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## Characteristics of Ophthalmologic Consultations and Hospital Admissions in the Emergency Department of a Tertiary Care Hospital: A Retrospective Study

Üçüncü Basamak Bir Hastanenin Acil Servisinde Oftalmolojik Konsültasyonların ve Hastane Başvurularının Özellikleri: Retrospektif Bir Çalışma

Vehbi ÖZAYDIN<sup>1</sup>, Serap KARACA<sup>2</sup>, Fatma Sarı DOĞAN<sup>3</sup>, Emel ALTINTAŞ<sup>4</sup>

Murat ÇETİN<sup>5</sup>, Onur İNCEALTIN<sup>1</sup>

<sup>1</sup>Department of Emergency Medicine, Goztepe Prof. Dr. Suleyman Yalcin City Hospital, Istanbul, Türkiye.

<sup>2</sup>Department of Ophthalmology, Goztepe Prof. Dr. Suleyman Yalcin City Hospital, Istanbul, Türkiye.

<sup>3</sup>Department of Emergency Medicine, Istanbul Fatih Sultan Mehmet Training and Research Hospital, Istanbul, Türkiye..

<sup>4</sup>Department of Emergency Medicine, Ufuk University, Ankara, Türkiye.

<sup>5</sup>Department of Emergency Medicine, Manisa Merkezefendi State Hospital, Manisa, Türkiye.

**Objective:** This study aims to evaluate the characteristics of ophthalmologic consultations, demographic data of patients, and reasons for hospital admission among patients presenting with ophthalmologic complaints to the emergency department (ED) of a tertiary care hospital.

**Materials and Methods:** This retrospective study included 3,617 patients with ocular complaints. The patients presented to a tertiary care ED in Istanbul between August 2021 and August 2022. The hospital's automation system was used to evaluate emergency ophthalmologic consultations.

**Results:** The mean age of the patients was  $42.17 \pm 16.60$  years, and 66.8% were male. The majority of visits (63.9%) occurred outside of working hours. Of these, 1,642 (45.4%) patients presented due to trauma. Intraocular foreign bodies were detected in 2,419 patients (66.9%). Among non-traumatic conditions, conjunctivitis (26.6%), subconjunctival hemorrhage (8.9%), and blepharitis (3.3%) were the most common diagnoses. A total of 91 patients (2.5%) were admitted to the ophthalmology department. The hospital admission rate was higher among older patients, those with non-traumatic conditions, and those without a foreign body.

**Conclusion:** Our study highlights the predominance of non-emergent consultations among ophthalmologic cases. It underscores the need for improved triage protocols to optimize consultations. Further research is required to enhance ophthalmologic case management and patient referral systems to optimize emergency care resources.

**Keywords:** Emergency Department; Ophthalmology; Admission; Consultation; Hospitalization

**Amaç:** Üçüncü basamak bir hastanenin acil servisine oftalmolojik şikayetlerle başvuran hastalar için yapılan konsültasyonların özellikleri, hastaların demografik bilgileri ve hastaneye yatış sebeplerinin değerlendirilmesidir.

**Gereç ve Yöntem:** Bu retrospektif çalışmaya oküler şikayetleri olan 3617 hasta dahil edildi. Hastalar Ağustos 2021 ve Ağustos 2022 tarihleri arasında İstanbul'da üçüncü basamak bir acil servise başvurdu. Acil oftalmolojik konsültasyonları değerlendirmek için hastanenin otomasyon sistemi kullanıldı.

**Bulgular:** Hastaların ortalama yaşı  $42,17 \pm 16,60$  yıl olup, %66,8'i erkekti. Başvuruların çoğu (%63,9) mesai saatleri dışında gerçekleşti. Bunların 1642'si (%45,4) travma nedeniyle başvurdu. Hastaların 2419'unda (%66,9) göz içi yabancı cisim saptandı. Travma dışında konjonktivit (%26,6), subkonjonktival hemoraji (%8,9) ve blefarit (%3,3) en yaygın tanımlar idi. Başvuran hastaların 91'i (%2,5) göz hastalıkları servisine yatırıldı. Yaşlı hastalarda, travma dışı yaralanması olanlarda ve yabancı cisim bulunmayanlarda göz hastalıkları servisine yatış oranı daha yüksekti.

**Sonuç:** Çalışmamız, konsülte edilen oftalmolojik vakalardaki acil olmayan konsültasyonların baskınlığını vurgulamaktadır. Konsültasyonları optimize etmek için triyaj protokollerine olan ihtiyacı vurgulamaktadır. Acil durum kaynaklarını daha iyi kullanabilmek için oftalmolojik vakaları yönetme ve hasta sevk sistemlerini geliştirme konusunda daha fazla araştırmaya ihtiyaç vardır.

