophthalmology*. New Delhi: Jaypee.
3. Wang, E. Y., Kong, X., Wolle, M., Gasquet, N., Ssekasanvu, J., Mariotti, S. P., ... & West, S. (2023). Global trends in blindness and vision impairment resulting from corneal opacity 1984–2020: A meta-analysis. *Ophthalmology*, *130*(8), 863-871.
4. Li, X., Wang, L., & Wei, Q. (2012). Corneal disease in China. *Ophthalmology*, *119*(8), 1712-1712.
5. Tidke, S. C., & Tidake, P. (2022). A review of corneal blindness: causes and management. *Cureus*, *14*(10).
6. [6] Wikipedia Contributors. Visual impairment [Internet]. Wikipedia. Wikimedia Foundation; 2019.
7. Rein, D. B., Wittenborn, J. S., Zhang, P., Sublett, F., Lamuda, P. A., Lundeen, E. A., & Saaddine, J. (2022). The economic burden of vision loss and blindness in the United States. *Ophthalmology*, *129*(4), 369-378.
8. Thylefors, B., Negrel, A. D., Pararajasegaram, R., & Dadzie, K. Y. (1995). Global data on blindness. *Bulletin of the world health organization*, *73*(1), 115.
9. Whitcher, J. P., Srinivasan, M., & Upadhyay, M. P. (2001). Corneal blindness: a global perspective. *Bulletin of the world health organization*, *79*(3), 214-221.
10. Sheng, X. L., Li, H. P., Liu, Q. X., Rong, W. N., Du, W. Z., Ma, L., ... & Bi, X. J. (2014). Prevalence and associated factors of corneal blindness in Ningxia in northwest China. *International journal of ophthalmology*, *7*(3), 557.
11. Xu, S. C., Chow, J., Liu, J., Li, L., Maslin, J. S., Chadha, N., ... & Teng, C. C. (2016). Risk factors for visual impairment associated with corneal diseases in southern China. *Clinical Ophthalmology*, *777*-782.
12. Gupta, N., Vashist, P., Tandon, R., Gupta, S. K., Dwivedi, S., & Mani, K. (2015). Prevalence of corneal diseases in the rural Indian population: the Corneal Opacity Rural Epidemiological (CORE) study. *British Journal of Ophthalmology*, *99*(2), 147-152.
13. Panjiyar, P., Gautam, V., Rai, P. G., & Puri, L. R. (2016). Childhood corneal blindness: a retrospective study in a tertiary eye hospital of eastern region of Nepal. *Nepalese Journal of Ophthalmology*, *8*(1), 18-22.
14. Thylefors, B. (1992). Epidemiological patterns of ocular trauma. *Australian and New Zealand journal of ophthalmology*, *20*(2), 95-98.
15. Dandona, L., Dandona, R., Srinivas, M., John, R. K., McCarty, C. A., & Rao, G. N. (2000). Ocular trauma in an urban population in southern India: the Andhra Pradesh Eye Disease Study. *Clinical & experimental ophthalmology*, *28*(5), 350-356.

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