

Original Article

## Incidence of fungal keratitis in Libya: An epidemiological study

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### ABSTRACT

**Objectives:** The aim of this study was to assess the occurrence of eye fungal infection among patients attending the eye hospital in Tripoli city, Libya.

**Materials and Methods:** Seventy-one patients with ocular fungal infections were subjected to clinical and microbiological investigations. They were selected from patients attending the Tripoli Eye Hospital. The specimens of the external ocular infections were collected using sterile swab and inoculated to different culture media. Data were presented as count and percentages.

**Results:** The current findings showed that *Aspergillus* was the most common causative agent, being responsible for 91.54% of the all cases, followed by *Candida albicans* (8.46%).

**Conclusion:** Occurrence of fungal keratitis gradually increased in the years after 2009, especially after 2013. Knowledge of the pathological course and clinical features of fungal keratitis will undoubtedly lead to early diagnosis and treatment, with reduction in ocular morbidity.

**Keywords:** Eye, Infection, Dermatophytic, Clinic

### INTRODUCTION

Ocular fungal infections (ophthalmic mycosis) are significant causes of morbidity and blindness (or even life-threatening infections) worldwide.<sup>[1]</sup> Among corneal diseases, the major cause of blindness is microbial keratitis.<sup>[2]</sup> Ocular ulceration and trauma are major causes of corneal blindness, often sub-related, but may be responsible for 1.5–2.0 million new cases of monocular blindness per year. Furthermore, the incidence of corneal diseases varies from nation to others and also from population to population.<sup>[1]</sup> In developed countries (North America, West Europe, and Australia), a high proportion of bacterial ulcers has been identified, and the highest proportion of corneal infections in Libya is related to fungi.<sup>[3]</sup>

A major cause of microbial keratitis is fungal keratitis.<sup>[2]</sup> An increase in its occurrence has been conveyed in recent years, but in terms of diagnosis and treatment, the disease is still a challenge.<sup>[4-7]</sup> Among the prevalent causes of fungal keratitis worldwide are *Aspergillus* and *Fusarium*. *Aspergillus* has the worst prognosis in general, but it shows a positive response to antifungal drugs.<sup>[3,8]</sup>

Medical suspicion is the main factor in the diagnosis of mycotic keratitis.<sup>[9]</sup> The clinical presumption of a microbial keratitis agent may be based on clinical and epidemiological

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evidence, and clinical suspicion may be useful in directing antimicrobial therapy and early therapy.<sup>[10]</sup> Reports on etiological and epidemiological facts of fungal keratitis patients provide valuable insights into how this possibly overwhelming corneal disease is understood, and the consequence of this condition can be enhanced by a proper understanding of the agent and host factors involved in these infectious processes.<sup>[11,12]</sup>

If untreated, fungal keratitis may result in complications such as hypopyon formation and even sight-threatening endophthalmitis. Fungal keratitis, such as fungal scleritis, can also lead to local complications. In certain countries, it is a significant cause of mono-ocular blindness.<sup>[13,14]</sup> There is no research on the actual prevalence and occurrence of fungal keratitis with its associated morbidity in Libya. Hence, the objectives of this study were to determine the occurrence of eye fungal infection among patients attending the eye hospital in Tripoli city, Libya.

## MATERIALS AND METHODS

The study was conducted with the approval of the committee of Faculty of Medical Technology, The University of Tripoli, Libya (RCC-MedTech-01), and was designed as a retrospective chart review. Archives of all identified cases of fungal keratitis at the eye hospital of Tripoli from January 2009 to June 2018 were studied. Patients were diagnosed based on the International Disease Classification and by the microbiology laboratory database of the hospital. Inclusion criteria were positive culture for fungus based on their macroscopic and microscopic features. Patients were excluded if they had ocular infection with other organisms than fungi.

The collected data included patient demographics, source of sample, department of the hospital, and laboratory results. All patients were involved for the analysis of occurrence, risk aspects, and laboratory outcomes. The obtained data were gathered in Microsoft Excel sheath and descriptively presented as counts and percentages.

## RESULTS

Seventy-one cases of fungal keratitis were identified during the study period. Overall, 52.2% were female. The most identified causative organism in the current study was *Aspergillus* 91.5% followed by *Candida albicans* 8.5% [Table 1].

The extent of the fungal infections during the years from 2009 to 2018 and the relationships between them, and the source of collection either floor, OPD, or casualty are shown in Figures 1 and 2. Most of the case samples were collected from floor constituted 84.5% followed by OPD and casualty (11.2% and 4.2%, respectively).