**Anahtar Kelimeler:** Acil Servis; Oftalmoloji; Başvuru; Konsültasyon; Hastaneye Yatış

**Corresponding Author:** Serap Karaca **e-mail:** dr.serap44@gmail.com

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## INTRODUCTION

Ophthalmological complaints account for approximately 1–6% of emergency department (ED) visits (Jafari et al., 2012). Given that the anamnesis and physical examination of ophthalmological patients directly influence diagnostic and treatment decisions, the initial assessment in the ED setting holds critical importance. Emergency physicians must be able to distinguish urgent ophthalmological conditions that may lead to rapid visual function loss from other ocular disorders and promptly refer such cases to an ophthalmologist (Dağ et al., 2024). While some ophthalmic emergencies require treatment within hours, others primarily cause symptomatic discomfort.

In our country, the number of ED visits is steadily increasing. Despite limited resources both during and outside working hours, EDs continue to provide effective and high-quality healthcare services. However, the proportion of true emergencies, including ophthalmological cases, remains relatively low within the total number of admissions (Dağ et al., 2024). Therefore, ensuring an efficient triage system to direct only patients with genuine emergencies to the appropriate departments is of great importance. Such an approach allows for the optimal allocation of time and resources to critical cases (Stagg et al., 2017).

In this context, emergency physicians must be well-versed in the evaluation and management of ophthalmological complaints. Early diagnosis and appropriate referral play a crucial role in preventing permanent vision loss. This study aims to determine the demographic characteristics of patients who presented to the ophthalmology department or required ophthalmological consultation in the emergency setting of our hospital. The findings of this study are expected to provide valuable data for improving the approach to ophthalmological cases in the ED and enhancing the overall efficiency of healthcare services.

## MATERIALS AND METHODS

This retrospective study included 3,617 patients who presented to the tertiary emergency department (ED) between August 1, 2021, and August 1, 2022. The study was conducted following approval from the ethics committee (Approval number: 2022/0611).

### Inclusion Criteria:

- Patients presenting with any ocular symptoms.
- Patients requiring ophthalmology consultation for ocular diseases.

### Exclusion Criteria:

- Patients admitted to the ophthalmology department but subsequently hospitalized in other departments or intensive care units.

Emergency ophthalmology consultations were assessed using the hospital's automation system (Nucleus Medical Information System, Monad Software and Consulting). The following data were recorded for each patient:

- Laterality (involvement of one or both eyes),
- Presence of foreign bodies,
- Trauma-related cases and occupational accidents,
- Admission timing (during or outside working hours),
- Additional consultations,
- Final diagnosis,
- Hospitalization status.

This structured approach ensures comprehensive data collection and facilitates an in-depth analysis of ophthalmological emergencies in the ED setting.

### *Statistical analysis and ethical aspects*

The data were analyzed using IBM SPSS Statistics 23© software. Descriptive statistics were expressed as frequency (n) and percentage (%) for categorical variables, while numerical

variables were presented as mean  $\pm$  standard deviation (minimum–maximum). The Kolmogorov-Smirnov test was employed to assess the normality of data distribution. For comparisons between two independent groups where the normality assumption was not met, the Mann-Whitney U test was utilized. The relationships between independent categorical variables were analyzed using the Pearson Chi-square test and Fisher's exact test, as appropriate. This statistical approach ensures a rigorous and reliable analysis of the collected data, allowing for valid interpretations of ophthalmological emergency presentations.

## RESULTS

A total of 3,617 patients were included in this study, with a mean age of  $42.17 \pm 16.60$  years (range: 6–99 years). Among these, 2,416 patients (66.8%) were male. The majority of patients (2,312; 63.9%) presented outside of working hours. Trauma-related admissions accounted for 1,642 patients (45.4%), while 105 patients (2.9%) presented due to occupational accidents. A total of 91 patients (2.5%) required hospitalization in the ophthalmology department. Additional consultations were not required for 3,349 patients (92.6%). Intraocular foreign bodies were detected in 2,419 patients (66.9%), while bilateral involvement was noted in 233 patients (6.4%) (Table 1).

Hospitalization in the ophthalmology department was found to be statistically significantly higher among older patients, non-traumatic cases, and patients without intraocular foreign bodies (Table 2).

