ABSTRACT: **AIMS:** This study was done to evaluate the clinical features of microbial keratitis with specific reference to causes and contributing factors. **METHODS:** This is a prospective non randomized analytical observational study done in regional institute of ophthalmology, GMC Bhopal, to evaluate the clinical features, causes and contributing factors in microbial keratitis. 104 patients of microbial keratitis were included, detailed history was taken. Careful ocular examination aided with slit lamp was done. **RESULTS:** Maximum incidence rate was seen in males belonging to rural areas (74%). farmers were commonly affected (42%) and also people from lower socioeconomic strata (81%). Trauma was the most common predisposing factors (45%), vegetative matter and wooden sticks were commonest agents of trauma. **CONCLUSION:** In most of the cases microbial keratitis can be prevented. Intervenational strategies should target on increasing the awareness, providing better ophthalmological care at primary health care level, and discouraging the practice of self-medication.

**KEY WORDS:** Corneal Ulcer; Causes: Contributing factors;

**INTRODUCTION:** Microbial keratitis is an important cause of ocular morbidity in India. It can lead to severe visual and structural damage to eyes. Various factors like Occupational hazards, compromised hygiene state, nutritional & immune status, self medication and many more play an important role in predisposition of microbial keratitis. Furthermore prolonged morbidity has grave implication on the earnings and financial regards of these patients. Though the literacy rate, earning capacity, access to medical facilities have increased in last decade, microbial keratitis still seems to affect significant number of people. Furthermore the practice of self medication which is quite rampant in certain class of population is also an important cause for this entity. Keeping these facts in consideration this study was done to evaluate various causative and contributing factors in microbial keratitis.

**METHOD:** This is a prospective non randomized analytical observational study done in regional institute of ophthalmology, GMC Bhopal, to evaluate the clinical profile with specific reference to, causes and contributing factors in microbial keratitis. 104 patients of microbial keratitis attending outdoor and indoor facilities were included. All cases of non – infectious keratitis were excluded from present study such as- Cases of allergic keratoconjunctivitis and who presented without any discharge; cases presenting with limbal infiltration and ulceration and associated with systemic signs and symptoms of collagen vascular disease; simple Corneal abrasion. All the cases of corneal ulcer were evaluated with detailed history comprising of -History of present illness; History of Febrile illness; Duration of pain &redness; watering& discharge: corneal haziness; defective vision;
History of trauma or entry of foreign body; History suggestive of dry eye; viral keratitis: Neuro paralysis or Exposure.

Treatment History was taken with specific reference to, self medication, use of steroid eyedrops, use of indigenous medicines, delay in reporting to an ophthalmologist, consultation and treatment from an ophthalmologist. Careful complete ocular examination aided with slit lamp was done. Visual acuity recording was done on snellens chart. digital intraocular tension were recorded. Detailed examination of ocular structures was done as per the corneal ulcer examination protocol. All relevant investigations were carried out – Fluorescein test, Schirmer's test, corneal sensations, corneal scraping for culture and sensitivity was done. All routine systemic investigations were done. Systemic evaluation was done for any septic foci in the body. Ultrasound examination of posterior segment was carried out to rule out endophthalmitis in suspicious cases. With regards to treatment, broad spectrum antibiotics local and systemic were started, and after the availability of culture and sensitivity report, antibiotics were reviewed. Statistical analysis of the data was done after completion of the study period and its result were compared with the various studies which were conducted on microbial keratitis.

RESULTS: The present study 'Clinical profile of microbial keratitis. Causes and contributing factors' was conducted at the Regional institute of Ophthalmology, Gandhi Medical college Bhopal. After thorough history taking, systemic and ocular examination was done, culture was sent and patients were put on appropriate therapy and were observed during the study period. With regard to clinical profile and specific reference to causes and contributing factors following results were observed. Maximum incidence of keratitis was observed in age group of 41-50y yrs. (28.46%). Age group of 51-60yrs was also predisposed to corneal ulcer (19.65%). Thereby it was noted that incidence of corneal ulcer was maximum in productive age group i. e 41-60yrs (48%). Age groups of 21-40yrs were also quite predisposed to occurrence of microbial keratitis (31%). In the age groups of less then 30yrs and more then 60yrs incidence of microbial keratitis was seen to be 9% and 12% respectively. It was further observed that males (61.58%) were more predisposed as compared to females (38.42%). Male to female ratio being 1.60.

<table>
<thead>
<tr>
<th>S. N.</th>
<th>Area</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Rural</td>
<td>74.5</td>
</tr>
<tr>
<td>2.</td>
<td>Urban</td>
<td>17.2</td>
</tr>
<tr>
<td>3.</td>
<td>suburban</td>
<td>8.64</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

| TABLE -1: DISTRIBUTION ACCORDING TO AREA |

Maximum No. of patients were from rural areas contributing to 74.5% cases. Urban and suburban contributed to 17.2% and 8.64% respectively.
In this study of 104 cases 42% cases were farmers followed by labourers i.e 23%. Other category comprising of students, housewives, professionals etc contributed to 35%.