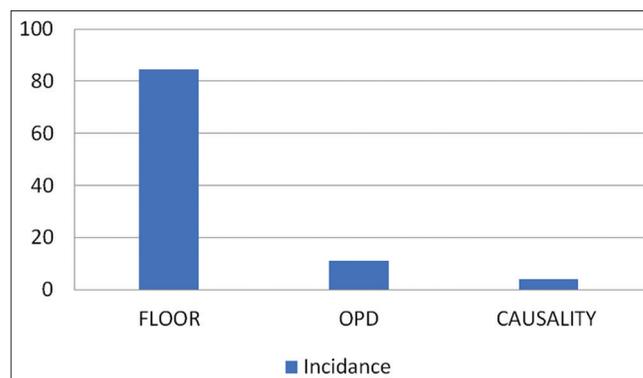
The incidence of fungal keratitis has been gradually increasing in the years after 2009, especially after the year of 2013.

## DISCUSSION

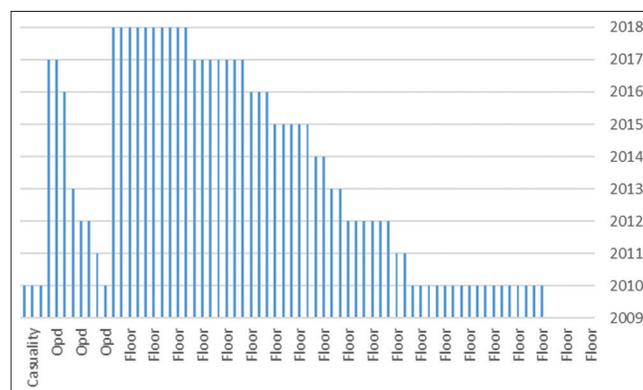
The patterns and consequences of fungal keratitis at Tripoli Eye Hospital were reported in this study. Much focus has been put on the recent outbreak of fungal keratitis in soft contact lens wearers and the possible reasons for it.<sup>[15]</sup> The key conclusion of the present study is that the occurrence of fungal keratitis gradually increased in the years after 2009, especially after 2013. In contrast to the common perception of a low frequency of fungal keratitis in the North African region, a high incidence of fungal keratitis among infectious keratitis patients (32.9%) was found in our sample. The *Aspergillus* and *Fusarium* genera have caused much of the fungal infections. In North Africa, the higher cases

**Table 1:** Number of fungal isolates.

Fungal isolate	Number	Percentage
<i>Aspergillus</i>	65	91.5
<i>Candida albicans</i>	6	8.5



**Figure 1:** Incidence rate by departments.



**Figure 2:** The extent of the fungal infections during the years from 2009 to 2018 in relation with the source of collection either floor, OPD, or casualty.

of fungal keratitis can be due to a growing trend toward farming activity in this area that predisposes individuals to vegetative injury. As per the prevalent sociocultural system, males primarily go for outdoor work and the same applies to agriculture, hence the predominance of males in fungal keratitis.

One of the highest crucial causes for infectious keratitis, along with ocular and systemic diseases, is contact lens use. In previous research, contact lens-related microbial keratitis had a high incidence rate.<sup>[16]</sup> The number of wearers of contact lenses has been growing, and younger people are equipped with contact lenses and do not follow guidelines for appropriate contact lens treatment. The age mode importance of patients in this presentation study was 24 years of age.<sup>[17]</sup> In addition, orthokeratology has resulted in several people wearing contact lenses overnight.<sup>[18]</sup>

The use of drugs, particularly steroid eye drops, lowers the immune system and reduces the host defense mechanism. For various ocular disorders such as blepharitis, iridocyclitis, choroiditis, and even allergic conjunctivitis, steroids are typically administered. When unmonitored, the use of steroids for a spectrum of ocular disorders leads to fungal keratitis. Diabetes mellitus has also been identified as a predisposing factor in some patients.<sup>[3]</sup>

Often, fungal keratitis has worse clinical results than bacterial keratitis. Studies have highlighted the advantage of topical natamycin for fungal keratitis over topical voriconazole, especially among those caused by *Fusarium*. In addition, voriconazole did not improve overall performance, although among *Fusarium* ulcers, there may have been some consequence. The authors concluded that they were unable to prescribe oral voriconazole at this time, considering the rise in non-serious adverse effects.<sup>[19]</sup>

## CONCLUSION

In conclusion, fungal keratitis is the leading cause of morbidity in the eye. Popular worldwide risk factors include diabetes mellitus, the use of contact lenses, and corticosteroids, but the most common identifiable cause is traumatic vegetative eye injury. There is significant variation between infectious keratitis because of its varied clinical appearance, and it has a clinical diagnostic challenge. Awareness of common cause clinical cases, related risk factors, and presentations of complications will also aid in the early diagnosis of fungal keratitis and improved clinical outcomes.

## Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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