

# Current Trend of Corneal Ulcer In Patients Attending a Tertiary Healthcare Centre

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**Abstract:** ***Purpose:** To study the epidemiological characteristics and etiology of corneal ulcer at a tertiary healthcare centre of upper Assam. **Materials and Methods:** The present prospective hospital based study was carried out on 60 consecutive corneal ulcer cases attending outpatient and admitted in in-patient department of ophthalmology, Assam Medical College. After clinical and slit-lamp biomicroscopic examination, corneal scrapings were collected from all the corneal ulcer cases and subjected to microscopy and culture. **Results:** Out of 60 consecutive patients having keratitis, 37 (61.66%) were found to be culture positive. Rate of detection of bacterial, fungal and mixed growth were respectively 32.43%, 59.48% and 5.40%. Patients from rural background constitute 71.6% (43). Ocular trauma 51 (85%) was the most common predisposing factor followed by acute and chronic dacryocystitis 4 (6.66%) and diabetes mellitus 3(5%). Bamboo stick injuries accounted for 19(37.25%) cases followed by injuries by paddy leaves 10(19.6%) and tea leaves 8 (15.6%). Out of 12 bacterial isolates, Streptococcus pneumonia 4(33.3%) was predominant followed by Staphylococcus Aureus 3 (25%). Out of the fungal isolates, 9 (40.9%) were Fusarium species followed by 6 (27.27%) Aspergillus species. **Conclusions:** Fungi are the major cause of corneal ulcer in the rural population of Assam with ocular trauma being the major risk factor.*

**Keywords:** Assam, corneal ulcer, ocular trauma, bacteria, fungi

## 1. Introduction

Corneal ulcer is defined as breach in epithelium accompanied by underlying stromal necrosis<sup>[1]</sup>. According to world health organisation (WHO), corneal diseases are among the major causes of vision loss and blindness in the world today, second only to cataract in overall importance.<sup>[2]</sup> India being an agricultural land, superficial corneal trauma in farming which frequently leads to rapidly progressing corneal ulceration and visual loss is very common.<sup>[3], [4], [5], [6]</sup> Bacteria and fungi frequently cause suppurative keratitis specially in developing countries. Clinical features aid the ophthalmologists in clinical diagnosis and starting empirical treatment of patients with infective keratitis. Etiologic and epidemiologic pattern of corneal ulcer varies with population, geographic location and climate. Assam being the agricultural hub of the country with humid climate, ocular trauma due to vegetative matter i.e., paddy leaves and bamboo sticks is very common. The present study is undertaken to analyze the epidemiologic features, predisposing features and microbiological profile of corneal ulcer.

## 2. Material and Methods

- **Type:** A hospital – based prospective study.
- **Place:** Assam medical college, Department of Ophthalmology
- **Duration:** 6 month
- **Inclusion criteria:** Clinical features consistent with the corneal ulcer, age above 5 year, both sexes and traumatic cases.
- **Exclusion criteria:** Age below 5 years, surgical trauma cases and patients with corneal degenerations and dystrophies.

A study was carried out on 60 consecutive patients attending OPD and IPD in clinically suggested cases of corneal

ulceration. A detailed clinical history of patient was taken. The demographic data and medical history were taken from each patient including age, gender, occupation, history of trauma, foreign body, diabetes mellitus etc. Using slit lamp and fluorescein staining, a thorough examination of the affected eye was done and the ulcer details were noted. After a detailed clinical examination of the eye, the eye was cleaned with sterile normal saline to remove all necrotic exudates. The eye was then locally anaesthetized by using 2-3 drops of 4% lignocaine hydroxide. Scrapings of the corneal ulcer were collected using a sterile Bard Parker blade no.15. The base of the ulcer as well as the edges was scrapped to obtain as much material as possible. Direct microscopic examination of the corneal scraping was performed with 10% potassium hydroxide (KOH) wet mount and gram staining. The scrapings were inoculated on Blood agar for culture of bacterial isolates and incubated at 37° C for 18-24 hrs and identified on the basis of microscopic morphology, staining characteristics and confirmed by putting up the battery of biochemical reactions. For fungal culture the scraping were directly inoculated on two slants of Sabourand's dextrose agar incubated at 25° C. Identification was made based on colony characteristics, rate of growth and microscopic examination.

