

Prevalence and causes of infectious keratitis in rural west Bengal

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Abstract

Introduction: Infectious keratitis is potential causes for vision loss in India. Early recognition with prompt diagnosis and rapid institution of appropriate therapy will significantly improve visual prognosis. **Aim:** The aim of this study was to evaluate prevalence, the common causes of infectious keratitis in rural West Bengal. **Materials and Methods:** This was a prospective observational clinical-based study conducted at the different eye clinic of West Nadia district of West Bengal in rural area from February to August 2025. Data related to socioeconomic status, predisposing factor, and course of disease was collected. Results were analysed on the basis of history, slit lamp examination, and appropriate laboratory investigation. **Results:** During the period of total 321 patients were examined in cornea specialty clinic, of which 66 were diagnosed with infective keratitis and were included in the study. Majority of patients of infectious keratitis were in in between 31 and 50 age group were 28 (42.43%) followed by 51–70 age group were 22 (33.33%) and incidence in male was higher than that of female. Incidence of fungal keratitis 37 (56.06%) was higher than bacterial 18 (27.27%) and viral 11 (16.67%). Among those on prompt follow-up and appropriate treatment most of the corneal ulcer 45 were healing; 7 had no change in ulcer status; only 3 were progress and 7 were perforate. Only 4 were deteriorated mainly due to poor follow-up and compliance. 36.36% were improved, 53.03% were stable there BCVA compare to BCVA at time of first presentation; only 6.06% were deteriorated mainly due to poor follow-up and compliance. **Conclusion:** Incidence of fungal corneal ulcer is higher among various causes of infectious keratitis in the rural area of Nadia district of West Bengal. Agricultural injuries are the main predisposing factor for infectious keratitis in this region. Prompt diagnosis and early appropriate treatment on the basis of laboratory investigation can prevents the community to reduce the burden of corneal blindness.

Key words: Corneal ulcer, fungal, keratitis, prevalence; rural area; West Nodia district

Introduction

Cornea is the window of our body, by which the light enters directly into our body. Light focus on an object then it creates an image, which go through cornea to central nerves systems. That's why, cornea is a precious part of our body. Cornea is a sensitive and transparent media of our eye. Once cornea have fallen any scratches it is very painful and people can blind without transparency of the cornea. So, it is very essential to protect our eyes means cornea as best as possible. The ocular trauma and corneal ulceration results in 1.5–2 million new cases of corneal blindness annually¹. As per recent worldwide lists on the causes of blindness, corneal scarring is the second-most common cause of blindness and visual disability in developing countries^{2,3}. Corneal infection is the most common cause of monocular corneal blindness worldwide⁴. As per census 2011 and survey (rapid assessment of avoidable blindness) conducted by the Ministry of Health and Family Welfare 2006–2007 out of total population of 122 crores, 0.1% (1.22 lakh) are bilateral and 0.9% (10.98 lakh) are unilateral corneal blind in India^{5,6}. Twenty thousand new cases of corneal blindness are being added annually to the existing burden⁷. Keratitis is the most common causes of corneal blindness in India. Infective keratitis caused by bacteria, fungi, viruses, and parasite results vision-threatening ocular infection. The most common causes of corneal blindness are infections, which made by lack of proper nutrition due to poverty and illiteracy. Ulcerative keratitis considered as an ocular emergency. Prompt diagnosis and rapid appropriate treatment will significantly improve the visual system.

Aim of the study: This study was undertaken to evaluate prevalence, the common causes of infectious keratitis in rural West Bengal.

Materials and Methods

It was a prospective observational clinical-based study conducted at the different eye clinic of West Nadia district of West Bengal in rural area from February to August 2025. The study was conducted with the approval of the Institutional Ethics committee with proper consent taken from the patients.

Inclusion criteria were patients with infectious keratitis, also patients on the treatment of infectious keratitis with irregular follow-up.

Exclusion criteria were patients showing signs and symptoms of endophthalmitis and pan-oophthalmitis. Patients from other than rural area and treatment defaulter were excluded from the study.

Data related to socioeconomic status were recorded. Appropriate history was taken to find out predisposing factors, previous treatment, and duration of symptoms. Visual acuity was recorded at the time of first attendance. All patients were evaluated on slit lamp to record the size, depth, and location of corneal ulcer along with an examination of margins, floor, and infiltrations.

