

## Clinico-Demographic Profile and Outcomes of Keratomycosis Attending a Tertiary Eye Care Referral Centre in North India - A Prospective Study

Ritu Chaturvedi<sup>1</sup>, Girish Dutt Chaturvedi<sup>2</sup>, Priya Sisodiya<sup>3\*</sup>, Dhruv Pathak<sup>4</sup>

<sup>1</sup>Assistant Professor, Department of Ophthalmology, Shrimant Rajmata Vijayaraje Scindia Medical College & Hospital, Shivpuri, M.P., India

<sup>2</sup>Senior Resident, Department of Ophthalmology, Shrimant Rajmata Vijayaraje Scindia Medical College & Hospital, Shivpuri, M.P., India

<sup>3</sup>Senior Resident, Department of Ophthalmology, Shrimant Rajmata Vijayaraje Scindia Medical College & Hospital, Shivpuri, M.P., India

<sup>4</sup>Senior Resident, Department of Ophthalmology, Shrimant Rajmata Vijayaraje Scindia Medical College & Hospital, Shivpuri, M.P., India

Received: 10-03-2021 / Revised: 13-04-2021 / Accepted: 31-05-2021

### Abstract

**Background & Method:** Corneal scraping of the patients suspected of fungal keratitis attending ophthalmology OPD and those admitted in ophthalmology ward of J A Group of Hospitals, Gajra Raja Medical College, Gwalior, M.P. Patient was made to lie down comfortably on a couch. The affected eye was cleaned with sterile saline using sterile swabs. Sterile 2% Paracaine was applied to the eye taking care not to apply too much of it as it may inhibit the growth of the organism. **Result:** The age and sex distribution of suspected cases were analyzed. The analysis showed that in this study 73 males and 33 females were studied. Considering the sex distribution 22(70.96%) males and 9 (29.04%) female patients showed positive culture showing higher prevalence among males. The urban and rural distribution of culture positive cases showed higher prevalence in rural population accounting for 74.19% cases. Distribution according to occupation in this study showed that maximum cases were farmer by occupation contributing about 51.61% followed by labourer 25.80%. **Conclusion:** Keratomycosis, an important cause of ocular morbidity was found mostly in patients residing in rural area and those who were involved in agricultural and outdoor activity. History of trauma was found to be an important predisposing factor and strongly correlated along with the clinical features. It was seen commonly in the middle age group with male preponderance. Male of this age group are often the sole earners of the family and so ocular morbidity due to this can cause grave economic consequences for them.

**Keywords:** Keratomycosis, Clinico-demographic & Eye Care.

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

### Introduction

In recent times, confocal microscopy has been very useful in delineating the nature and extent of keratomycosis. Earlier, dematiaceous fungi were not considered to be significant but now these are also one of the important cause of keratomycosis[1].

It was considered as rare entity in the past because up to 1951 only 63 cases were reported. As a result of awareness among medical personnel about use of corticosteroids as one the predisposing factor to keratomycosis as well as use of calcoflour white stain in mid 1980s as diagnostic tool, have improved early detection of these cases[2].

Keratomycosis is defined as an invasive infection of corneal stroma caused by a variety of fungal species[3]. This is also called "mycotic keratitis" or simply "fungal keratitis" or fungal corneal ulcer. It is exclusively an infection of cornea only and not the keratinized area of skin as its name sounds like that hence should not be mistaken[4].