## 3. Results

Out of 60 consecutive corneal ulcer patients the rate of detection of culture positive cases was 37(61.66%) while 23 (38.33%) showed no growth.

**Table1:** Rate of microbiological agents in clinically suspects.

Total no of suspected corneal ulcer cases	Total no of culture positive cases	No growth
60	37(61.66%)	23(38.33%)

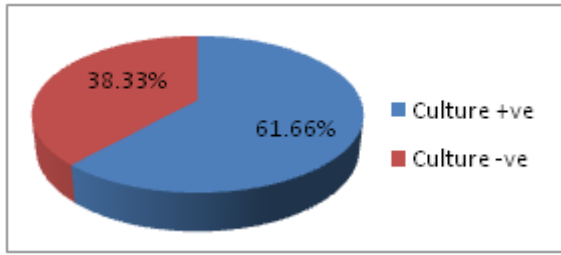


Figure 1: Rate of microbiological agents

Out of the 37 culture positive isolates rate of fungal, bacterial and mixed isolates are respectively 59.45%, 32.43% and 5.40%.

Table 2: Distribution of causative organisms in culture positive cases.

Organisms	No. of cases	Percentage
Fungus	22(22/37)	59.45%
Bacteria	12(12/37)	32.43%
Protozoa	1(1/37)	2.70%
Fungus + bacterial	2(2/37)	5.40%
Total	37	

From clinical presentation one case was found to be of viral etiology

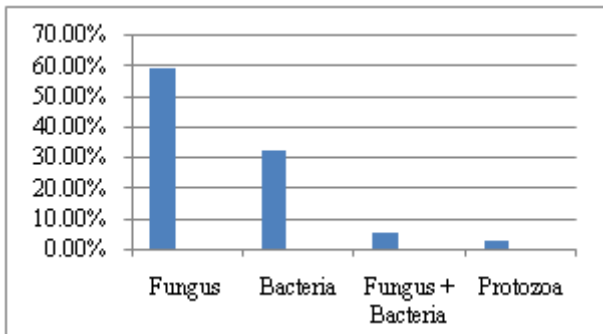


Figure 2: Causative organism's matrix

Table 3: Distribution of various species isolated from culture positive cases

Fungal species	No. of cases (%)	Bacterial species	No. of cases (%)
Fusarium spp	9 (40.9)	Streptococcus pneumonia	4 (33.3)
Aspergillus spp	6 (27.3)	Staphylococcus aureus	3 (25)
Curvularia spp	4 (18.2)	Pseudomonas	3 (25)
Candida spp	2 (9.09)	Diphtheroids	1 (8.33)
Microsporidia	1 (4.54)	E.coli	1 (8.33)
Total	22		12