Examination of ocular adnexa including lids, eyelashes, and lacrimal sac area was done by slit lamp. The lacrimal sac syringing was done to check the patency of the lacrimal system, and random blood sugar was recorded to screen for diabetes mellitus in every patient. Corneal scraping was done in cases of large epithelial defect and involved visual axis. A non-preservative topical anaesthetic was instilled (4% lignocaine) for proper corneal examinations. Scrapping was taken with a disposable scalpel blade. Loose mucus and necrotic tissue were removed before scraping. The margins and base of the lesion were scraped. The thin smear was placed on one or two glass slides for microscopy, including gram stain, acid-fast bacillus, calcofluor white⁸. Samples were plated onto culture media, routinely blood agar, chocolate, media were used and placed incubator. Standard antimicrobial therapy was given based on laboratory reports. Scraping may be delayed without treatment for 12hrs if antibiotics have instilled previously. Viral keratitis cases were confirmed on basis of clinical findings, Fluorescein and Rose Bengal stain. If no improvement after 48hrs then suspension of treatment for 24hrs, re-scraping performed with inoculation on border range of media and additional staining techniques requested.

No sign of healing after 7–8 days' label as nonhealing ulcer. For the purpose of analysis each case was then classified into either of Groups I–VI, based on presenting best-corrected visual acuity (BCVA). Group I (6/6 to >6/18), Group II (6/24 to >6/60), Group III (5/60–1/60), Group IV counting fingers, Group V hand movement (HM to PL), and Group VI no perception of light (No PL). Visual acuity was compared at the time of first presentation and after treatment. The Data was analysed by statistically.

Results

During the period of February to August 2025, a total of 321 patients were examined in different rural eye clinic, of which 66 were diagnosed with infective keratitis and were included in the study. In the study, the age range was 10 years to above 70 years.

Gender	10 – 30 years	31 – 50 years	51 – 70 years	Above 70 years	Total
Male	4 (6.06%)	19 (28.79%)	14 (21.21%)	7 (10.61%)	44 (66.67%)
Female	2 (3.03%)	9 (13.64%)	8 (12.12%)	3 (4.55%)	22 (33.33%)
Total	6 (9.09%)	28 (42.43%)	22 (33.33%)	10 (15.15%)	66 (100%)

Table – 1 Gender wise distributions of infectious keratitis in different age groups

This study shows that majority patients of infectious keratitis were in between 31 and 50 age group were 28 (42.43%) followed by 51–70 age group were 22 (33.33%) and incidence in male was higher than that of female [Table – 1].

Occupations	10 – 30 years	31 – 50 years	51 – 70 years	Above 70 years	Total
Farmers	2 (3.03%)	8 (12.12%)	6 (9.09%)	2 (3.03%)	18 (27.27%)
Laborer	1 (1.52%)	4 (6.06%)	3 (4.55%)	2 (3.03%)	10 (15.15%)
House hold Work	1 (1.52%)	5 (7.58%)	2 (3.03%)	1 (1.52%)	9 (13.64%)
Business	0	1 (1.52%)	1 (1.52%)	1 (1.52%)	3 (4.55%)
Students	0	0	0	0	0
Others	0	1 (1.52%)	2 (3.03%)	1 (1.52%)	4 (6.07%)
Total	4 (6.07%)	19 (28.79%)	14 (21.21%)	7 (10.61%)	44 (66.67%)

Table – 2 Distribution of male patient according to occupation in different age group

Distribution of male patient according to their occupation in different age groups found that, majority cases 18 (27.27%) were farmer followed by laborer 10 (15.15%) and household work 9 (13.64%). Few amount patients were among business 3 (4.55%), and 4 (6.07%) were others, but no students were found affected [Table – 2].

Occupations	10 – 30 years	31 – 50 years	51 – 70 years	Above 70 years	Total
Farmers	1 (1.52%)	4 (6.06%)	3 (4.55%)	1 (1.52%)	9 (13.64%)
Laborer	0	2 (3.03%)	2 (3.03%)	1 (1.52%)	5 (7.58%)
House hold Work	1 (1.52%)	2 (3.03%)	3 (4.55%)	1 (1.52%)	7 (10.61%)
Business	0	0	0	0	0
Students	0	0	0	0	0
Others	0	1 (1.52%)	0	0	1 (1.52%)
Total	2 (3.03%)	9 (13.64%)	8 (12.12%)	3 (4.55%)	22 (33.33%)

Table – 3 Distribution of female patient according to occupation in different age group

Distribution of female patient according to their occupation in different age groups found that, majority cases 9 (13.64%) were farmer followed by household work 7 (10.61%) and laborer 5 (7.58%) and. Few amount patients 1 (1.52%) were others, but no students and business were found affected [Table – 3].