\*Correspondence

**Dr. Priya Sisodiya**

Senior Resident, Department of Ophthalmology, Shrimant Rajmata Vijayaraje Scindia Medical College & Hospital, Shivpuri, M.P., India  
E-mail: [medicalpub.2021@gmail.com](mailto:medicalpub.2021@gmail.com)

The cornea is window of eye through which light pass and subsequently travelling through other ocular media fall on the retina where reception and transmission of these light impulses occurs and reaches to the higher visual centers[5]. It is a complex structure which, as well as having a protective role, is responsible for about three quarters of the optical power of eye. The normal cornea is free of blood vessels. The cornea is the most densely innervated tissue in the body and conditions such as abrasion and bullous keratopathy are associated with marked pain, photophobia and reflex lacrimation[6]. Keratomycosis is a significant reason of visual handicap in non-industrial nations. It is normal in our country on account of the heat and humidity and an enormous agrarian populace in danger. Since the primary report of keratomycosis, growths have been progressively involved in the reason for corneal ulcer, there has been a sensational ascent in recurrence of these diseases over the most recent twenty years potentially in light of the aimless utilization of anti-toxins and corticosteroids in ophthalmology practice. An expanded clinical mindfulness has likewise incompletely added to its continuous detailing. In northern India, contagious keratitis has a commonness of 8.4% while it has been accounted for as high as 46.3% from southern India. Keratomycosis can be brought about by upwards of 60 types of organisms. The prevalent etiological specialists shift in various topographical zones. In any case, *Aspergillus* spp. is the commonest disconnect in India[7].

Organisms are pioneering specialists of disease and become pathogenic under states of disabled immunodefense. Contagious disease without accelerating occasion is surprising. Injury is the most well-known accelerating factor in the vast majority of the cases. The idea of injury frequently is vegetative in beginning, which may comprise of injury with plant twigs, rice-husk, cotton plant and so on. Injury prompts obliteration of the epithelium and Bowman's layer, weakening hindrance to contamination[8]. The fundamental stroma turns out to be, unnecessarily hydrated and conceivably changed in such a manner to comprise a more favorable site for organism to develop. Keratomycosis brought about by filamentous organisms is a word related peril of ranchers and horticultural laborers. The occasional variety noted in many arrangements doubtlessly address word related wounds related with reaping. Then again mycotic contamination particularly *Candida* spp may create in prior injuries like herpetic scars, neurotrophic keratitis which adjusts neighborhood visual immunoprotection[9]. Eyes are our principle contact with the world. Vision is the feeling that everybody esteems more than the remainder. Light waves from an article enter the eye first through the cornea, the straightforward vault which fills in as the external window of the eye. Corneal ulceration is characterized as a deficiency of corneal epithelium with basic stromal penetration and festering related with indications of aggravation. Corneal visual impairment is a significant general medical issue worldwide and irresistible keratitis is one of the transcendent preventable reasons.

**Material & Method**

Corneal scraping of the patients suspected of fungal keratitis attending ophthalmology OPD and those admitted in ophthalmology

ward of J A Group of Hospitals, Gajra Raja Medical College, Gwalior, M.P. were studied from 1<sup>st</sup> May 2017 to 30<sup>th</sup> April 2018.

**Inclusion Criteria**

Patients who were having corneal ulcer and were suspected of fungal keratitis attending Ophthalmology OPD and those admitted in ophthalmology ward in the J. A. Group of Hospitals during the study period of one year.

**Exclusion Criteria**

- 1) Child <2 yrs of age
- 2) Patients who were not willing to participate in the study.

**Specimen collection:** Written consent from the participants or their guardians included in the study was obtained after providing full explanation of the current study in their local language. The study was submitted to Institutional Ethical committee and got the approval for proceedings. All the data collected were kept confidential.

Corneal scrapings were collected from patients of corneal ulcer.

**Procedure** -Patient was made to lie down comfortably on a couch. The affected eye was cleaned with sterile saline using sterile swabs. Sterile 2% Paracaine was applied to the eye taking care not to apply too much of it as it may inhibit the growth of the organism. Care was taken to see that the eyelids did not contaminate the specimens. Eye speculum was used whenever necessary. Patients were given relevant instructions regarding position and restriction of eyeball movement during the scraping procedure.

No.15 Bard Parker blades were used to scrap the ulcer. A new sterile blade was used for each patient. Materials were obtained from leading edge and base of ulcer. Scrapings were taken and processed as follows.