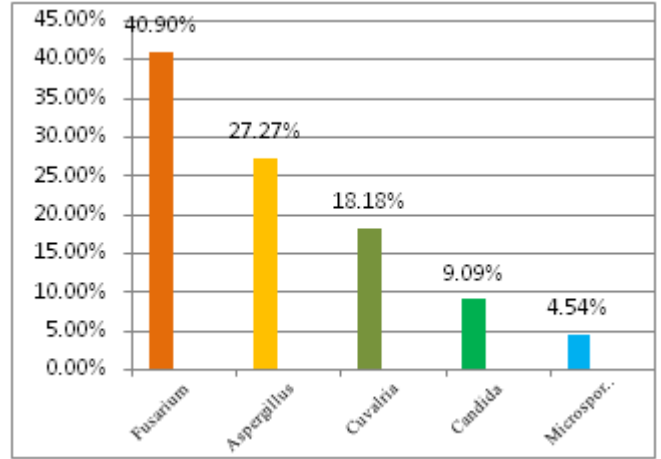


Figure 3: Fungal isolates matrix

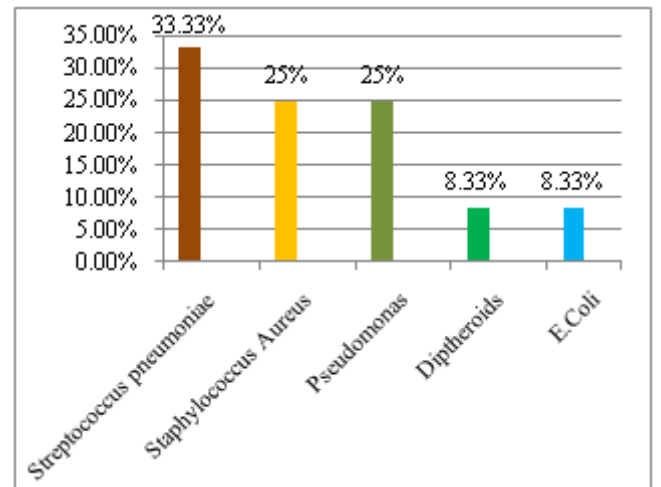


Figure 4: Bacterial isolates matrix.

In 1(2.70%) case *Acanthamoeba species* (Protozoa) infection could be established.

Table 4: Distribution of corneal ulcer in different age group.

Age in years	Total corneal ulcer cases	Percentage
5-15	4	6.52%
16-30	14	21.73%
31-45	20	32.60%
46-60	11	23.91%
61-75	8	13.04%
76-90	3	2.17%
Total	60	

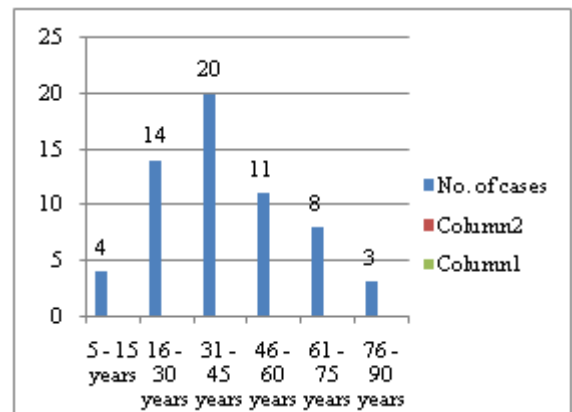
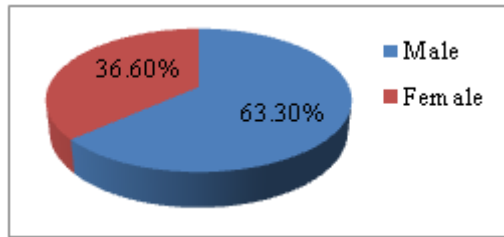


Figure 5: Age wise pattern of corneal ulcer.

**Table 5:** Distribution of corneal ulcer in different sex groups.

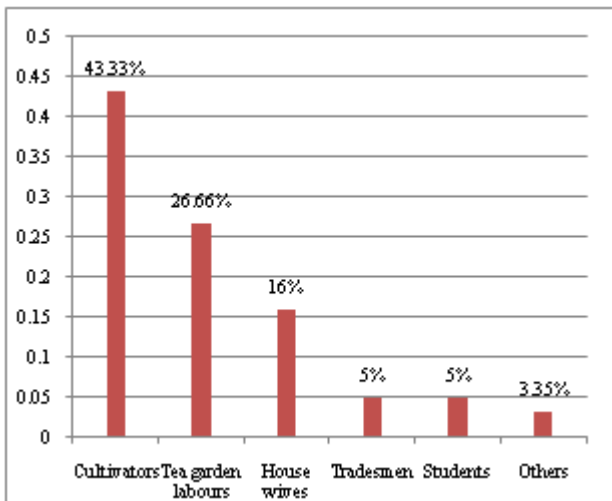
Sex group	Total no. of corneal ulcer cases	Percentage
Male	38(38/60)	63.3%
Female	22(22/60)	36.6%
Total	60	