<table>
<thead>
<tr>
<th>S. N.</th>
<th>Occupation</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Farmers</td>
<td>42</td>
</tr>
<tr>
<td>2</td>
<td>Labourers</td>
<td>23</td>
</tr>
<tr>
<td>3</td>
<td>Others</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

**TABLE -2: DISTRIBUTION ACCORDING TO OCCUPATION**

According to kuppuswamy classification, three categories of socioeconomic status were taken in present study 81% cases belonged to lower income group. Remaining cases were from middle 14% and higher 5 % income group.

<table>
<thead>
<tr>
<th>S. N.</th>
<th>Socio – economic Status</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lower income group</td>
<td>81</td>
</tr>
<tr>
<td>2</td>
<td>Middle income group</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>Higher income group</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

**TABLE -3: DISTRIBUTION ACCORDING TO SOCIO – ECONOMIC STATUS**
Main cause of trauma was by wooden stick seen in 45% cases, followed by vegetative material in 33% cases. In substantial 13% cases agent of trauma could not be identified.

In present study most common risk factor was trauma, seen in 45% cases. In 18% there was associated Meibomianitis. 17% cases presented with history of prior use of steroid. Corneal Ulcer in association with Diabetes mellitus was seen in 6% cases. Other contributing factors which were identified comprised of Dry Eye (2%): Conjunctivitis (trachoma Grade IV) (3%): Chronic Dacryocystitis (4%): trichiasis (2%): Lagophthalmos (2%): Contact lens use (1%).
After evaluation of the results of the present study following conclusions were drawn. The maximum incidence of microbial keratitis was observed in males specially of productive age group (41-60 years). Thus it was concluded that corneal ulcer is seen most commonly in age groups of 40-60yrs. Microbial keratitis was seen more frequently in the rural population (74.5%). Farmers were more commonly affected (42%), followed by labourers and persons employed in other occupation as 23% & 35% each. People from low socio economic class were effected more frequently (81%). Trauma as predisposing factor was present in 45% cases, more common in males. Vegetative materials was responsible for causing corneal trauma in 33%, followed by wooden stick in 45% cases.

**DISCUSSION:** Corneal blindness is a major public health problem worldwide and infectious keratitis is one of the predominant causes. In India, 15.4% of blindness is attributed to corneal diseases\(^1\). In India, it is estimated that there are approximately 6.8 million people who have vision less than 6/60 in at least one eye due to corneal diseases: of these, about a million have bilateral involvement\(^2\). Corneal ulceration has been recognized as a silent epidemic in developing countries, especially the South-east Asia Region.\(^3\)

In present study of microbial keratitis 61.58% cases were males and 38.42 cases were females. the male:female ratio was 1:60. Maximum incidence of keratitis was observed in age group of 41-50y yrs (28.46%). Age group of 51-60 yrs was also predisposed to corneal ulcer (19.65%). The greater incidence in Male could be due to the fact that males are more exposed to the external environment and more exposed to the risk factor such as trauma in outdoor activities and thus more susceptible to corneal infection. V Sharma et al\(^4\)in their study noted that mean age of patients affected was 40 years and the male to female ratio was 7:2. Gonzales et al \(^5\) noted male to female ratio being 1.6:1. Parmar et al\(^6\) reported high incidence of corneal ulcers in age group of 50-60yrs. Panda A et al\(^7\) noted that incidence of corneal ulcer was more in 3rd to 5th decade. Our findings are consistent with findings of Other studies\(^8,9\). Male preponderance was noted in other studies as well\(^8,10\). However Study done by Upadhyay MP\(^11\) reported equal affection of males and female.

Majority of cases (74.15%) of present series belonged to rural area. It might be due to the fact that majority of the population in rural areas belong to low socioeconomic strata. Less literacy rate and poor access to ophthalmological consultation aggravates the condition. Furthermore they were predominantly involved in agricultural work, and were labourers by occupation hence more prone to trauma. In addition risk further increases due to poor ocular hygiene. Consultation with quacks, and lack of awareness. Bharthi M J\(^8\), et al reported distribution in cases of Microbial keratitis to be 54.07% rural and 45.95% urban.

In present study of 104 cases 42% cases were farmers followed by labourers i.e 23%. In our country, majority of population is involved in agricultural work and various types of manual labourers. Thus they become more prone to injuries, exposure to dust & wind, dryness and heat and also to bad ocular surface and poor ocular hygiene, which promote development of Microbial keratitis. As reported by Gopinathan et al\(^12\), patients with agriculture-based activities were at 1.33-times (95% CI 1.16-1.51) greater risk of developing microbial keratitis. Our findings are consistent with observations in other studies\(^12,13\). Nema et al\(^13\) reported incidence of corneal ulcer in farmer to be 29.4% and 20.90% in labourers. A 10 year study at LVPEI, Hyderabad\(^12\) concluded that incidence in farmers was 27.6% followed by labourers (20%).
In present study (81%) cases of microbial keratitis belonged to lower socioeconomic group, remaining cases were from middle (14%) and higher (5%) income group. Persons from lower socioeconomic groups have compromised ocular hygiene, poor nutritional status, have less access to medical care. Furthermore poor economic status leads to chain of reaction of events leading to late presentation of cases and in advanced stage of disease.