Types of Keratitis	Male	Female	Total
Fungal keratitis	25 (37.88%)	12 (18.18%)	37 (56.06%)
Bacterial keratitis	11 (16.67%)	7 (10.61%)	18 (27.27%)
Viral keratitis	8 (12.12%)	3 (4.55%)	11 (16.67%)
Total	44 (66.67%)	22 (33.33%)	66 (100%)

Table – 4 Distribution of infectious keratitis in both gender

In the study, the incidence of fungal keratitis 37 (56.06%) was higher than bacterial 18 (27.27%) and viral 11 (16.67%) [Table – 4].

Among all patients, majority of the patient had BCVA Group I (32) and Group II (17) followed by Group III (9) Group IV (4) Group V (3) and Group VI only 1 patient had No PL. It was found that most of the patients visited to the rural clinic after 2–3 weeks were 29 of the initial symptoms, about 22 were visited on the 1st week and 15 were visited after 4 weeks of initial complaints. 23 patients had significant vision-threatening complication noted at the time of presentation and during management.

In the present study, among those on prompt follow-up and appropriate treatment most of the corneal ulcer 45 were healing; 7 had no change in ulcer status; only 3 were progress and 7 were perforate. Only 4 were deteriorated mainly due to poor follow-up and compliance.

Discussion

Clinical outcome in microbial keratitis and epidemiological patterns may be different from country to country and between different geographical regions within a country. In our study, Majority of patients of infectious keratitis were in between 31 and 50 age group were 28 (42.43%) followed by 51–70 age group were 22 (33.33%). Most of them were a farmer as this is the most common occupation of rural population in developing countries. This explains why agriculture trauma was the leading predisposing factor of corneal ulcer in developing countries⁹. This is in concurrence with that of Panda et al.,⁹ Khare et al¹⁰, Srinivasan et al¹¹. and other studies^{12,13,14} shows similar results.

Incidence was higher in males (66.67%) than that of females in our study. Male predominance was found in many studies,^{10,15} This may be because males are more involved in outdoor activities and also males are preferred over females to seek medical advice.

Our study showed farming 18 (27.27%) was the predominant occupation followed by laborer 10 (15.15%) and household work 9 (13.64%). Srinivasan et al.¹⁰ showed that the majority of corneal ulcers were observed in the farmer. Vegetative trauma was the most common predisposing factor for the development of corneal ulcer. Bharathi et al.¹⁶ and other author also found the ocular trauma as a main predisposing factor for microbial keratitis^{10,17}. All patients with a history of trauma implicated wheat/maize stalks as the traumatic object. This was followed by tree branches and thorns, soil and rocks, vegetable matter, and animal products.

Out of the 66 patients with corneal ulcer, 37 (56.06%) were fungal keratitis; 18 (27.27%) were bacterial keratitis and 11 (16.67%) were viral keratitis. The detection of fungal filaments in 10% KOH mount has 90%–99% sensitivity¹⁸. While sensitivity and specificity of bacterial detection in gram stain are inferior to that of culture method¹⁹.

Lack of awareness and local treatment from nonprofessional were responsible for late presentation and severe complications.

Majority of patients came to our eye clinic were from the nearby rural region. Most of them take initial treatment from the local practitioner including medical personnel, relatives, traditional healer, and even directly from drugstores. Patients' accessibility to eye care services is the main barrier for early consultation followed by cost, social belief, and ignorance about the disease.

On prompt follow-up and appropriate treatment most of the corneal ulcer 45 cases were healing, 7 cases had no changes in ulcer status; only 3 cases were progress. 36.36% were improved, 53.03% were stable there BCVA compare to BCVA at time of first presentation; only 6.06% were deteriorated mainly due to poor follow-up and compliance.

Conclusion

Our study highlights that the incidence of fungal corneal ulcer is higher among various causes of infectious keratitis in the rural area of Nadia district of West Bengal. Agricultural injuries are the main predisposing factor for infectious keratitis in this region. Prompt diagnosis and early appropriate treatment on the basis of laboratory investigation can prevent the community to reduce the burden of corneal blindness. Community awareness to know the risk factors and restriction of the abuse of topical corticosteroids or antibiotics plays a key role for control worsening of keratitis in rural area.

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