**Figure 6:** Sex wise distribution of corneal ulcer

**Table 6:** Distribution of corneal ulcer in relation to occupation:

Occupation	Total corneal ulcer cases	Percentage
Cultivators & Farmers	26(26/60)	43.33%
Tea garden labours	16(16/60)	26.66%
Housewives	10(10/60)	16.0%
Tradesmen	3(3/60)	5.0%
Students	3(3/60)	5.0%
Others	2(2/60)	3.33%
Total	60	

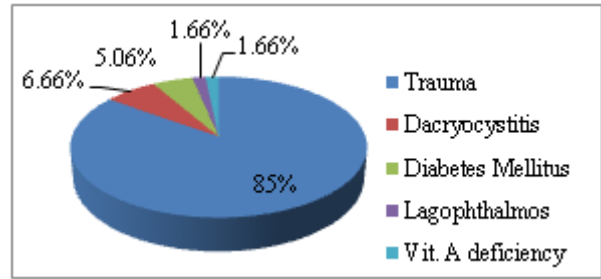


**Figure 7:** Corneal ulcer in relation to occupation.

**Out of 60 cases of corneal ulcer, 51 (85.0%) cases gave history of predisposing trauma.**

**Table 7:** Distribution of predisposing factors causing corneal ulcer:

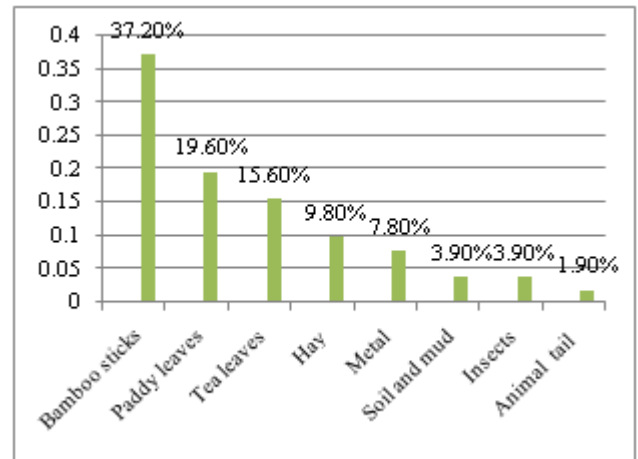
Predisposing factors	Number	Percentage (%)
Trauma	51(51/60)	85.0%
Dacryocystitis	4(4/60)	6.66%
Diabetes Mellitus	3(3/60)	5.0%
Lagophthalmos	1(1/60)	1.66%
Vitamin A deficiency	1(1/60)	1.66%



**Figure 8:** Predisposing factors of corneal ulcer.

**Table 8:** Distribution of different agents causing trauma to cornea

History & nature of trauma	Total no. of corneal ulcer cases	Percentage
Bamboo stick	19	37.2%
Paddy leaves	10	19.6%
Tea leaves	8	15.6%
Hay	5	9.8%
Metal	4	7.8%
Soil and mud	2	3.9%
Insects	2	3.9%
Animal tail	1	1.9%
Total	51	



**Figure 9:** Agents causing trauma.

#### 4. Discussion

Corneal ulcer is a major cause of blindness throughout the world and mostly in developing countries. In our study out of 60 cases, 37 (61.6%) were male, and 23 (38.3%) were female, the ratio being 3:2. This is comparable with study conducted by *Nath et al*<sup>[6]</sup> (2011) who reported 214 (68.8%) were male and 96 (31.2%) cases were female. *Bharathi et al*<sup>[7]</sup> (2003) reported 65.1% cases to be male and 34.9% to be female. Similar report was found in study conducted by *Gopinathan U et al*<sup>[5]</sup> (2002) where 71.2% were male and 28.8% were female.