In present study 39% cases presented after taking self medication. Commonest Agent of self medication was rose water, followed by plant extract & honey. Some patients also reported to have put desi ghee, which can serve as a good culture media for microorganisms. In certain class of population specially in rural areas there is still the practice of using indigenous medicines for common eye ailments. Inappropriate use of these medicines works as an important predisposing factor for microbial keratitis. Some of these products are crushed dried plant materials, human products such as breast milk and saliva: rosewater, goat milk, castor oil etc These preparations are often contaminated and serve as a vehicle for spread and growth of microorganisms. They may also cause corneal damage by their toxic effect. Study from South India, reported the use of human milk and goat milk contributing to Acanthamoeba keratitis. A study of tertiary care center in India reported that among patients with a predominantly rural background and presenting with corneal ulcer, breast milk was the most common traditional medicine used. M Srinivasan et al observed (19. 8%) of patients using herbal medicine had put some kind of oil into the eye (castor oil, lamp oil, or seed oil) plant juice (usually from a flower or onion extract). honey, chicken blood into the eye. Norina TJ et al observed that self prescribed medication impose a dangerous impact on the progression of Microbial keratitis.

Use of topical steroid was confirmed by substantial 17% of cases. This was mainly because of over the counter availability of medicines, and less awareness about their indications. similar findings were noted in other studies. According to Jack J kanski text book of ophthalmology, use of topical steroid is an important risk factor for bacterial and fungal keratitis in large number of patients.

In present study most common risk factor was trauma in 45% cases followed by Meibomitis in 18% cases. 17% cases presented with history of prior use of steroid. Evaluating trauma as commonest risk factor, it was observed that trauma by vegetative matter was seen in33% cases. Other studies also reported that trauma was most common risk factor for microbial keratitis. Other studies also reported that most common predisposing cause of ulceration was corneal trauma, usually with organic agricultural materials. Contact lens & dry as predisposing factor was seen in, 1% and 2% cases respectively. Henry CR noted dry eye as associating factor in 31% cases of corneal ulcer. Other studies also noted dry eye as contributing factor for microbial keratitis. Sapkota K reported 3% incidence of corneal ulcer in contact lens wearers. In our study Trachoma was seen in 3% and Uncontrolled diabetes mellitus in 6% cases. M Srinivasan noted diabetes as one of the causative factors.

Huang SC et al concluded that blepharitis and meibomianitis has been shown to be leading contributors to bacterial keratitis. Chronic dacryocystitis was seen in 4%: and lagophthalmos in 2% cases. Other studies noted chronic dacyrocystitis, mucocoele and lagophthalmos as predisposing factors. other predisposing factors noted were ectropion, Bell's palsy with exposure keratitis, corneal anaesthesia following herpes simplex or herpes zoster infections, neurotrophic keratitis.
It is worth mentioning here that trauma is the only predisposing factor which is causing direct corneal affection and microbiological introduction in corneal tissue, whereas other factors play a contributing role in causation of corneal ulcer. Normal microbial flora of eyelid and conjunctiva work as a protective factor and any change of this flora of Eyelid and conjunctiva may result in local infections like blepheritis, meibomitis, dry eye etc. This may inturn works as a contributing factor for microbial keratitis.

CONCLUSIONS: The predisposing factors of corneal ulcers in this region are important for the prevention and early treatment of the disease. Many other studies have also identified the same risk factors playing an important role in causation of cornea Ulcer. Increasing the awareness amongst general population, more so in underdeveloped class may help in reducing the incidence of microbial keratitis. This can be achieved by increasing the literacy rate, increasing the awareness about the impact of trauma to eye, preventing the availability of over the counter medicines, avoiding self medication specially the use of topical steroids in treatment of simple red eyes. These objectives may not be as difficult as they seem to be. In this era of mass communication, public awareness on such issues can be increased through the medium of television &radio talks, organizing awareness and screening camps in areas of risks can also help in lowering the incidence. Traditional eye medicines were more commonly used by patients with a history of trauma: hence, health education and awareness about primary eye care following trauma needs to be created in our community. Local health care Providers need to be educated and their cooperation must be sought in order to direct patients to appropriate health care facilities so that corneal blindness due to use of traditional eye medicines may be prevented. All local infections should be treated with appropriate therapy, for if they are not treated promptly, it may lead to corneal ulceration.

REFERENCES:


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