**Table 1.** General characteristics of eye consultations

Variables	n (%), mean $\pm$ SD
	42.17 $\pm$ 16.60 (6-99)
Age(year)	
Gender	
Female	1201 (33.2)
Male	2416 (66.8)
Admission time	
Within working hours	1305 (36.1)
Out of working hours	2312 (63.9)
Trauma	
Yes	1642 (45.4)
Occupational accident	
Yes	105 (2.9)
Other eye involvement	
Yes	233 (6.4)
Presence of Foreign body	
Yes	2419 (66.9)
Additional consultation	
No	3349 (92.6)
Non-traumatic eye diseases	
Conjunctivitis	525 (26.6)
Chalazion	3 (0.2)
Subconjunctival	21 (1.1)
hemorrhage	176 (8.9)
Blepharitis	66 (3.3)
Scleritis	36 (1.8)
Keratitis	15 (0.8)
Retinal detachment	42 (2.1)
Uveitis	1080 (54.8)
None	
Outcome	
Admitted	91 (2.5)
Discharged	3526 (97.5)

	Admission to the eye service n (%) / Mean $\pm$ SD / Median (IQR)		p value
	Yes (n=91)	No(n=3526)	
<b>Age</b>	53(45-68)	40 (28-52)	<b>&lt;0.001*</b>
<b>Gender</b>			
Female	39 (3.2)	1162 (96.8)	0.055**
Male	52 (2.2)	2364 (97.8)	
<b>Admission time</b>			
Within working hours	41 (3.1)	1264 (96.9)	0.071**
Out of working hours	50 (2.2)	2262 (97.8)	
<b>Trauma</b>			
Yes	25 (1.5)	1617 (98.5)	<b>&lt;0.001**</b>
No	66 (3.3)	1909 (96.7)	
<b>Occupational accident</b>			
Yes	4 (3.8)	101 (96.2)	0.337***
No	87 (2.5)	3425 (97.5)	
<b>Other eye involvement</b>			
Yes	5 (2.1)	228 (97.9)	0.709**
No	86 (2.5)	3298 (97.5)	
<b>Presence of Foreign body</b>			
Yes	8 (0.7)	1190 (99.3)	<b>&lt;0.001</b>
No	83 (3.4)	2336 (96.4)	
<b>Additional consultation</b>			
Yes	8 (3)	260 (97)	0.610
No	83 (2.5)	3266 (92.5)	

## DISCUSSION

This study presents the characteristics of patients presenting with ocular complaints to a tertiary care ED. The rate of admissions due to traumatic ocular emergencies was 45.4%. Among non-traumatic ocular emergencies, the most common diagnoses were conjunctivitis (26.6%), subconjunctival hemorrhage (8.9%), and blepharitis (3.3%). The presence of a foreign body was the most frequent complaint, accounting for 66.9% of cases. In a cohort study conducted in the United States of America (USA), corneal abrasions (13.7%) and foreign bodies in the external eye (7.5%) were the most common presentations in the ED (Channa et al., 2016).

In a retrospective study conducted by Alshammari et al. analyzing records from 2019 to 2023, conjunctival disorders were identified as the most common ocular emergency, comprising 29.8% of cases (Alshammari et al., 2024). Similarly, a prospective study by Sridhar

et al. from 2010 to 2014, involving 5323 patients, reported viral conjunctivitis as the most frequent diagnosis (8.7%), followed by dry eye (6.6%) and corneal abrasion (6.6%) (Sridhar et al., 2018).

In Lebanon, a study conducted in 2012 found that the most common ocular findings in EDs were conjunctivitis (31.8%), subconjunctival hemorrhage (27.4%), and keratitis (6.6%) (Salti et al., 2018). In Saudi Arabia, a study aimed to determine the prevalence and various ocular diagnoses in patients presenting to ED. Among 868 patients, conjunctivitis was the most common diagnosis, affecting 282 individuals (32.5%), followed by dry eye (18.0%) and eyelid infections (12.0%) (Alabbasi et al., 2017). These findings are consistent with the frequent diagnosis of conjunctivitis observed in our study.

Another study from Saudi Arabia investigated the characteristics of patients presenting to ED and the patterns of ocular emergency cases.

Among 1412 patients, trauma was the most common diagnosis (27%), followed by conjunctivitis (14.9%) and eyelid and lacrimal system disorders (9.4%) (Alotaibi et al., 2011). In our study, the rate of admissions due to traumatic eye injuries was found to be 45.4%.

