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Predisposing Factors and aetiologic diagnosis of eye's Infection in Baghdad city/ Iraq

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Abstract: One of most common cause of ocular morbidity and blindness is microbial infections of the eye. There are numerous series that have been published of microbial eye's infection from many parts of the world. The current research was detected the certain bacteria and fungus and predisposing variables which predisposed for the microbial eye's infection. Annual study of the hospital record (194) cases were identified as microbial eye's infection and treated at Ibn Al-Haytham Hospital for Ophthalmology from (June 2020 to May 2021). A review of predisposing variables, clinical and microbiological data were conducted sample, Professionals obtained the samples, which were subsequently subjected to testing microbial culture and biochemical tests. Results showed *E. coli, Pseudomonas aeroginosa* and *S. epidermids* were the most predominant species of bacteria at a higher proportion (53.52%) whereas *P. mirabilis* isolated to lower proportion (2.58%). The most prevalent risk factors were corneal trauma in (39.69%) and ocular surface disease in (25.25%) of cases.

Keywords: Predisposing Factors, eye infections, corneal trauma, *P. aeroginosa*, Baghdad.

1-1 Introduction

Infections of the eyes might happen once pathogenic microorganisms like Viruses, bacteria, and fungi can infect any portion of the eyeball or surrounding tissues, together with the front transparent surface of the attention (cornea) and therefore infect the skinny membrane that lines the exterior of the eye and the interior of the eyelids (conjunctiva) (1).

In primary care, eye infections are a common concern. The five disorders most usually referred to two ophthalmology departments in Brisbane were'red eye,' 'conjunctivitis,' and 'keratitis/ corneal ulcer. (2). To verify that the patients' visual results are good, The Physician should make a quick diagnosis and begin necessary therapy immediately. Conjunctivitis commonly does not affect eye vision, but cornea or inside the eye infections pose a major concern and should be sent to an ophthalmologist instantly (3).

Infectious keratitis is one of the most destructive problems associated with contact lens use (4). *Pseudomonas aeruginosa* is the most common pathogens in infectious keratitis. Other pathogens included *Serratia*, *Streptococcus*, *Staphylococcus*, and *Acanthamoeba*. Corneal infections by bacteria may be threat the eye vision which need immediate broad spectrum antibiotics therapy, while *Acanthamoeba* keratitis treatment require multiple of antiamoebic drugs (5).

Contact lenses may cause eye allergies and inflammations. Inflammatory reactions, papillary conjunctivitis and in critical cases, cellular reactions and anterior chamber flare can develop (6). There are many published case reports (7-10) and case series (11-13) corneal infections of eye with, limbal circle, cosmetic contact lenses. In a study in France, of all eye contact lens infections eye infections caused by decorative contact lens comprised 12.5 % (14), while in a study in South Korea reported 41% of infections (15).

The research focused to Look into the origins of bacterial eye infections. such as conjunctivitis inflammation, Blepharitis (infection of eye lid) and dacryocystitis, and determinate some predisposing risk factors for eye's infection in Ibn Al-Haytham Hospital For Ophthalmology/ Baghdad/ Iraq.

Materials and methods

Retrospective study records of (194) cases who were diagnosed as microbial eye's infection and treated at Ibn Al-Haytham Hospital for Ophthalmology from (June 2020 to May 2021). The study excluded cases that didn't show microbial growth and care about the following risk factors: The most frequent and significant risk factor was corneal trauma, ocular surface disease, contact lens wear, corneal surgery and others. Corneal scrape was collected by sterile cotton swabs and transferred to the hospital's laboratory for culturing on four types of cultura media included: MacConkey, agar Blood agar, Chocolates and finally

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inoculated onto sabouraud's dextrose agar by streaking in C – shaped and inoculated onto the brain heart agar and broth medium, all agar plates incubated for 24 hr. at 37Cº except plates of sabouraud's dextrose agar which incubated at 2 temperature degrees: room temperature and 37Cº for 48 hour (Tille, 2014).

