

Prevalence and Causes of Corneal Opacity in a Rural Population in Bihar: Need for Promotion of Health Awareness for Prevention of Corneal Blindness.

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ABSTRACT

Background: The cornea is the transparent frontal part of the eye that covers the iris, pupil and anterior chamber. Together with the lens, the cornea refracts light accounting for approximately two-thirds of the eye's total optical power. The cornea has unmyelinated nerve endings that are sensitive to touch, temperature and chemicals. The cornea is devoid of blood vessels as transparency is of prime importance. The cornea receives its nutrients by diffusion from the tear fluid at the outside and from the aqueous humor at the inside. In humans the cornea has a diameter of about 11.5 mm and a thickness of 500-600µm at the centre and 600-800µm at the periphery. Transparency, avascularity, presence of immature resident immune cells and immunologic privilege makes the cornea a very special tissue. Corneal opacity is a disorder of the cornea and it occurs when the cornea becomes scarred. This condition causes disruption of light waves passing through the cornea to the retina thus giving a cloudy or hazy appearance of the cornea. The aim of the study is to evaluate the prevalence and causes of corneal opacity in a rural area in Bihar. Design of the study – A population based retrospective and observational study. **Methods:** Among all the cases that presented with ocular morbidity between September 2014 and February 2016 to the outdoor clinic of Department of Ophthalmology or any of the primary health centres of Katihar Medical College, those with corneal opacity were enrolled for this study. Participants belonged to rural areas that were medically catered to by the primary health centres under the Department of Community Medicine of Katihar Medical College. Those participants who attended either the primary health centres or the outdoor clinic of the Department of Ophthalmology with corneal disease were included in this study. **Results:** During the study period a total of 519 cases presented with ocular morbidity and were diagnosed for corneal opacity. Prevalence of corneal opacity was 2.35% among the study population. Corneal opacity was reported to be much higher in the elderly probably due to a weakened immune system and among cases with poor personal hygiene. Common causes of corneal opacity in the study population was corneal degeneration, infective keratitis, ocular trauma and pterygium. **Conclusion:** Corneal morbidity in rural Bihar is attributed to keratitis, keratopathy, corneal degenerations, lack of hygiene and generalized immunodeficiency. Efforts must be made by health workers for health promotion and health awareness for promotion of corneal blindness.

Keywords: Blindness, Cornea, Morbidity, Opacity.

INTRODUCTION

The cornea is the transparent dome shaped surface that covers the front of the eye. Though the cornea is ultrathin and appears to lack substance, it is actually an organized group of cells and proteins. Unlike most tissues in the body, the cornea contains no blood vessels to nourish it or protect it against infection. The cornea is nourished by the tear fluid and aqueous humor and must remain transparent to refract light properly. The structure of the cornea is such that even the tiniest of blood vessels can interfere with the process of vision. Thus for optimum visual acuity the cornea must be free from any cloudy, hazy or opaque areas. The cornea copes extremely well with minor injuries or abrasions.

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In the event of a superficial injury, the healthy cells slide over and patch the injury before infection

occurs or vision is affected. Deep injuries take a long time to heal and may result in unbearable pain, redness, visual impairment and extreme photosensitivity. They may also cause corneal scarring or opacity, visual loss and require corneal transplantation. Blindness causes physical, social and economic dependence of the blind person on the family and society.^[1] According to WHO, an estimated 180 million people worldwide are visually disabled of whom nearly 45 million are blind and are living in developed countries.^[2,3] Eighty percent of blindness is avoidable.^[4] Corneal blindness is different from other types and causes of blindness because it is both preventable and curable to a large extent. Any local change in the index of refraction of the cornea leads to turbidity.^[5] Corneal blindness due to corneal opacity is a common cause of ocular morbidity in developing countries. The term corneal opacity is used particularly for the loss of transparency of the cornea due to scarring. Treatment of corneal blindness once it has occurred is difficult and implementation of prevention measures perhaps remains the most cost-effective option. Corneal disease as a major cause of blindness is preceded only by cataract. Prevalence of corneal blindness varies from country to country and from population to population. The prevalence is

multifactorial. The common causes of corneal opacities such as trauma, keratitis, post-surgical, congenital, developmental, degenerative and dystrophic are avoidable.

