

# Patterns of ophthalmic emergencies presenting to a referral hospital in Medina City, Saudi Arabia



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## Abstract

**Background:** Data are required on ophthalmic cases that present to the emergency eye clinics in Madinah, Saudi Arabia for proper allocation of healthcare resources.

**Objectives:** To determine the frequency and various diagnoses of patients presenting to the A&E at Ohud Hospital, Madinah, Saudi Arabia.

**Methods:** Data was collected prospectively for all patients who presented to the A&E ophthalmology clinic from June 2014 to September 2014. The data was analyzed and presented using frequency of incidence and percentages. Chi-square tests were used to evaluate the diagnoses based on age, sex and nationality.  $P \leq 0.05$  indicated statistical significance.

**Results:** The study sample included 868 patients. The male-to-female ratio was 1.1:1.0. The main age categories included patients  $\geq 45$  years of age (256 patients) and 251 patients between the ages of 15–30 years. Various types of Conjunctivitis was the most common diagnosis, reported in 282 patients (32.5%), and followed by dry eye syndrome in 156 (18%) patients. Nasolacrimal duct obstruction in 156 patients (18%). Eyelid infections were detected in 102 patients (12%), corneal abrasion in 102 patients (9.3%). Various eye traumas was diagnosed in 30 patients (3.5%), increased intraocular pressure (IOP) in 17 patients (2%), ruptured globe in 2 patients (0.2%) and various other non-emergency pathologies in the remaining eyes. There were no significant differences in patient's characteristics and categories of diagnoses.

**Conclusion:** Non-emergent ophthalmic cases were the most common reason for the ophthalmology emergency room visits. It was observed that most cases could be referred to outpatient departments and potentially be managed by primary healthcare providers. This would be more cost effective and will also allow for better management of vision threatening ocular emergencies.

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## Introduction

Ophthalmic emergencies include conditions that involve sudden threats to the visual system that if left untreated

can lead to permanent visual loss and/or severe threats to the visual function of patients. Ohud Hospital in Madinah, Saudi Arabia is a specialized center for Eye and Ear, Nose and Throat emergencies that serves Madinah city and the

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surrounding rural region. The Ophthalmology Emergency Department at Ohud hospital provides 24 h, 7 days-a-week dedicated eye emergency care. The ophthalmology unit provides care for many different types of urgent and emergent eye problems on a walk-in basis.

Ocular trauma has recently been highlighted as a major cause of visual morbidity.<sup>1</sup> Despite the fact that the eyes represent only 0.27% of the total body surface area and 4% of the facial area, they are the third most common organs affected by injuries after the hands and feet.<sup>2</sup> The World Health Organization (WHO) Program for the Prevention of Blindness, suggests that: 55 million eye injuries occurs each year, restricting activities for more than one day, out of which 750,000 cases requires hospitalization each year, which include 200,000 open-globe injuries. There are approximately 1.6 million people who become blind from injuries, and an additional 2.3 million people with bilateral low vision. Almost a total of 19 million people suffer from either unilateral blindness or low vision.<sup>3</sup> Hence, ocular trauma is the most common cause of unilateral blindness.<sup>3</sup> People are at different risks of ocular injuries, depending on their activities, jobs and the protective eyewear used. Apart from trauma-related injuries such as corneal abrasion, foreign bodies and penetrating globe injuries, other important ocular emergencies such as glaucoma, whose outcome varies significantly if treated in a timely manner.<sup>4</sup>

A previous study from Riyadh, Saudi Arabia of ophthalmic cases presenting to the A&E concluded that the majority of cases were non-emergent and could be handled in outpatient clinics. However, there were no data to date regarding ophthalmic emergencies in Madina region. This study analyzes the pattern of ophthalmic emergencies presenting over a 4-months period documenting the frequency and characteristics of ophthalmic cases attending the A&E at Ohud Hospital. To our knowledge, this is the first study to document such ophthalmic emergencies in this region.

## Methods

A cross-sectional survey was performed from June 2014 to September 2014 at Ohud hospital, Al-Madinah Al-Munawwarah, Kingdom of Saudi Arabia.

An interviewer-administrated questionnaire was used to collect data from all patients attending the ophthalmology A&E department at Ohud Hospital during the study period. The interview script was divided into two categories; the first was about personal data including the patient's age, gender and nationality. The second part was concerned with collecting information regarding present and past patients' history including source of referral, presenting complain, history of previous attendance and history of ocular surgeries. The data were obtained by open-end questions.

A chart review was performed to collect other data including, the attending physician, and category of diagnosis, provisional diagnosis and treatment. The diagnoses were divided into three main categories: trauma, inflammatory and infectious.

The ethics committees of the hospital approved the study. Each potential subject for the study received a thorough explanation of the purpose of the study and was informed that the enrollment is voluntary and whether they decided to participate or not would not affect the quality of health-

care provided. This study adhered to the tenets of the declaration of Helsinki.

## Statistical analysis

Data were analyzed using SAS version 8.2 software (SAS Institute Inc., Cary, NC, USA). The data collected were analyzed and presented using frequencies, numbers and percentages. Chi square tests were used to compare the diagnosis based on age, gender and nationality. Statistical significance was indicated by  $P \leq 0.05$ .