Results and Discussion

Among total cases (194) of culture, 155 cases (79.89%) showed microbial positive growth , while 39 cases (20.1%) had no growth . The microbial types and species are shown in (figure 4-1) (Table 4-1). Gram negative bacteria were predominant (67 cases 43.23%), mainly *E.coli* and *Pseudomonas aeruginosa* in same percentage (27 cases 17.41%). Gram positive bacteria (61 cases 39.35%), were mostly *Staphylococcus epidermidis* and *S. aureus.*

the present study compatible with Ismael et al, 2017 who reported that G-ve bacteria were the most predominant bacterial isolates specially *Pseudomonas aeruginosa* which isolated from eye infection cases in Baghdad city, the current study disagree with local study by Abdulnabi J. Abid et al, 2012 which reported different results where gram positive bacteria were predominant than gram negative, but compatible with current study in which G+ve bacteria *Staphylococcus auerus* appeared high proportion (38.06 %),While in G+ve bacteria, *Escherichia Coli* appeared high percentage (22.7%). This study shows that both gram negative and gram positive share in Eye infections may due to the eye is a sensitive organ and can be exposed to any microbial invasion, especially people with immunodeficiency or those with hard work.

(17.41) percent of positive growth is isolated were detected as fungus (20 cases 12.9%) *Aspergillus* spp. and (7 cases 4.51%) *Candida albicans.* In this study, growth culture was positive in (79.89%), in different studies the percentage of positive growth culture had been 32-76% (Bajracharya *et al*, 2020). Our study showed less fungus (17.41%) infections than bacterial eye infections, which compatible with local study by Hameed, 2020 which reported just bacterial species isolated from eye infections in Ibn Al- Haytham Hospital for Ophthalmology in Baghdad city, while in study at a Tertiary Eye Hospital in Nepal showed the proportion of fungal was higher than bacterial eye infections (Bajracharya *et al*, 2020). These results may due to increase of antibiotic resistance by bacterial isolates as a result of misuse of antibiotics and critical epidemiological situation in our society.

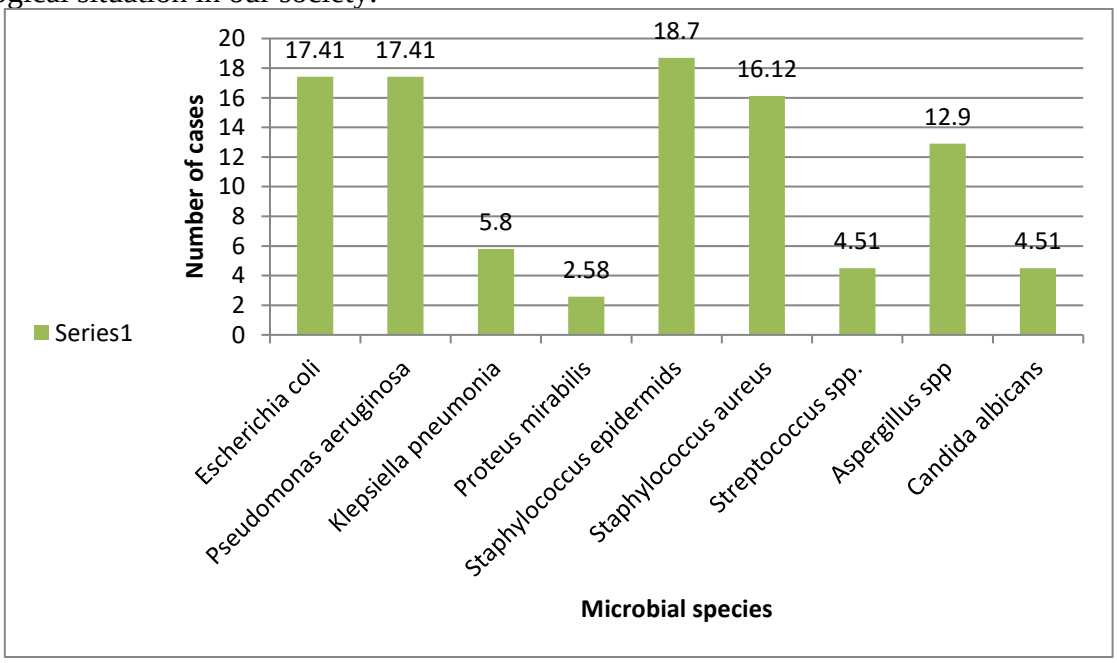

Figure (4-1) Relationship between microbial species and number of total cases (June 2020 - May 2021)