MATERIALS AND METHODS

This retrospective observational study was conducted jointly by the Department of Ophthalmology and Department of Community Medicine of Katihar Medical College during September 2014 to February 2016. After obtaining permission from the Institutional Ethics Committee, 519 cases of corneal opacity were enlisted in this study after obtaining informed consent from each case. Cases with presenting complaint of diminished vision were included in this study. A detailed clinical history was recorded of each patient. Age, sex, occupation, socio-economic status, literacy and laterality of the affected eye were also recorded. Ocular investigation were performed in detail. Cases diagnosed with underlying systemic diseases and pterygium were excluded from this study. Visual Acuity (VA), anterior segment, posterior segment and intraocular pressure (IOP) were examined in detail following routine clinical procedures.

RESULTS

Out of the 519 cases of corneal opacity, we observed the following.

Table 1: Distribution of corneal opacity among presenting cases in this study

S. No.	Causes of Corneal Opacity	No. of cases	Percentage of cases
1	Trauma	232/519	44.7%
2	Infective	197/519	38.1%
3	Degenerative	58/519	11.2%
4	Congenital	32/519	06.1%

Table 2: Distribution of parameters among presenting cases in this study

S. No.	Distribution	No. of cases	% of cases
1	According to age in years <ul style="list-style-type: none"> • 00-25 • 26-50 • 51-75 	141/519 195/519 183/519	27.2% 37.6% 35.2%
2	According to sex <ul style="list-style-type: none"> • Male • Female 	325/519 194/519	62.6% 37.4%
3	According to the eye involved <ul style="list-style-type: none"> • Right eye • Left eye • Both eyes 	257/519 181/519 81/519	49.5% 34.9% 15.6%
4	According to literacy <ul style="list-style-type: none"> • Literate cases • Illiterate cases 	217/519 302/519	41.9% 58.1%
5	According to complications <ul style="list-style-type: none"> • Complicated • Uncomplicated 	326/519 193/519	62.8% 37.2%

DISCUSSION

Blindness and visual impairment have far-reaching implications, as both are tragic situations in social and economic terms. Diseases affecting the cornea are a major cause of blindness worldwide, second only to cataract. The epidemiology of corneal blindness is complicated encircles a wide spectrum of infections and inflammatory diseases that may lead to functional blindness. Ocular trauma and corneal ulceration are significant causes of corneal blindness. Cause of childhood blindness include xerophthalmia, ophthalmia neonatorum and less frequently kerato-conjunctivitis. Corneal opacification from trachoma and corneal scars from trachoma and vitamin A deficiency were found to be 20% & 44% of all blindness in Ethiopia^[6] and Tanzania^[7] respectively. Corneal ulceration in developing countries has only recently been recognized as a silent epidemic.^[8] The incidence of corneal ulceration was reported to be 113 per 100000 people in Madurai District of Tamil Nadu state in South India.^[9] In our study we observed that trauma and infection were among the common causes of corneal opacity. Degenerative changes and corneal malformation were less significant [Table-1]. We also observed that in cases aged between 26-50 years the prevalence of corneal opacity was higher, with preponderance among males. The right eye was more vulnerable and corneal opacity was observed more among illiterates [Table-2]. A study on corneal blindness documented that the prevalence of corneal blindness was significantly higher in lower socio-economic strata of society and with increasing age.^[10] Although the emphasis should be on prevention of corneal opacity, surgical treatment may be appropriate.^[11] Optical iridectomy and pterygium excisions can be performed at regional health centres.^[12] Meticulous post-operative care of the eye in addition of regular hospital follow up for at least a year are required for successful rehabilitation of keratoplasty, both of which are practically infeasible for majority of the rural cases in our study.

CONCLUSION

The epidemiology of corneal blindness is diverse and highly dependent on ocular diseases distributed geographically. Such diseases are directly responsible for occurrence of corneal opacity in populations. Both ocular trauma and corneal ulceration lead to corneal opacity thus causing monocular corneal blindness leading to visual impairment. There is vital need for mobilization of health workers to promote ocular health in rural areas. Irrespective of aetiology and cause, an eye blinded by corneal opacity hampers visual acuity permanently unless professional surgical treatment is

sought. Specific education aimed at earlier presentation of cases is required. This article is a community based study and is in the interest of public health and vision for all.

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