## Results

During the period from June 2014 to September 2014, a total of 868 patients were assessed at the emergency eye clinic at Ohud Hospital. Patients' demographics, diagnosis, ocular history, presenting complaints are presented in Table 1. Approximately one third (29.5%) of the study sample was 45 years or older while less than one-tenth (7.6%) were children aged 5 years or younger (Table 1). There were more males than females (25.4% versus 47.6%, respectively) (Table 1). The majority (76.6%) of patients were Saudis (Table 1). Twenty-six percent of the attendees presented with

**Table 1.** Demographics, ocular characteristics and history of patients who presented to Ohud Hospital with ocular emergencies.

Characteristics*	Number of patients (N = 868) (%)
<i>Age in years</i>	
≤5	66 (7.6)
>5–15	129 (14.9)
>15–30	251 (28.9)
>30–45	166 (19.1)
≥45	256 (29.5)
<i>Gender</i>	
Male	455 (52.4)
Female	413 (47.6)
<i>Nationality</i>	
Saudi	665 (76.6)
Non-Saudi	203 (23.4)
<i>Presenting complaints</i>	
Pain	218 (25.1)
Redness	163 (18.8)
Swelling	59 (6.8)
Pain, redness and swelling	226 (26.0)
Tearing	29 (3.3)
Decreased vision	44 (5.1)
Floaters	3 (0.4)
Flashes	2 (0.25)
Itching	42 (4.8)
Photophobia	11 (1.7)
Others	71 (8.2)
<i>Previous attendance</i>	
Yes	86 (9.9)
No	782 (90.1)
<i>History of ocular surgery</i>	
No	778 (89.6)
Cataract	56 (6.5)
Glaucoma	28 (3.2)
Retinal detachment	6 (0.7)
<i>Referral</i>	
Self	895 (97.3)
Hospital	18 (2.1)
General Practitioners	5 (0.6)

a combination of pain, redness and swelling (Table 1). Other presenting complaints included pain in 25.1% of patients and redness in 18.8% of patients (Table 1). Around 10.4% of patients had previous history of ocular surgery mostly cataract and glaucoma (Table 1). The majority of attendees (97.3%) were self-referred to the emergency clinic (Table 1).

Regarding the diagnosis of each case, 35% of patients suffered from ocular inflammation. Ocular trauma accounted for around 19.1% and ocular infections for 10.5% of the presenting cases as noted in Table 2. The professional diagnosis, however, showed that conjunctivitis was the most frequent eye infection (32.5%), followed by eyelid infection (12%; Table 2). Corneal abrasions were diagnosed in 81 patients (9.3%). Dry eye syndromes were professionally diagnosed in 156 patients (18%) and cataracts were diagnosed in 4% of patients while glaucoma was seen in 1.3% of patients (Table 2). Foreign bodies were diagnosed in 30 patients (3.5%), and ruptured globes in 2 patients (2.0%) (Table 2). The majority of the treating ophthalmologists were at the ophthalmology residency level in (87%) of patients. In addition, the majority of patients have received treatment (local and/or systemic) and were discharged (87%).

Table 3 presents the distribution of the study sample based on diagnosis and their socio-demographic characteristics. Although no statistically significant differences were detected, ocular trauma and eye infection were slightly higher among 5 years old or younger children. Inflammation was higher in children between 5 years to 15 years and in children aged less than 5 years of age (Table 3). There was no statistical difference in the category of diagnosis however, ocular trauma and inflammation were slightly higher among males (Table 3). The distribution of diagnosis by nationality

was not statistically significant, however, trauma was higher among non-Saudi patients and infection was higher among Saudi patients.

### Discussion

Most of the cases seen at the ophthalmic A/E in Ohud Hospital were non-emergencies. This finding was in agreement with other studies; a previous study of ophthalmic emergencies at KAUH, Riyadh, Saudi Arabia, in July 2010 concluded that most cases seen at ophthalmic A/E had non-urgent conditions that could be appropriately referred to outpatient departments or potentially managed by primary healthcare providers.

This study, presents the most common ocular complaints, diseases and conditions that presented at to the ophthalmology A&E in Ohud Hospital, Madina, Saudi Arabia. The analysis was carried out over the period of June to September, which is the annual summer vacation between school years in Saudi Arabia. There were a relatively high number of patients (868) compared to a similar study that recruited a sample of 574 patients at the University of São Paulo General Hospital in Brazil (2007, Jun 3).<sup>5</sup>

We found that trauma and inflammation were slightly higher in males (52.4%) than females. In contrast, a study from an Iranian eye referral hospital, reported a much higher attendance of males (75.6%) compared to females. The greater preponderance of males is likely due to the greater risk-taking behavior at an early age.<sup>8</sup> The differences between studies could be due to different demographic characteristics of the patients and the sample size.

In our study, trauma and infection were most common in children under 5 years of age, and inflammation was most prevalent among patients aged from 5 to 15 years. This observation may be due to the nature of activities at different ages. For example, children under 5 years understand very little about hygiene and may be more prone to contaminating the lids and ocular adnexa with soiled fingers. However, as children age, hygienic behavior is developed and children begin to play outdoors in the sandy environs of Saudi Arabia, which may predispose more eye rubbing tendency and greater preponderance of inflammation.