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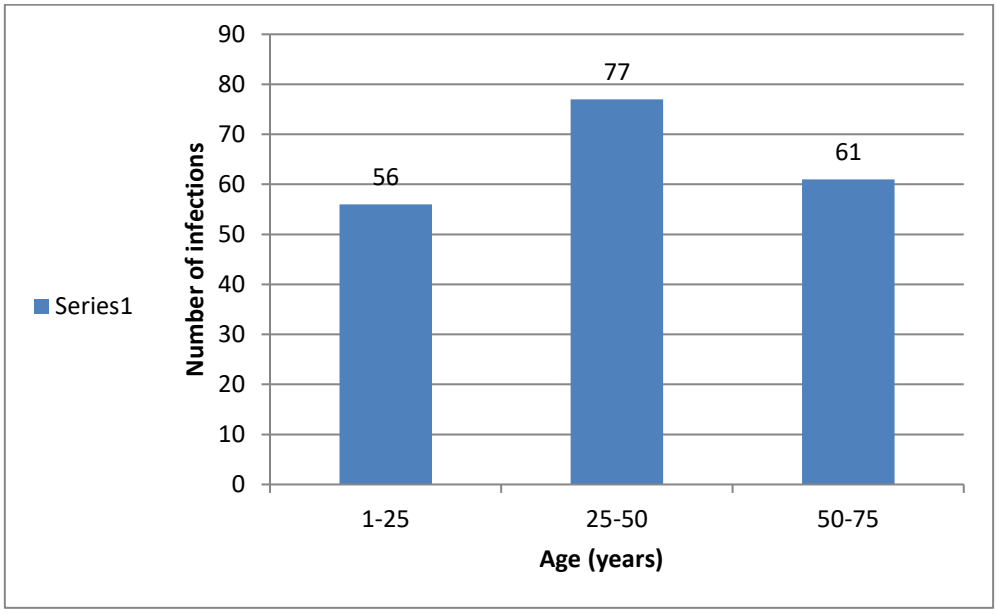
Table 4-1 Types of microbial isolates of eye infections

Microbial isolates	No. of isolates	Percentage
Gram negative		
Escherichia coli	27	17.41%
Pseudomonas aeruginosa	27	17.41%
Klepsiella pneumonia	9	5.8%
Proteus mirabilis	4	2.58%
Gram positive		
Staphylococcus epidermids	29	18.7%
Staphylococcus aureus	25	16.12%
Streptococcus spp .	7	4.51%
Fungus		
Aspergillus spp.	20	12.9%
Candida albicans	7	4.51%

(Figure 4-2): shows age distribution with microbial infection of eye. In our study, (26-50) range of age of patients showed a higher percentage (39.69%) of microbial infection, which is more like the working age groups. This results were similar to the average age (47 years) recorded by Bajrachage *et al* ,2020. The incidence of microbiological eye infections was bimodal in developed countries, initial peak in young adult people and second in the senior age people. The reason is using of contact lenses by young adult people



(Figure 4-2) Age distribution with number of eye infections

Like other studies, the present study had also showed male 101 cases (52.06%) predominant, while female 93 cases (47.938%) (figure 4-3). It's possible that this is due to the fact that men are concerned in based or outdoor jobs

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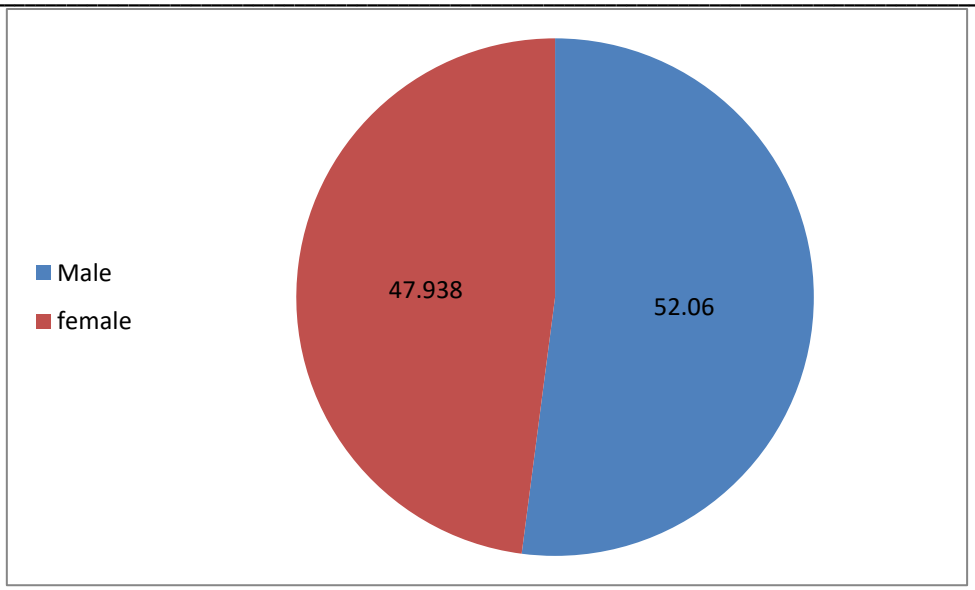

Figure (4-3) Eye infections distribution between male and female

A total of 155 microbial isolates, 47 (30.32%) in the summer months (May-September), and 104 (67.09%) in the winter months (October - April) (figure 4-4). The frequency of infection was higher in winter in our study like study in UK which reported incompared with winter, overall positive culture of eye infections was significantly less likely in summer and spring seasons (Walkden *et al*, 2018). The winter season provides a very suitable environment and weather for manifestation and increased activity of latent microorganisms that can contaminate the eyes (due to increased moisture in the air).