In a study conducted by Nanji et al. involving 774,257 patients, foreign bodies were reported in 16% of patients, conjunctivitis in 13.8%, corneal/conjunctival abrasions in 13.4%, and styes in 8.1%. More than 50% of the visits were related to corneal and external diseases, while complaints regarding the retina, neuro-ophthalmology, and glaucoma accounted for less than 10% of the visits. These findings are consistent with previous studies that suggest anterior segment pathologies lead to more frequent emergency visits (Nanji et al., 2023).

In ophthalmology, the timely diagnosis and management of vision-threatening ocular conditions such as trauma, infections, and retinal detachment play a vital role in determining patients' visual outcomes (Hsu et al., 2020). The provision of ocular care in emergency settings is of critical importance. A study conducted in the United States reported that nearly half of all eye-related ED visits were not associated with true emergencies (Channa et al., 2016). In a study by Kang, which evaluated 5422 patients, 21.5% of the cases were deemed non-emergent (Kang et al., 2020). Another study reported that only 25% of patients presenting to the ED had urgent medical conditions (Choi et al., 2006). Similarly, in the study by Sridhar et al., more than one-third of visits were non-urgent, with these visits being more common among women, individuals over 65 years old, and those with complaints persisting for more than a week (Sridhar et al., 2018).

In a nationwide study in the U.S. by Channa et al., analyzing 11,929,955 ED visits, 54.2% of patients were male with an average age of 31 years. The most common diagnoses were corneal erosion (13.7%), foreign bodies in the external eye (7.5%), conjunctivitis (28%), subconjunctival hemorrhage (3%), and stye (3.8%). Since these conditions do not typically

lead to visual impairment, they could be evaluated in eye clinics rather than ED (Channa et al., 2016). These studies highlight the misuse of emergency services and the unnecessary burden placed on these facilities. In our study, we did not classify patients as emergent or non-emergent. However, the predominance of non-emergent diagnoses among our cases aligns with these findings.

In the study by Jafari et al., the mean age of 2380 patients presenting to the ED was  $33.2 \pm 16.8$  years, with 75.6% of patients being male. Among the referrals, 9.5% were non-emergent, most commonly due to work-related injuries (30.3%). Additionally, 24.9% of patients were referred for non-urgent reasons (Jafari et al., 2012). In a study by Dag et al., 1.5% of patients presenting to the ED had ocular complaints. Of those referred to the ophthalmology emergency clinic, 27% were found not to have an urgent eye condition. This may indicate that emergency department physicians need to increase their knowledge and experience of ophthalmological diseases (Dag et al., 2024).

In our study, foreign bodies were found in approximately 66.9% of the patients who requested consultation. However, we found that the presence of foreign body was not associated with ophthalmology referral. It includes removal of the foreign body with a biomicroscope. It has been reported that foreign bodies pose a 6.5% risk of endophthalmitis and should be removed within the first 24 hours (Bourke et al., 2021). In our study, 8.9% of the patients were diagnosed with blepharitis, 3.3% with scleritis, and 1.8% with keratitis. These conditions, which present with red eye and decreased visual acuity, are typically manageable through examination and treatment in primary care or outpatient ophthalmology clinics rather than ED. In the study by Alabbasi et al. among 868 patients presenting to the ED, the most common diagnoses were conjunctivitis, dry eye, and nasolacrimal duct obstruction, indicating that non-urgent cases frequently seek emergency care. Managing such cases at the primary care level could significantly reduce the burden on ED



(Alabbasi et al., 2017). In our study, 66.8% of patients presenting to the ED were male, consistent with findings from other studies where the male population predominated (Channa et al., 2016; Jafari et al., 2012; Vaziri et al., 2016). We attribute this trend to the higher incidence of trauma and work-related injuries among men.

In our study, we found that the most common non-traumatic eye emergencies can be diagnosed and treated by the emergency physician. However, the core education curriculum of the Emergency Medicine Residency programme includes ophthalmological emergencies including skills such as foreign body removal, digital intraocular pressure measurement, and lateral canthotomy. We believe that emergency medicine specialists should evaluate and improve their self-efficacy in these skills.

### Limitations

This study has some limitations. Since the diagnoses were obtained from the hospital automation system, detailed eye examination findings of the patients were not available. In particular, it was not possible to clearly distinguish which conditions caused decreased visual acuity. Furthermore, since the doctors examining patients in the ED work in shifts, the emergency evaluation and referral of cases to ophthalmology is not standardized.

### CONCLUSION

In conclusion, the rate of emergency department visits and consultations was higher in non-traumatic eyes. Further studies in a larger population are needed.

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The study was conducted in line with the principles of the "Helsinki Declaration."

**Availability of Data and Materials:** The datasets from the current study can be obtained on request from the corresponding author.

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