We also found that trauma was higher in non-Saudis and infection was higher among Saudi patients. Conjunctivitis was the most common diagnosis (32.5% of patients). This frequency of conjunctivitis in the current study is comparable to the 29.4% reported in a similar study from the University Of São Paulo General Hospital, Brazil.<sup>6</sup>

Trauma patients in this study accounted for 19.1%, which was lower than that reported for a previous study of ocular related emergencies in central Saudi Arabia (27%). Corneal abrasion was diagnosed in 9.3% of our patients. This figure was almost equal to the previous study conducted in Central Saudi Arabia (19.6%).<sup>9</sup>

Dry eye syndrome was seen in 18% of patients, which was higher than the 6.9% reported in a study from the Ophthalmic A&E of the Royal Victoria Eye and Ear Hospital in Dublin.<sup>7</sup> The difference between studies is likely due to the significantly different climate and weather difference between Saudi Arabia and Ireland. There were 12% of patients with eyelid infections, which is not greatly different to the 10.5% reported in a study at the University of São

**Table 2.** Distribution of ocular diagnosis and action taken at the emergency clinic.

	Number of patients (N = 868) (%)
<i>Diagnosis category</i>	
Trauma	165 (19.1)
Inflammation	304 (35.0)
Infections	91 (10.5)
Others	308 (35.4)
<i>Professional diagnosis</i>	
Trauma	30 (3.5)
Rupture globe	2 (0.2)
Corneal abrasion	81 (9.3)
Keratitis	16 (1.8)
Conjunctivitis	282 (32.5)
Lid infections	102 (12.0)
Cataract	35 (4.0)
Glaucoma	11 (1.3)
Nasolacrimal duct obstruction	13 (1.5)
Dry eye	156 (18.0)
IOP disturbance	18 (2.0)
Foreign body	30 (3.5)
Others	92 (10.6)
<i>Attending doctor</i>	
Residents	790 (91.0)
Specialists	74 (8.5)
Consultants	4 (0.5)
<i>Action at clinic</i>	
Treatment and discharge	755 (87.0)
Admitted to hospital	26 (3.0)
Referred	87 (10.0)

**Table 3.** Distribution by category of diagnosis and age of patients presenting to Ohud Hospital with ocular emergencies.

Parameters	Diagnosis category (Number of patients) (%)				P value*
	Trauma	Inflammation	Infection	Others	
<i>Age in years</i>					
≤5	15 (22.7)	27 (40.9)	8 (12.1)	16 (24.3)	0.67
>5–15	19 (14.7)	53 (41.1)	14 (10.8)	43 (33.3)	
>15–30	51 (20.3)	86 (34.3)	26 (10.4)	88 (35.1)	
>30–45	35 (21.1)	53 (31.9)	18 (10.8)	60 (36.2)	
≥45	45 (17.5)	85 (33.2)	25 (9.8)	101 (39.5)	
<i>Sex</i>					
Male	87 (19.1)	161 (35.4)	42 (9.2)	165 (36.3)	0.65
Female	78 (18.9)	143 (34.6)	49 (11.9)	143 (34.6)	
<i>Nationality</i>					
Saudi	124 (18.6)	232 (35.0)	74 (11.0)	235 (35.4)	0.70
Non Saudi	41 (20.2)	72 (35.5)	17 (8.3)	73 (36.0)	

\* P ≤ 0.05 is statistically significant.

Paulo General Hospital.<sup>6</sup> Foreign body was diagnosed in 3.5% of patients, and ruptured globe was diagnosed in 2.0%. Keratitis was diagnosed in 1.8% of our patients, which was significantly lower than the 17% reported in an Egyptian study.<sup>10</sup> The differences between study despite similar weather and environmental conditions could be due to differences in the size and distribution of the study sample.

Glaucoma was diagnosed in 1.3% of our patients and cataract in 4%. The frequencies differed from study of ocular emergencies in an Egyptian population 2011, where glaucoma was diagnosed in 5.6% patients and cataract in 2.6% of patients.<sup>10</sup> About 10.4% of the patients in our study had a history of eye surgery, mainly for cataract or glaucoma.

Almost all cases (97.3%) were self-referred which was much higher than in similar study from Central Saudi Arabia that reported 77.5% of patients were self-referred.<sup>9</sup> In this study, 87% of patients were discharged at the first visit, which was significantly higher than the percentage reported in the study in central Saudi Arabia at 27%.<sup>9</sup>

In conclusion, the vast majority of cases presenting to the A&E department at Ohud hospital are non-emergencies that could be managed in the out-patient department. Thus, mandating the implementations of a strict regulatory policy at the ophthalmology A&E department in Ohud Hospital, Madina, Saudi Arabia to avoid abuse and insure proper utilization of this important emergency facility. A well-designed public education program is also required to avoid self-referrals and to direct potential patients to the proper ocular departments.

### Conflict of interest

The authors declare that there are no conflicts of interest.

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