Other study showed , the reason for the increase of eye infection cases in hot seasons may be due to higher temperatures, rise humidity, and greater eye exposure to water (Gorski *et al*, 2015) Depending on geographic location, etiology and climate, the diversity of microorganisms that cause microbial eye infection varies. G +ve bacteria, for example, are often more common in temperate climates, but G -ve bacteria and fungus are more common in tropical climates.

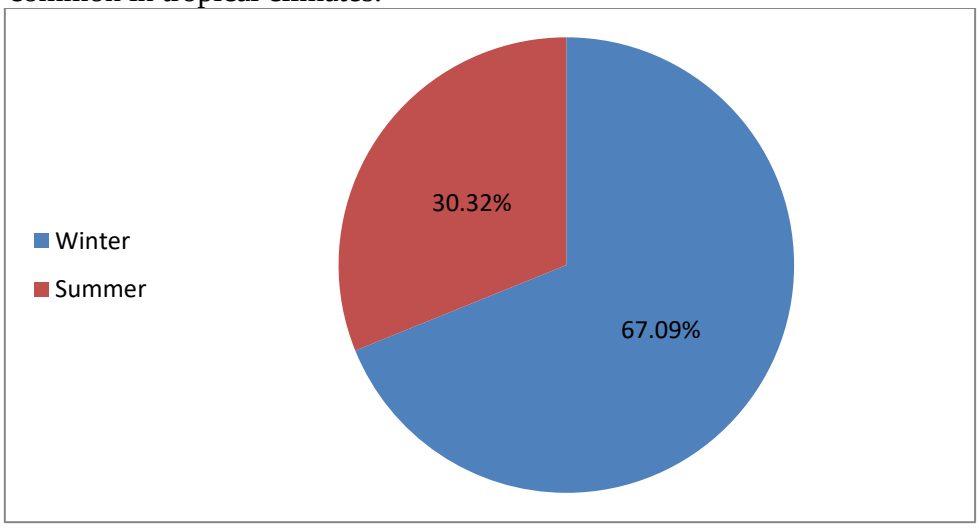

Figure (4-4) Distribution of microbial isolates over 12 month (May 2020 - April 2021)

Table 4-2: Frequency of some predisposing risk factors in eye infection

Factors	**Number of cases**	**percentage**
corneal trauma	77	39.69%
ocular surface disease	49	25.25%

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contact lenses wear	34	17.52%
corneal surgery	18	9.27%
others (unknown case)	16	8.24%

In the existing research, hazard factors for microbial eye's infection, were corneal trauma, ocular disease , which was equivalent to the outcomes of a previous study in Nepal (Bajrachaya *et al* , 2020), the leading risk factor for microbial keratitis trauma . Results in our study in compatible with studies in western countries results which reported that contact lens wear was the amount risk factor (Wong *et al*, 2003).

Contact lens induced eye infections only constitutes (17.52%) of all cases in current study which approximately compatible with study by (Fiona Stapleton et al , 2021) which reported of total keratitis infections cases recorded among 12 months , (11%) cases were contact lens-related infections. Bacterial corneal infections risks in contact lens wearers increase with contact lens improperly maintaining and contact lens hygiene continuously, failing to discard the contact lenses in a timely manner, and exposing the contact lenses to showering, swimming and tap water.

Conclusion

The microbial species obtained are: *E-coli, Pseudomonas aeruginosa, Klepsiella pneumonia, Proteus mirabilis , Staph. epidermids , Staphylococcus aureus , Streptococcus* spp. , *Aspergillus* spp. and *Candida albicans* , the season that gave the highest infections were winter because provides a very suitable environment and weather for manifestation and increased activity of latent microorganisms that can contaminated the eyes (due to increased moisture in the air) , and the most predisposing factors for infection are corneal trauma because a bacterial infection that invades the cornea, often after an eye injury, trauma or other damage. Contact lenses are particularly susceptible to eye irritation that can lead to corneal trauma.

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