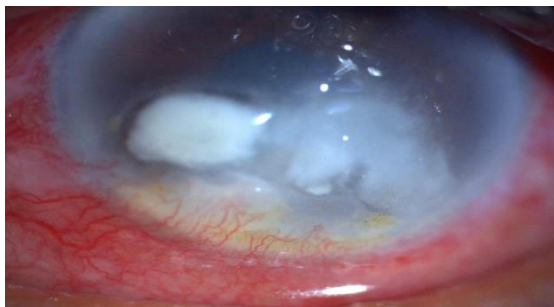


Fig 1: Corneal ulcer

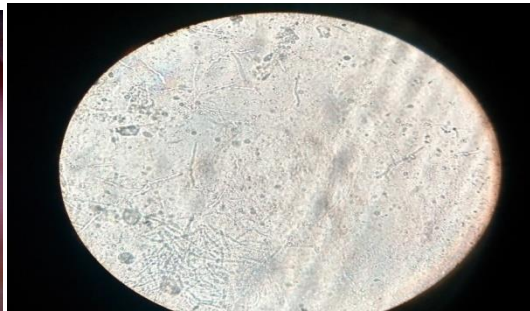


Fig 2: Fungal Hyphae on KOH mount

**Results**

**Table 1: Incidence of Keratomycosis**

Fungal etiology	Number of cases (n)	Percentage (%)
Positive	38	35.84
Negative	68	64.15
Total	106	100

In this study a total of 106 patients suspected of having fungal keratitis were studied. Out of this 38 cases were found to have fungal etiology depending upon direct microscopy and culture positivity,

showing 35.84% incidence of keratomycosis in this study. The chi-square statistic is 0.0055. The p-value is .940979. The result is not significant at  $p < .05$ .

**Table 2: Sex wise distribution of suspected cases**

S. No.	Sex	Number of cases (n)	Percentage (%)
1	Male	73	68.86
2	Female	33	31.13
3	Total	106	100

The age and sex distribution of suspected cases were analyzed. The analysis showed that in this study 73 males and 33 females were studied.

**Table 3: Sex wise distribution of culture positive cases**

S. No.	Sex	Number of cases (n)	Percentage (%)
1	Male	22	70.96
2	Female	09	29.04
3	Total	31	100

Considering the sex distribution 22(70.96%) males and 9 (29.04%) female patients showed positive culture showing higher prevalence among males.

**Table 4: Distribution of culture positive cases according to residence**

S. No.	Residence	Number of cases(n)	Percentage(%)
1	Rural	23	74.19
2	Urban	08	25.80
	Total	31	100

The urban and rural distribution of culture positive cases showed higher prevalence in rural population accounting for 74.19% cases.

**Table 5: Distribution of culture positive cases according to occupation**

S. No.	Occupation	Number of cases(n)	Percentage(%)
1	Farmer	16	51.61
2	Labourer	08	25.80
3	Household worker	04	12.90
4	Others	03	9.67
	Total	31	100

Distribution according to occupation in this study showed that maximum cases were farmer by occupation contributing about 51.61% followed by labourer 25.80%.