By the nature of their work profile men are more exposed to outdoor activities thereby increasing their vulnerability to ocular trauma which is a major risk factor for keratitis. 71.6% (43) cases are from the rural population.

In the present study maximum number of cases were of the age group of 31-45 years (33.3%) followed by 16-30 years (23.3%). Age group 16-60 years constituted 45 (75%)

patients. A study done by Chowdhary A et al<sup>[9]</sup> reported most cases (37%) of keratitis in the age group 31- 40 years, followed by 31% in the age group 21 – 30 years.

In an earlier study done in Assam by Nath et al<sup>[6]</sup> the commonest age group affected was reported to be 41- 50 years. In a study conducted by Bharathi et al<sup>[7]</sup> a large proportion of the patients were in the age group 21-50 years. Nath et al<sup>[6]</sup> found that 56.7% patients were tea garden workers and 43.3% were rice field workers. However in our study most of the patients were farmer 26(43.3%) by occupation, followed by tea garden labourers 16 (26.6%). Study conducted by Bharathi et al<sup>[7]</sup> showed that majority of the patients (64.75%) to be cultivators by occupation. Out of 60 patients , history of trauma was given by 51(85%). This corroborates with findings of studies by Nath et al<sup>[6]</sup> , Bharathi et al<sup>[7]</sup> , Kumari N et al<sup>[10]</sup>.

Infection of cornea due to filamentous fungi are a frequent cause of corneal damage in developing countries and are difficult to treat . Microscopy is an essential tool in the diagnosis of these infection . In the present study the rate of detection of bacterial and fungal and mixed growth was 32.43%, 59.45 % and 5.40% respectively which is comparable with Nath et al<sup>[6]</sup>(60.6%), Shrinivasan et al<sup>[3]</sup> and Basak et al<sup>[4]</sup> (62.7%) where higher incidence of fungal keratitis was seen. Bharathi et al<sup>[7]</sup> (34.4%) and Kumari N et al<sup>[10]</sup>(37.23%), Dutta et al<sup>[13]</sup>(32%) has shown lesser incidence whereas Geethakumari et al<sup>[8]</sup> (69.78%) has reported a much higher incidence of fungal keratitis. It may be due to hot and humid climate of this region. Another reason may be because this study was conducted at a tertiary care centre so fungal ulcers reported are more due to their prolonged course and poor response to available topical medications. Amongst the fungal isolates most common isolates were *Fusarium spp* (8 ,40.0%) , *Aspergillus spp* (6, 30%) . A similar figure was reported by Nath et al<sup>[6]</sup> , Bharathi et al<sup>[7]</sup> , Gopinathan et al<sup>[5]</sup> .But *Aspergillus spp* was found to predominant in West Bengal (Basak et al<sup>[4]</sup>), Nepal (Upadhyay et al<sup>[11]</sup>) , Bangladesh (William et al<sup>[12]</sup>). We isolated *Streptococcus pneumoniae* (33.3%) as the commonest bacterial isolates.

Ocular trauma (85.0%) was the most common predisposing factor followed by chronic and acute dacryocystitis (6.66%) and diabetes mellitus (5.0%). This is comparable with Basak et al<sup>[4]</sup> and Bharathi et al<sup>[7]</sup> where ocular trauma constituted 82.9% and 92.15% respectively of the cases. This may be because most of the patients in the present study were involved in agriculture activities and are prone for injury with vegetative matter which is associated with higher incidence of fungal keratitis. Injury with bamboo sticks (19, 37.25%) and paddy leaf (13 ,25.4%) predominates .

## 5. Conclusion

Suppurative keratitis is a preventable vision-threatening disease . In the present study maximum number of cases were from rural area and most of them were cultivators by occupation with trauma being the major risk factor . *Fusarium spp* and *Streptococcus pneumoniae* are the most common isolates with corneal ulcer. Microbiological investigations will aid the ophthalmologists in precise

identification of the organisms and to institute appropriate treatment.

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