### Discussion

In this study, most common age group affected was 41-60 yrs representing 41.02% of cases. Bharathi et al (2003)[1]documented higher incidence of fungal keratitis in age group of 21-50 yrs.However study by Chowdary et al (2005)[6] documented higher incidence in younger age group of 31-40yrs. Another study by documented 83.25% cases in age group 31-70yrs.Higher incidence of keratomycosis in middle aged people can be explained by the fact that this age group people are more engaged in outdoor and field activity and so are prone to injury.The rural and urban distribution of corneal ulcer patients in this study revealed highest prevalence of fungal keratitis (74.19%) in people living in rural areas.This was similar to the study of Basaksamar K et al (2005)[10] in which 78.5% of the patients were from rural areas.The study of Bharathi M J et al(2003)[1] also showed higher prevalence of infected corneal ulcers in patients from rural background with 80.27% and 76.62% prevalence respectively.In study done by Bandyopadhyay et al (2012)[11] 85.71% of affected people were from rural background. The greater incidence of fungal keratitis in rural population can be explained by the fact that in rural area people are more ignorant towards their health, they are mostly engaged in agricultural activity and are therefore more exposed for injury from vegetative matter. In present study, fungal keratitis was observed to be more common in farmers(51.61%) followed by labourers(25.80%) which is in concordance.Also similar results were found in study done by Bharathi et al (2003)[1], Kumari et al (2002)[12] and Deshpande et al (1999)[13].The present study shows seasonal variation in presentation of cases. Incidence was maximum in month of March-April followed by Nov-Dec.This period correlated with the harvesting season of our region. In harvesting season more people gets engaged in agricultural activity and also chances of vegetative injury increases and also they get exposed to fungal spores.

### Conclusion

Keratomycosis, an important cause of ocular morbidity was found mostly in patients residing in rural area and those who were involved in agricultural and outdoor activity.History of trauma was found to be an important predisposing factor and strongly correlated along with the clinical features.It was seen commonly in the middle age group with male preponderance. Male of this age group are often the sole earners of the family and so ocular morbidity due to this can cause grave economic consequences for them.

**Conflict of Interest: Nil Source of support:Nil**

### References

- Bharti MJ, Ramakrishnan R, Vasu et al. Epidemiological characteristics and laboratory diagnosis of fungal keratitis. A three year study. Indian Journal of Ophthalmology. 2003; 51:315-21.
- Panda A, Sharma N, Das G,Satpathy G. Mycotic keratitis in children epidemiologic and microbiologic evaluation. Cornea. 1997; 16:295-9.
- Srinivasan M, Ganzales CA, George C et al. Epidemiology and aetiological diagnosis of corneal ulceration in Madurai, South India. Brit J Ophthalmol. 1997; 81:965-71.
- Tanure MA, Cohen EJ, Sudesh S, Rapuano CJ, Laibson PR. Spectrum of fungal keratitis at Wills Eye Hospital, Philadelphia, Pennsylvania. Cornea. 2000; 19:307-312.
- Laspina F, Samudio M, Cibils D et al. Epidemiological Nepal Medical College Journal characteristic of microbiological results on patients with infectious corneal ulcers: a 13 year survey in Paraguay. Graefes Arch Clin Exp Ophthalmol. 2004; 242:204-9.
- Chowdhary,Anuradha MD. Spectrum of Fungal Keratitis in North India. Cornea. 2005;24(1):8-15.
- Nath R, Baruah S, Saikia L, Devi B, Borthakur AK, Mahanta J. Mycotic corneal ulcers in upper Assam. Indian J Ophthalmol. 2001; 59:367-371.
- Thomas PA, Kaliamurthy J. Mycotic keratitis: epidemiology, diagnosis and management. ClinMicrobiol Infect. 2013; 19:210-220.
- Sun RL, Jones DB, Wilhelmus KR. Clinical characteristics and outcome of Candida keratitis. Am J Ophthalmol. 2007;143: 1043 -1045.
- Basak SK, Basak S,Mohanta A, Bhowmick A. Epidemiological and microbiological diagnosis of suppurative keratitis in gangetic West Bengal, Eastern India. Indian J Ophthalmol. 2005; 53:17-22.
- Bandyopadhyay et al. epidemiology and laboratory diagnosis of fungal corneal ulcer in the sub urban region of West Bengal, eastern India. Nepal J Ophthalmology. 2012;4(7):29-36.
- NamrataKumari,AXess, SK Shahi. A study of keratomycosis: one experience. Indian journal of Mico & Path. 2002; 45(3):299-302
- Deshpande SD, Koppikar GV.A study of mycotic keratitis in Mumbai. IJMM. 1999;42(1):81-87.